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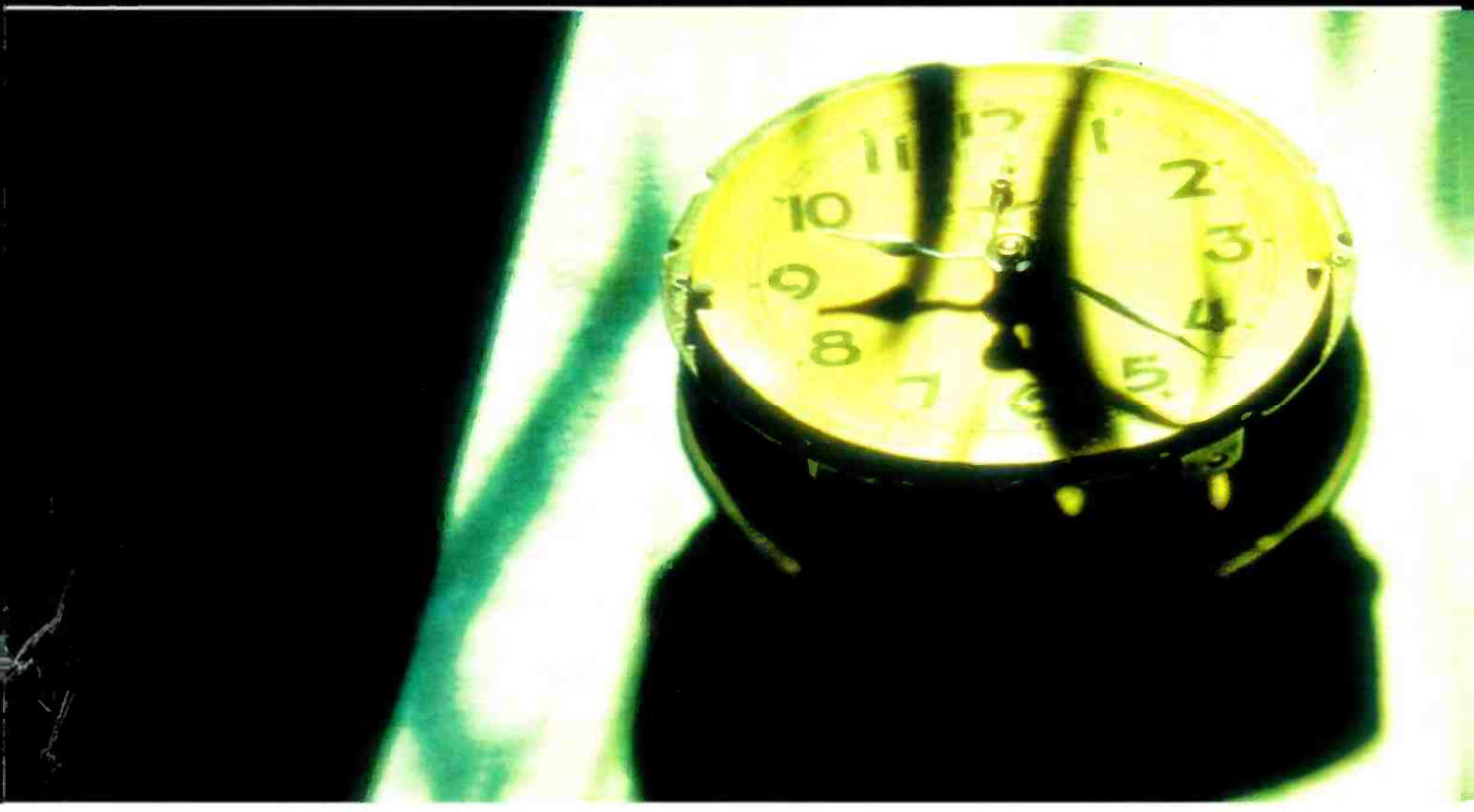

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Broadcast & Post Production

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THIS EDITION'S CONTRIBUTORS

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SUE SILLITOE has been writing about pro audio for so long that she suspects she must have been a mixing desk in a previous life. Apart from her three kids, her production credits include regular articles in *Music Week* and *Pro Sound News* as well as a review column for the Press Association.

WADE McGREGOR is a senior consultant for Barron Kennedy Lyzun & Associates, one of Canada's largest acoustical consulting firms. He began his professional audio career 20 years ago when he joined CBS to record symphonic music and radio drama.

Genetic engineering

God was he ugly–really ugly. I'd say about a foot and a half, maybe two feet tall, with huge hands and feet, and hopelessly tiny arms and legs. His head was enormous and his tongue trailed along the floor. But it was his genitalia that was really frightening...

It could just have been a bad dream but it wasn't. Instead, it was the model of a man used some years back by eminent British doctor and sometime comedian Jonathan Miller to illustrate a human male's psychological perception of his own body. For me, it was as enlightening as it was unattractive.

The principle of profiling human beings in accordance with some particular precept is neither new nor fully explored; it will undoubtedly play a part in many future academic presentations. It might also form the basis of an exercise in remodelling the human form in response to the requirements of the recording studio.

Having thought this through, I can assure you that it's a curious exercise. It has intellectual merit that it has no right to claim–after all, isn't a recording studio designed around the requirements of a human form? Isn't the equipment exclusively engineered to suit hands, ears and eyes in the arrangement forced upon us by Mother Nature?

LET'S START WITH HANDS. Two are fine but I have a conceptual problem with five fingers–wouldn't eight be more convenient? The whole principle of 8-track recording, 8-channel modularity and, of course, the 8-track modular digital recorder would make eight fingers of equal length an inarguable asset. The opposed thumb remains a prerequisite to humans learning to manage tools, of course, but if we had managed to neglect those thumbs when we were learning to count, we could quite easily have had a head start when hex surfaced as such a useful number base in computing circles.

Perhaps the most dramatic 'improvement' in the human form centres on the rearrangement of eyes and ears. Unfortunately, the term 'line of sight' as applied to the directionality of loudspeakers is rather literal and gives rise to conflicting requirements between optimum loudspeaker positioning and visual contact with everything from outboard equipment to a band on the other side of the glass. Of course, I accept that there are very good reasons to give our eyes as high a vantage point as possible and to keep both eyes and ears relatively mobile, but the drawbacks of the design in a studio setting are obvious.

From here on the argument moves gently from being less coherent to becoming ridiculous. Likely components for redesigning are arms (how long should they be and how should they be jointed?) and legs (which could optimally be replaced with wheels for traversing a large console–but wheels are not a feature of the natural world). The point, however, has been made.

Or part of it has.

Accepting the abstract nature of the exercise, the question remains: if studio equipment has been designed specifically for the human form, why it is so easy to identify discontinuities in the man-machine interface? Am I simply identifying difficult areas of the design problem and simplifying the problem or is there another factor at work here? Why, for example, are we having problems accepting an alternative to the established console format? It is relevant to quote the example of the Maltron alternative to the QWERTY keyboard? The Maltron was a design that was conceived to lessen the risk of RSI, Repetitive Strain Injury, as well as making typing more efficient. Sounds too good to be true. But no big computer hardware manufacturers appear to want it. The working patterns were set; progress was unwelcome.

On a lighter note, a human being optimised for work in a recording studio might find itself challenged by the musical instruments we now find familiar. Come to think of it, Jonathan Miller's model is strongly reminiscent of most of the musicians I know.

editor

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sound in

Netherlands: Paul Weijenberg Studios is the first audio postproduction company in Europe to install Yamaha's new digital mixing console, the O2R. The desk combines with the Akai DD1500, 16-track, hard-disk recorder to produce a fast and powerful audio workstation. This arrangement makes the studio suitable for Dolby Surround audio postproduction. For video playback there is a FED Video MOD nonlinear optical-disk video recorder. Almost 20,000 sound effects are accessible via a Pioneer twin CD jukebox, while communications are provided with the 128 kb/s CCS ISDN codec. Next month's *Studio Sound* sees the first part of Sam Wise's two-part bench-test of the Yamaha O2R

AMS NEVE changes hands

IN A SHOCK announcement embargoed until 19th February, AMS Neve told of its liberation from the Siemen empire. The company has been acquired, along with its family of companies and Rupert Neve Canada Inc, by Managing Director and AMS founder, Mark Crabtree.

The announcement claims that the company will 'remain a close business partner for Siemens who will continue to supply turnkey systems incorporating AMS Neve equipment'. TIM GOODYER

THE MACWORLD EXPO was hosted this year by San Francisco. Previously it has not been renowned for products of a pro-audio nature but there are always offerings from the bigger companies—and a few surprises.

With Apple exhibiting no new products, it was a case of bring in the clones. Power Computing launched its PowerWave range, three high-end machines boasting 604 processors at between 120MHz and 150MHz, at around a 20% discount on the Apple brand.

An even greater stir was caused by the news that UMAX Data Systems and Radius have formed a new company, UMAX Computer Corporation, and will be releasing the StormSurge 150 workstation and budget-priced Riptide around the middle of 1996.

Sony boosted its range of storage devices with the first 2.6Gb magneto-optical drive (SMO-F541), and an impressive 78Gb jukebox (OSL-6000), neither being for the cost-conscious. Also of interest was the Spressa CD-R drive with its 1Mb data buffer and bundled Corel CD Creator software.

Last December, Abbey Road chose Data Translation's Media 100 system for its multimedia studio. The big news at the Expo was the launch of the Media 100 qx PCI board and version 2.5 of the software, bundled with Adobe Premiere 4.2 to create a powerful Power-Mac-based QuickTime digital editing suite. Price is expected to be around $5,000 (US).

Macromedia continued its march into the audio production side with new versions of DECK II (v2.5) and SoundEdit 16 (v2.0). New features for DECK II include up to 32 tracks of 16-bit audio play-back on Power Macs plus enhanced file import and export, real-time, non-destructive editing and support for Premiere-compatible plug-ins—including Waves' new AudioTrack, with 4-band EQ and compressor, expander and gate facilities. SoundEdit 16 now has professional quality downsampling, input level control and over 300Mb of clip sounds.

With less than 40 real General MIDI sounds in Apple's QuickTime Musical Instruments extension, someone just had to provide a full set. Enter InVision with its Cybersound VS, the world's first software-only MIDI synth for the Mac. This includes over 50Mb of 16-bit audio (far more than any standard synth) and can deliver typically 24 to 32 voices—or 128 voices if you happen to have a Power Mac 9500 with 16Mb of RAM and bucket-loads of hard disk space.

VIC LENNARD

THE FIRST 1996 meeting of the Cinema Audio Society was held on 18th January, in the new Sony Pictures dubbing facility in Culver City, California. It offered a symposium on the trials, triumphs and some of the tribulations of Modular Digital Multitrack (MDM) technology for production and postproduction audio. The meeting, cosponsored

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by the AES, featured a panel of audio-for-film luminaries addressing hands-on MDM issues.

Five-time Academy Award nominee Michael Kohut, VP of Postproduction for Sony Pictures Studios and a CAS member, welcomed an audience of over 200 production and post engineers. Steve Hawk, CAS, moderated the discussion between the audience and a panel consisting of: Academy Award winner Jim Webb, CAS; Academy Award winner Mark Mangini; Academy Technical Achievement award winner Kim Waugh; Bill Johnson; Seven-time nominee Michael Minkler, CAS; Four-time nominee (Canadian Cinema Academy) Richard Lightstone, CAS; Dan Dilonardo; Mark Kaufman and Larry Blake.

While both the ADAT format with Alesis ADAT and the Fostex RD8, and the DTRS format with Tascam DA-88 and Sony PCM 800 were discussed, the panel made it clear that the DTRS system was the system of choice in the postproduction community. Studios have ADAT machines to accommodate tapes from music studios and some production audio sources, but the nuts and bolts post process is done on DTRS. Everyone also agreed that MDM is a convenient transfer medium from production through the dubbing stage and a great bridging technology until the audio manufacturers come up with interchangeable optical systems—with an emphasis on interchangeable.

The panel fielded questions from the audience ranging from proper levels and premix schemes for production audio to the sound quality of the DA-88 convertors. Sixteen-bit, 44.1kHz recording in general was applauded, but the wish list was for 20 bits and a higher sampling rate. Some recommendations from the panel were to not premix production audio, if possible; upgrade the convertors; and, most simply and importantly, properly label the tape. The label should include information on time code, sample rate and a detailed track sheet. This last point may sound like advice from the 'Duh, Yeah!' corner of audio, but the absence of thorough labelling is an ongoing problem. ALLAN VARELA

UK: Christopher Lambert's latest movie thriller *Northstar* takes him to the frozen north as both executive producer and leading man. The music was composed by the appropriately named John Scott [wrong pole—Ed] and was recorded with a 70-piece orchestra at London's Angel Recording Studios. Recording was via Studio 3's AMS Neve V48 console onto analogue 15ips SR tape and then mixed down to DA88 in Dolby stereo. Currently on release in France, the film opens in the US in April, and will be followed shortly by CD soundtrack release

News in brief

◆ Bombay's Sunny Super Sounds has chosen two pairs of Genelec 1035B active monitors as part of a major refurbishment which includes the installation of an SSL OmniMix. Based in Juhu Beach, Sunny specialises in recording and mixing music and dialogue for India's massive film industry.

Other recent Genelec sales include a pair of 1034As to Austria's MCP Records folk music studio and a further pair of 1034As to Samsung's mastering studios located just outside Seoul.
Genelec, Finland. Tel: +358 77 133 11.
Genelec, US. Tel: +1 508 647 4780.

◆ Nashville's Champagne Studios has installed an Audiomate automation system in its Neotek Elite console. Part of the PolyGram group, Champagne has already had the new system up and running with such artists as Kevin Mabry and Autumn Barr.
Audiomation, UK. Tel: +44 1207 529444.
Audiomation, US. Tel: +1 508 881 7903.

◆ Australian broadcasting operation, ATN-7 has upgraded all five of its AudioFiles to 16-output Spectras. From its location in Sydney, ATN-7 post a mixture of promos, 'infotainment' and drama including *Gladiators* and *Home and Away* for the Network 7 group.
AMS Neve, UK. Tel: +44 1282 457011.
Siemens, US. Tel: +1 212 949 2324.
Siemens, Germany. Tel: +49 6131 9460.
Audio Consultants, Kowloon.
Tel: +852 351 3628.

◆ Several British post facilities have recently committed to Yamaha's 02R digital console. BBC Wales have installed an 02R in a newly refurbished audio post suite in Cardiff to handle drama and feature production; NBC Superchannel are to install four consoles in a new Hammersmith facility where they will be used in conjunction with an Avid suite, a Quantel Edit Box, a Sony BVE 910 and Snell and Wilcox DVS 800.
Yamaha-Kemble Music, UK.
Tel: +44 1908 366700.
Yamaha, US. Tel: +1 714 522 9011.

◆ Saudi Arabia's first Axiom installation is set to be at ARA International. The console is accompanied by SSL's Disktrack and Audio Preparation Station, and will form the basis of a digital music recording and post facility.

Further Far Eastern activity for SSL sees Taipei's Premium Studio opening with a 48-channel SL9000j console complete with 48-channel Disktrack system. The new complex includes a MIDI preproduction suite with a refurbished SL4032 E-series console with G-series automation.

A further SL9000j has been installed in London's prestigious Sarm West as part of a major refurbishment designed by John Flynn and Sam Toyashima of the Audio Design Group.
SSL, UK. Tel: +44 1865 842300.
SSL, US. Tel: +1 212 315 1111 and +1 213 463 4444.
SSL, Japan. Tel: +81 1 3 5474 1144.
Diayoung, Korea. Tel: +82 588 3960.

◆ Two of Germany's largest state radio stations have taken delivery of Fairlight MFX3 workstation systems. Stuttgart-based SDR has opted for a 24-track MFX3 for its drama post studio; while Frankfurt-based HR has purchased an MFX3 Mini in readiness for completion of a preproduction room currently under construction.

A further European MFX3 has gone to the Swedish FilmMixarna AB post house as part of a digital upgrade programme.
Fairlight, Australia. Tel: +61 2 975 1230.
Fairlight, UK. Tel: +44 171 267 3323.
Fairlight, US. Tel: +1 213 460 4884.
STV Video Data, Sweden.
Tel: +46 8 714 0020.

◆ British OB operation, Arena Mobiles, is building a new 'flagship' vehicle around a Soundcraft B800 console. At 22 tonnes and 52 feet, the 16-camera Scania 113 truck will be the largest of Arena's fleet. Arena's clients currently include the BBC, LWT, Sky Sports and the Formula One Constructors Association.
Soundcraft, UK. Tel: +44 1707 665000.

◆ China Central Television has purchased a 72-input J-type console following a seminar given last May by console designer Clive Green. The purchase represents CCTV's commitment to improving the standards of broadcast programme in the Far East.
Clive Green & Co, UK.
Tel: +44 1582 404202.
Promix inc, US. Tel: +1 914 668 8886.
Wo Kee Engineering, Hong Kong.
Tel: +852 2774 2628.

◆ Canada's National Film Board has purchased five MS38 MkII MS stereo processors. The processors are to be placed in the Film Board's St Laurent facility.
Wes Dooley Audio Applications, US.
Tel: +1 818 798 9128.

◆ Irish National television broadcaster, RTE, has included a 16-channel Sennheiser UHF radio mic system as part of its £2.7m production studio refit. RTE's system employs two EM1046 receiver racks supporting 10 belt transmitters and eight hand-held transmitters. The project will provide a fully-digital 16:9 production studio capable of accommodating a 300-strong audience.
Sennheiser, Germany.
Tel: +49 51 30 600 366.
Sennheiser, UK. Tel: +44 1628 850811.
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Bloody computers!

The 1960s' prophesy that one day everyone would have a computer is now true. But it didn't foretell of the poor design and bad software authoring

Most people regard the history of aviation as pretty short but in comparison the history of computers is even shorter. Babbage aside, computing didn't really get going until the urgencies of WWII provided the fuel. Calculations of shell trajectories, design of atomic weapons and code breaking were all requirements of national importance which forced the development of computation almost regardless of cost.

After the war, most of the basic research was done, and all that has happened since has been to make computers faster, more reliable, smaller and cheaper. With the development of the transistor and then the chip this was inevitable. As the economics improved, mainframes gave way to minicomputers followed by personal computers then lap-tops. As a result, the PCs we have today are no more than a speeded-up miniaturised version of a WWII device. Although the technology has improved, with the exception of the transputer, no-one has bothered to examine whether the basic concept could be improved or whether what is offered is what people want.

When computers were expensive and uncommon, this was no big deal. Today the audio industry uses small computers extensively for instrumentation, console control, nonlinear editing, subcode logging and so on. Other industries are equally dependent, yet appear to have equally little say in what is available.

While the hardware architecture of most PCs is stuck in the mud, the most frustrating aspect of computers is software. Unlike almost every other branch of human endeavour, software (apparently) doesn't have to work. It appears to be acceptable for computer software to have faults such that the job it is used for takes longer than it should. It is high time that some discipline was adopted in software writing because at the moment it is hard to see how it can be classified as a profession. Perhaps because what goes on inside a computer is hidden from the user, software is regarded as a black art which users are fearful to criticise. In fact, the covert nature of software allows mediocre programmers to get away with murder because the cockeyed structures they have created are too well hidden to attract mockery. I have a feeling that computers even hide what is going on from programmers. Trying to visualise and develop a complex system via a single screen is akin to trying to appreciate the Tate Gallery by looking through the letter box.

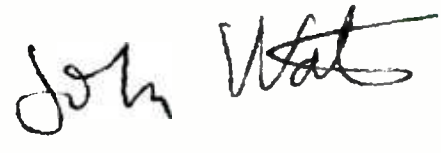
Software doesn't have to be ergonomic to operate or logically documented. Most software manuals are written backwards. In order to make the system do something, you have to find out what commands to use, but nowhere can you look up what you want to do and find the command you need. Instead the commands are described alphabetically. Such manuals are very good at confirming what you found out by asking someone else but useless for actually solving problems.

In the PCs themselves, it appears acceptable to lose data when the mains fails. 'Real' computers have power loss sensing and can recover perfectly from a power loss and come back to exactly where they were when power returns. As I earn much of my keep writing, I can't afford to lose data so I use a battery-powered machine which is constantly charged from the house current. But I still can't switch the thing off without going through an unnecessary close-down process following which more time is wasted while the thing thanks you for using it. Because startup and shutdown are such a chore, most people just leave the damned thing on all the time wasting electricity. Of course when travelling with a portable you can't do this because the batteries will give out.

MOST PCs are built to penny-pinching standards, with the result that little thought is given to the noise they make. The cooling fans and hard disks in most PCs produce far more noise than they ought to and it becomes fatiguing after a while. (This is another reason why I use a battery machine: there are no fans in it!) In the audio industry we can do without unnecessary noise and professional equipment is invariably silent if it has be used in a control room. I recently obtained a CLIO loudspeaker-testing package which uses a PC plug-in. While the features of the CLIO are just great, the acoustic noise made by the PC is a major problem. Upon opening the offending unit, it is clear that there are no fundamental reasons why it has to be cooled by a microscopic fan which has to scream round to move any air. It's just that nobody though, about it. Naturally I have tried to find a silent battery powered portable to put the CLIO in. Has anyone else tried to find a portable PC with an expansion slot? They appear to be about as common as rocking-horse droppings. I would have thought that with the number of instruments now available as PC plug-ins a one-slot lap-top would be a popular item, but it appears again that almost nobody has thought about it.

Manufacturers make what users are deemed to want, rather than what they actually want. Consequently, if you buy a lap-top because you can't stand the noise of the fans in a desktop machine, you have to make do with a lousy keyboard. In order to make the machine 5mm slimmer—which we are deemed to want—the key overtravel is eliminated and typing becomes a real drag. Now, in fact, what portable users really want is lightweight rather than ridiculously small size. An extra 5mm of thickness on a lap-top would give enough space for a proper keyboard without making it any heavier. It's really sad that an industry which has the power to make virtually anything confines itself to making universally detested products cheaper rather than better.

Unlike almost every other branch of human endeavour, software (apparently) doesn't have to work



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California dreamin'

Riots and historic murder trials may have conspired to distract the world's attention from the steady demise of Los Angeles' music business. The time is ripe for its recovery writes **DAN DALEY**

Whenever I stop by in Los Angeles, I make a point of calling Pete Anderson on the phone. It is rare that I actually get hold of him; between producing records for, and playing guitar with, California country star Dwight Yoakam and pursuing his own solo recording and touring career, Anderson has his time pretty well spoken for. But despite the low odds of reaching him on the first try, I think I call as much to hear the tag line of the outgoing message that's been on his answering machine for so long: 'It's a lovely day here in Southern California so have fun today.' (Beep...)

On a clear, 65-degree January day, Southern California can be terminally seductive. You can easily forget that there ever were riots here. You can forget about Rodney King; forget about earthquakes and mud slides, You can even forget about O J Simpson.

The sounds of surf bands, the Beach Boys, Jackson Browne, Linda Ronstadt and the Eagles come easily to mind, spanning the long Golden Age of SoCal musical culture. But the high gloss of that musical *La Belle Age* could not survive *fin de siécle* America, and everyone's impression of Southern California came to be viewed through a prism of social unrest, dismal economics and a dazed-and-confused music scene whose followers were bewildered that its claim to pop primacy could ever have been usurped by pretenders like Minneapolis and Seattle. And it was common to hear the put-downs from emigrating Angelenos who bad-mouthed their erstwhile abode as a sinking mess that would never see the light of the power lunch again as far as music was concerned.

IT MIGHT once have been believable–as Los Angeles' studio community became better known as the battlefield upon which the battle with the home-recording juggernaut was being lost–that LA was the ultimate playing field of pop. Yet apropos of its position as the mailing address of the American Dream, Los Angeles is once again reinventing itself and its music-recording scene, though truncated, is revitalising itself quickly and decidedly. I took a peek inside some of the city's major recording rooms during a recent visit, and it showed me that the city's studios have not ceded their dreams to either Nashville's moment of laid-back allure or New York's new-found hipness and significantly reduced homicide rate.

'Los Angeles is really coming back,' says Jeff Greenberg, the new CEO at one of the city's veteran facilities–the 28-year-old Village Recorder, which he's presently running together with the studio founder's daughter, Julie Hormel, and Consultant Producer-cum-Engineer Al Schmitt. The studio is getting a face-lift and some new equipment.

'LA got a lot of bad press, and things were tough for a while,' he admits, 'but it never got as bad as it looked on television.'

Nearby, The Complex, another long-established facility founded by 1970s supergroup Earth, Wind & Fire, was undergoing its own upgrade, adding a new SSL Scenaria suite that will bolster music-recording revenues even as its rehearsal stage hosted a new edition of Guns 'N' Roses.

'LA is still the world's capital of audio post and that includes music,' says David DeVore, The Complex' Studio Manager and Producer of 1980s rock act REO Speedwagon. 'This town has a lot of growing to do yet.' And over at Ocean Way-Record One, owner Allen Sides [interview, *Studio Sound*, February 1996] supervises the installation of a joined-at-the-hip pair of vintage Neve 8078s and a somewhat newer SSL 9000j console.

IT'S IMPORTANT to remember the pivotal–and simultaneously ironic–role that Southern California played in American, and by extension Western, culture. The area has created a few entertainment idioms of its own (remember that even the movie business started back East) but has consistently been the place many of them settled into when they start to get serious. Is it the palm trees (which aren't truly native to the soil)? Is it the abundance of plastic surgeons (the 700 registered in California are double the number in any other state and do 20% of the country's nip-and-tuck work)? It would take more than a column (and less than a book) to comprehensively explain Southern California's siren song for the music industry.

The Mamas and the Papas pictured in 1967 after Mama Cass had been cleared of theft by a West London magistrate. It was alleged that she had stolen 2 keys and 2 blankets from a London hotel

But what can be posited here is that its importance is undeniable and that it's reconstructing itself at a pace almost as rapid as the state itself. If Los Angeles has not always been the engine under the hood of the US recording industry, it has definitely always provided the chrome bumpers and lubricious hood ornaments of the business. Its studios benefited, then suffered, from the excesses of that egregious media mobile over the years. And like the happy endings that Hollywood has always favoured, the studio community in Southern California is back in its saddle again.

Wouldn't it be nice if the soundtrack overture to this comeback was already recorded on Pete Anderson's answering machine?

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It's a small world

Concealment is the key to programme protection, but concealment of the system's existence is more fashionable writes **BARRY FOX**

Remember Copycode? It was the system which CBS developed ten years ago to watermark analogue music. Copycode notched a narrow frequency band out of the music. The RIAA and IFPI wanted laws which forced all manufacturers of tape recorders to build in notch recognition circuitry. This circuitry would then stop the recorder making a copy.

The man at CBS who promoted Copycode was David Stebbings, 'ex' of the BBC and the Chartwell speaker company. He gave demonstrations of Copycode, including one at Abbey Road where we clearly heard the effect of the notch on solo piano. The US government ordered a test programme which Copycode also failed in pretty spectacular fashion.

After the Copycode fiasco the RIAA commissioned fresh work on watermarking by Bolt, Beranek and Newman. BBN developed a system it called BBN. The RIAA has refused to say how it works. When I asked the IFPI for information on BBN I was referred to David Stebbings at Sony Music in New York. The project, they said, was in his care.

Before I had the chance to ask Sony Music for information, the RIAA put out a statement. It had set up a new technology division that will 'examine encryption systems to be used for security and identification purposes'. With the new division comes a new Senior Vice President of Technology—David Stebbings. The biography which the RIAA sent out to the press somehow omits to mention CBS or Copycode.

The RIAA people were recently in London for a meeting with the IFPI. 'How did you find out out about the meeting?' was all the IFPI's Isobel Betsy would say.

So what exactly does BBN do? The RIAA isn't saying but one of the best things about Europe is that patents are published here early; anyone can read them and report what they reveal. And the BBN patent sure is revealing. I can well understand why the RIAA and IFPI would not want to help anyone from the audio industry find out how the system works. That's assuming, of course, that anyone inside the RIAA and IFPI other than David Stebbings understands how it works and the significance of its working. In short, what Sony's new DSD giveth, BBN taketh away, with a vengeance.

International patent application WO 93/12599, on embedded signalling, was filed in 1991 by seven people working for Bolt Beranek and Newman, of Cambridge, Mass. The object is to bury a string of digital code words in the analogue music signal so that the coded watermark travels with the music, regardless of whether it is recorded on a digital disc, analogue tape or sent over the Internet. The digital code is arranged as a series of digital words running at around 4.4kHz. The code represents the artist's name and the title of the music.

Simply superimposing this signal on the music would, of course, make it audible—perhaps even to a record industry executive. So the code words are spread wide and thin on top of the music, from around 1.9kHz to 10.7kHz. To make this 'spread spectrum' signal less audible, the encoder continually monitors the music signal and adjusts the level of the added noise to keep a constant offset between the music and the code noise.

With honesty that will surely come to haunt the RIAA and IFPI, BBN says the Embedded Signalling creates a 'composite audio signal which is not readily distinguishable from the original'. Elsewhere BBN says the 'distortions' caused by adding the noise 'do not significantly degrade the quality'. So the audio signal is 'essentially indistinguishable' from the original.

The system works on the principle of psychoacoustic masking. The sound of the music masks the sound of the noise. But systems like Musicam which are used to compress music, for example before it is sent through the Internet, also work on the principle of psychoacoustic masking. They save bits by throwing away any music signal which the ear will not hear. So they may also throw away the digital identification code which the ear is supposed not to hear.

This looks likely to present the RIAA and IFPI with a tricky dilemma. If the record companies make the code noise loud enough to survive compressed transmission, then the audio industry will say the original recording is unacceptable. If they make the noise code quiet enough to keep hi-fi buffs happy, the code will be lost as it travels down the Internet.

THE PRESS ASSOCIATION in London has come up with a clever new use for ISDN technology—it is expanding its text 'wire service' into audio.

The PA currently posts news stories on electronic bulletin boards for newspapers to pull off and publish, while the TV and radio stations use the stories as a basis for their own news reports. In late January, the PA launched Star Talk. Radio reporters tape interviews, edit the interview into a 2-minute package and store it on a hard-disk server.

Twice a day, the PA sends out a fax menu of around ten items that are new on the server. These faxes go to BBC and independent, local radio stations all round the country. Programme editors in the radio stations can then make an ordinary telephone call to the PA, and listen to any of the recorded packages on the menu. If they like what they hear, they dial in by ISDN line and use a personal identification number to download the package onto a recorder in the studio. The radio station is then free to broadcast the item, for instance during a news or current affairs programme.

As the stations broadcast only locally it does not matter if several use the same material. The PA's charges are quite low, only around £12 per two minutes.

But on the very day that PA launched the service some stations were already looking for ways to beat the system. I know, because I had recorded an item for the PA on the music industry's daft idea for making square CDs. I got a call from Viva, the radio station which launched with a mission to provide programmes for women. The nice young lady from Viva wanted me to go on the station's programme, and give an interview, 'just like the one you did for the PA'.

Would Viva be paying me? 'Oh no, we never pay for guests'.

I then started getting calls from BBC local radio stations with exactly the same request. Would I recreate the PA interview, but for no charge? Because my telephone number is unlisted, and the radio stations could hardly ask the PA for it, they had all had to scuffle around finding a magazine willing to pass on my number.

'The whole point of the service is that it saves local stations the leg work in tracking people down', said a puzzled PA.

Even more puzzling, the PA's service is on a two-month free trial. Local stations can temporarily access broadcast-quality packages by ISDN line for no charge. These stations are now so deeply rooted into the idea of scamming something for nothing that they were missing the legitimate opportunity to get something for nothing.

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Sleeping giants

In spite of Western preconceptions, Asia is neither a backward or overly accommodating market. The challenge to the West is clear but not readily recognised writes **PUSHPA VEERAPPAN**

It was a dramatic display of quiet strength; a distinctive portrayal of quality that could not be ignored. The whole exercise was a deliberate statement of confidence and inescapable presence.

It took place in a shophouse on a little street in Singapore. The scene was dominated by the dazzling traditional Chinese Lion Dancers. These dancers are frequently invited to perform their ceremonial dance on auspicious occasions such as this appeared to be—the opening of the new premises of Electronics and Engineering, a local contracted firm. But their presence was more significant than this.

While there was no escaping the magnitude of the experience, it was equally certain that there was just a hint of irony at play. The pomp and splendour of the traditional dancers washed against a backdrop of international elegance. The occasion was graced by top executives from major manufacturing companies from around the world. Dressed in the Western suits, these execs looked on in awe. The irony was in the fact that this was indeed a company embroiled in high-tech, state-of-the-art audio and cinema equipment.

The contrast was as stark as it was deliberate: the setting, the suits, the dancers, the equipment, the champagne, the lobsters...

If nothing else, the day marked the difference between the way in which cultural significance is attributed in different areas of the globe. But here was a a fast-emerging group of people who have transcended the language barrier, sidestepped the culture clash and revelled in a certain amount of success along the way. And while the description may not meet the demands of Western society, it is an accurate picture of the reality that is Asia.

In case you hadn't noticed, Asia is booming. Following the economic changes of the last decade, the world has been treated to an onslaught of opportunities from the East, and interest in the region has grown at something approaching fever pitch. For those who continue to regard Asians as a bunch of of undisciplined amateurs, a rude awakening awaits. Asia has developed an industry populated by bright graduates, brilliant thinkers and extraordinary salesmen that continues to address new areas of activity. On the face of it, Asians may seem as if they're marooned in some sort of distant vacuum. It has also been speculated that even if the territory is approaching commercial maturity, it will be unable to capitalise on it without help from the West.

Such thinking could not be further from the truth.

THE REVELATION that, in this staid and staunchly conservative land, there reside many industrial giants may be difficult to accept. The reality is that Asia has produced many giants that appear dormant and are capable of giving any Western establishment a run for its money.

One such giant is Electronics and Engineering, a Singapore contracting firm specialising in the professional audio and cinema industries. The company has had some 45 years' activity to its credit during which time it has grown from a modest two-man operation to employing over 40 people. Over the intervening years, the company has represented major names in the industry, and designed and installed sound reinforcement systems in the region's arenas and facilities. E&E has gone beyond the local boundaries and secured international accounts such as the string of Hard Rock Cafés. It has also installed sound systems in over 180 cinemas in the region.

Here, then, is a company whose outlook is rooted in commitment to product excellence and customer service. This is evident from its understanding of the wider implications of the marketplace, as it has been called upon to provide sound reinforcement systems for such prestigious events as Indonesia's 50th Anniversary celebrations and the South Eastern Federation Games held in Bangladesh.

Companies like E&E are echoed throughout the Asian region. They revel in their achievements and individual identities. It is interesting to note that, despite the rapid growth in the region, these companies have managed to absorb the technologies required while retaining the traditional outlook expected of Far Eastern businesses. The balance precludes the rehearsed sophistication of the West, trading on a new-found frankness.

To some it may seem that the development of the Asian audio and video industries is still in its infancy, but it would be wise not to assume that the entire marketplace is too young. In reality, the Asian region displays an unusual flexibility and originality. To the educated eye, there is a spread of character that makes sweeping generalisation both commercially and politically dangerous.

Increasingly, Asian manufacturers are realising that they need to establish a forceful profile within the region—but they also recognise that they have to carefully tailor their moves in order to play the Asian game to its best advantage. And the first element in this game is communication.

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Garwood RADIO STATION IDS

Devising equipment which causes a revolution in operating practices is enviable but it often carries a severe penalty. KEVIN HILTON examines the Radio Station problem–and its solution

IF A PRODUCT is first in its field and it continues to define its particular area even after competition appears, the problem for its creator is where to go from there? Some items that have changed little since their first introduction—Heinz faces heavy competition but is secure in the knowledge that as far as many consumers are concerned, to use the old advertising slogan, 'Beanz Meanz Heinz'. In much the same way, 'In-ear Monitoring Means Garwood', despite the presence of US competition and whispers suggesting that some major wireless microphone manufacturers are preparing their own spins on this technology.

Since it was first introduced at the end of 1992, the Radio Station has appeared on most of the big production tours—Peter Gabriel, Rod Stewart, David Bowie—and redefined how artists monitor what happens on stage during a performance. This aside, Garwood Communications could not allow itself to become complacent; even if the competition did not push the need for a next generation Radio Station, it would come through advances in technology, combined with changes in the legislation and allocation of frequencies made available to the operators of wireless equipment. The Garwood range has expanded in the past four years, with the PRS II (a lower cost relative of the original Radio Station) and the M-Pak (a hard-wired unit aimed at musicians who do not move around much and therefore don't need to take up a valuable radio frequency). But its creators knew that the flagship product had to move on.

The January NAMM Show in Anaheim saw the first prototype of a new approach to the top-of-the-range unit, the Radio Station IDS, which is due to appear in full production form this month. The main advance is the part abandonment of traditional RF technology, particularly in the processing, which now relies on high-tech synthesis.

'The IDS arises from comments we got over the years from users of the original Radio Station, concerning things they didn't like and things that they would like to see on any future products,' explains Designer and Garwood Director Martin Noar. 'These fell into two main areas: firstly, frequencies, because, as has been well publicised, countries have their own frequency allocations for entertainment, and, secondly, the limitations of the UHF wireless system.' The IDS system is made up of three distinct parts, all of which address the perennial problems of wireless communication: a 1U-high, 19-inch rack mounted Processor; the Active Antenna; and a belt-worn Receiver. The Processor is provided fully preprogrammed and usable between 510MHz–900MHz, thereby simplifying the selection of channels and allowing operators immediate access to the right frequency around the world, just by pushing a button.

'It's unfortunate that the usable frequencies for entertainment use are so spread across the band,' comments Noar. 'In the US it runs 517MHz–608MHz, but in the UK it's 854MHz–862MHz. Until now there were no units that spanned one band to the next, at least not without replacing modules or bolting on extra parts.'

GARWOOD'S SOLUTION to the problem has been to collect all the relevant information from the most popular touring countries and program the Processor with country names and the corresponding useful frequencies. The necessary information has been collated through Garwood contacting its European distributors, who have liaised with their local regulatory authorities, and by working with ASP Frequency Management in the UK and the FCC in the US. This data has been programmed into the new processor and can be retrieved via two buttons on the unit's front panel. 'The ultimate goal behind using synthesis was to easily achieve the storing of these frequencies, despite being told that it couldn't be done,' says Noar.

This application also allows the transmitter to simultaneously program any number of receivers to the selected frequency without any external connection. 'Programming from the transmitter has been made as simple as possible,' he explains, 'but we've also built in a feature for situations where one might have four or five receivers that need to be programmed with the same frequency. By putting the receivers into Program mode, and using a switch on the rear of the unit, you can automatically setup the receivers from the transmitter. At the moment there are dedicated receivers and transmitters but that is no longer the case.'

One of the original intentions of the Radio Station was to give greater on-stage mobility to the artist, combined with the increased artistic freedom for the production designer and technical crew. While these aims have been largely achieved, there are still limitations to the placement of the system brought about by the UHF wireless used in the aerial.

'Because of the inherent loss caused by greater lengths of the UHF cable, there are practical limits as to how long the cable can be,' explains Noar. 'Even using large-diameter, low-loss cable it doesn't give anything better than a maximum distance of 30m. Any more than this can cause a significant loss of power. With the flexibility in-ear monitoring has given bands, the stage sets have become more and more complicated and the best place for the aerial is not necessarily within 30m.' The losses experienced by all such wireless systems are caused by the distance between the transmitter and the aerial, which, at the moment, is restricted as to where it can be placed.

'In a lot of cases, the aerial really needs to be up the truss or round the back of the stage,' Noar points out. 'This means using special cables that are very bulky and have to be looked after. And they're still limited to 30m before signal loss.'

To get around this restriction, Noar developed the Active Antenna, which is based on integral RF, taking it away from its conventional home in the equipment rack. In doing this, Garwood has given technical crews the chance to change the traditional on-stage monitoring setup, where a rack unit is placed alongside the monitor desk and the engineers can plug into a local monitoring output before it is transmitted. The Radio Station IDS's Active Antenna removes the previously general limitation on systems by using coded audio, sent along with the DC power signal down a 5-core cable and inputted as a low impedance balanced line.

'This means that the same kind of losses incurred with radio frequencies are not experienced,' explains Noar. 'In this case the signal is treated almost as an audio signal, therefore stage boxes can be used.' The Active Antenna also helps reduce the problems of multipath dropout and intermodulation when multiple systems are in operation, when antennae are often placed too close together. With the older system, technicians had to carefully position the individual units to avoid such situations, as was the case on the last Rod Stewart tour, where 14 aerials (mounted on stands) had to be placed very carefully. The

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Antenna is powered from the multiplex output on the processor unit and conforms to US MIL-STD-810E military and UK IP66 specifications. By using this system, the aerial can be placed up to 300ft away from the main transmitter with no loss of power.

THESE ARE THE main changes to the Radio Station system, but improvements have been made to existing features, including the compression-limiting and the unit's integral noise reduction. The internal stereo compressor-limiter, based on a variable slope, can be easily bypassed if end-users wish to choose another system. This is also possible with the onboard noise reduction system, which, like those used in other wireless units, is based on compansion, although the IDS uses synchronised compansion as opposed to other forms.

'The Radio Station is a wide-band wireless system and as with any radio transmitter, there is noise,' concedes Noar. 'Compansion is used by 90% of radio mic manufacturers in one form or another and it works very, very well, although there is a certain degree of degradation to audio quality. We've used synchronised compansion to try and reduce some of the common complaints about noise reduction, particularly the "breathing" effect.'

The new IDS version will supersede the existing Radio Station, which will cease production once its successor appears in April. Noar stresses that the support structure for the original Radio Station will remain in place but he sees operators moving towards IDS in due course.

'What I see happening is that when someone next goes on tour, they will look at all their equipment,' he says. 'At that point the end users will see there are enough advantages over the current Radio Station to warrant an upgrade.'

In overviewing the changes to the Radio Station by adding IDS technology, Noar observes, 'As regards audio processing and the logistics of using the system, things have not changed a great deal. The quantum leap in technology really comes with the Active Antenna and in making a system that is truly integrated.'

As frequency spectrums have become more crowded the attention of equipment developers has shifted towards digital technology as a possible solution to present problems. A number of manufacturers, particularly in the field of wireless microphones, have been looking at this direction and while the Radio Station IDS could be seen as a first move, Noar is circumspect when it comes to the full implementation of digits.

'Bandwidth and legal problems are encountered when you start investigating digital,' he says. 'Digital transmission can be achieved by using data compression but the processing delays make it impractical.'

Such a major overhaul of a flagship piece of equipment has concentrated most of Garwood's energies, but there has still been time to address another set of comments from end-users. These came specifically from the theatre, where wireless microphones have become almost synonymous with the field; if it weren't for this technology, sound designers concede, most of the big shows currently running in the West End and on Broadway could not happen. While smaller mic heads have been developed so that they can be easily attached to a performer's forehead and lighter receivers can be hidden under wigs, the Radio Station's belt-pack has remained bulky, which looks fine clipped to David Bowie's belt but is a bit of a pain for someone taking the lead in a top musical.

The solution comes in the form of the LV1 receiver, which will be available as a special order unit. It is a small-scale version of the standard Radio Station belt-pack receiver but weighs only 65g rather than 220g. It has been constructed from tough ABS plastic and measures only 71mm(h) x 55mm(w) x 18mm(d). This pared down receiver features an on-off switch, ear-piece socket and volume control, with power being provided by one AA battery, which can run the unit for at least three hours. As there is no external aerial, the receiver can be easily placed in a small pouch or pocket. It is a single-frequency device and is preset at the factory onto a requested band. It can be used in conjunction with any current Garwood transmitter. The LV1 was also seen at NAMM in prototype form and will receive its main launch during March. The first full road testing of the Radio Station IDS was due to take place after the NAMM Show, although a slightly different form of the system has already had tour experience. French-Canadian warbler Celine Dion is a regular in-ear user and her crew requested a customised version of the existing unit. This used IDS technology but without the synthesiser. While Garwood has more or less reinvented its original, core product it has chosen to move into more general wireless territory with its next release. The ADA8 is an antenna distribution amplifier that can work with any radio microphone system and is designed to do away with the need for individual aerials on any number of receivers by actively splitting the received signal across two antennae. It can sustain up to eight diversity radio mics or 16 non-diversity units. The new device is used in conjunction with the also recently launched MA-10 masthead amplifier.

The new IDS version will supersede the existing Radio Station, which will cease production once its successor appears in April

Garwood has answered the 'where do we go from here?' question. Obviously it is a question that will have to be addressed again in the future but it appears to have produced enough new product and directions to keep its competitors busy for a while.

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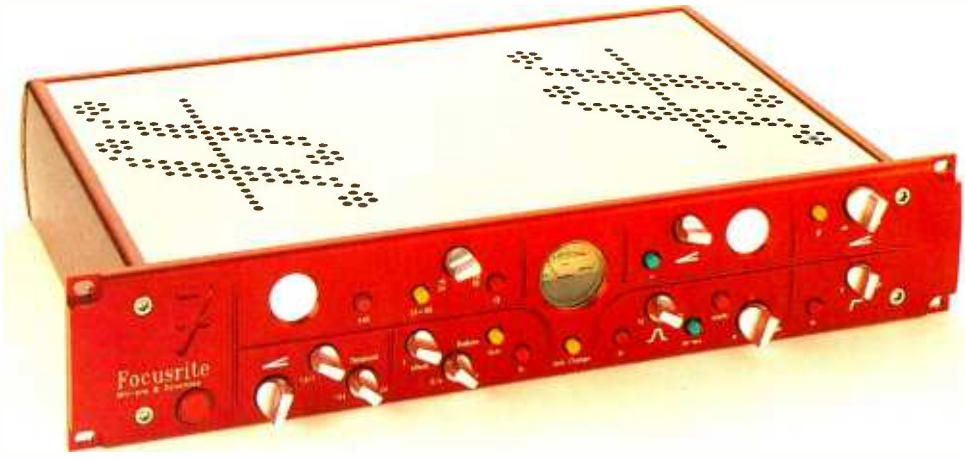
Focusrite RED 7

The Focusrite Red 7 extends the company's Red signal-processor range into the previously uncharted area of de-essing.

DAVE FOISTER checks out the latest preamp and finds a unit of uncompromising quality



BEFORE LONG we should be seeing the first fruits of Focusrite's forays into digital-signal processing—an unlikely concept, given the company's tradition of analogue design. Its emphasis has always been on well-engineered simplicity, with never a microprocessor in sight; Focusrite's idea of user memories is to provide front-panel drawings to be photocopied and drawn on.

And it is this tradition which is in play on the Red 7. Accepting the straightforward nature of what signal processors do, the only way to expand a range like Focusrite's Red range is to offer fresh combinations of recognised processes. Which is what the Red 6 and 7, among the more recent additions to the Red range, do. Both these models incorporate a microphone-line preamplifier, with the Red 6 adding a channel of EQ. The Red 7, under consideration here, takes the signal through a compressor and, unusually for Focusrite, a de-esser/exciter.

The preamplifier is classically simple yet still slightly more elaborate than those found on the Red 1 quad preamp. The microphone section offers no more than phantom-power switching and gain control, with a continuously variable control operating over two ranges as set by what amounts to a pad switch. The line side has only a centre-detented gain control, and switching between the paths is via two illuminated electronically-latched switches, which appear to be completely silent in operation. Signal level pre the large output-gain control is shown on the typical Focusrite round vu meter, and another familiar Focusrite touch is the scribble areas on both sections for reminders as to their sources.

The compressor again is pretty much as simple as they come. Fully variable controls are provided for Threshold, Ratio, Attack and Release, with an automatic programme-dependent option for the release time. Focusrite's controls never carry more calibration than absolutely necessary; the company understands the importance of knowing where unity gain is, but beyond that little is marked other than the end-stop positions of the controls, even that sometimes consisting of simply 'fast' and 'slow'. The whole compressor can be switched silently in and out of the signal path, and has a gain make-up control for matching its level to that of the uncompressed signal. The single vu meter can be switched to show gain reduction, often the only way of confirming the compressor's operation, so smooth and unobtrusive is it.

The most novel feature on the Red 7 is the de-esser /exciter section, which like the compressor can be switched undetectably in and out of circuit. Its controls are even simpler and more cryptic than those elsewhere, not helped by the manual's curious reticence as to what may be going on. A pair of switches selects between the two functions (they are not available simultaneously, although either may be used with the compressor) and two uncalibrated controls determine the result. One is marked like a band-pass filter control, and appears to set either the de-essing frequency or the lowest frequency at which excitement begins, while the other controls the amount of effect added. Those who feel slightly alarmed at the prospect of Focusrite joining the psychoacoustic fairy-dust club need not worry; the effect produced by the exciter is very subtle indeed. It is remarkably effective on suitable signals, such as voice and saxes, adding a bite to the sound which is clearly not straightforward EQ, but has no discernible side effects and is never extreme enough to become hard or unpleasant even in the wrong hands. Unfortunately, during my time with the Red 7 I never encountered anything which needed de-essing sufficiently to enable me to assess the process's efficacy, although its ability to notch out loud peaks at a given frequency was evident, as was its unobtrusiveness in the absence of such peaks.

The Red 7 offers fresh combinations of recognised processes

The Red 7's facilities are completed by a variable high-pass filter, continuously adjustable up to 330Hz and bypassed when not in use, and an overall PHASE REVERSE switch. All the controls feel smooth and expensive—which they presumably are, particularly as Focusrite pots usually come from Penny & Giles—and the whole thing is a delight to use. Sonically it is completely transparent when it needs to be, and behaves exactly as one would wish when performing any of its processes. Its intention is clearly to be an ideal signal path from vocal microphone to tape, as indicated by its choice of facilities, and for this use, as well as many others, it is hard to fault. Build quality is typical of the Red range and everything else from Focusrite, with its outrageously heavy front, back and side panels and stainless steel top and bottom, with the highest quality components inside.

You know where you are with a Focusrite unit, and you get what you pay for—uncompromised engineering and uncompromised quality. The previous Red modules have done well both in and out of the studio, with a rare blend of sonic integrity and roadworthiness, and the Red 7 seems sure to follow in their footsteps.

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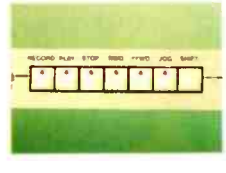

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Soundtracs DIGITAL DESK

As the 'affordable' digital console stakes are raised ZENON SCHOEPE gets an exclusive look at the prototype of Soundtracs' forthcoming desk and gives an insight into the design considerations

IF YAMAHA'S 02R proved one thing, it was how far ahead of the pack the Japanese giant was with affordable digital desk technology. Certain other console manufacturers candidly admitted that, at the time of its launch, they couldn't even build a similar desk for Yamaha's selling price. The console set the lower limit for the price differential between itself and the super-league of all-digital or digitally-controlled analogue boards with fully dynamic automation. And what a gap this is. Given that no manufacturer is presently able to mix it with Yamaha at the 02R price point, the scene is set for the arrival of 02R contenders. Most analogue desk manufacturers will admit, or at least pretend, to be investigating digital options. But it is Soundtracs that has broken cover first by showing its as yet unnamed digital desk at the Frankfurt MusikMesse. The fact that the console was launched at what is essentially a music fair underlines Soundtracs' urgency to show its hand even though at around £15,000 (UK) it is not a head-on attack at the 02R.

The tack taken is refreshingly different to the 02R and it aimed higher at a different wish list and a different set of expectations.

David Gibbons (left) and John Stadius with the prototype digital console

THE IMPORTANT POINT to note about this new digital desk is that its technology has been developed to provide the basis for a new generation of digital desks from the company which should see the Soundtracs name circulating in many different market sectors in the future. This first incarnation has applications for the project studio market but it is, perhaps, most at home in commercial music studios and postproduction. The desk uses a stand-alone approach requiring no external computer and comprises a rack of A–D and D–A convertors, a generous assignable desk control surface, which, interestingly, contains all the digital processing and connects to the the rack optically, with a monitor screen which reflects changes to desk controls and helps global visualisation of desk status. I'll mention at this point that the desk is reconfigurable via console setups for things like inputs and outputs in a similar way to high-end digital boards although Soundtracs is at pains to point out that it will come out of the box ready to go in an easy to understand and recognise configuration. Surround panning is planned as a future development.

> Soundtracs began to look seriously at building a digital desk towards the end of 1993 spurred by the availability of what it considered to be suitable DSP

Internally, the architecture is 32-bit floating point with 20-bit conversion on the outputs. In terms of I-O capacity, it has 32 mic-line inputs, 8 group outputs, 8 aux outputs, 16 direct outputs and an additional 16 basic inputs which can be used as 8 stereo effects returns or as monitor returns. Further, 16 channels of ADAT I-O can be plugged up digitally with full processing on the inputs. DA-88 interfaces will follow.

The simplest way to consider the desk is as a 32:8 (its default setup) but as already mentioned the configuration can be modified to work with larger multitracks or in different applications. The fact that an output socket is legended as a particular type of output is down to convenience and ease of use but its function can be changed. You are not expected or obliged to enter into the level of console configuration, indeed most won't even have a need to, but the potential is there.

Each of the fully featured inputs has access to a digitally-controlled remote mic preamp, 8 auxes, 4 fully-parametric EQ bands, and 2 dynamic-effects sections. Automation is total, and fully dynamic, employing touch-sensitive moving faders and is supplemented by snapshots. It syncs to SMPTE and MTC and offers MMC and Sony 9-pin control through a set of transport buttons. Channel presets can store custom default channel arrangements of processing to act as starting points for particular tasks such as dealing with a particular voice-over artist. The desk surface provides assignable hard control sections for such things as inputs and routeing, the EQ, the dynamics and auxes. The basic desk surface provides these panels and 8 faders which can be scrolled through to show all channel levels although this can be expanded in 8-fader blocks to a maximum of 32 faders.

The screen is bidirectional meaning that not only does it register control changes on the desk surface but also it allows adjustments on-screen via track ball to be reflected on the desk surface. The display is detailed and can be sized, zoomed and jumped-to easily, while the desk surface has loads of rotaries and switches and displays. They work together well.

SOUNDTRACS BEGAN TO look seriously at building a digital desk towards the end of 1993 spurred by the availability of what it considered to be suitable DSP. The DSP chips used in the console were the turning point for its feasibility, although the company will not at present reveal which chip it is, saying only that it is from a major IC manufacturer that has been involved in DSP before. It is understood that the chip has not actually been available commercially for very long but Soundtracs has been in close contact with the developers from very early on and is, consequently, seriously up to speed on it now so that it has employed it in a number of different versions of its digital desk project. Continuity in software was ☞

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Awaiting finalisation— Soundtracs' digital desk

provided by the team responsible for developing the automation packages for Soundtracs' Solitaire and Topaz consoles.

Looking at the desk's evolution through mock-ups and projects at Soundtracs is entertaining because it reveals a company venturing close to good ideas with confident regularity but being drawn inexplicably to what, in honesty, would have been total disasters if they had gone to market. It illustrates how fraught with danger the business of devising a digital desk from scratch can be. Soundtracs' sole involvement with the word digital to this point had centred around digitally controlled analogue in its assignable dynamics processor, and a more blatant assault on DCA with a 1U-high rackmount, digitally controlled Exiom mixer that appeared briefly at a trade show a year or so ago only to disappear and never be seen again.

Rumours circulated that a digital desk from Soundtracs was close at the time of last year's APRS and New York AES Shows, but nothing appeared. The company still hadn't taken the quantum leap in ergonomics that the new desk has over previous incarnations of the digital project.

To my mind, the 'Frankfurt' desk is extremely well though out, ergonomically sound and remarkably coherent, adopting a principle of assignability that is different from other rival implementations yet still clear. This desk is almost the antithesis of anything Soundtracs had previously attempted, pressed as if it was by the knowledge that it could not pursue the knob-per-function route and meet the target price. This desk is roughly the fourth generation of the project which began in the earliest attempts as a highly assignable trackball, touchscreen and touchscreen-fader control, surface arrangement operating a 10-channel mixer aimed at undermining the Yamaha Promix 01 in cost with a 24-channel option. It was followed by very futuristic-looking motor-fader variants again with touch pads. Soundtracs Technical Director John Stadius manages to retain a sense of humour regarding those early attempts, 'Everything was fully assignable and even if you knew what you were doing you couldn't understand it!' he says.

I regard the fact that I was shown the console that Soundtracs had almost launched, as a sign of confidence that they finally feel they've got it right. 'We did go off at a lot of different tangents at first,' adds Stadius.

The design team were undoubtedly helped by the processing side of the desk remaining relatively constant (the only modifications necessary were to release more horsepower). 'We had been working on an early version of the chip,' Stadius explains. 'And we'd been developing a lot of software for it and checking algorithms for EQ and dynamics but it was only after Christmas (1995) that we had this system fully working with everything integrated.'

Significantly, early generations of the desk were based around a controller and a plug-in PC card—but this was shelved. Soundtracs International Sales Engineer David Gibbons puts the abandonment of this concept into the perspective of the finished article.

'In the beginning the idea was that there would be a range of different boxes with different configurations of A–Ds and D–As, DA-88 and ADAT inputs and a range of controllers with varying amounts of control and any controller could run with any rack,' he says. 'We stood back one day and thought "Right, I've never seen this before and I'm supposed to able to decide what to buy? How will I able able to work out how many of each bit I'll need?".

Rumours circulated that a digital desk from Soundtracs was close at the time of last year's APRS and New York AES Shows

'At that stage we were also planning to allow the DSP to be bought separately so you'd also have to work out how much DSP you'd need. For the layman to work out what he needed to achieve what he wanted was just too difficult. We decided to look at it as a package that people could plug in and go.'

The exact nature of the product that will be launched at Frankfurt was only decided on 26th October and while a lot of board layout had been done several times already the breakthrough was in the design of the assignable surface as this is the make or break for any digital desk according to Gibbons. 'It really is crucial how you deal with the assignability and what the surface is

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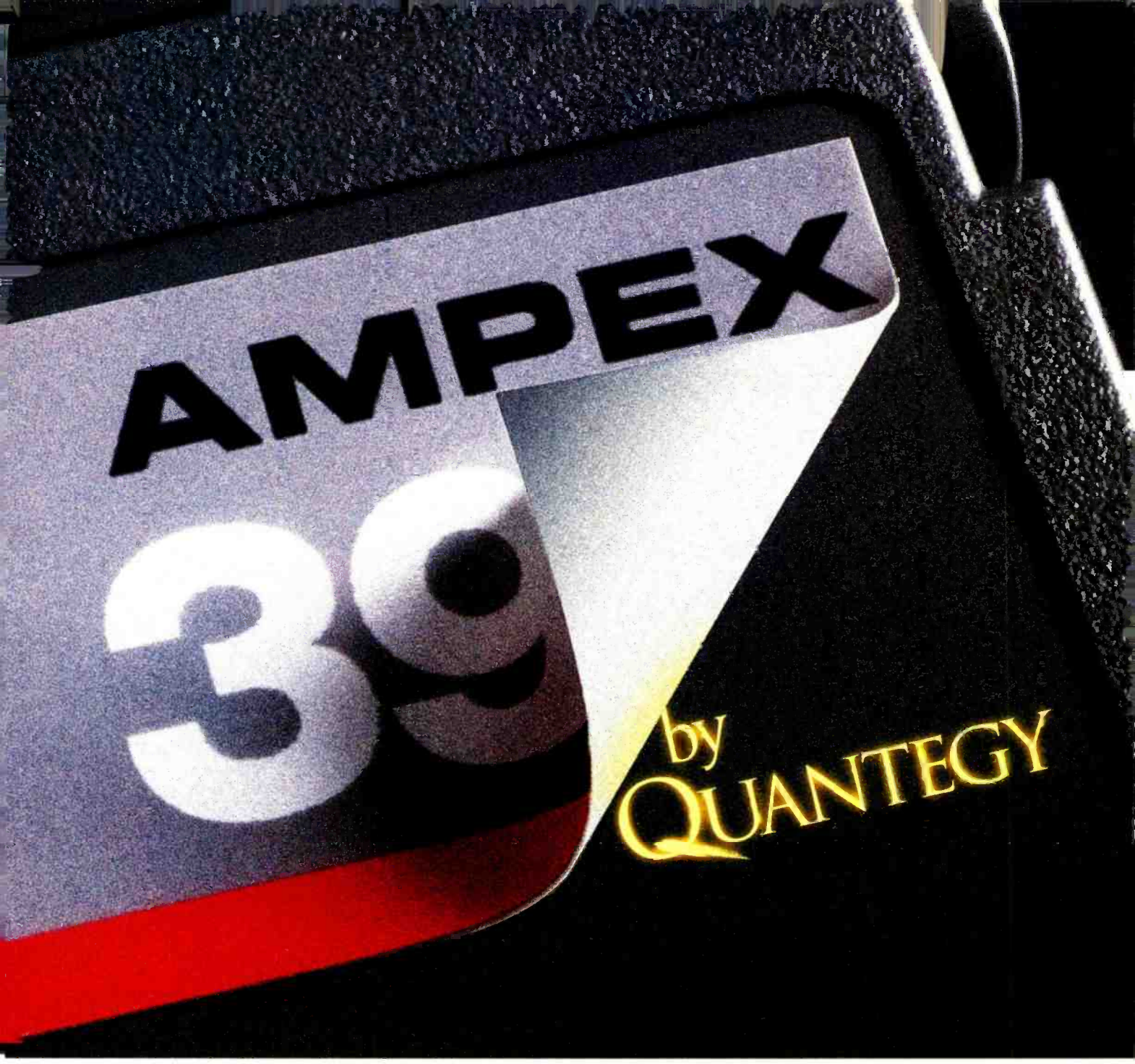

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like,' he says.

If the Soundtracs digital desk project proves anything it is that contrary to what we are led to believe a relatively small independent British console manufacturer can compete with the mighty when it comes to digital stuff.

'A company like Yamaha can design it's own DSPs and they can use components across it other range of products,' explains Gibbons. 'We can't do that but what we can do is be a little bit more agile and if we know we're on to something good we can get stuff together and get it out.

'We don't think that this is going to turn Yamaha's head—people will still buy the 02R for what it does and, let's face it, it's also cheaper. But there are people who are looking at the 02R in commercial studios and post because it gives them solutions that they can't find anywhere else for less than something like a Euphonix,' he continues. 'What we're doing is giving them those sorts of solutions for about £15,000 that is easy for professionals to use with a rugged control surface and the critical-mass number of inputs for the type of work they're doing.'

However, the arrival of the 02R was not without effect as it spurred Soundtracs into faster action in response to this attention grabbing product. Frankfurt was simply the next big exhibition to hang the new digital desk on. Music production studios are expected to account for 50% of sales, postproduction some 40% with the usual curios making up the remainder—although Stadius claims the potential of the concept and technology involved is enormous.

'There is no reason why you couldn't use the same processing for a broadcast mixer or a more full-size work-surface like on the Euphonix as the two sections are completely independent and connecting the two is just a matter of mapping changes on one to the other. In the future we'd be able to bring out new products a lot quicker than we could a new analogue product. It's taken us a lot longer than it would to design a comparable analogue desk and a lot more money but this is a very good stepping stone to the future for us.'

At face value, Soundtracs' project promises to yield a digital desk to plug the gap betwixt the 02R and AMS Neve's Logic 3

The question of whether this technology could become any cheaper does not illicit a response although the company's interest in going significantly higher to large-scale digital desks has already been implied. One thing is certain: the company's brief flirtation with digitally-controlled analogue will remain just that.

'Now that we're in the digital domain it's a lot easier to manipulate audio there,' states Stadius. 'There are fewer technical problems to deal with.'

PERHAPS ONE OF the strongest points of the Soundtracs effort is that a relatively small team of engineers is involved with the development and if they stay on top of it and don't get side-tracked by every single user whim, then the console should be extremely responsive to changes and enhancements. I can't hide a certain surprise and admiration that it should be Soundtracs that is next off the blocks in bringing digital-desk capabilities to the masses. I'm particularly impressed by the design and format of the desk, even in prototype it seems extremely well sorted. Small bits were still not firmed up but it was passing audio happily and doing pretty much all that was asked of it. It bodes well.

Taking it at face value, Soundtracs' project promises to yield a digital desk to plug the gap betwixt the 02R and AMS Neve's Logic 3. Most significantly, it employs the advanced principles of reconfiguration and custom setup that are desirable attributes of digital consoles but have previously only been associated with the top end.

Like the 02R, I suspect that the Soundtracs digital desk will create its own market. Expect to see a flurry of activity and gnashing of other manufacturers' teeth on a biblical scale.

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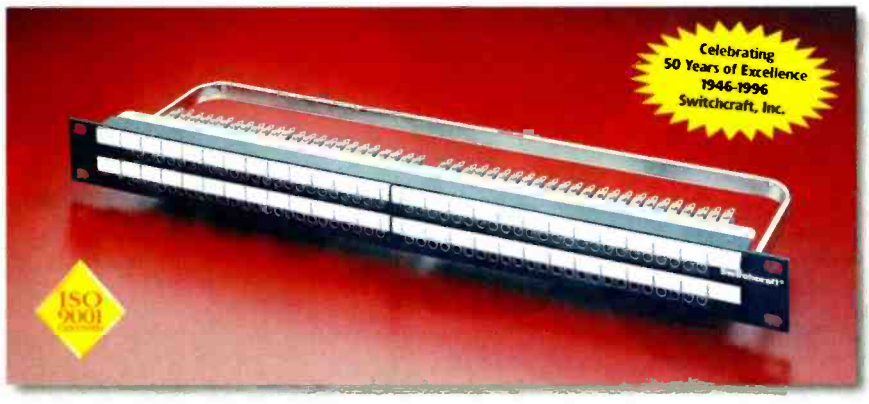

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Aphex MODEL 661

Combine elements of valve circuitry, with more recent electronics, add a little patented technology to a modular design philosophy and you have Aphex' latest compressor. WADE McGREGOR lends a critical ear

APHEX FIRST made its mark as an innovator in the field of audio enhancement with the Aural Exciter back in 1975. Its latest Aphex processor sidesteps the problems of choosing between valve sound and wide ranging control of parameters by taking the best functions of its compressor series and combining them with Tubessence. Thus, the single-channel Model 661 is a practical workhorse compressor with the choice of fully automatic or manual compression controls in addition to signal enhancing features.

The proliferation of valve-based compressors speaks strongly of the interest in creating an audible effect through compression that includes an enhancement of the sound quality

The proliferation of valve-based compressors speaks strongly of the interest in creating an audible effect through compression that includes an enhancement of the sound quality. To extract the audible qualities of the valve circuitry and yet maintain modern performance criteria Aphex developed Tubessence which was first introduced in the Aphex Model 107 microphone preamp.

Tubessence is a patented Aphex topology using the Reflected Plate Amplifier circuitry to operate the valve plate at less than 50V DC, and claiming benefits of a reduction in the Miller effect; shot noise; microphonics; and noise floor, while maintaining typical valve sound qualities such as the even-order harmonic overload characteristics. A notable side effect of the Tubessence design is that the Model 661 produces little heat from its single 12AT7 valve, and can be mounted adjacent to other gear in a rack with no danger of finding a puddle of solder inside the chassis.

The 661 is not a compressor that changes the sound quality just by passing audio, unlike some of the much more expensive valve units, but, when driven, mellow additions to the harmonic content make themselves known.

THE FRONT panel is thoughtfully laid out according to function. The controls for level adjustment Input (±10dB) and Output (±15dB), along with the threshold (-30dB to +20dB) are grouped on the left. In the middle of the front panel the Ratio (1:1–30:1), Attack (10ms–30ms) and Release (40ms–4s) following the switching for the soft-knee mode for decreased compression ratios near threshold, and the Easyrider automatic mode. The Easyrider function was first introduced in the Model 105 4-channel unit and uses a continuously increasing compression ratio (1:1–6:1) that is capable of musical output even with music pushing into >20dB of gain reduction. Ratio, attack and release controls are then disabled and these settings are varied relative to the waveform detected by the Easyrider circuit. In use you simply have to determine whether a slow (such as voices and bass instruments) or fast (such as percussion) time constant is preferred and you can get back to mixing.

There are several selectable features on the 106 specifically to enhance the sound of the compressed signal. A low-cut filter can be switched into the side chain to allow shorter attack and release times to be used without the low-frequencies causing pumping. A high-frequency expander brings back the definition that can be lost using heavy compression. Unlike some units, this is not fixed but can be set using the HFX Ratio control (Off, 0.1–1.0) and Frequency (2kHz–20kHz). The HFX controls provide dynamic EQ for dialling in the appropriate degree of expansion provided by the high-frequency shelving filter—this allows you to prevent exaggerated sibilance on vocals while still retaining the texture of acoustic guitar strings. An SPR switch adds an additional delay (**Fig.1**) to high-frequency signals in an attempt to compensate for the cumulative effect of previous stages in the audio signal chain that may have caused a delay in the low-frequencies relative to the overall signal. This feature may be unattractive to purists, so can be bypassed to give an exceptionally linear phase and frequency response.

Linking the side chain of most compressors usually includes sharing the philosophy of the manufacturer on the issue of control hierarchy. However, the Model 661 offers a choice of alternating switches to enable either Link (stereo) or Slave (master-slave) linking with three colours of LED indicator (including unlink) using a 2-conductor 6.3mm connector on the rear panel to connect between units. The former mode combines the control voltage for the three Aphex 1001 VCAs inside, while the latter mode disables the detection and controls of the slave unit.

Metering is displayed by a row of bright horizontal LED ladders, one selectable between input and output level (+12dB to -30dB), the other covering a gain-reduction range of 30dB. All the switch functions on the Model 661 have an LED indicator and those which alternate between functions have two different

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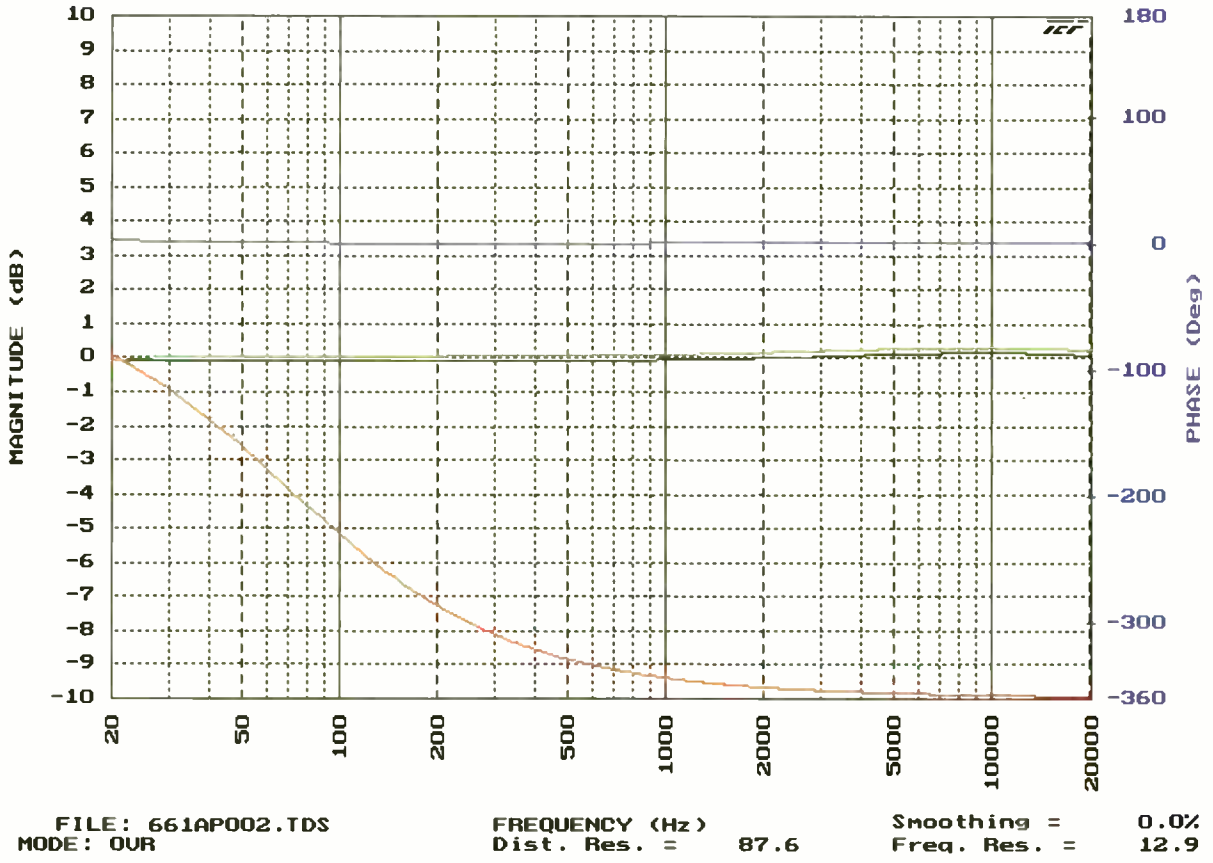

Figure 1: Aphex Model 661 Spectral Phase Refractor (SPR) mode is shown in green (frequency) and red (phase response) and, with this feature bypassed, in black (frequency) and blue (phase response)

coloured LEDs. A little familiarity with the functional layout and a quick glance will apprise you of the current setup. The knobs are grouped by function and quickly fall to hand, while the low-key panel graphics allow the legends to be legible even in the dim light at the back row of the venue or the corner of the control room.

The rear-panel audio connections are actively balanced and can be switched between a nominal +4dBu or -10dBV. In addition to the above mentioned side-chain link connection, there are two 6.3mm jacks for the unbalanced connection of an external device, such as an EQ for de-essing, into the side-chain audio signal. This side-chain processor can be engaged from the front-panel switch on the Model 661.

The build quality of the Model 661 is to a high standard and this should be a roadworthy valve device that needs little provision for its retro heritage.

APHEX HAS covered a lot of ground here with features drawn from the entire catalogue of the company's products. Anyone seeking a comprehensive single-channel compressor will find this unit meets their needs and those that want valve sound will be pleased with the additional harmonics generated by driving the Model 661 hard.

The Tubessence circuitry does not add the smooth silky sound quality of more costly valve compressors but can create an unmistakable valve richness in a less eccentric format that easily integrates into any processing rack.

The Tubessence design is that the Model 661 produces little heat from its single 12AT7 valve, and can be mounted adjacent to other gear in a rack with no danger of finding a puddle of solder inside the chassis

The front panel has been thoughtfully laid out, both in terms of visibility and functionality

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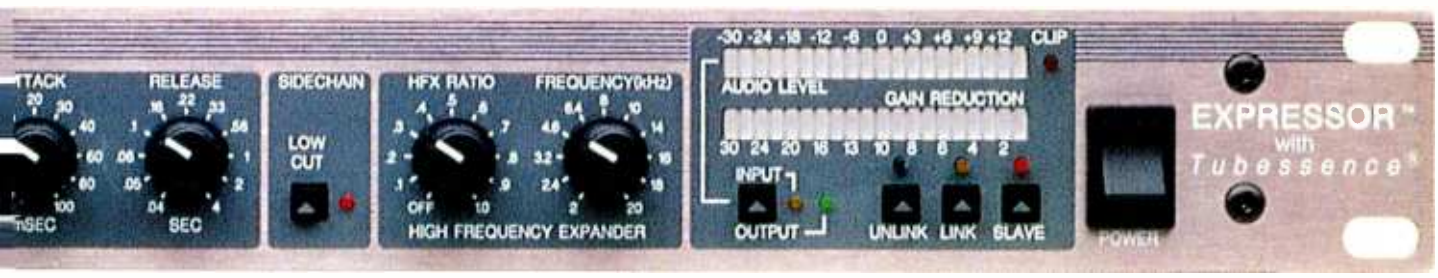

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ART PRO GATE

The modular, digital, 8-track recording revolution has opened the door wide to 8-track, modular, signal processing.

GEORGE SHILLING looks at an 8-channel gate with more than just the project studio in its sights

THERE'S NO DOUBT that 8-track digital videotape-based multitracks are to be taken seriously. You don't need me to tell you how commonplace they are in project studios and professional applications alike. It is no surprise, therefore, to witness an upsurge in the development of associated outboard equipment. ART, for example, has just released a 'full-featured 8-channel noise gate' aimed squarely at ADAT and DA-88 users. What I found though was something with a much wider range of uses than 8-track digital recording.

The ART Pro Gate Model 205 is a 2U-high dynamics processor containing eight, separate, analogue noise gates. The outrageous front-panel graphics of the companies earlier multieffects processors are gone in the interests of making this look like a professional piece of kit. The front-panel design includes almost all the usual gating functions but these are now digitally controlled—as such, there is only one set of controls and these are assigned to one gate channel at a time. Here, assignability is not the problem it can be on some consoles since setting up one gate at a time is all you need, even if you want to link channels together. You can also copy settings from one channel to another, although I was confused at first as the Pro Gate copies everything including the name of the channel. Having turned Channel 2 into 'Channel 1', I realised I could substitute the name of the instrument or part passing through it—groovy.

The unit's six rotary encoders are laid out like a typical, single analogue gate: HF and-or LF Tuneable Filters, Threshold, Attack, Release, Hold Time and Range. Values for all these parameters are displayed above the relevant knob in a 40 x 2 backlit LCD. Although you only see one of the filters at a time.

Audio connections are on ¼-inch balanced jacks, an uncommon standard in the UK but increasingly popular on American gear. You can use mono jacks, however, and you can choose between balanced and unbalanced termination. There is insufficient space on the unit for XLRs, so this economy is excusable. However, it is not immediately obvious that the balanced-unbalanced parameter option also switches the operating level between -10dBV and +4dBm.

There is also a 'non-destructive key listen audition' mono jack output. This is useful in a live sound situation, letting the engineer hear the key filters in operation. In a recording situation a button-press allows you to check the key via the normal output. Live engineers are likely to be big fans of the setting which locks nearly all the controls, letting the engineer go for a beer confident that the settings will remain unaltered. There are mono jacks for key inputs to each channel, and MIDI In, Thru and Out.

ART's Pro Gate Model 205 —taking advantage of the 'budget digital' revolution

Visual indication of gate operation is via a row of green LEDs which light to show when each gate is closed, situated above a corresponding row of red LEDs, one of which lights to indicate which channel is being edited. Below these is a row of channel buttons for such selection. Simple and elegant.

The Key Filter on the Pro Gate includes a 26-position, high-pass filter (25Hz–2.2kHz) and a 26-position, low-pass filter (250Hz–20kHz). These are good, powerful 12dB/octave filters. When switching between key sources the display shows that currently chosen (Int, Ext or MIDI) for a few seconds only. There is a key listen switch which operates on the 'current' channel, although if you have selected a MIDI trigger you get...silence.

THRESHOLD has 64 positions ranging from -50dB to +16dB; ATTACK TIME has 75 positions (20µs–500 ms); RELEASE TIME, 60 positions (3ms–4s); HOLD TIME, 69 positions (4ms–4s); and ATTENUATION DEPTH, (Range) 29 positions (-82dB–2dB). Unlike an analogue gate, settings are stepped instead of being infinitely variable. In practice, the steps are small enough for normal use.

Groups of eight channels may be stored as MIDI Songs for uploading and downloading. As well as the MIDI key source facility, the Pro Gate can send MIDI Note On-Off messages for triggering samples, thus giving you a basic audio to MIDI trigger facility. Unfortunately, this does not give you any velocity information, as a gate is either open or closed (Note On velocities of 127 and Note Offs of 64). This is still good news for MIDI aficionados, opening up all sorts of creative possibilities. For real MIDI boffins there's more: using any MIDI controllers, you can vary attack, hold and threshold values, and these changing values display themselves on-screen as you vary them. The MIDI spec appears to be good, with full implementation of SysEx dumping of settings.

IN USE the Pro Gate is excellent in nearly all respects. The display is clear and straightforward, and I hardly ever had to refer to the manual. That said, when I did read the manual it offered good explanations and schematics of different wiring connections; and lots of useful information for the less experienced. The MIDI section in particular is concise and easy to understand.

In terms of sound, the gate opening and closing is efficient, sounding very clean and Kepex-II-like rather than the sometimes clicky Drawmer when on very fast settings. I did find a problem linking channels: there is a sort of downloading effect and the more channels you link, the lower the output seems to get. I should mention, however, that I was using the unit in 'unbalanced' mode and also the effect is directly related to the number of channels linked

ART has made one omission; I admit that ducking is not something I use every day but it is a useful option. It is useful for a number of unusual effects, as well as practical stuff like switching on a talkback mic between takes, with it ducking off the time code.

The Pro Gate is, however, well thought out and boasts impressive maximum input and output levels of +21dBu, and dynamic range a huge >115dB. I am sure it will be popular in its intended markets and also live sound, film sound and broadcast. Perhaps it is not as 'pro' as ART would like you to believe but the Pro Gate has many potential users.

CONTACTS

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For some studio owners, only one console is good enough.

"I have recorded over 400 albums in the last 25 years and in that time I have worked on virtually every console imaginable. To me, sound quality is everything. Great low end impact, effortless open top end and exceptional overall clarity are not qualities I normally associate with modern consoles. I am not easily impressed, but to my amazement, the SL 9000 exhibits all these attributes. The second I put up a multitrack tape I was familiar with, I was knocked out."

"The SL 9000 just sounds great, period."

Allen Sides, Ocean Way Recording, Hollywood.

SL 9000

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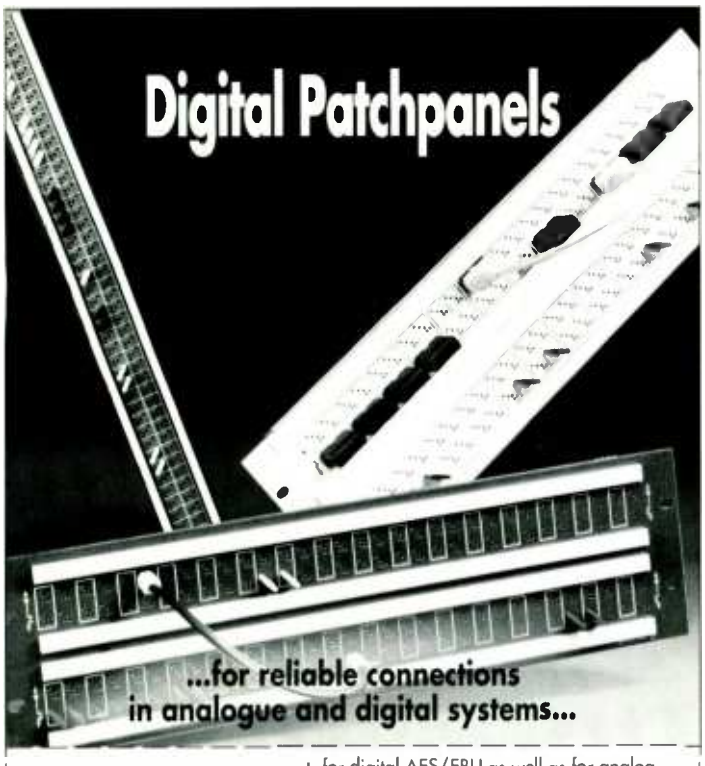

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Inward Connections VAC RAC

The intimate link between fashion and music can often lead to compromise when selecting instruments and equipment. DAVE FOISTER discovers that some units can perform as well as they look

THE RETRO movement shows no signs of losing momentum. Valves, it seems, are back for good, no longer a novel throwback but a routine element in our equipment complement, with the valve sceptics now occupying the same ground as the transistor sceptics must have done in the early days of solid state design. Despite the wide acceptance of the returning technology, however, valves are still an excuse to use eye-catching styling evoking memories of the equipment of decades ago.

So it is with the Vac Rac range of modules from Inward Connections, where careful (and not inexpensive) valve design is contained within a housing which would not look out of place in a wartime radar room. The system comprises a 3U-high rack which can accommodate up to four modules alongside an on-board PSU or six with a separate rackmount supply. In both cases, the large toroidal mains transformer is housed separately, connected to the rack by a stout multiway cable. Here, even the power supply eschews more modern solid-state circuitry in favour of three Russian valves. And two valves used in each module as well, it is hardly surprising that the actual rack space required for the system is in most cases 1U more than the height of the rack, as the amount of heat produced needs a grille above to let it out. The grille is supplied as standard with the rack, and forced cooling is provided by a small, very quiet (although still audi-ble if not carefully sited) fan in the rear panel.

The stimulus for the system came from Steve Barker, a classical engi-neer in search of the ideal mic preamp, in conjunction with Steve Firlotte of Inward Connections, who has built custom electronics for many top audio facilities including his SPA690 discrete op amp. Design and field testing went hand in hand, leading to the development of the TMP-1 microphone preamplifier central to the Vac Rac system.

THREE MODULES are available for the rack to date. First up is the aforementioned microphone preamplifier, designed for maximum signal quality with the minimum of frills, although all the essentials are there. Coarse gain and fine trim are dealt with by two large black knobs, and in common with many of the Vac Rac modules' controls these are switched attenu-ators rather than detented pots. Often with such controls the trade-off is stiffness in operation, but the Vac Rac knobs are quite light to turn.

> The first challenge to the European user is that all the switches are mounted like American light switches, that is to say upside down

Other functions are selected with large toggle switches, and the first challenge to the European user is that all the switches are mounted like American light switches, that is to say upside down as far as anyone else is concerned. Thus the phantom-power switch must be up to be on, the pad switch must be up to be in, the phase is reversed when its switch is up, and so on. The legending is quite clear, but it goes so violently against the intuitive grain for this Brit that it took some getting used to. The final switch selects a front-panel, high-impedance, line-level jack input instead of the rear-mounted microphone XLR, making the preamp suitable for direct injection of instrument signals.

Above all the switches is the signal level vu meter, a wilfully dated design made specially for Inward Connections. It looks as if it should be illuminated but isn't. It is, however, so clear, being a non-standard white instead of the regulation shade of yellow, that this hardly matters. At the bottom of the module, completing the 1940s military look, is a handle for pulling the module out of the rack. At the rear are plugged holes for further options, which include remote fader operation, for which a special P&G-equipped panel will be available, and insert points. With the inserts option comes a solid-state all-discrete additional gain stage, Steve Firlotte's SPA690 op amp, bringing the maximum gain of the preamp up from 53 to 73dB.

THE SOUND of the preamp bears out some pretty impressive specifications. The unit is extremely quiet and transparent, and almost impossible to overload, with a maximum output level of +30dBm at 0.15% distortion. This is in all respects a preamplifier worthy of inclusion in any rig, however specialised and esoteric, making as good a path from microphone to tape as I have heard.

Augmenting the preamp is the TLM-1 valve limiter, sharing both the aesthetic design and the complement of two valves and offering simple effective limiting. Only

The Vac Rac comes in a housing that would not look out of place in a wartime radar room

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two controls are provided, one for gain and one for gain reduction, and the meter—the same retro design as on the preamp—can show either output level or gain reduction. A 2-pole jack on the rear allows stereo linking of a pair of TLM-1s, switchable on the front. No attempt is made to offer level calibration, and the gain make-up controls are active even in bypass, so for protective use of the limiters careful setup using external tones and meters is advisable. My experience was that the on-board metering was very accurately calibrated and that it was easy, for instance, to set up a brick-wall threshold to a DAT machine that the most dynamic of material could not overshoot.

The obvious test of the system was to drive the preamps straight into the limiters and thence to tape, and the result was very impressive indeed. Like the preamp, the limiter has huge headroom and a complete neutrality of sound, the gain-reduction meters often being the only outward sign that limiting is taking place. Even quite large amounts of limiting have surprisingly little effect on the perceived sound, and the sight of the preamp meters pegstopping and the limiter meters ducking wildly while an apparently clean sound emerges is a bit bizarre.

The Vac Rac's mic preamp module

The third currently available module is the TII-1 DI box (or Instrument Interface as the front panel says) featuring, again, two valves and rather more facilities than normally found on a DI. The instrument input is a two-pole jack on the front, and two loop-through jacks are provided, one linked directly to the input and one with a switchable signal path—straight from the input or after one or both of the buffer stages. This output is marked as being 'to amp' but can equally be used to feed line-level signals to a desk, albeit unbalanced. Only the second buffered setting appears after the front-panel controls, the other being tapped off independently and adding a little gain and a touch of fullness to the sound when compared with the straight loop through. The other output is on a rear-mounted XLR, and in true DI fashion carries a microphone-level balanced signal, with a maximum of 25dB of gain available. The front- panel output jack offers substantially more gain, and scores slightly over the microphone-level output in being a bit quieter—although that may have been the effect of the mic amps I was using to bring the low-level output up.

No less than four of Inward Connections' bakelite knobs appear on the front, giving control over input level, output level (although with no meters or peak indicators) and simple bass and treble adjustment. The tone controls are remarkably useful despite their simplicity, with a warm musical character and an effective range. A troublesome double-bass pickup, which when DI'd conventionally into my console needed various frequencies notched out of it, smoothed out easily on the Vac Rac front panel EQ alone, perhaps a tribute as well to the very high input impedance (5MΩ) which is probably better matched to such pickups than many DIs. My usual DIs have a similarly high impedance, and it always gives a noticeably better sound on this kind of bug.

The nature of this DI poses some interesting questions, in common with one or two other powered DI interfaces available. Normally a DI box lives in the studio with the musician, playing its simple part without any intervention and allowing the musician to loop through it into an amplifier. A unit such as the Vac Rac must surely be sited in the control room, giving the engineer access to its controls, but this means feeding unbalanced high impedance signals from the instrument in the studio to the DI's front panel and then back again to the musician's amplifier —not an ideal situation. If the tie-lines are available, however, and the distances not so long as to give losses or hum problems, this DI is worth the trouble of setting up as it offers a good deal more than most and gives a useful bit of extra control that would be hard to duplicate in another way.

Construction of the whole system is every bit as rugged as its military appearance suggests. All the framework is made from heavy-gauge steel, and the modules fit smoothly and positively into the rack. All the audio connections are on the rear panels of the modules themselves, which appear through the back of the rack, while power is supplied to them via small D-connectors on a rail below. The fit of the parts is so accurate that sliding the modules in and out never gives problems with the Ds mating or anything failing to line up. Internally, the construction is of a very high calibre, with the valves sitting oddly on a clearly computer designed and printed board.

The Vac Rac's kind of deliberately dated styling sometimes risks alienating potential users as it can suggest that image is more important than content; this is certainly not the case with the Vac Rac system, which provides a rather special signal path which I found myself using at every possible opportunity. More modules are in the pipeline, including a 15-band valve graphic and a 3-band solid state parametric as well as Pultec copies, and on this showing I look forward very much to hearing them.

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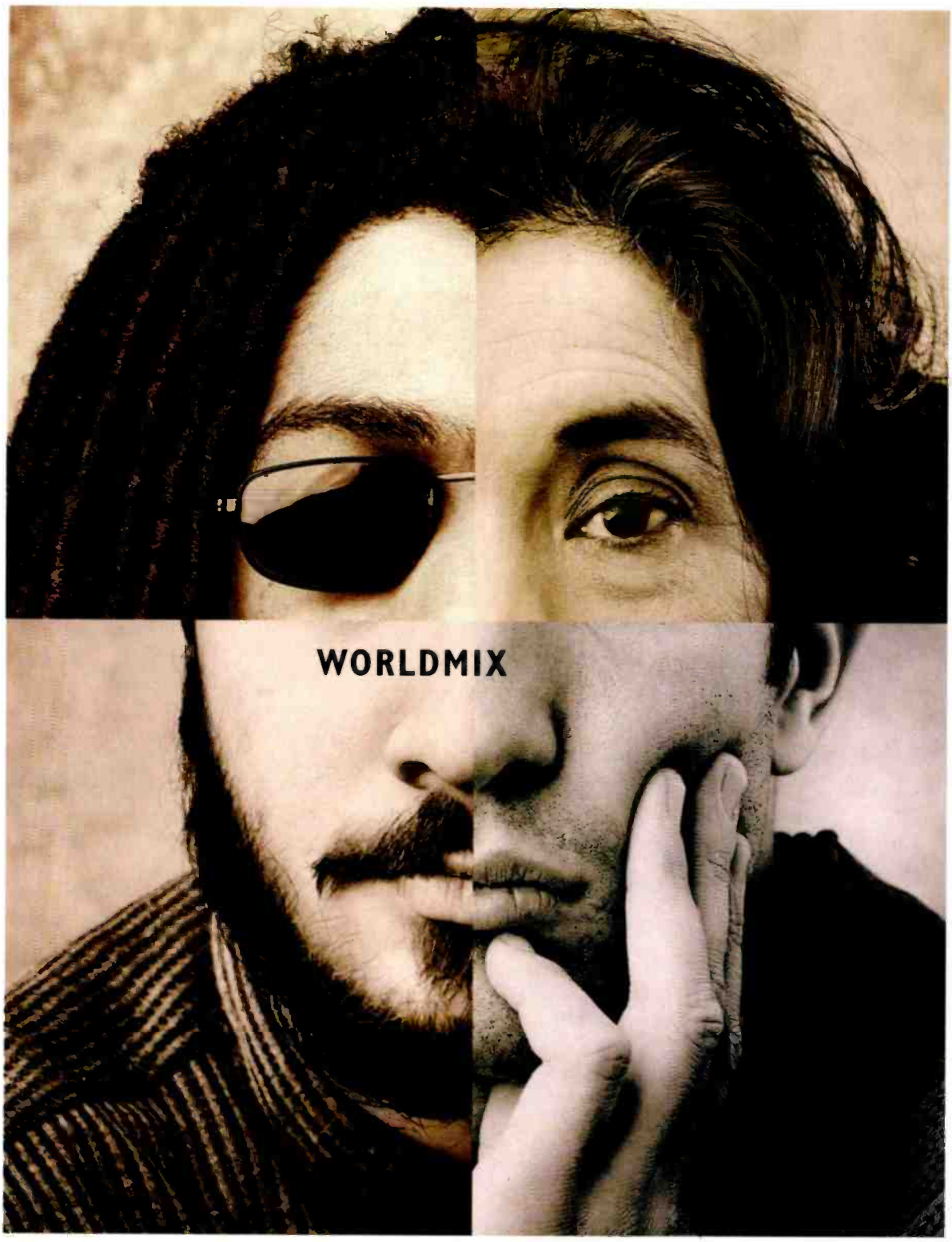

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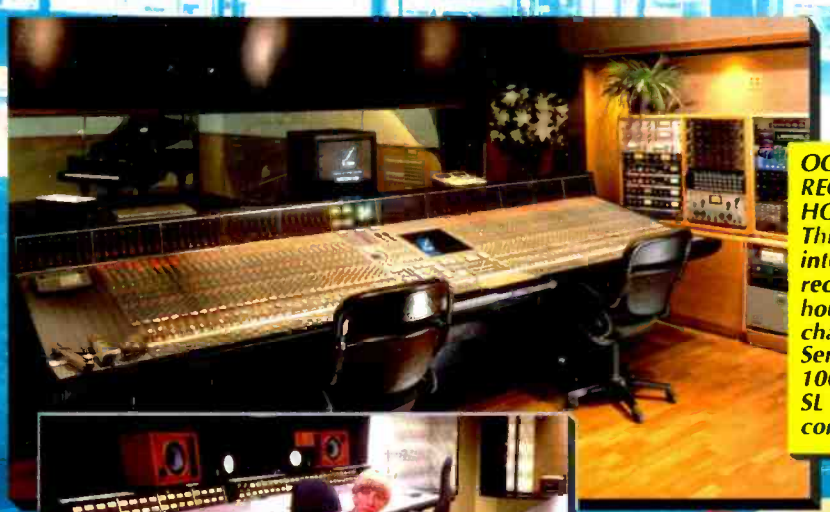

OCEAN WAY RECORDING, HOLLYWOOD
This prestigious international recording centre houses this 80-channel SL 9000 J Series, as well as a 100-channel SL 8000 G Plus console

ROYALTONE STUDIOS, HOLLYWOOD
Owner Delight Jenkins with the new SL 4000 G Plus in Studio B

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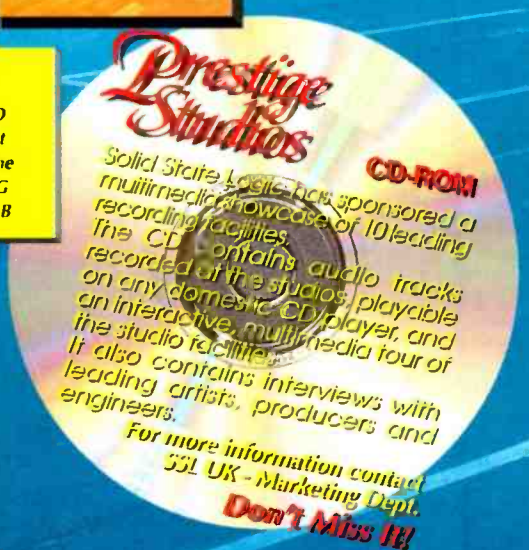
Scenaria® installed in this state-of-the-art post-production and network operations facility



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Solid State Logic

Broadcast & Post Production NEWS

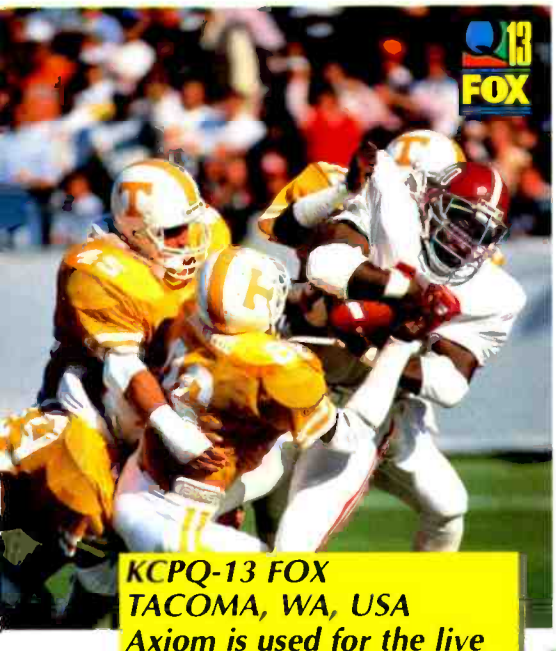
LE BROADCAST PAR EXCELLENCE

Axiom

Axiom For Football Highlights

An SSL Axiom live on-air, digital production console has been chosen by **KCPQ-13 Fox** in Tacoma, WA.

Larry Brandt, Chief Engineer, liked the approach that SSL takes when it comes to personalising a console:



KCPQ-13 FOX TACOMA, WA, USA Axiom is used for the live 'NFL Highlights' show

"The Axiom features an internal routing switcher," says Brandt. *"This simplifies installation and set up for operators. Plus, the ability to add a hard disk for production work was a real advantage."*

The AXIOM will be used for the *NFL Highlights* show: *"It is a very tight live show and sometimes includes hundreds of audio elements, making it fairly complex."* Brandt notes. *"We knew this was the console to handle that operation."*

RADIO FRANCE, PARIS The Axiom digital console services three independent concert studios

Radio France operates a number of national radio stations, including, France Culture, France Musique and Radio Blue, as well as 39 local radio stations. Radio France is also the country's leading, and most prolific, producer of live concerts.

The station's Studio 103 acts as the control room for 3 major stages. The huge concert hall style rooms have very 'open' acoustics, and feature traditional pipe organs.

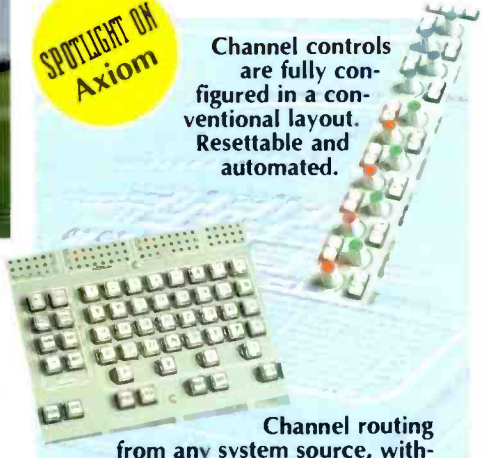
An 80-frame Digital **Axiom** console, with integral DiskTrack™, has been installed as part of a recent refurbishment programme.

Jean-Louis Blanc, Project Manager says: *"SSL's Axiom was the complete answer to our needs, with its integral DiskTrack™ hard disk storage and editing system, plus Axiom's open and flexible architecture. It is also affordable and SSL has a very good reputation with our operators."*

There are long distances between the three stages serviced by the Axiom control room, that could pose problems for lesser console systems. Axiom's HiWay links enable SSL's own mic pre amps to be placed remotely in the recording theatres close to the sound sources, thereby dramatically eliminating sonic degradation in transmission. The HiWay link connections are by thin coaxial cables.

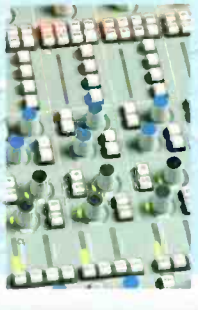
"We have made the investment in Axiom because it is important that Radio France has the best technical and sonic equipment for the prestigious productions we work on."

SPOTLIGHT ON Axiom



Channel controls are fully configured in a conventional layout. Resettable and automated.

Channel routing from any system source, without the need for a physical jackfield. Resettable and automated.



Integral FX processing in channels. Preset delays correct sound/picture offsets. Resettable and automated.

- **Open Media Interchange**: Scenaria® and OmniMix systems can now import data generated on a number of other editing platforms. File formats supported include OMF, AIFF, SD II and .WAV.
- **Unique HiWay interface**: Offers unlimited I/O flexibility through access to analogue and digital remote I/O units (Also supports connection to the Hub Router – see page 7)
  The HiWay interface facilitates connection distances of two kilometres or more!
- **Removable Hard Drives**: Enables fast and easy transport of work between remote studios.
- **Sample Rate Convertors**: New, high resolution sample rate convertors eliminate the issues raised when dealing with asynchronous digital sources, such as CD players.

IMAJ, ISTANBUL, TURKEY
OmniMix and SL 8000 are both installed in this leading facility

IMAJ (Turkey) is without doubt Istanbul's leading multiformat recording and dubbing facility. In order to guarantee attracting international business, IMAJ chose an SL 8000 console and an OmniMix post production system from SSL.

Owner, Cemal Noyan, believes strongly in the global broadcasting concept. It was therefore important that the equipment in which he invested was of the highest possible international standard.

The OmniMix system is housed in a THX-approved dubbing theatre. It can also be moved easily into the adjoining SL 8000 room for projects that require a combination of digital and analogue manipulation.

X-FILES?

Solid State Logic
Broadcast & Post Production
NEWS

Space Facilities in London is an audio facility which combines alien and Earth technology and design! It has a fully integrated technical superstructure devised by SSL. This includes four OmniMixes, a Scenaria®, seven VisionTracks and six ScreenSounds plus five banks of removable disk drives configured together in a total network. Each of the four Sound Cabins is equipped with Surround Sound.

"We selected SSL systems because we wanted the whole facility to be fully integrated so every room has access to everything," says Robbie Weston (Owner). *"We were also very impressed by the spatial control of sound that is only available on OmniMix."*

SPACE FACILITIES, LONDON
Extra-terrestrial influences and SSL technology combined

Video Post & Transfer, a full service audio/video post-production house in Dallas, recently purchased an OmniMix, joining a Scenaria® and a ScreenSound at the facility.

Bruce Buehlmann, mixer and former NBC engineer, says: *"The OmniMix gives us the flexibility to do stereo mixing, or Surround Sound, or both. The OmniMix, integrated with a 24-track recorder editor, gives us more capabilities, and even more flexibility. The SSL systems are phenomenal for creativity as well as speed."*

Video Post & Transfer produces national commercials and documentaries, as well as work for Disney, and ADR on *Walker*, a CBS television series.

VIDEO POST & TRANSFER, DALLAS, TEXAS
Adds OmniMix for Surround Sound

Proprietary Technology

SSL's use of proprietary technology brings with it major advantages over products which use 'standard platforms':

- Large scale systems are only possible using proprietary technology.
- SSL digital products can be custom designed to optimise audio performance. (NOT ALL DIGITAL PRODUCTS SOUND ALIKE).
- SSL systems are developed without the compromises and trade-offs inherent when adapting a general purpose computer to fit an audio application.
- SSL can assure the upgrade paths of its systems; it is not reliant on changes to third party hardware or operating systems - or even their obsolescence!

Diagnostics Built In

SSL has designed its own diagnostics system which provides systems with maximum reliability

Dynamic Resolution Control

SSL system operators do not have to consider the internal dynamic range of the processing when making a change to EQ or dynamics. SSL has developed the proprietary process of Dynamic Resolution Control to optimise the dynamic range from sample to sample.

Don't Delay

SSL determined to have constant processing delay throughout the mix system. General purpose DSP is very cumbersome and slow so SSL designed specialised processing hardware. The result is a short and constant processing delay of seven samples (Under 150µS), providing absolute freedom to construct elaborate systems without reference to processing loads.

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Solid State Logic
Music & Film
NEWS

SL 9000 J Series – The First Year

In the past year, the SL 9000 J Series console by SSL has gained a considerable fan club amongst producers, engineers, artists and, of course, facility owners. There are now SL 9000 J installations right across the world. We thought we'd let the owners and users tell you for themselves why the SL 9000 J Series is so successful.

"We opted to buy the second 9000 only three months after the first, to facilitate our client's demands – Studio 2 has been booked every day since the SL 9000 was installed. The feedback on the 9000 has been tremendous in terms of the console's sonic quality and software flexibility."

Kevin Mills – Owner
Larrabee Studios, USA

Two SL 9000s Now Installed!

From left: Phil Ramone, Brian Setzer and Allen Sides

"To me sound quality is everything. Great low end impact, effortless open top end and exceptional overall clarity are not qualities I normally associate with modern consoles. I am not easily impressed, but to my amazement, the SL 9000 J exhibits all these attributes. The second I put up a multitrack tape I was familiar with, I was knocked out; the SL 9000 J just sounds great, period!"

Allen Sides – Producer/Owner
OceanWay Studios, USA

2nd. SL 9000 ordered for OceanWay, Nashville

"I am very, very confident of success with the SL 9000. Within days of the installation we received three months of advance bookings."

Mr Ema – President
Onkio Haus, Japan

"The SL 9000 is a significant advance in audio quality, and it will define what a world-class studio should be."

Bart Sloothaak – Manager
Wisseloord Studios, Holland

"The J Series console offers versatile, common sense recording that is fully automated by a new generation studio computer. In addition the use of hard disk for storage and editing adds a new dimension to digital recording."

Narvel Blackstock – Executive Vice President
Starstruck, USA

"We are always looking to maximise productivity within each session. Replacing linear tape-based digital recorders with DiskTrack™ has had a dramatic impact in releasing more time for concentrating on the creative process, both in mix sessions and in vocal dubbing. I found the new features of the console and automation system immediately accessible, and my clients have been equally impressed with the clarity of the mixes produced on the SL 9000."

Jerry Lin – Chief Engineer/Manager
Premium Studio, Taiwan

Owners of three SL 9000s

The SL 9000 J Series was chosen for Studio 1 because of its superb sonic qualities and Sarm's respect for SSL's advanced audio circuitry, operational facilities and comprehensive automation.

Sarm West, London, UK

"Studio 1 is our main studio, used primarily for acoustic recording. The SL 9000 easily met our sound policy requirements, with ease of operation right through to the mixdown stage."

Mr Tanaka – Executive Recording Engineer
Nippon Columbia, Tokyo

"I was looking for a world class console to go into our large Music studio, which features a 6-channel monitoring system, that was familiar, easy to learn and capable of integrating with our post-production studios. The SL 9000 J is the only console able to deliver our high standards, and it sounds 'magnifique'."

Thierry Rogen – Owner
Mega West, Paris

"Both our national and international clients demand the best equipment available. The SL 9000 J Series provides them with excellent sonic qualities and impressive automation features, yet is familiar to most users."

Roland Guillotel – Owner
Studios Guillaume Tell, Paris

"I've used the SL 9000 J Series console for my last three album projects at Larrabee North, LA. The 9000 has all the punch of previous SSL's as well as added warmth and smoothness. It is the best sounding desk I've ever used for mixing and recording. Once you use the 9000, you don't want to use anything else."

Dave Bianco – Producer/Mixer

"It is necessary for us to have a console which accurately addresses the low frequencies and provides absolute integrity of the sonic performance. The SL 9000's outstanding sound quality, expanded features and functions make it ideal for this critical listening environment. The fact that our engineers can quickly and effectively move from our existing SL 4000 consoles onto the SL 9000 without any serious learning curve was an additional deciding factor."

Glenn Meadows – President
Masterfonics, USA

"The J Series console blew away all of my assumptions about the longevity of analogue – it's functionally, ergonomically and sonically superior to any other analogue console available today."

Frank Filipetti – Producer

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SSL at the Movies

Solid State Logic
Music & Film
NEWS

Solid State Logic has a long history of working with, and innovating for, the film industry. As digital technology continues to impact the world of film, all-digital consoles, such as the Axiom by SSL, are making regular appearances on dubbing stages around Hollywood.

An 80-channel Axiom system was recently installed in the South Dubbing Stage at **Twentieth Century Fox**. It was used for sound effects premixes and finals during re-recording of director Robert Rodriguez's new movie, *From Dusk Till Dawn*, starring co-producer Quentin Tarantino, George Clooney, Harvey Keitel and Juliette Lewis. The Axiom was fitted with DiskTrack™ and VisionTrack™; SSL's hard disk recording and editing systems.

"This was definitely an effects heavy mix," recalls Tennyson Sebastian, who handled sound effects mixing on the movie. *"In certain pivotal scenes we had as many as 80 channels of effects elements which provided an excellent test for the Axiom. To retain transients and 'punch' through the premixes and finals, the all digital system was great; we couldn't have produced such a vivid mix without the Axiom. The tracks sounded very transparent."*

All sound-effect premixes were recorded and replayed directly from Axiom's DiskTrack Sebastian recalls: *"While we were premixing the effects stems, we saved a great deal of rewind time by preloading tracks from DA-88, 35mm mag and Pro-Tools drives directly to DiskTrack. Then we were able to move to any part of the track instantly, without waiting for external transports to catch up."*

Tennyson Sebastian (rear), with Director Robert Rodriguez, mixing Dusk Till Dawn *on the Axiom Film System at Twentieth Century Fox*

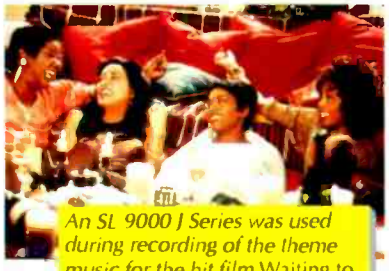
Axiom's optional VisionTrack™ also came into its own. *"Sure, while setting up premixes and EQ profiles, we were able to run VisionTrack locally on the Axiom - rather than use the room's film projector - and move through a scene much more quickly than if we had to wait for 35mm film to stop, rewind and then come back up to speed. Our projectors are pretty fast, but nothing beats the speed of hard-disk video!*

Compared to conventional consoles, Sebastian offers: *"Operation of Axiom is totally automated; everything can be stored and recalled to timecode or feet and frames. I also like the fact that you have one knob per function, which makes it very easy to find the right control without paging through multiple layers - it just feels like a normal console, except everything is handled digitally. I also used the onboard EQ exclusively - it's very flexible, and sounds great. I'd love to mix a whole film on Axiom!"*

Each Axiom channel strip includes dedicated controls for a four-band parametric digital EQ section; eight auxiliary sends; a digital dynamics section; plus full panning between 32 programmable outputs. On film-dubbing Axioms, direct assignment is provided to four, eight-track busses; an additional 32 assignable busses are also available. All signal processing applied during recording or overdubbing can be saved as snapshots or dynamically automated without affecting the recorded signal.

Robert Rodriguez confides: *"The Axiom was real cool. I'm a 'hands-on' kind of director and a great believer in digital technology. I've worked as a music mixer on my other films, and like to get behind the board. In terms of speed, audio quality and the number of options you can try out during a mix, there is no way that I could go back to mixing any other way! I've been spoiled by Axiom's high-speed DiskTrack audio playback.*

"Although the console won't do the work for you - you still have to make the creative decisions - Axiom now let's you get to where you want to be more easily and let's you concentrate on the sound of a mix."



An SL 9000 J Series was used during recording of the theme music for the hit film Waiting to Exhale, *starring Whitney Houston*

SL 9000 Update

NEW Motion Control Panel and V2 Software

- New off-line mix level trim
- Enhanced machine control facilities
- Enhanced project management
- A host of new features and enhanced ergonomics

Digital technology has come of age, and products such as SSL's Axiom system, have a major part to play in the movie industry of the future.

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Solid State Logic

Broadcast & Post Production NEWS

SL 8000 – THE MULTI-FORMAT SOLUTION

The SL 8000 is designed to provide the most flexible and effective solution to audio post-production for video and film. Its exceptionally versatile output bus structure enables separate music, dialogue, effects and audience mixes to be created, as well as a stereo or 4-channel surround sound mix.

Programmable Joystick Pan Controls

Features of special interest include:

Two programmable joystick pan controls with individual displays of spatial position. Movements of the joystick controls can be stored and replayed by the G Plus computer.

Comprehensive monitor reassign and selection, allowing all 36 bus outputs, plus 20 external sources, to be assigned to any or all of four (or eight) monitor outputs. Up to 99 different formats may be set-up, edited and stored.

SL 8000 GB has additional features to meet on-air broadcast requirements:

Master Status Switching allows users to switch between Broadcast, Remix and Recording status according to current operational requirements. In Broadcast mode, microphone inputs are selected to feed the large fader, which in turn can be routed to the subgroup, main and multitrack busses, to provide clean feeds.

Comprehensive routing matrix on SL 8000 GB mono channel provides routing to 24 multitrack/ clean feed busses.

Monitor Input and Format Module

One of Mexico's leading TV and film facilities, **Estudios Churubusco Azteca**, *recently modernised its audio department, and installed an SL 8000 G Plus console in a new THX-standard audio production room. "We decided to upgrade to offer sound facilities for the music industry as well as television and film," says Jaime Bakhst, Sound Manager. "The SL 8000 is the only console that allows us to carry out all these tasks in one room."*

SL 8000 users include:
Turner Broadcasting, USA
National Mobile TV, USA
Polyson, France
Fox TV, USA
BBC, UK
Slovenia TV, Slovenia

Eastern Europe E x p a n d s with SSL

Broadcast professionals within Eastern Europe continue to expand and upgrade rapidly as the demand for high-quality audio for recording, broadcast and post in the region accelerates; resulting in developing sales of SSL consoles and digital systems

The latest country to join the SSL ranks is ***BULGARIA*** where two SL 4000 G Plus consoles have been ordered by **Bulgarian National Radio**. One console is to be installed in the prestigious National Concert Hall in Sofia, while the second is for the station's newly refurbished Studio One, which is used for music recording for transmission on radio and television. Technical Director Georgi Trenev said: *"It has been our dream to re-equip with the latest technology and we felt we couldn't buy better than SSL."*

Other SSL sales have been made in:

CZECH REPUBLIC

S-Pro Alfa, Prague, has become the leading post-production facility in the country following their purchase of a ScreenSound system, which was followed by a second ScreenSound and a Scenaria® – the first Scenaria in Eastern Europe. All are networked.

ROMANIA

Romanian National TV, Bucharest. A ScreenSound is used for production and post-production of TV programmes and commercials. Due to the ease of use and flexibility of the System, they are about to upgrade and expand the system.

RUSSIA

Premier SV, Moscow. The most prestigious advertising agency in Russia, with the country's first ScreenSound/VisionTrack™ system.

Sofia, Bulgaria, one of many East European cities in which SSL consoles and systems are installed

SLOVAKIA

ESPE, Bratislava. The country's leading production and post-production facility. The first privately owned facility in eastern Europe to buy SSL digital, networked systems.

Slovak National TV. Purchasers of the very first SSL Digital systems in Eastern Europe. Multiple ScreenSounds are used on their own television programmes and commercials.

SLOVENIA

Ritem, Ljubljana. Owners of the first SSL console in Slovenia, Ritem added a Scenaria in November 1995. Main clients are foreign advertising agencies and local TV companies requiring the dubbing of foreign programmes for local transmission.

Studio Tivoli, Ljubljana. A dominant presence in the Slovenian post-production industry, Studio Tivoli has recently installed a Scenaria specially modified to facilitate upgrade to OmniMix in the near future.

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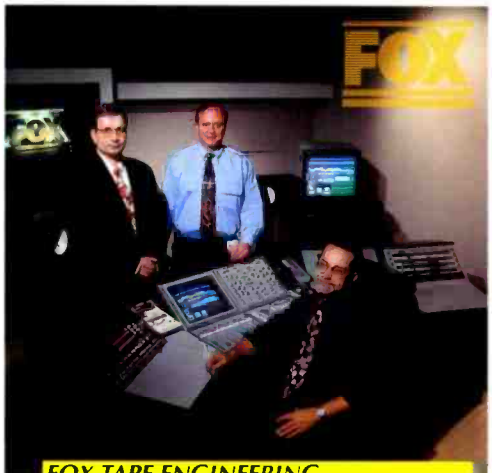
POST to PICTURE

with Fox Tape Engineering

Located in Fox's Los Angeles broadcasting facility, **Fox Tape Engineering** is responsible for creating over 400 promotions a week; and is one of the world's largest users of SSL Scenaria® systems.



FOX TAPE ENGINEERING, LOS ANGELES
Pictured at one of the facility's Scenarias are (L-R) Chris Homer, Vice President of Post-Production; Bill Messersmith, Manager of Post-Production and Andy Harper, Engineer in Charge

"We initially started out with two Scenarias and one ScreenSound alongside our analogue consoles," explains Chris Homer, Vice President of Post-Production. *"However, in order to save time and space, we elected to add additional Scenarias making the department all-digital. The biggest advantage is Scenaria's integration. One engineer uses one box to bring in and combine all the various elements, giving us greater flexibility."*

Homer continues, *"Scenaria has a built in video recorder, so your picture is locked to sound. It allows us to mix to picture, so even though we still need conventional equipment like DAT and Video machines to stream in and out of, all the creative work takes place within Scenaria and is stored in RAM. Basically, SSL systems satisfy our post-production requirements for television work"*

SSL NEWS

Solid State Logic
Broadcast & Post Production
NEWS

NEW OFFICE
Solid State Logic is pleased to announce the opening of **SSL ASIA**, to supply enhanced local sales and service facilities. The new office, based in Singapore, will be headed by Mr. Chan Kheng Wah, a seasoned professional in the Asian Pro-Audio Industry.

NEW DISTRIBUTOR
KOREA – DAIYOUNG has been appointed SSL full service distributor
Tel: +82 2 588 3960 Fax: +82 2 586 3721
Contact: Mr. Kyong-Sub Kwon
(President)

NEW FACES
TIM CUNNINGHAM
Broadcast & Post Sales Executive, International

MIKE BANKS
Music Recording & Film Sales Executive, UK and Scandinavian recording studios

PATRICK McDOUGALL
Trainer – Music Recording – USA

JIM ROSENTHAL
Sales Executive – West Coast, USA

Staff Wanted

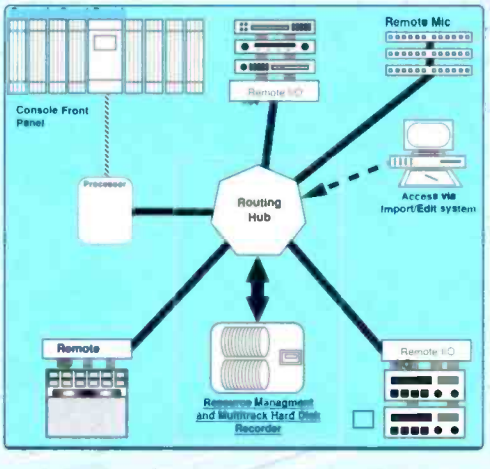
Experienced SSL operators are always in demand around the world.
To meet this growing need, SSL runs regular training courses both in the UK and the USA. Numbers are always strictly limited in order to ensure personal attention.
Call your nearest SSL office for more information, or speak to the Training Dept. Manager, Dave Grinsted, at SSL UK.
On-site facility staff training is also available.

WEB SITES
View SSL on: **http://www.c21media.com/studios**
and
http://www.zynet.co.uk/smiles/ssl

Intelligent Digital Routing

The SSL HubRouter

In an intelligent digital system, any source may be connected to any output by routing via SSL's digital Hub. Potentially noisy connections are totally eliminated and any routing changes may be made instantly. The SSL HubRouter is a major progression from the conventional analogue console environment where the routing is via fixed hard-wiring and changes must be made by hand using physical patchcords, which is a laborious process.
HubRouter provides a super fast, silent switching exchange to support SSL digital consoles, such as AXIOM. It not only interchanges sources, but also distributes mixed outputs from the console to other users.



A single presentation studio may provide sources for several off-line editing or packaging rooms equipped with SSL consoles. Conversely, multiple production studios may be supported by a single Axiom control room.
Complete project handover from one studio to the other is accomplished effortlessly and elegantly in a few seconds.

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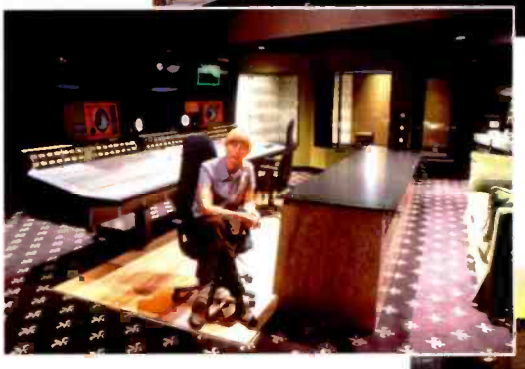
Music & Film

NEWS

G+



Recent SL 4000 G Plus installations include:

(top)
Sonolux, Colombia
(left)
Royaltone Studios, USA
(below)
Gimmick Studios, France

SL 4000 G Plus continues to be the world's most desirable console. Latest installations include:

MCR Produções de Propoganda in São Paulo, Brazil, which specialises in music recording for commercials. Sergio Campanelli, co-founder of MCR, says: *"When you deal with the best, you want nothing but the best equipment. SSL was our obvious and only choice."*

At **Royaltone Studios**, North Hollywood, a 64-input SL 4000 G Plus is the major feature of Studio B. *"The G Plus is sonically superior to anything I have considered,"* says studio owner Delight Jenkins. *"It sounds fabulous and I couldn't be happier with it. Frankly I think it is amazing."*

For a full listing of G Plus installations around the world, contact your local SSL office and request a copy of the SSL Worldwide Directory.

Which Label Has Most Hits?

The evidence is in the results.

A few recent successes include:

Song/Album	Artist	Studio	Console
One Sweet Day	*Mariah Carey*	*Hit Factory*	*SL 8000*
Wake Up, It's A Beautiful Morning	*Boo Radleys*	*The Church*	*SL 4000*
Gangsta's Paradise	*Coolio*	*Larrabee West*	*SL 4000*
Forbidden Love	*Madonna*	*Quad Recording*	*SL 4000*

There are now more than 1,200 SL 4000s installed in leading studios worldwide, making it the definite industry standard.

The G Plus combines optimum sound quality with operational refinement and a wealth of sophisticated automation options.

SSL's reputation ensures that SSL-equipped studios really do attract top flight clients

Choosing an SSL console gives you a great audio facility. It also makes superb business sense!

Solid State Logic

Billboard 1994 STUDIO ACTION
PRODUCTION CREDITS FOR BILLBOARD'S NO. 1 SINGLES

CATEGORY	Produced on SSL Consoles
HOT 100	84%
ALBUM ROCK	79%
COUNTRY SINGLES	76%
DANCE CLUB	67%
R&B SINGLES	66%
RAP SINGLES	61%
DANCE SALES	56%
MODERN ROCK	50%

Billboard 1995 STUDIO ACTION
PRODUCTION CREDITS FOR BILLBOARD'S NO. 1 SINGLES

CATEGORY	Produced on SSL Consoles
DANCE SALES	100%
ADULT CONTEMPORARY	100%
RAP SINGLES	88.8%
ALBUM ROCK	88.4%
HOT 100	74.5%
R&B SINGLES	72.5%
COUNTRY SINGLES	68.6%
DANCE CLUB	68.4%

SSL Worldwide

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Fax: (03) 5474 1147

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Tel: (213) 463 4444
Fax: (213) 463 6568

Sales and Service Agents: **Argentina:** Diesel SRL (1) 362 5977; **Australia; New Zealand:** Sintec International PTY (NSW) (2) 417 4700; **Austria, Croatia, Slovenia, Bosnia:** Audiosales (Austria) (22) 36 26 121; **Belgium, Luxembourg:** Trans European Music (2) 466 5010; **Brazil:** Savana Comunicacoes Ltda (21) 274 5009; **Chile:** InterVideo (2) 235 2668; **China (PRC):** Medialand (Hong Kong) 27210343; **Colombia:** Datanex Ltda (1) 313 0538; **Czech Republic:** Audiosales S.R.O. (2) 54 4173; **Denmark:** Provideo Equipment A-S (42) 64 78 00; **Egypt:** EKO Sound (349) 7181; **Finland:** Studiotec (0) 592 055; **Germany:** Audio Export (7131) 62470; **Hong Kong:** Digital Media Technology 27210343; **Hungary:** Audiosales (1) 156 95 15; **Iran:** Besat Broadcasting Systems Co. 9821 676 136; **Korea:** Dalyoung Industrial Co. Ltd. (2) 588 3960; **Kuwait:** International Music Centre 264 5635; **Netherlands:** TM Audio (30) 2414070; **Norway:** Siv. Ing. Benum A/S (22) 145 460; **Russian Federation:** Elbor Ltd (095) 938 2321; **Slovakia:** Audiosales (7) 722 249; **Southern Africa:** Questek Marketing CC (11) 706 0405; **Spain:** Lexon SA (3) 203 4804; **Sweden:** Tonkraft Import AB (31) 7957595; **Switzerland:** Dr. W.A. Günther (1) 910 4141; **Taiwan:** Advancetek (2) 719 2388; **Thailand:** Digital Equipment & Transducer Ltd (2) 248 2185; **Venezuela:** Sonex (2) 235 8828

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New technologies

This month's crop of equipment launches includes highlights from the forthcoming Musikmesse and a roundup of project studio gear. **DAVE FOISTER** reports

A new move from Tascam takes the company into the burgeoning MiniDisc market.

Tascam MD-801R

Tascam has joined the MiniDisc fray with a major pairing of machines intended as open-reel replacements in a wide variety of applications. The MD-801R is the recorder-player, and bears more than a passing resemblance to Tascam's current professional DAT machines. An important feature of both this and the 801P playback-only machine is unusually fast access, with Tascam claiming five-times-faster, full stroke, search time than other players and four times faster start time at 100ms. This is reckoned to amount to instant-cue replay for jingles, sound effects and samples. Pitch is variable by almost 10% either way, and an optional 16Mb RAM card allows programmable instant start of up to 20 tracks or preprogrammed sections. The recorder adds non-destructive, random-access editing directly from the front panel, which has jog and shuttle wheels for the purpose, and the whole process can be controlled from a PC via a rear-panel connector, giving direct access to TOC writing functions as well as full control of the machine.

- *Tascam, US. Tel: +1 213 726 0303.*
- *Tascam, UK. Tel: +44 1923 819630.*

Digidesign software

Alongside Digidesign's recently introduced ProControl hardware controller comes a new family of Pro Tools products, making it available to Digidesign's Session 8 Mac and Audiomedia II packages. The addition of PowerMix allows Pro Tools to run on suitable PowerPC-based Macs without additional Digidesign hardware, and a new entry-level version, Pro Tools Project, brings the system within the reach of the project studio owner. The PC is not left out; Audiomedia III with Session Software is a multitrack production system for the Windows platform with two to four recording tracks and eight playback tracks, eight bands of assignable real-time parametric EQ and full mixing, editing and synchronisation facilities.

- *Digidesign, US. Tel: +1 415 688 0600.*
- *Digidesign, UK. Tel: +44 1753 653322.*

Euphonix Time Transporter

The machine-control capabilities of Euphonix' CS2000 console system are enhanced by the new TT-007 Time Transporter module. The console's existing control possibilities are complemented by the TT-007's ability to translate between different types of control protocol and time-code formats; types include MTC, MMC, Sony P-2 and LTC. This allows the console's Digital Studio Controller module to handle all the connected equipment in the studio, or enables the CS2000 to be controlled via Sony 9-pin from a video editor or via MIDI from a workstation.

- *Euphonix, US. Tel: +1 415 855 0400.*
- *Euphonix, Europe. Tel: +44 171 602 4575.*

Digidesign's ProControl offers a tactile control surface for the newly expanded Pro Tools system

DAWN 4

The DAWN workstation has now reached v4, involving entirely new hardware and software. Intended for audio editing for film and video, it forms an integrated media-production environment combining multitrack audio, nonlinear video, sound design, sampling and MIDI. Version 4's processor board is six times faster, claiming the best sync capabilities in the business as well as negligible jitter and improved signal-to-noise. Also claimed to be the most advanced in the field is the autoconform facility, handling both CMX and Sony EDLs and able to interpret CMX 'notes' to specify source tracks for an edit. Multiple DAWN workstations can exchange material via standard networks such as Ethernet and FDDI.

- *Doremi Labs, US. Tel: +1 213 874 3411.*

AKG wireless mics and MicroMics

AKG's success with the WMS 900 UHF wireless microphone system has led to the development of the WMS 300, offering 10 different microphone combinations and up to 16 frequency options. Six belt-pack microphones are available, and the hand-held version comes with a choice of three heads; all use the SR 300 receiver, a true-diversity system in a half-width rack unit. Also new is a range of miniature instrument microphones, MicroMic Series II, whose seven models include clip-on

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Milab
MICROPHONE LABORATORIES

Contact Your Dealer or
Milab Microphones AB
P.O.Box 1342
S-251 13 Helsingborg, Sweden
Fax: Int.+4642136350

PROJECT STUDIO FOCUS

Roland VS-880 Workstation

Roland's experience in multitrack, hard-disk recording has resulted in a new integrated recording; mixing; editing workstation, the VS-880. Recording uses eight primary tracks with eight levels of virtual tracks in each incorporating sophisticated digital-editing functions to produce eight final tracks for mixing. This is accomplished via the integra 14-channel digital mixer with full dynamic MIDI automation of fader, pan and other parameters. MIDI synchronisation is also built in, and, with this in mind, editing can be performed by means of bars and beats or location points as well as straightforward time. Scrubbing is provided, and time stretching and compression are both possible. Four sample rates are supported, and the standard mode with the 1Gb removable drive gives 500 total track minutes, extendible by external SCSI drives. Effects are dealt with by an optional expansion board, the VS8F-1, which makes two complete multi-effects processors available, both incorporating Roland's RSS surround system in some of their algorithms.

◆ *Roland Corp, US. Tel: +1 213 685 5141.*
◆ *Roland, UK. Tel: +44 1792 702701.*

Electro-Voice true condenser mics

Two new microphones from Electro-Voice set out to bring studio instrument microphone quality to the home and project studio, providing true externally polarised condenser operation rather than the more familiar electret designs. The RE200 features a continuous presence rise to help cut through dense mixes, and its small size and neutral fawn-beige colour suggest its use in shot for video work. The companion model is the individually hand-built RE1000, with a mid-size diaphragm intended to produce warmth and detail. It features transformerless output circuitry and a bass roll-off switch, giving a 12dB/octave filter at 130Hz, and E-V claims an unusually low self-noise performance.

◆ *Electro-Voice, US. Tel: +1 616 695 6831.*

LA Audio processors

Two new eight-channel signal processors from LA Audio offer contrasting approaches. The V8 offers eight channels of valve signal-conditioning intended as a front end for digital multitracks, and has individual control of each channel's output level and valve drive with LED status and process indication. At the other end of the technology spectrum is the C8 8-channel compressor, offering eight independent simple

LA Audio's V8 offers eight channels of valve signal-editing

compressors and, again, meant for modular digital multitracks to prevent overload. The only controls are for threshold and gain; ratio, attack and release settings are programme dependent, and pairs of compressors can be linked for stereo operation.

◆ *SCV, UK. Tel: +44 171 923 1892.*

Sony DARS-MP Hi-8 tape

Sony's commitment to the Hi-8 MDM format originated by Tascam is evidenced in the new DARS-MP tape designed especially for the application. The main feature is an advanced coating technology wherein the metal particles in the magnetic layer are aligned diagonally, allowing the tape to record smaller wavelengths. There is also a new binder system to improve durability and reduce dropouts during the multiple passes and shuttles used in multitrack work.

◆ *Sony Broadcast & Professional, Europe. Tel: +44 1256 55011.*
◆ *Sony, America. Tel: 201 930 1000.*

Alesis NanoVerb

Smaller and smaller: Alesis now introduces the NanoVerb, an 18-bit digital effects unit with new algorithms and a wide choice of effects. Sixteen basic algorithms are offered, with several reverb types as well as delay-related effects including rotary speaker simulation. For each effect one chosen parameter is available for user adjustment.

◆ *Alesis, US. Tel: +1 310 841 2272.*

Roland SX-700

Alongside the new studio workstation comes a low-price, high-spec, Boss-labelled, effects processor from Roland, the SX-700. Twenty-seven different effects are provided, with five available simultaneously. Some incorporate 3-D panning using RSS, and another surprising inclusion at this level is a four-voice intelligent pitch shifter.

◆ *Roland Corp, US. Tel: +1 213 685 5141.*
◆ *Roland, UK. Tel: +44 1792 702701.*

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DN6000

REAL TIME AUDIO SPECTRUM ANALYSER

Sensitive audio analysis.

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

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

It performs real time 1/3 and 1/6 Octave spectrum, LET, LEQ and RT60 analysis to a resolution of 0.2dB – and incorporates microphone or line level inputs, with a 20dB trim control to allow optimum visual display.

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

Thirty two memory positions are available to store spectrum analysis data and a further sixteen for LET/LEQ/RT60. Also, accumulation of measurements can be achieved to build up a composite average. It can automatically analyse a whole evening's or even a whole week's data.

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

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

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The transformerless AT4041 cardioid microphone from Audio Technica

types, head-mounted boom microphones and specialist pickups for double bass and other string instruments.

- *AKG, Austria. Tel: +43 1 98 1240.*
- *Harman, UK. Tel: +44 181 207 5050.*
- *SCJ & AKG, Japan. Tel: +81 813 5411 2551.*
- *AKG, US. Tel: +1 818 830 8278.*

Audio Technica AT4041

Following the successful 4033 and 4050 microphones comes the AT4041 from Audio Technica, a transformerless cardioid design intended for recording and broadcast applications. A quoted frequency response from 20Hz–20kHz and SPLs as high as 145dB at less than 1% THD are attributed to a new precision-milled backplate in the capsule along with a low-mass diaphragm, made possible by the fixed-charge capacitor element design. The case is of turned brass for ruggedness, and carries only one control, an 80Hz 12dB/octave high-pass filter.

- *Audio Technica, US. Tel: +1 216 686 2600.*
- *Audio Technica, UK. Tel: +44 1132 771441.*

Aphex 109

Aphex' Tubessence valve technology, introduced in the 107 mic preamp, makes a further appearance in the new Model 109 parametric equaliser. The EQ can be configured either as two 2-band channels or a single 4-band path, and each EQ band offers 15dB of boost and cut at sweepable frequencies complete with fully variable bandwidth. Shelf and peak modes are available. Bypassing the EQ still allows the signal to pass through the Tubessence valve stage if required, or a hard-wire bypass can be selected.

- *Aphex, US. Tel: +1 616 683 4400.*
- *Stirling Audio, UK. Tel: +44 171 624 6000.*

Apogee ACS loudspeakers

One of the first products of Apogee's new manufacturing facility is the ACS (Apogee Contractor Series) range of loudspeakers, with a wide variety of sizes and styles to suit a range of limited-budget installation applications. Unique to Apogee is the concept of the optional processor; the speakers are intended to perform well as they stand or with other third-party processing, but for critical applications-specific processors are available to get the best out of the design. The processor family extends the bass response, smooths the midrange and provides various kinds of speaker protection, with a selection of plug-in voicing modules available.

- *Apogee, US. Tel: +1 707 778 8887.*

Intelligent Devices AD-1

Intelligent Devices' real-time, analogue-digital, audio-monitoring display system is now available as a TDM plug-in, offering metering, spectral display, phase scope and waveform-monitor facilities. Modules can be used individually, or in any combination, and include five 240-element meters with true peak and average displays and a true stereo RTA with two 1024-point Fourier engines and a 74dB digital peak log display. Ten presets store 24 separate user-adjustable parameters.

- *Intelligent Devices, US. Tel: +1 410 744 3044.*

Band Pro Kataband Audio Vest

Band Pro manufactures a range of Kataband products including soft camera cases, tripod bags and anti-bullet body armour, and has now added to the list a modular Vest system for location sound recordists. Three components provide space and protection for the

AKG C 419, one of the new MicroMic series

E = MC 26

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Quality console of the year?

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What ever the reasons, for the success of the Malcolm Toft *Series 980*, the fact remains you owe it to yourself to take a closer look.

The new *Series 900* extends the range and includes options such as, Penny & Giles faders and Mosses & Mitchell patchbay.
The Signature Series EQ offers a dual mic/line pre amp together with the '40 Hertz' four band sweep equaliser, as found on the desks.

The *Series 980* and*900* feature the same overall sonic performance, 8 Aux sends, 6 Returns and 24 balanced bus routing.

We at MTA are committed to the philosophy of quality, quality of components, build and superb sound.

In short, no compromise!

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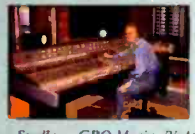
Malcolm Toft Associates
Limited

Signature Series EQ

Series 980



Black Barn Studios - GRQ Music, Ripley Surrey.
Nick Hogarth
"Great sound and excellent value for money".

George Foulgham - Studio 2.
Video London.
"Good value coupled with a fulfilled delivery date".

David Humphries, DB Post-production, London
"I have always preferred the sound of a Malcolm Toft desk".

Terry Britten, Songwriter - producer
"Simplicity combined with powerful musical EQ and its built like a brick sh-shed".

Series 900

Sam Partington
Mike Stock's Studio - London.
"We choose the MTA 980 for its sonic integrity and its superb build quality".

Matt Skilton - Studio 3.
Video London Sound Studios
"Malcolm Toft's proven track record for desk design, quality and backup".

A_2 D Mobile - West Sussex.
Doug Hopkins
"Rigid construction with customised design, and its very quite".

<u>Other Series 980 Owners</u>

Charlie Daniels, Nashville - USA
DK studio - Belgium
Billie Ray Herns - USA
Studio 45, Connecticut - USA
Audio Playground, Florida - USA
Sigma Studios, Norway
Pride Hutchington, LA - USA
Cole Street, LA - USA
Dino MKII, LA - USA
The Ranch - Tom Keans, LA - USA
Master Recording, Thailand

- 40 Hertz, 4 band sweep EQ
- Classic Split console design
- 24 Balanced Busses, with faders
- Two line inputs per channel (94 inputs on mixdown)
- 8 Auxiliary sends, with pre/post and mute switching
- 6 Echo returns, with EQ and level fader
- Aux's can be routed to groups, for extra 24 Aux sends
- Auto mute groups on channels
- Penny and Giles faders throughout (optional on 900)
- Mosses & Mitchell patchbay as standard (optional on 900)
- Factory or Retrofit of any Automation, to customers choice

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kind of equipment generally carried, including a holster for a small mixer, pockets for cables and microphones and so on. The Chest Vest and Audio Front Belt can be used as a pair or with the BackPack to give a large number of zippered compartments with Velcro-backed add-on pouches.
◆ *Band Pro, US. Tel: +1 818 841 9655.*

Gold Line 30M8RM and SPL120RM3

New from Gold Line is an affordable, portable rackmount audio-analyser, the 30M8RM. It has a built-in pink-noise generator and eight memories, and comes with a reference microphone as well as a line input capable of handling -81dBm to +3dBm. This is joined by a rackmounted SPL meter with three switchable inputs allowing readings to be taken at various points around a venue. This, too, comes with up to three factory-calibrated measurement microphones.
◆ *Gold Line, US. Tel: +1 203 938 2588.*

Z-Systems z-q1

Processor and router specialist Z-Systems has introduced a 4-band stereo digital parametric equaliser, the z-q1. The unit features analogue-like filter controls which according to Z-Systems can be swept in real time without any unpleasant digital side effects. Internal processing is 32-bit, with inputs capable of handling up to 24 bits and outputs at 16, 20 or 24 bits, dithered or undithered. Apogee UV22 Super CD encoding is available as an option, as is a snapshot automation package.
◆ *Z-Systems, US.*
Tel: +1 352 371 0990.

IN BRIEF

Tannoy System 600 and optional tweeter

Tannoy close-fields

Tannoy has introduced two new close-field monitor designs, both incorporating the expected dual-concentric configuration. The System 600 has a 6-inch driver with 'tulip' waveguide and can handle up to 150W with a frequency response down to 52Hz. The System 800 improves both these figures, with 180W handling and 47Hz LF extension from an 8-inch driver.
◆ *Tannoy, UK. Tel: +44 1236 420199.*

Digital Solutions BVE02

No sooner is the Yamaha 02R upon us than we have an interface to enable it to be used as the audio basis of a video edit suite. The BVE02 from Digital Solutions responds to any ESAM II-capable video edit controller to control the 02R's moving faders during editing, allowing the mixer, with its wide choice of I-O formats, to handle the entire audio for the suite under central control.
◆ *Aspen Media, UK. Tel: +44 1442 255405.*

White Instruments Model 4828

White Instruments has a new graphic, the 28-band, single-channel, Model 4828, whose 2U-high rack size allows the use of 60mm sliders, giving 12dB of boost and cut at ISO centres. The main EQ is augmented by 7-stage LED headroom metering, gain and bypass, as well as variable high-pass and low-pass filters on horizontal sliders.
◆ *White Instruments, US.*
Tel: +1 512 389 3800.

Samson MixPad 9

Samson Audio's new mixer provides a remarkable range of facilities for a small, low-priced unit. Nine channels provide a selection of mic-line inputs and stereo inputs, the mic ins being balanced and phantom powered. Two-band EQ and two auxes are complemented by two stereo aux returns, balanced main outputs and peak-overload LEDs. The present outboard PSU will shortly be joined by an optional battery pack for full portable use.
◆ *Samson Audio, US.*
Tel: +1 516 364 2244

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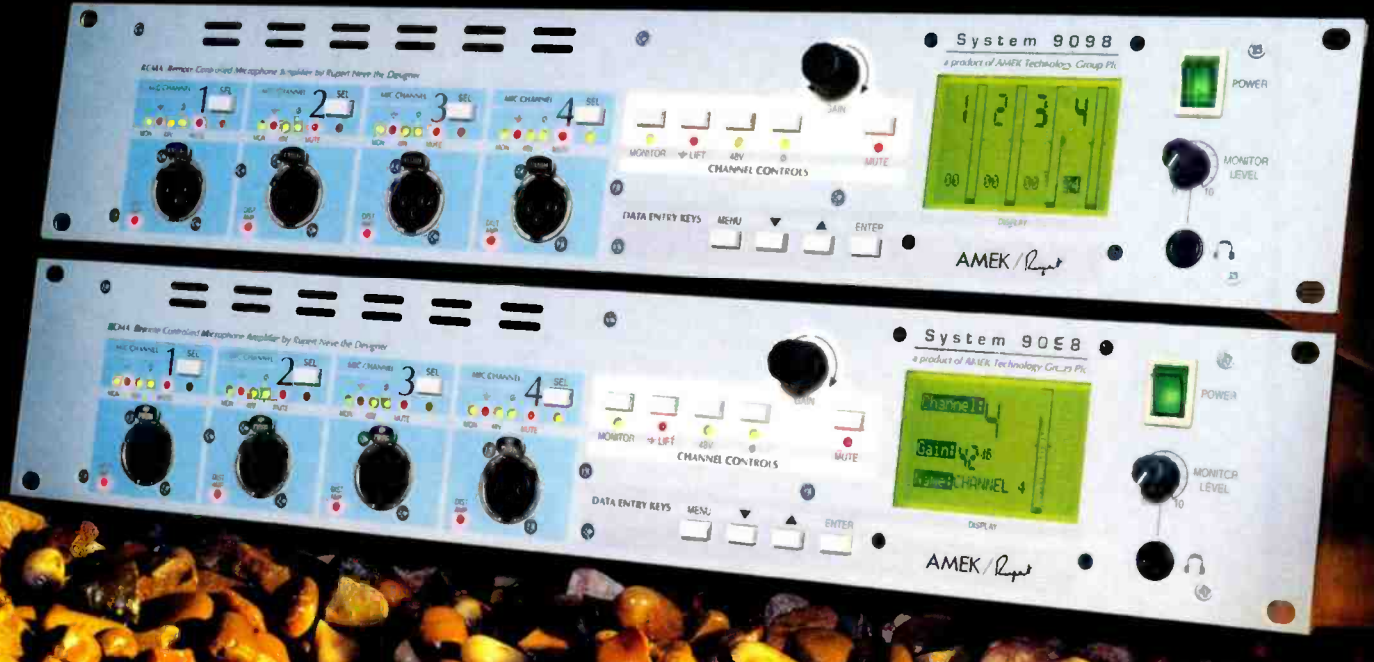
System 9098
Remote Controlled Mic Amplifier
by Rupert Neve the Designer

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

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

The AMEK / RUPERT NEVE RCMA Remote Controlled Microphone Amplifier is designed to provide microphone source audio of the highest possible calibre by raising the level of the microphone signal at source and then feeding the line from an amplifier which has been specifically designed to drive it. Thus the RCMA will be attractive to broadcasters, digital console owners requiring first-quality microphone signals, location recorders and sound reinforcement operators. Various options include simultaneous analogue and digital outputs, a distribution output mode, and remote operation of the software-driven control functions. These, combined with exceptional audio performance, make the RCMA a unique and original product.

Rupert



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FRANKFURT PREVIEW

Frankfurt debutant—Soundcraft's new Ghost project mixing console

tc electronic Wizard M2000

tc's benchmark M5000 effects and processing platform is to be joined at Frankfurt by the Wizard M2000. Sharing the M5000's DARC processor, the new model is intended to bring tc technology to a wider market, and offers 20-bit in and out (digital and analogue), 24-bit processing and a wide range of effects possibilities including tc's latest CORE reverb algorithm. Transition between effects is made seamless by a preset 'gliding' function, and tc's unique Dynamic Morphing allows an effect to change in character in response to increasing signal levels.

◆ *tc electronic, Denmark. Tel: +45 86 26 28 00.*

Soundcraft Ghost

On show for the first time in Frankfurt will be Soundcraft's new project studio console, the Ghost. Specifically designed as a creative tool for the professional musician, the Ghost features low-noise mic preamps with phantom, 4-band EQ with two fully-parametric mids, 10 aux buses including stereo configurations, up to 56 mixdown inputs on a 24-channel desk, and several MIDI-based automation facilities including snapshot-based mute recall and on-board, time-code, reader-generator. Soundcraft's C3 moving-fader automation system is expected to be available for the Ghost later in the year.

◆ *Soundcraft, UK. Tel: +44 1707 665000.*

ARX ULTM-8

New from ARX at Frankfurt is the ULTM-8 dynamics processor, designed to provide an interface to modular digital 8-tracks. Eight individual compressors are fitted, each with variable threshold, and an overall safety net is provided by a global peak limiter with an overall threshold control. Operating levels are switchable and balanced outputs are available on a D connector.

◆ *ARX, Australia. Tel: +61 3 9555 7859.*

3G Fireball

To be unveiled at Frankfurt is a new automated live mixing console from 3G—a company so far best known for small professional audio mixers. The Fireball is a modular console design for PA and theatre applications, with custom-designed Mix-Genie automation software.

◆ *3G, UK. Tel: +44 1702 420645.*

Klotz Vadis hardware controller

The Klotz Vadis digital matrix system can now be operated under external control using a new hardware controller, to be shown at Frankfurt, in conjunction with a PC. The system gives flexible mixer and processor configurations, with up to 48 input-channels with 5-band parametric EQ, all processing being handled by the connected Vadis system.

◆ *Klotz Digital, Germany. Tel: +49 89 462338 0.*

TL Audio Indigo Series

TL Audio's recently introduced Micro Series of valve products has been redesignated the Indigo Series and given new model numbers for launch at Frankfurt. The range comprises a 4-channel mic preamp, 2-channel, 4-band EQ, 2-channel parametric, 2-channel compressor and a 2-channel overdrive unit, all based round TL's established valve technology.

◆ *TL Audio, UK. Tel: +44 1462 490600.*

Spirit Folio additions

Alongside the Ghost, in what Soundcraft describes as a major new product launch, the Folio family will have new members announced at Frankfurt, shown together with other recent Spirit introductions including Spirit 8, Live 4² and Live 3².

◆ *Soundcraft, UK. Tel: +44 1707 665000.*

The increasingly familiar 8-channel modularity principle: ARX ULTM-8

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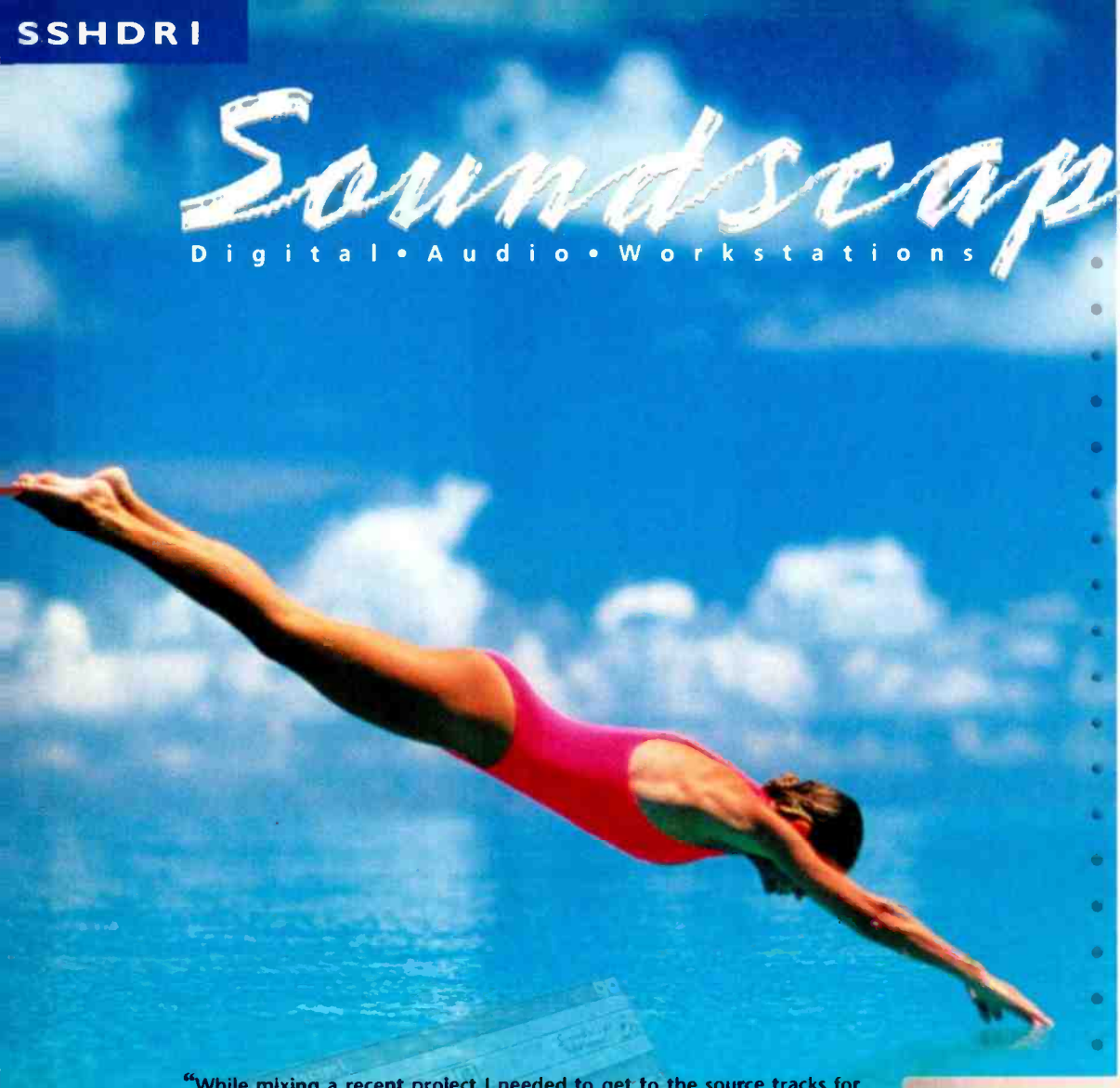

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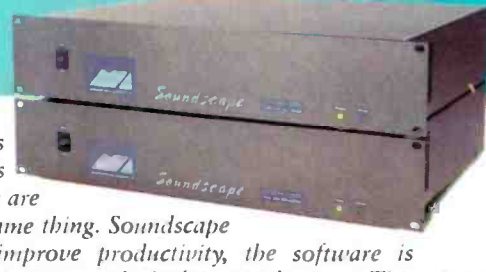
Alan Howarth, Sound Designer on such films as Haloween, Stargate, The Mask.



In this age of global communications good new travels fast... especially in this industry. Talk to any of our users (there are over 2000) and they'll all tell you the same thing. Soundscape SSHDR1 has the creative tools to improve productivity, the software is incredibly fast and reliable and saved them a great deal of time and money. This is why more and more of the worlds top professionals in sound design and motion picture editing are changing to Soundscape and the PC for their audio editing. From dialogue replacement and foley recording to that blockbuster movie soundtrack the SSHDR1 has some of the fastest and most powerful editing features available.

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DK-Audio MSD150C

The format of the MSD150C follows that of DK-Audio's MSD100 master stereo display. Like its forerunner, the MSD150C incorporates a variety of audio measuring functions into one display, showing an audio-vector oscilloscope *alongside* a phase meter and PPMs.

The significant difference between the new unit and the MSD100 is the use of colour on the screen. This, claims DK-Audio, is not simply to make the MSD150C look more attractive but to enhance the information and make it easier to read.

The MSD150C's reference level is user-selectable, as is the PPM type, offering Nordic, DIN and vu scales as options.

- *DK-Audio, Denmark. Tel: +45 44 53 02 55.*

Fostex D-80 recorder

In the wake of the DMT-8, Fostex has launched a new 8-track, hard-disk recorder: the D-80. This rackmounting recorder features 18mins of 44.1kHz recording on each track as standard (on a removable Quantum 850Mb drive), simultaneous recording on all eight tracks, an on-board MTC generator, modular connection to other D-80s and DMT-8s and a removable front panel which can be used as a remote control. The recording time can be increased by the installation of a 1.3Gb drive which will offer 30mins of recording per track at 44.1kHz. Unlike its stand-alone predecessor, the D-80 does not incorporate mixing functions

- *Fostex, Japan. Tel: +81 425 45 611.*
- *Fostex, US. Tel: +1 310 921 1112.*
- *SCV, UK. Tel: +44 171 241 3644.*

IN BRIEF

Better Betas—Shure's new mic range

Shure Beta improvements

Shure's Beta microphone range has been expanded and improved, with two new models, the Beta 52 and Beta 56 for kick drum and general percussion instrument use respectively. The familiar 57 and 58 now become the Beta 57A and Beta 58A; the 57 has a new hardened grille and added warmth and presence, while both models have new shock mounts to reduce handling noise.

- *Shure, US. Tel: +1 708 866 2200.*
- *Shure, Germany. Tel: +49 71 31 72 14 0.*

Waves plug-ins v2

Waves' range of software processing plug-ins has been updated to version 2.0. The range comprises the Q10 paragraphic EQ, the L1 Ultramaximizer, the C1 compressor-gate and the S1 stereo imager, and all now include mono-stereo and 'component' assignment in TDM and SDII. They also support native processing on Power Macintoshes, allowing use without DSP boards.

- *ks Waves, Israel. Tel: +972 3 5107667.*
- *World Marketing. Tel: +44 1637 877170.*

BSS DPR-901 II

BSS' successful DPR-901 dynamic equaliser has had two new features added to form the DPR-901 II. Its four bands can now be split into two 2-band channels, one handling low and low-mid ranges with the other processing upper mid and highs. In addition, a side-chain monitor facility is now fitted, allowing the processing to be more precisely tuned to the desired frequency.

- *BSS Audio, US. Tel: +1 818 830 8278.*
- *BSS Audio, UK. Tel: +44 1707 660667.*

SADiE TimeSync

SADiE's new TimeSync facility caters for the increasing number of film shoots using time code, allowing rushes to be synced quickly and easily from either Aaton or Arriflex format film. The two systems place code on the film in different ways but TimeSync can deal with either and cope with time-of-day code and short run-ups.

- *SA&V, UK. Tel: +44 1353 648888.*

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Visualise your next multitrack

Disk is the ***future*** for multitrack production, but ***most disk recorders have problems*** even compared to aging 24-track tape technology.

Fairlight's ***MFX3*** is the first ***genuine 24-track disk*** recorder. Like tape, it plays ***entire*** 24-track ***projects*** from ***a single*** piece of ***removable media*** (hard or optical[1] disk). But unlike tape, audio can be recorded in ***layers*** so that ***dozens of takes can be kept and compiled*** together on ***one track***.

For soundtrack production Fairlight's MFX3 is already the multitrack ***benchmark***, and ***more 24-track systems*** are in use than ***any other*** disk recorder.

40-bit floating-point DSPs provide MFX3's legendary audio ***transparency***, while its ***multi-channel*** digital audio ***bus*** allows internal digital routing and mixing. Which brings us to ***F.A.M.E.***, our new ***integrated*** all digital production ***environment***.

F.A.M.E. incorporates an ***Amek***[2]***-designed moving fader*** control surface, directly coupled to the MFX3 ***mixer engine***, to provide ***recording, editing*** and ***mixing*** for ***stereo*** and multi-speaker ***surround*** productions. MFX3 also has a special interface to ***Yamaha's***[2] ***02R*** console.

MFX3's blazingly fast ***Waveform Extension Bus*** is a ***realtime playback network***[3] that connects multiple workrooms into a ***shared audio environment***. In the future you can add Fairlight's ***'Audio Server***[3]***'*** which centralises projects and libraries.

Need ***more tracks? D.a.D.,*** our new ***Digital Audio Dubber*** can add 24 tracks of playback to your MFX3 system at ***minimal cost***. Multiple dubbers can be locked together to provide ***hundreds*** of extra ***tracks***.

We guarantee you'll ***fall in love*** with MFX3's lightning fast, ***stress-free*** user interface. Scrolling graphics, dedicated console, ***no mouse***, no trackball, no pull-down menus and no moving cursor means more ***creativity*** and more ***productivity***.

Fairlight's 20 years in digital audio has resulted in a suite of modern engineering solutions for professionals. ***MFX3 is the perfect 24-track***, and your entree to the ***superior all digital future***. No wonder more ***leading facilities*** are ***choosing MFX3*** as their multitrack solution.

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On the

Home to an Aladdin's cave of vintage gear and a favourite haunt of Lenny Kravitz, Hoboken's Waterfront Studios is quite unique. **EDWIN PFANZAGL** takes a dip

LOCATED IN THE basement of a former Lipton Tea factory, Waterfront Studios is described by the staff as 'a 24-track recording facility'. This is either misplaced modesty or, surely, a joke—there's a world of difference between a 'regular' SSL or Neve-equipped facility and this place. Word has it that Waterfront is the place to go if you are looking for 'philosophy sound'.

Waterfront's founders—Engineers Henry Hirsch and David Domanich—have not joined the trend of digital, ultra-clean production. On the contrary: they are looking to recapture the sound and energy of recordings of the 1960s and early 1970s, partly through the use of vintage equipment and partly through sound 'aesthetics'. And it works, because a lot of the studio's clients book the place because a 'vintage sound' is what they are trying to achieve. Lenny Kravitz, for example, recorded the1982 Vanessa Paradis album here.

Waterfront Studios: not just a '24-track recording facility'

Waterfront's control room is equipped with an old—and entirely discrete—Trident A-range 30:16:24 console. It offers a perfect starting point for a discussion of the technology of the 1960s and early 1970s. When the Beatles left Abbey Road, they left to go to Trident Studios. At the time, Trident was an 8-track facility and its owners wanted to build their own console, so they built what was to become the Trident A-range. Having made one such desk for themselves, they ended up building a further 13 for other studios...

'There are still nine of these consoles in existence,' comments Domanich. 'The majority are in LA, two or three are in Nashville, and I think there is also one in Canada. However, ours is the only one on the east coast. This console was in a studio called Chipping Norton in the suburbs of London for about six or seven years. They sold the board to the group Ten Years After. When their bass-player put the console on sale we brought it back here and restored it.

'It took over 700 hours of work because we had to clean everything and I had to find sources for all the original switches and stuff like that. All the monitor faders and the EQ faders had been made by companies that are out of business, so I was happy to find and buy old stock. There were just two modules that did not work but we had to double the size of the patchbay and put all the mics and lines on XLR connectors. It was quite an endeavour.

'The whole studio is based on old valve equipment—we have Langevin valve mic preamps from the 1960s, which are really excellent sounding, and two Pultec-Mavec mic preamps combined with EQ's, which are also great. In addition, we have two Neve modules, the 1066 mic preamp with 3-band

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waterfront

'The Waterfront EMI board is a 10:2 Redd 17 with 10, only four were built altogether. It seems that an unidentified Abbey Road engineer bought the console back in the late 1960s, and when he moved to Germany he kept it in his living room hooked up to a 2-track machine. Dan Alexander of Alexander Audio and another guy named Chris bought it as an investment, but they wanted a lot of money for it. Finally, we asked Lenny if he was interested, and so Henry and I went to San Francisco to check it out. They had a 4-track hooked up, and some really good microphones so we cut 'Please, Please Me' or some Beatles song just to check it out, and the thing was mint, it was flawless –nobody had used it in 20 years. 'These old consoles are built so well, they used very expensive switches, and these faders might have cost the equivalent of over $100 back in the late 1950s. All the transformers they made themselves, and the mic and line preamps are all Siemens V72s. They are so in vogue now because of this board that you can go and hire stereo pairs of V72s.

'The Redd 37 has eight inputs, four outputs and a 2-band filter–you can exchange the filter characteristic by changing the filter module. What the engineers have also included in this board are the so-called spreaders. Ken Townsend, the Studio Manager of Abbey Road told me that with stereo microphones connected you could do some kind of panoramic thing; you could bring the microphones in and out, I guess it must be done through phasing, although I really don't know. We want to hook them up sometime–as the Beatles experimented so much I'm sure they used them on string overdubs or whatever.

'Nobody really knows where the second Redd 37 console is. Most likely it got torn apart in order to use the mic preamps, because they are housed in cassettes and have individual power-supplies so they can easily be used separately. After this console they built the Redd 51, which was still valve technology, but the electronics was built by EMI themselves. The Redd 37 was used on all the recordings from the beginning of the Beatles era until the *Sgt. Pepper* album. We do also have five separate Siemens mic preamps, which we bought from a broadcast studio in Cologne.

'As far as monitoring is concerned we use the Urei 811Cs as main monitors. Nobody likes these speakers, generally, Urei even stopped making them. But we found out that if you can make your music sound good on them, your mix will translate also in other places. Our second set of main monitors are these old Altec 604 Es, which were also used at Abbey Road Studios. In the 1960s these were the traditional speakers which everybody used.'

Although enthusiastic about equipment, Domanich is in no danger of confusing kit and creativity; it is simply one element in the creative process. ☞

EQ, and two Helios modules from Olympic Studios in London. These mic preamps are all discrete electronics and they were part of one of the consoles at Olympic, on which a lot of Jimmy Hendrix, Led Zeppelin and Rolling Stones stuff was done.

'We also have an old Ampex valve mixer, the MX10, and 4 API mic preamps. The Fairchild 670 valve stereo compressor-limiter gets used more than any single unit in this studio besides a couple of favourite microphones. Right now we are checking out some old RCA mics from 1935. We have a rack of API EQ's like the 550a and the 560b Graphic, and we also have two old 9-band Motown EQ's–Tony Bongiovi at the Power Station in Manhattan also has a lot of them because he used to work for Motown.'

Above left: The control room with Altec 604 E speakers and Trident console. Above: David Domanich on the left with Henry Hirsch

THE STARS OF the Waterfront show are the EMI consoles.

'We have two old EMI valve recording consoles,' Domanich confirms, 'One is Lenny's, it is not part of the studio and the other one belongs to us. Lenny's board is a Redd 37 and was used at Abbey Road to cut tracks with the Beatles. As far as I know only two consoles like this were built.

EQUIPMENT

EMI Redd 17; Trident A-Range; 3M 16-track 2-inch, 8-track 1-inch; Otari MTR 90 MkII; Panasonic SV-3700; Studer A80 2-track 1/2-inch; Altec 604 E; JBL 100's; ROR-Cubes; Tannoy Red's; UREI 811C; Yamaha NS-10M

OUTBOARD

Ampex MX 1 (valve); Aphex Compellor; API 550a, 560b, Mic Preamps; dbx 160, 160x, 162; Drawmer Dual Gates; Effectron 2; EMT 140 (valve); Eventide H3000B Harmonizer; Fairchild 670 (valve); Flickenger 225-9 (valve); Gatex 4 Gates; Helios Mic Preamp, EQ; Langevin Mic Preamp (valve); Lexicon 224XL, PCM 41, PCM60; Loft 450; Massenburg GML Stereo EQ 8200; Motown EQ's; Neve 1066; Orban Spring Reverb 3B; Pultec EQH-2 (valve); Pultec Mavec Mic Preamp, EQ; RCA BA6a (valve), Mic Preamps (valve) from 1935; Roland R-880, SRV2000, SRV2500; tc electronic 2290; Valve-Tech CL1a; Urei 1176; Valley People De-esser; Yamaha Rev-7; Additional Siemens V72 (valve)

MICROPHONES

AKG 451, C61 (valve), C41, D12; beyerdynamic M88; Brüel & Kjær 4007; Crown PZM; ElectroVoice RE20; Neumann KM84, KM254 (valve), U67 (valve), U87; RCA 44 (ribbon), 77 (ribbon); Schoeps 221 (valve); Sennheiser 421, 441; Shure SM7, SM57, SM58, SM81; Spalden Stereo Ribbon; Telefunken KM56 (valve), U48 (valve)

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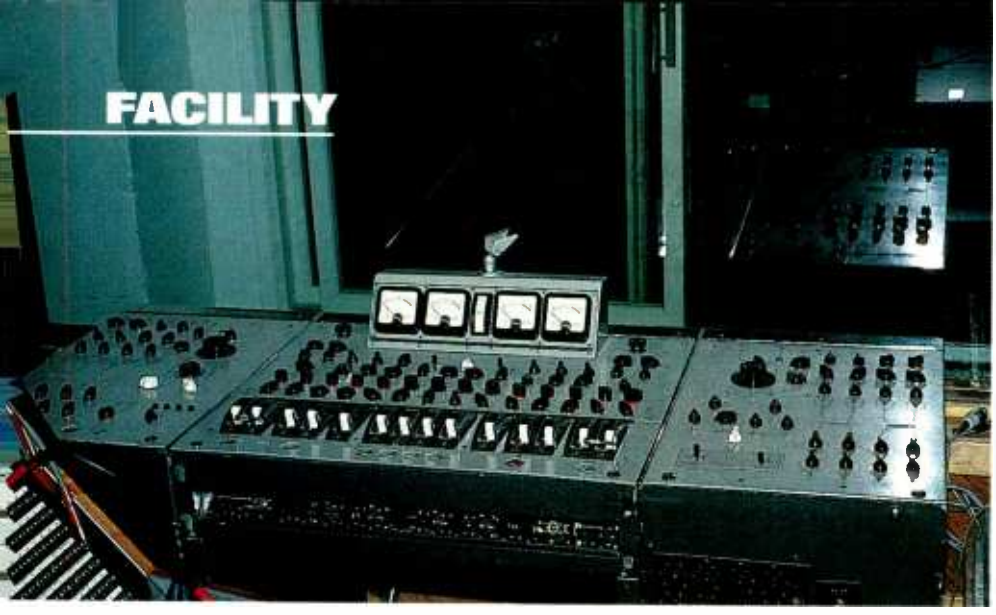

Lenny Kravitz' valve console: the EMI Redd 37

'When Lenny likes to work very fast, he wants to capture the spontaneity, the feeling of the moment,' he relates. 'With the song "Stop Draggin' Around" [on *Mama Said,* 1981] Henry and I had set up everything early in the morning and Lenny came up with that riff, and wanted to do a quick demo of it. Henry said: "We're not going to put it to the multitrack because you are going to like it, and we will have to stick to it!" And Lenny said: "I just need it to work out the song so let's put it down on a cassette".

Effects rack with vintage valve equipment

'I played the drums, Henry played the bass and Lenny the guitar, and we put it down on a cassette with the drums completely panned to one side, and the guitar to the other. Neither of us knew the form of the song, so we just ran it down once on the tape. When we listened to the thing Lenny said: "This is the way records should be made—transfer that to the multitrack, I want to write the vocals right now". So what you hear on the CD is basically from our cassette player.

'The same thing happens sometimes with rough mixes which Lenny takes home at night. He knows what he loves, and if he loves a mix one day, he will love it every day after. Some of the mixes on the last album are just the monitor mixes we used during the recording sessions.'

The recording techniques so revered by certain engineers are treated with considered irreverence by Domanich who regards the 'right' equipment as the key.

'Let's be honest; if you put up a drum set, it's a crap shoot. Even if it sounded good two days before, it might sound very bad today, depending completely on who is playing it. Same thing with a bass—you could bring 20 bass players in and it would sound in 20 different ways: the cleanness, the attack, the sustain... However, the recording has to happen in the studio —it doesn't matter what console or microphones you use, if the snare sounds like crap in the recording room, it's gonna sound the same in the control room.

'If you compare modern records to old recordings made at Abbey Road, the new ones are blown away. They are so processed, and they all sound the same because they are all made on SSL consoles. There are other studios out there who have old Neve boards, but we are particularly fond of our Trident A-range because of the EQ.'

The drums on Kravitz' records offer a significant departure from many of the records of which Domanich is critical.

'We record drums in the smaller of our two recording rooms because it has a drier acoustic,' he reveals. 'What happens in the industry today is that so many engineers have cut their teeth on 48-track machines they can't think about putting up a small number of microphones. It's ridiculous and it always sounds bad to me. We once had an engineer in here who put up 17 microphones on a 5-piece drum kit. Once I see something like that, I know that the guy cannot make a commitment.'

WATERFRONT WAS BUILT up slowly over a period of about 8½ years. During this time, as now, Domanich and Hirsch handled the lion's share of engineering duties. Today, the owners are supported by around four regular freelance engineers and an in-house maintenance man. But it seems impossible to discuss any aspect—from equipment through practice to history—of a studio that is so remarkable in its own right without coming back to Lenny Kravitz.

'Lenny was one of our first clients,' says Domanich laying part of the credit for the studios inception at the guitarist's feet. 'He had a drummer in his band who lived in Hoboken, and he had suggested coming to our place to cut some demos right after we had opened. Lenny was 21 years old when he came here first, and we just naturally became friends. Later, although he spends most of his time in LA, when he was going to record his first album, he got in touch with us because he wanted it to sound his way.'

And the Kravitz way is very much the Waterfront way. ⓢ

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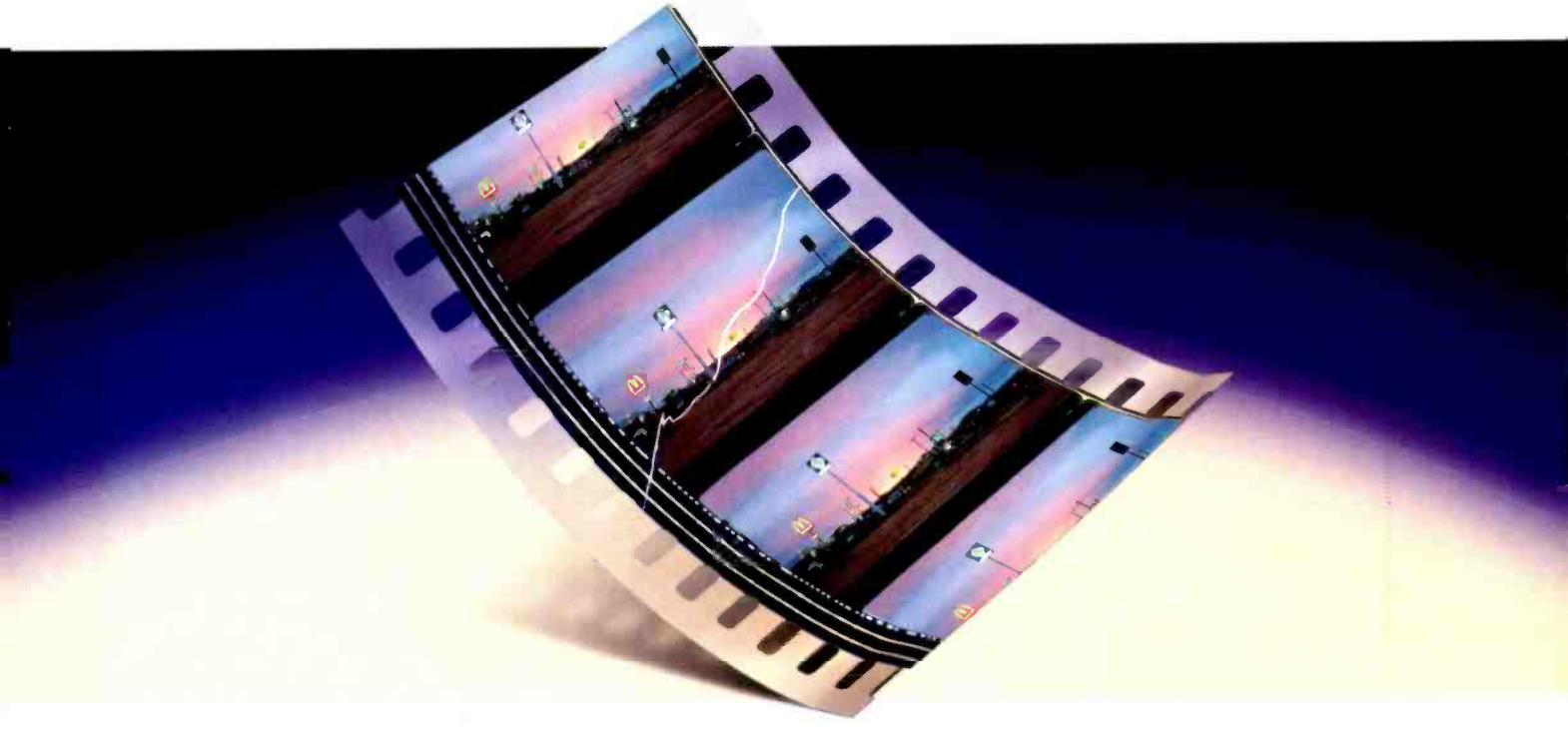

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Channel crossing: 2

In the second of an exclusive *Studio Sound* series on multichannel postproduction, THX pioneer **TOM HOLMAN** discusses the impact 5.1 channel sound will have on recording techniques

LAST MONTH the background behind the emerging adoption of 5.1 channel sound for the home was discussed. With 20 million surround-sound decoders in the field capable of delivering at least four audio channels, and with discrete 5.1 channel delivery now available on laser disc (and soon on DVD), the most rapidly growing trend in audio today has to be multichannel sound. Yet multichannel sound in its current incarnation has not really reached the music industry because recent developments have been driven by the video part of the entertainment industry. Still, hardware manufacturers surely want to produce a new generation of audio equipment to form a new wave of installations, much as the CD drove sales of new gear ten years ago. The time is near when music studios will face the multichannel challenge.

With this background, it is time to determine which parts of the development of 5.1 channel sound are relevant to a music-only experience. It is clear already that with the large installed base of surround-sound systems in the home, the current 5.1 channel systems should be respected as representing a critical mass capable of forming a market. On the other hand, there are some specific limitations to 5.1 channel sound which came up during its development which either should be respected, or should be eliminated by the use of more channels. It is our purpose here to describe what the advantages and limitations of the 5.1 channel system are, and in time to discuss what other approaches might be useful in multichannel sound, in order to go, in the words of *Toy Story*, 'to infinity and beyond'.

THE TWO reasons supporting the use of a third–centre–channel were discussed last month. The first is to 'anchor' the centre of the stereo sound field so that, for instance, when you slide back and forth across the console, the centre of the stereo field is anchored between the left and right loudspeakers.

The second is that frequency response is improved using a single centre loudspeaker compared with a phantom centre, since acoustic crosstalk from right loudspeaker to left ear, for instance, arrives later than the desired left loudspeaker sound. Given the crosstalk signal's response and timing due to diffraction about the head, at particular frequencies it subtracts from the main signal, causing a dip in response around 2kHz among other effects.

This may even be the reason why some microphones on the market have a 'presence' response peak in this region. If the microphone is usually auditioned centred in a phantom stereo soundfield, it will have been assessed with this crosstalk originated dip in place. Also, there is a lesson here: for 2-channel stereo it is necessary to first pan a microphone channel into position and then equalise, since panning an already equalised signal will result in response variation across the stereo soundfield.

Adding a centre loudspeaker-channel overcomes these problems. A third factor comes into play too. In an experiment I did at Lucasfilm in the early 1980s, I equalised the sound for centre using the ear canals of a dummy manikin as a reference point. Thus I eliminated the response dip, for all practical purposes. This was also a 'dentist chair' experiment, using a head holder so that subjects could not move about, eliminating that source of finding a difference. Then I added a centred vocalist in a stereo soundfield of music, switching between adding the vocalist by way of a phantom image, or an actual centre loudspeaker. What the subjects reported is that the two presentations sounded the same for level and response and general 'goodness' but the actual loudspeaker was simply 'clearer', that is, it took less work to hear. When I posed this to well-known psychoacousticians they agreed with my thesis that the actual point source centre should be easier to listen to as it simply uses up less brain power: the phantom is unknown in nature and 'uses up' brain power to form, whereas the point source loudspeaker produces a more natural sound image.

Theile at the IRT developed the term 'imaging distortion' as describing the warping effect on stereo sound-images due to off-centre listening. He experimented with two, three and four front channels, and found a very large improvement in imaging distortion going from two to three channels, and another large improvement from three to four. The difficulty with four channels across the front though is that it leaves the exact centre where many events occur still to be a phantom image with its attendant problems, so that if this line of reasoning is to be followed the best number of front channels is five. In fact, Todd AO in the 1950s and Sony SDDS in the 1990s do have 5-channel front capability, which does widen the listening area for best representation of frontal stereo-sound, but may be impractical for many installations such as in the home where there can be some restraints placed on seating to overcome the more extreme off-axis listening situations.

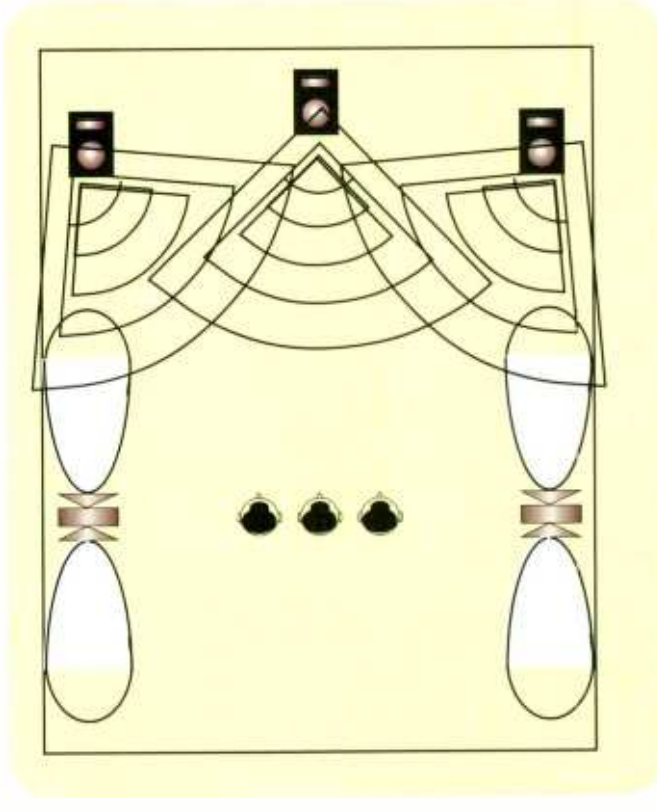

Fig.1: Five-channel home theatre with dipole surrounds

IN FILM APPLICATIONS, the centre channel is already in use. In fact, motion-picture sound has always had a centre channel. Film sound started with centred mono, and stereo added left, right, and surround to it. So there is nothing to change.

Pop music recording stays essentially the same when dealing with centre channel issues. When there is a 'hard centre' and the frequency response is better. Centred sound stays centred despite moving about, so there is more clarity in the centre of soundfield, ☞

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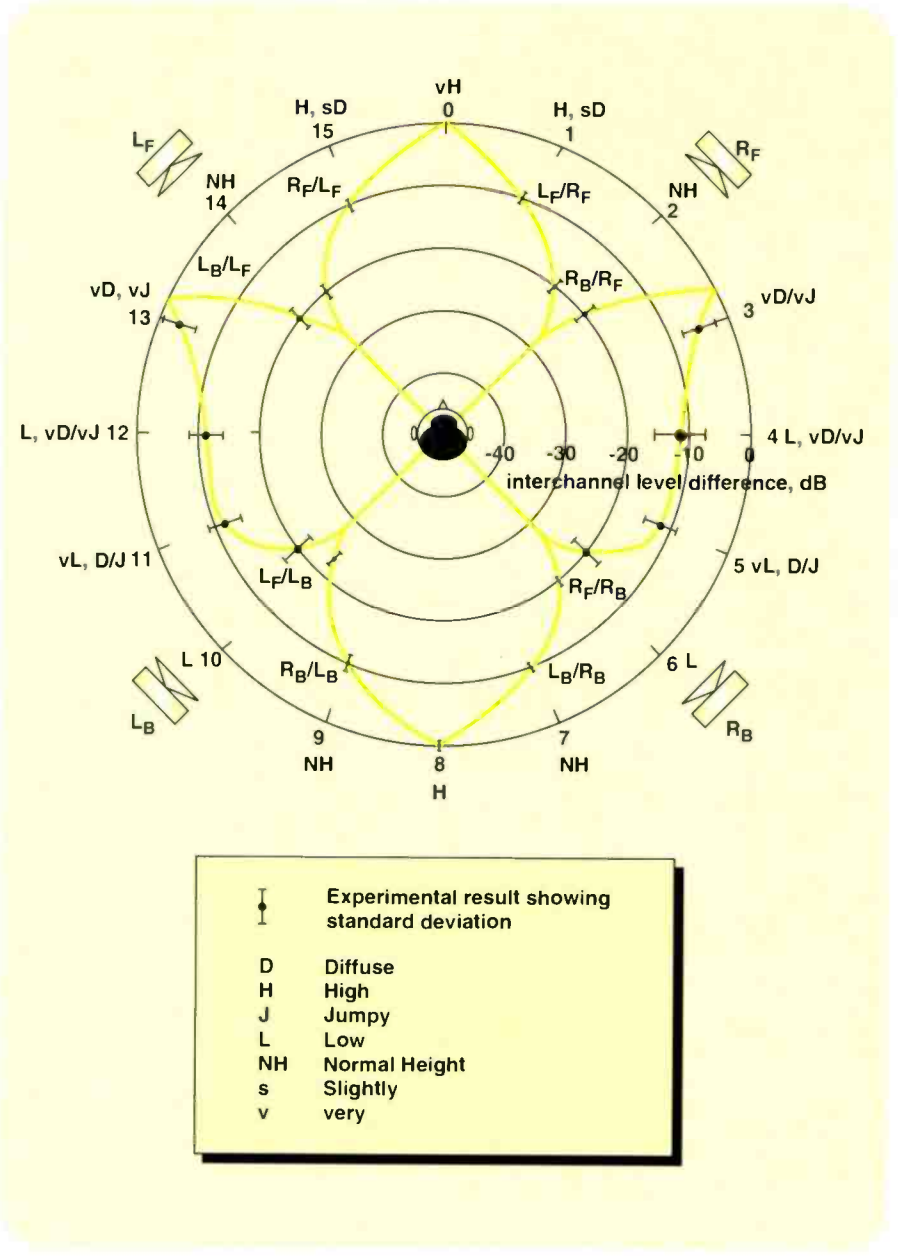

Fig.2: With classic amplitude panning among the channels the stereo soundfield is distorted to the side

and intermodulation is lessened. The main problems a centre channel brings up is to panning and console routeing, but the solutions are well known from film consoles, and to monitoring.

In classical music recording, the spaced omni technique, such as practiced in possibly its most pure form by Jack Renner at Telarc (three spaced Schoeps omnis across the front) is largely unaffected by adding a centre channel, since a centre microphone is already used. This is currently split between left and right but devoted to its own channel in the new system. Coincident technique may be developed.

While no current systems are available specifically for LCR miking, the development of second-order cardioids could make such a system practical, as pointed out by John Eargle and Elizabeth Cohen in their Fall 1995 AES convention preprint.

Once a coincident technique has been developed, there is no reason not to add additional microphones such as flanking pairs and spot mics to produce a better balance among the parts of an orchestra, say. The debate changes very little if a centre channel system is present, rather than a twin-channel system.

The primary difference between the 5.1 channel sound system developed for film and video and a music-only medium is that the existence of accompanying picture images causes changes to the meaning of sound coming from the direction of the picture, as contrasted to elsewhere in the stereo field—the surround sound. On-screen sound includes almost all dialogue, most music and most sound effects, especially ones for things you see happening on the screen. Left as part of the surround field are some very specific items which have been found to work best aesthetically. Among these are reverberation of on-screen events, general ambience establishing the space for the film to 'live in' and transient fly-bys such as those in *Indiana Jones and the Last Crusade*. Specific 'hard' effects are usually avoided, since if one's attention is

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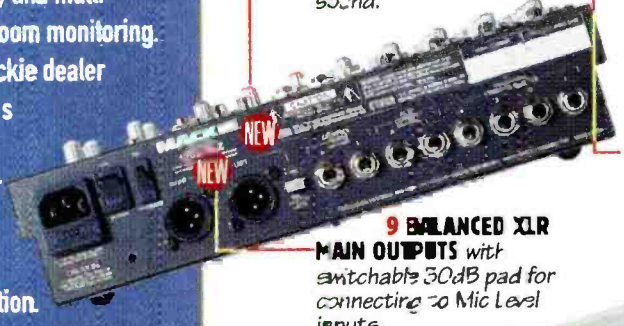

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drawn by a sound to the area off the screen one is probably going to wind up looking at a surround speaker, surely breaking the concentration of the viewer.

An interesting aesthetic decision made on dubbing stages all the time is how active the surround sound should be—little or heavily used, and for what? For instance, if the reverb returns are all kept on the screen the viewer is invited to look into the scene, without becoming overly involved in it. On the other hand, if the reverb returns include the surrounds, the audience is being more 'embedded' in the scene. Both of these approaches work, only for different things, and are alternated in interesting ways in some of the best films.

In virtually all of the cases found to be good aesthetically through long practice one does not expect a 'hard' sound image of surround sound for if there was one it would be distracting. For this reason, among others, cinemas use arrays of loudspeakers to produce the surround-sound component of the stereo soundfield, quite different from the approximately point-source screen loudspeakers. Thus there is an attempt to delocalise surround sound in the cinema. Home theatres with their aesthetic limitations may make use of special directivity loudspeakers emphasising diffuse-field sound instead of a surround array (**Fig.1**) to good effect.

It is interesting to point out that the 5.1-channel system for film was designed from the outset for three front channels having higher directivity loudspeakers for better sound images to accompany the picture images, and two surround channels having lower directivity for better sound envelop-ment from the surrounds. A widely held opinion today is that you've got to have five matched loudspeakers in order to operate 5.1 channel systems correctly. We'll see in next month's article why five matched loudspeakers do not produce a matched soundfield.

DIVORCED FROM a visual reference, the distinction between on-screen and off-screen sound vanishes. There may, however, still be a preference for front-localised sound since this is where our attention is usually focused. Quadraphonic sound 'wandered without direction or vision,' said John Eargle, because it was hard to sort out what kind of perspective was most desirable: one from an audience's perspective, or one 'inside the band'. This was only one of the problems with quad, which along with the competing systems of delivery, led to its demise. Actually, quad got started without a sound foundation in psychoacoustics. When it came to be thoroughly studied (by the BBC among others, in the mid-1970s) it was found lacking in what was claimed for it: sound images available from all directions.

Ratliff wrote a classic BBC report in 1975 whose primary results can be delivered in one complex graphic, shown in **Fig.2**. With classic amplitude panning among the channels, it is seen that the stereo soundfield is highly distorted to the sides. After all, matched loudspeakers do not produce sound images at the sides like they do as phantom images in front, for our heads are not symmetrical but have two ears on two sides, not four! The graphic shows for each interchannel level difference in dB where the sound will be imaged, and what the quality of that image will be. For instance, if there is a 0dB difference between LF and RF [L sub F and R sub F] one perceives a centre-front image, although it is perceived 'vH' (very High relative to the plane of the loud-speakers). For a level difference of 0dB between RF and RB the sound image is heard just a few degrees off the right-front loud-speaker, and the image is very diffuse and very 'jumpy'. Note that for an approximate level difference of 12dB between a front and a 'back' loudspeaker that the sound image appears at a large variety of angles, from about 90° from the front, to about 135°. So much for consistent all-round imaging from 'matched' loudspeakers.

Since the quad approach to imaging sound with four loudspeakers can now be seen to be lacking, it is worthwhile next to study how a multichannel sound system may be used. Among the questions to be asked are: How important is frontal sound compared to other directions? How important is it to maintain timbre despite direction? How important is it to have direct-field sound from some directions as opposed to diffuse-field sound? And, isn't Ambisonics a solution to these problems? We'll see in future installments.

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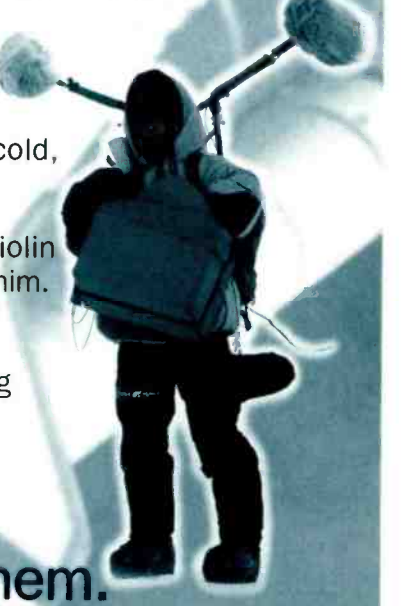

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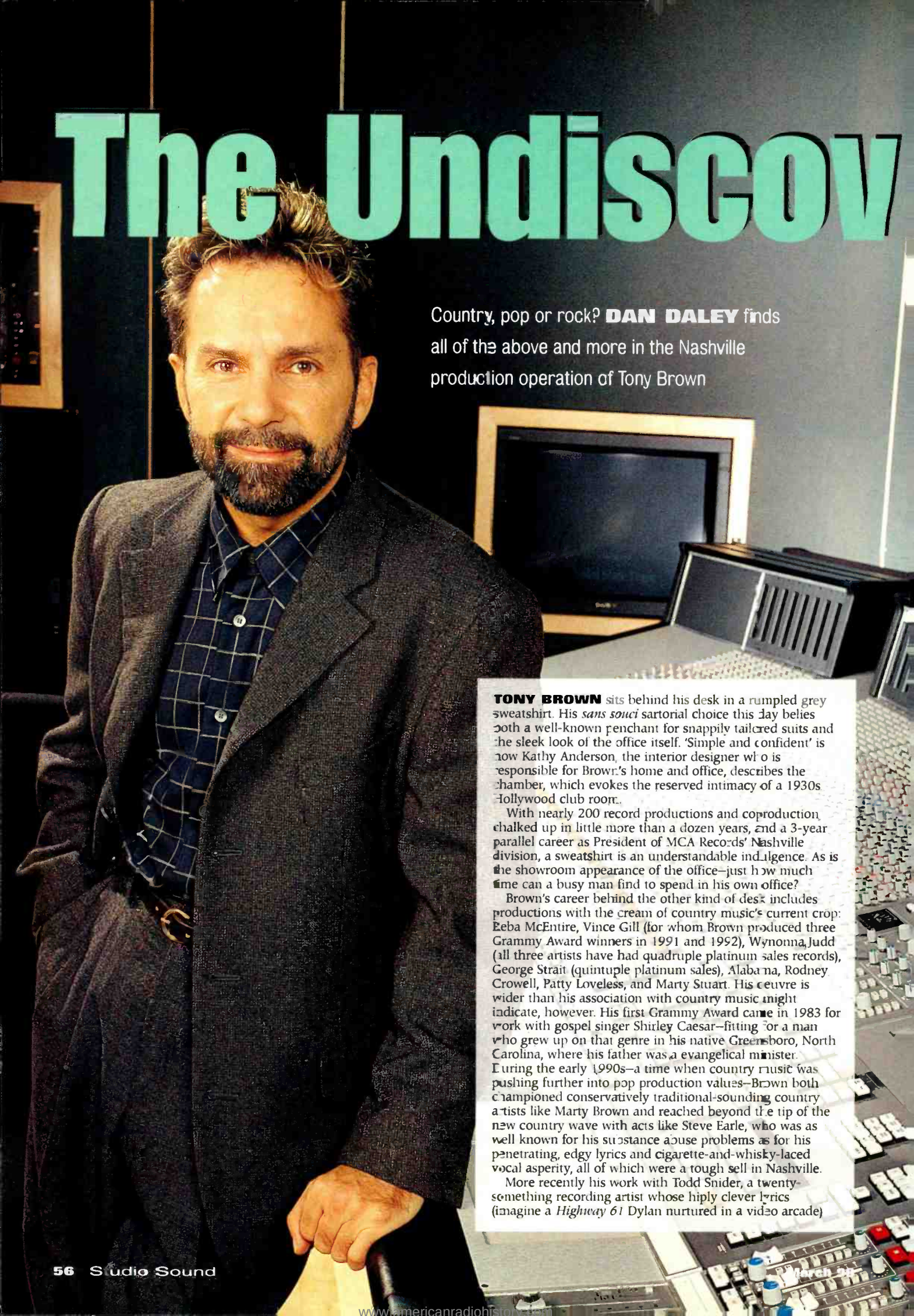
The Undiscov

Country, pop or rock? **DAN DALEY** finds all of the above and more in the Nashville production operation of Tony Brown



TONY BROWN sits behind his desk in a rumpled grey sweatshirt. His *sans souci* sartorial choice this day belies both a well-known penchant for snappily tailored suits and the sleek look of the office itself. 'Simple and confident' is how Kathy Anderson, the interior designer who is responsible for Brown's home and office, describes the chamber, which evokes the reserved intimacy of a 1930s Hollywood club room.

With nearly 200 record productions and coproduction chalked up in little more than a dozen years, and a 3-year parallel career as President of MCA Records' Nashville division, a sweatshirt is an understandable indulgence. As is the showroom appearance of the office—just how much time can a busy man find to spend in his own office?

Brown's career behind the other kind of desk includes productions with the cream of country music's current crop: Reba McEntire, Vince Gill (for whom Brown produced three Grammy Award winners in 1991 and 1992), Wynonna Judd (all three artists have had quadruple platinum sales records), George Strait (quintuple platinum sales), Alabama, Rodney Crowell, Patty Loveless, and Marty Stuart. His oeuvre is wider than his association with country music might indicate, however. His first Grammy Award came in 1983 for work with gospel singer Shirley Caesar—fitting for a man who grew up on that genre in his native Greensboro, North Carolina, where his father was a evangelical minister. During the early 1990s—a time when country music was pushing further into pop production values—Brown both championed conservatively traditional-sounding country artists like Marty Brown and reached beyond the tip of the new country wave with acts like Steve Earle, who was as well known for his substance abuse problems as for his penetrating, edgy lyrics and cigarette-and-whisky-laced vocal asperity, all of which were a tough sell in Nashville.

More recently his work with Todd Snider, a twenty-something recording artist whose hiply clever lyrics (imagine a *Highway 61* Dylan nurtured in a video arcade)

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ered Country

have virtually nothing to do with country music and almost everything to do with country's emerging young demographic. Sprinkle in one-offs with artists like Billy Joel (a cut on the Leonard Cohen tribute record) and pairings between country and pop-R&B artists (executive producer on the Reba McEntire-Natalie Cole duet on 'Rhythm, Country and Blues'), and soundtrack cuts ('Eight Seconds', 'Thelma & Louise', 'Honeymoon in Vegas'), and you have a pretty well-rounded production plate.

Context is everything. While Brown's output is seemingly superhuman compared with the number of records pop producers of his standing and tenure usually have accomplished, coproduction is a standard Nashville MO practiced by most of country music's major producers, enabling their discographies to run longer than their biographies.

'If you're going to produce ten acts a year, you've got to coproduce some of them,' he says. 'If I produce a record by myself, like I do Wynonna or Vince [Gill] or David Lee Murphy, then I'm there for every note that's struck. If I'm coproducing with another producer, or the engineer, then I don't have to be there for every single note. I do the tracks, I do the vocals, but I let someone else do the guitar overdubs, for instance. But if I'm coproducing with the artist, then I'm there for all of it.'

TONY BROWN fits that other Nashville paradigm; in addition to producing and heading a record company, he came into the business as a musician. His first gig of note was as pianist with country's Oak Ridge Boys in the early 1970s. In 1975, he moved into the keyboard spot with the Elvis Presley's touring band, Sweet Inspirations, and played with Presley until The King's death (or anonymous career move into 24-hour, convenience-store management, depending upon which tabloids you prefer) two years later. It was this gig that Brown refers to as a turning point in his career.

'It was a real pivotal point in my career in that it introduced me to the people that would become important to me artistically in the future,' Brown recalls.

Wheeling on the Elvis pivot, they turned him from a gospel piano player into a producer. Most notable among those responsible are Emmylou Harris, with whom Brown played with after Elvis. Then came time in Rodney Crowell's band, who took the burgeoning combination of traditional country and rock edge a few steps further. Crowell's future former wife, Roseanne Cash (daughter of Johnny) was another new associate of Brown. Records like her 'Seven Year Ache' and 'What Kind of Girl Am I' treated mature lyrical themes with rock sensibilities and country ornamentation.

Harris, Crowell and Cash also were at home with the Los Angeles connection that country music had developed in the 1970s with LA acts like the Flying Burrito Brothers and Poco, stretching country music in a way that the power brokers in Nashville at the time could neither completely comprehend nor condone. Brown's first A&R position was with Free Flight Records, a pop division of RCA Records. Brown moved to Los Angeles in 1979 for 18 months before returning to Nashville. But he returned a changed man.

'Before Elvis, I only listened to Gospel music,' he confesses. 'Free Flight was my first label gig and it was really bizarre because I did not like country—at least, I thought I didn't like it. I think it was because of the way the records were being made then. Very predictable and sterile. I looked down on it. So I moved to LA to work for RCA and continued to play with Emmylou on the weekends. That's when I also got in with Rodney and Roseanne.

'Being in pop music in LA, that's when I finally discovered that what I knew most about was country music,' he observes ironically. 'I was sort of in denial about the music. To me, Emmylou was a rock star, Rodney was a rock star. Then, all of a sudden, I realised that this is country music. This is really good. I like this.'

RCA closed Free Flight and Brown agreed to move back to Nashville to stay with RCA's country division. But he looked at the city and the music through very different eyes now: what LA musicians and producers had done with, and to, country revealed an untapped potential in the music that struck a common chord in Brown.

Brown's first country production came in 1983, and resulted in a hit, 'A Midnight Fire', for Steve Wariner on RCA.

'I look back on that record and the ones that came after it and I can hear the influence of not only Emmylou but also people like James Burton, the Elvis stuff, all mixed in with my Gospel stuff,' explains the producer. His signings for RCA, like Alabama, were edgy for their time, and his production career at that label was delayed by Division President Jerry Bradley who was willing to back Brown's signings but thought his production ideas were too pop for country.

Brown's lateral move to MCA Records' A&R department in 1984, though, put him on his current trajectory. Then-President, Jimmy Bowen—who had come from Los Angeles where he produced for Frank Sinatra and Dean Martin, as well as early incarnations of the Eagles—was receptive to Brown's fascination with fashion-forward country and the mid-1980s saw Brown sign and produce Lyle Lovett, Steve Earle and others.

'RCA gave me my shot at producing but I had to beg for it,' recalls Brown. 'But Bowen lured me over to MCA by guaranteeing me three acts to coproduce with him [they turned out to be Jimmy Buffet and two crossovers from RCA, Steve Wariner and Razzy Bailey] and that I'd be groomed as a producer. Bowen... made a bigger difference in Nashville than just about any other producer-executive before him. Studios were built to please him. [Soundstage Studios built a Tom Hidley design with no wall between control and recording rooms, as per Bowen's request. A wall has since been added.] This town had digital recording before New York or LA because of him. He pushed the budgets up that allowed records to be made more like pop records. I was attracted to his maverick ways and he intrigued me. We ended up banging heads at the end but he definitely influenced my aggressiveness and belief in myself as a producer by affirming my own instincts as to what country could be.'

Between his own signings and production inheritances from Bowen like Reba McEntire, Brown's discography was growing. He is

> '...it was really bizarre because I did not like country—at least, I thought I didn't like it. I think it was because of the way the records were being made then. Very predictable and sterile. I looked down on it.'

comfortable with the standard Nashville methodology that says that you pick the right songs, players and engineers. Then you mostly sit back and listen. In country, the critical parts of production take place before you enter the studio, with song and personnel choices, as contrasted with the more hands-on production approaches of other mainstream genres. In fact, Brown not only not plays on his own productions, but he finds he plays relatively little piano any more; that particular skill's place in his personal hierarchy has atrophied as its need in his career diminished.

STEVE MARCANTONIO, one of Nashville's busier engineers who has worked with Brown on a number of projects, says of him, 'What Tony does is cast musicians and engineers the way most producers cast songs for artists. Some producers in Nashville tend to work with the same musicians and engineers on almost every project they do because they're comfortable with them and it gets the project done faster. Tony picks players and engineers that he thinks work for a particular project. As a result, I think his records tend to be more diverse sounding.'

What also set Tony Brown apart was his ☞

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COUNTRY TECH

THAT THE SECRET to country-music production lies perhaps more in preproduction as far as the producer is concerned does not preclude other equally aesthetic prerogatives. Brown states a preference for Tom Hidley studio designs, such as Masterfonics' rooms and Sound Stage in Nashville, though he says he *rarely specifies* consoles and from there on down technologically his input tends to trail off. 'I do specify the tape machine and it's usually digital; I used to use the Mitsubishi 32-track but now I love the Sony 3348, though the Studer digital is less expensive and it locks up with a Sony. And if I had my choice, I'd cut on a Neve and mix on an SSL,' he says flatly. 'But most everybody here has SSLs and that's fine. I usually go with the artists' wishes. Some producers use only one studio, but I really like a change of scenery. If you give me the right musicians, good songs and a great engineer, I'll go with you anywhere to cut as long as the engineer is comfortable, because I'm not technical. I refer to everything in layman's terms. I know what I like and what I know about new gear comes from an engineer saying, here, check this new compressor out. But I go by my ears.'

The long-time secret of postproduction vocal-pitch repairs is coming out of the Nashville closet, and Brown acknowledges that they've become regular aspects of the premix stage of production. But, he says, 'I only [electronically] fix vocals as a last resort. I'd rather try to get every artist to give their best possible take. And only if I think it won't affect the character of the performance. I've actually fixed things before and then unfixed them for the effect of the performance. Some people do it on every single project, but I don't. Most country artists travel and work a lot and they give you one [time] window to cut the record. So if the vocals aren't quite there and they need to be fixed, then we fly them back in.'

There's one other aspect of posting a country record, one that's got more to do with politics than taste, and that's pleasing country radio, which even in the age of two national all-country video channels (TNN and CMT, which is also now carried on some European cable systems) is still the prime expositor of new records and artists.

'Country radio manipulates country music,' Brown concedes. 'I definitely know that there are parameters and you have to live with that. I continue to sort of try to push it just a little bit, but you know it when you cross the line.'

unconventional choice of artist, a policy he pursued even as he worked with more conventional choices. For almost every mainstream country success, Brown's repertoire contains an artist that fights his way out of the box.

'Todd Snider wanted to work with me because he loved Steve Earle's *Guitar Town*, and the label were saying "maybe we can get some of these songs played on country radio",' recalls Brown. 'But I said to him, "Todd, you're not a country artist. If we cut this thing to be played on country radio, for one thing, it wouldn't be honest, and it wouldn't be you". Instead I said, "let's cut this record to where it won't be played on country radio". It freed him up to use the lyrics he wanted—words like "shit", like "scumbag" and all that; he even said "fuck" or "fucker" on one of them. We left it all in there. It's not something country radio would have gone for.'

The record did get good response on Triple-A radio formats, and says Brown, 'The rules in pop music seem to be that there are no rules. But an artist like Alanis Morissette, those artists come about because they don't adhere to any rules, they basically just play their music. So that's the way I cut Todd Snider. I said, "you know what, if nobody plays this, screw 'em, let's just cut it".'

As with Steve Earle and Todd Snider, Tony Brown took a minimalist approach to the production of Lyle Lovett's records.

'Lyle's demos are what was his first album—I just mixed 'em. Everybody wanted to recut that stuff and he said, "I love these

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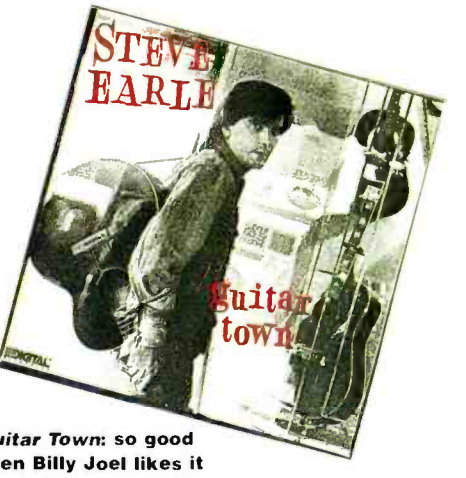
demos, they sound good to me, don't they to you?" And I said, "absolutely!"

'He had cut the multitracks in Arizona, and we just replaced a thing here and and a guitar there. On "Cowboy Man" we inserted a fiddle, but for the most part, that record was his demos. His voice was so refreshing but country radio started reading his lyrics and said he was a misogynist and that his hair was pretty wild and they kept saying he ought to be in pop music and just shoved him that way.'

Brown's affinity for pop music is sometimes as subtle as it seems apparent. It's as though as a producer he is torn between two increasingly interchangeable dimensions as country goes more pop and pop does things like throwing pedal steel guitars on its records (Sheryl Crow's 'All I Want To Do', for example).

I've asked Tony Brown a few times whether he has considered making pop records outside of Nashville and his response inevitably is that he doesn't need to leave Nashville to do that. The subtext seems also to say that he needs to make non-country records in Nashville to both buttress his contention that Nashville deserves to be perceived as more than just Hillbilly Central, and on a more personal, intimate level, to somehow reassure himself that his high degree of success with leading country artists has not implicitly undermined his credibility in other musical mainstreams.

'I saw an article someone had written about me saying that I didn't seem to have a clue about mainstream country because I kept associating myself with strange, left-of-centre artists. I just really want to work on things that I think I can contribute to. The most outrageous opportunity I've had was when Billy Joel came to town and did the track on the Leonard Cohen project. His manager called me from an airport and said



***Guitar Town*: so good even Billy Joel likes it**

Billy Joel would be calling me today. I said why? He said he loves *Guitar Town*. That record only sold about 350,000 units, but it continues to be my bench mark as a producer between pop and country. And I listen to it and it still sounds great, it sounds timeless and I keep thinking back what happened when I cut that record. And what happened was I sat back and let Steve [Earle] run the show. We really cut his stuff really honest; we were not trying to make him into George Strait; we just really thought we loved what he did.'

As mentioned earlier, Brown broadly fits the traditional mould of the Nashville Producer: he produces, runs a major label and is a musician. Where he diverges from the archetype is that he does not participate in the ownership of a studio, and his publishing interests are minimal, which reduces the potential for conflict of interest in song choices–historically a common issue in Nashville's music industry. But in the larger picture, it's Brown's ability to broadly conceptualise yet still remain within the bounds of the artists' vision that sets him apart as a Nashville producer. During the height of the 'tribute record' fever that gripped much of the American recording industry during the early 1990s, MCA-Nashville under Brown put together *Rhythm, Country & Blues*, a high-concept collection that used imaginative pairings such as B B King and George Jones, and Patty LaBelle and Travis Tritt, and resisted the strategies taken by some other Nashville labels, such as the Baby Boomer marketing appeal of the Nashville-Eagles redux or the country-does-the-Beatles tribute (nicely timed around the release of the Beatles' own remixes). Steering acts that refuse to be easily categorised, like Wynonna Judd and Lyle Lovett, through the maze of a pigeonhole-ready industry is no mean feat. And it's in this regard that Brown appears to use the power of his business office to extend his reach as a producer.

And in doing so, he is extending Nashville's own reach to horizons it once had and which have now been lost in the dust of country music's sales figures this decade.

'Nobody realises that some of the coolest rock and pop music of all times was recorded right here,' Brown stresses. 'Nashville in the beginning was a music centre for the Everly Brothers, Elvis, Roy Orbison... All this great rock and pop music was recorded and then it became a country music centre and people thought you could only cut country music here. And now, once again, we're trying to become a music centre. Now we're trying to send the word out that, hey, we're more than country here in Nashville. And it's hard as hell to get people to believe that.'

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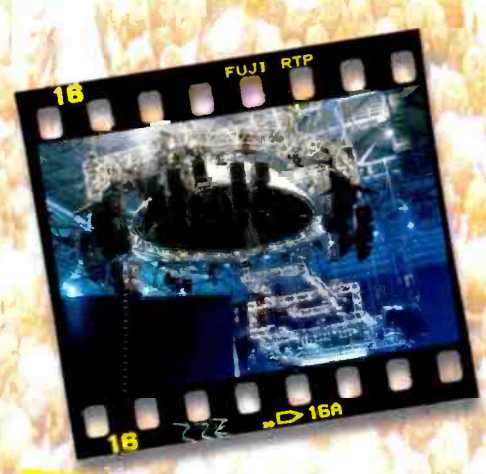

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The sound

Galactica's Project Head and Chief Engineer Farhad K DadyBurjor relaxing in the surroundings he spent two years putting together

Through Bollywood's acceptance of state-of-the-art technology, comes a move into modern music recording.

SUE SILLITOE visits a new studio in the heart of the world's largest film industry

ONE OF BOMBAY'S established television and film postproduction facilities recently joined the ranks of Euphonix users with the opening of a new room. As a result, Famous Cine Laboratories and Studios now believes that its clients can complete their entire postproduction process under one roof.

The company, which has been around for an impressive 50 years, began life as a film centre. But after years of neglect, owner and Director Arun Roongta decided it was time to make Famous Cine famous again and to this end he has been investing substantial sums of money in new equipment and facilities.

The new audio studio represents the icing on the cake for the facility which already houses seven air-conditioned shooting sets; a projection theatre with surround sound; automated multicamera and lighting setups; Betacam edit suites with an Alladin Digital Effects generator; telecine with MNR for restoring archive material and an Avid MediaComposer 8000 suite with the 3DVE option for on-line video editing.

'It has always been our intention to offer clients the very best facilities for complete production under one roof,' Roongta confirms. 'This is why, when we decided to build an audio studio, we specified the highest possible technical and aesthetic standards. I feel that what we have achieved is something that we can all be justifiably proud of.'

Although sound remains the poor relation in much film and TV post work, the technical staff at Famous were determined that their audio facility, aptly named Galactica, should be second to none. Project Head and Chief Engineer Farhad K DadyBurjor who was given the task of putting the studio together says his main priorities were the mixing console,the room acoustics and monitoring system.

'In India, room design is pretty much a hit and miss do-it-yourself affair based on the traditional but erroneous belief that a reasonably soundproofed room is a good room,' he explains. 'No-one ever worries about acoustic niceties such as RT time, slap-backs or early reflections and standing waves within the room.

'However, I reasoned that no matter how good the gear you put into it, a great-sounding room will always be just that —a great-sounding room. I wanted a studio that was acoustically correct and carefully tuned to sound fantastic. I believed that would be an investment we would never regret—money well spent.'

In order to achieve an acoustically correct environment, DadyBurjor appointed UK acoustic consultancy Munro Associates to design and oversee the building of the room.

'I had been toying with the idea of using an acoustic consultancy on the project, but I wasn't finally convinced until I visited Solid State Logic's headquarters in Oxfordshire. I was very impressed by the Munro-designed demo room as it is a wonderfully simple construction that sounds as good as it looks. I just knew that a room of this type would work perfectly in India.'

DadyBurjor had already specified DynaudioAcoustics monitors after hearing a pair of M3s at London's Air Studios and Andy Munro's involvement with DynaudioAcoustics was yet another reason for awarding the design contract.

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# of music

'I was convinced that the contract had to go to them because their designs blend so well with DynaudioAcoustics monitoring systems,' DadyBurjor adds. 'After hearing the M3s at Air, I was sure that these were the type of speakers I could live comfortably with at different monitoring levels for the extended periods of time that studio work demands.

'What I particularly like about them is that the basic character of the speaker sound remains constant at all monitoring levels, from whisper soft to window-rattling loud. Also, the transients are quick and clean, the imaging is superb and the quality of the sound always seems effortlessly transparent. To standardise the quality level of the monitoring, we also bought a DynaudioAcoustics close-field system. However, for those who insist we do also have a pair of Yamaha NS10Ms.'

FAMOUS' NEW ROOM was designed to be capable of handling anything from background scoring, audio postproduction and album work, though the Euphonix desk makes it especially suited to post work.

Munro Associate's Amber Naqvi, who was responsible for the design and project management of Galactica, says: 'It is a fairly conventional, no compromise, Munro design with a lot of time spent on detailed acoustic predictions before the final design was reached.

'Specialised consultants were employed for air-conditioning design and considerable thought was given to the interior design of the whole facility. One of our main concerns was working with the acoustic material that was available locally—we had to improvise on a few occasions to achieve the correct acoustic performance. In the end it worked out very well and we are pleased to complete our first project in India—a world-class facility in every sense.'

Having sorted out the design and monitoring, DadyBurjor turned his attention to the choice of console—a decision he admits was not easy given the level of investment that was being made in just one piece of equipment.

'When we decided to build this studio, I knew that there were already a plethora of studios around offering simple and cost-effective 8-bus consoles and modular 8-track digital recorders,' he says. 'However, while this type of studio was already at that point a commercial success, I was hearing rumblings of dissent from engineers, producers and clients who were questioning the performance of these machines within the postproduction environment.

'We decided that someone had to take a stand for a better technical working environment, especially as there is now an increased awareness and demand for quality, both within the creative process as well as in the finished product.'

In order to check out all the console options, DadyBurjor spent some time in the UK talking to various manufacturers and demoing a number of desks.

'I wanted to be absolutely sure we were making an informed choice. Because of the way things work in India, I was looking for a desk that was optimally functional, upgradeable and had a solid history of innovation and product support behind it since it would have to undergo a long-term period of usage.'

> 'I was looking for a desk that was optimally functional, upgradeable and had a solid history of innovation and product support behind it'

Although the 40-fader CS2000D was not initially top of DadyBurjor's list because of the cost involved, he claims that within five minutes of sitting at the board he knew it was the right desk for the studio. 'I was completely floored at the sheer power, flexibility, upgradeability and neutral sound quality of the console. There is undoubtedly a formidable amount of data to absorb, even for engineers who are used to fairly complex boards. But I soon realised that it wasn't a difficult machine to operate because it is so logically laid out.

'With the addition of the Digital Studio Controller, the automation extends to storing tape locations, effects-unit presets, machine control and many other functions which means engineers can recall exactly the same mix or tracking setup at any given time in the future. For the first time one can do A-B comparisons of the mixes by switching between them in real time at the push of a button. These features not only save time but also allow clients to make repetitive creative decisions in an instant. Painful and demanding reconstruction of mixes becomes redundant.'

In keeping with the state-of-the-art feel of the studio, Famous Cine Laboratories and Studios has installed an Otari RADAR ☞

MUSIC RECORDING

FAMOUS CINE Laboratories and Studios' Galactica room is not designed for audio postproduction work only, although the Euphonix automation capabilities ensures that a lot of people will do post work at the studio, says Project Head and Chief Engineer Farhad DadyBurjor.

However, he is keen to point out that the studio's large recording area makes it just as well suited to album projects.

'In India, the economic reality is that there is more money in postproduction for TV and film than in music recording for album releases. As things stand, I envisage that 80% of our work will come from postproduction film clients and the remaining 20% will be straight music recording.

'However, we have not ignored the possibility of album projects, which is why—when we designed the studio—we insisted on having a recording area that was big enough to take a rock band complete with drum kit.'

Even though it is equipped with the very latest gear, Galactica is ridiculously cheap to hire by Western standards —going out at approximately £50 an hour. Although this still seems too expensive for many Indian recording artists, DadyBurjor believes it will be possible to attract overseas recording artists who may be tempted by the combination of state-of-the-art equipment, low rates and an unusual location.

'It would be great for the studio to attract artists from Europe and the US because we need more interaction with Western clients. For overseas bands there are obvious attractions in working here. For one thing it is a very cost-effective way of using the latest technology—and for another it would be a new experience for many bands because we are very close to places like Goa.

'Although we are not a residential studio, accommodation in India is very cheap and the whole package could prove to be quite tempting.'

Initially, though, DadyBurjor anticipates that most of the studio's work will come from local clients.

'We already have a built-in post-production clientele because apart from the technical facilities on site, Famous Cine Laboratories and Studios also lets office space to a number of television production companies—all of which are keen to use the new room.

'Until we opened Galactica, these clients were having to go elsewhere for their audio postproduction. But now we have added the missing link they are literally queuing up to use the studio.'

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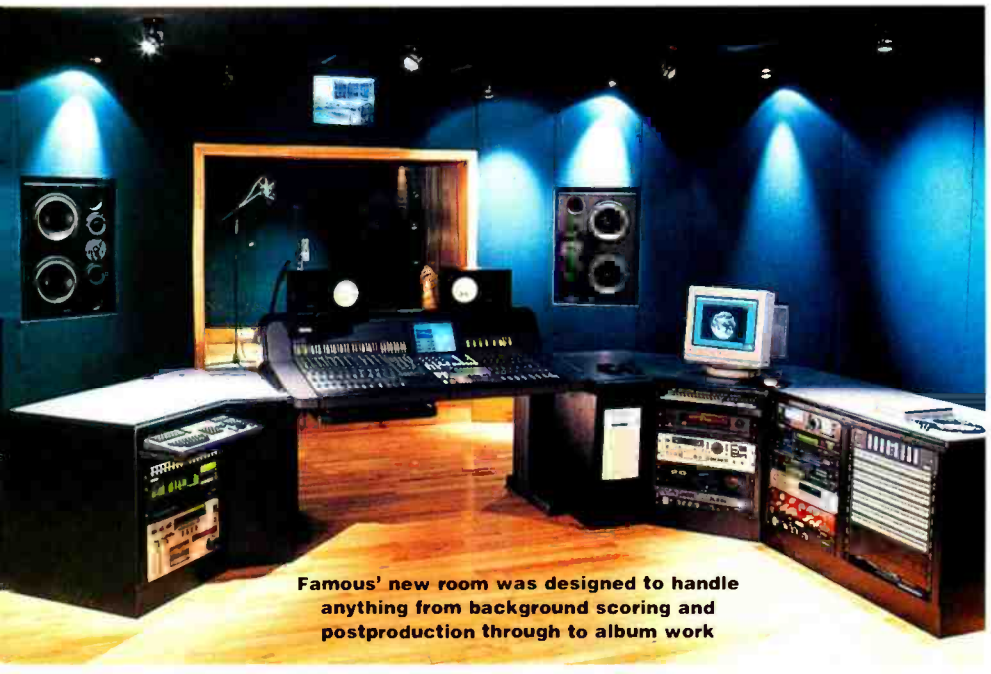

Famous' new room was designed to handle anything from background scoring and postproduction through to album work

24-track digital recorder.

'I considered a 24-track analogue as well as the 24-track Sony DASH machine,' DadyBurjor says, 'but the running cost in terms of blank media is phenomenal. As this is an expense that would have to be passed on to the client, I felt that they were just not cost-effective for the Indian marketplace.'

He eventually opted for the RADAR system because, like many, he sees hard-disk recording as the medium of the future and because the machine works just like a large format multitrack, making it easy for clients to use.

'As it is so easy to operate, the hard disk is almost transparent in usage, simply replacing the tape as a storage medium. Like the Euphonix, the RADAR is also software based so future upgrades are available on diskette—and of course it sounds wonderful, which is the most important reason for choosing it.'

Alongside the investment in the console, room design and monitoring, the company has also spent a considerable amount of money on outboard gear from Eventide, Lexicon, tc electronic, Roland and Focusrite. The room also boasts time-code DAT machines and a CD recorder which will give clients even greater flexibility in a choice of mastering media. There is also a Digidesign hard-disk editing system for CD-R premastering and editing as well as a huge collection of sound effects libraries.

'Mastering a project on CD-R is advantageous because the master can be played back on any consumer CD player with the same precision and sound quality as one gets in the studio environment. Another advantage is that CD is inherently a more stable medium than DAT for archival purposes.'

Famous' Galactica audio suite is now up and running—an achievement that represents the culmination of two years hard work for DadyBurjor and his technical team. So far, the response from clients has been overwhelmingly supportive: 'They love the fact that they can now do everything under one roof,' says DadyBurjor.

DadyBurjor believes it will be possible to attract overseas recording artists who may be tempted by the combination of state-of-the-art equipment, low rates—£50 an hour – and an usual location

'From our point of view this studio has been well worth the investment. Everyone who has seen it has been stunned at how good it looks and sounds.'

Famous Cine Laboratories and Studios is now starting work on a second audio suite, again designed by Munro Associates, which will be dedicated to postproduction work. This will be equipped with a fully digital desk—probably a Logic II—and an extensive Digidesign Pro Tools II system. DadyBurjor adds that a third audio room designed for surround-sound work, dedicated film mixing and scoring is a distinct possibility for the future.

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The great cable stitch-up

The UK offers a concise model for much of what is going on in the way that international attitudes to cable vary, writes **KEVIN HILTON**

While watching the Joe Dante movie *Gremlins* recently, I was reminded that the US perception of cable TV is that it is very cool indeed. The arch rival of the film's hero was trying to muscle in on his girlfriend, offering to show her his new flat, which—and this he thought was the stunning blow—'had cable'.

Europe appears to have a more sensible attitude towards this technology, with large urban areas now fully cabled up and offering a wide range of local, national and international services. The city of Amsterdam is a particularly good example of this: Brits alone in the Dutch fun capital can console themselves with relays of BBC services, particularly if they're sad enough not to venture out and find something better to do.

Perhaps this is really a side effect: many people in the UK still regard cable as something of a novelty. The Independent Television Commission (ITC), which licenses and regulates TV services in the UK, has issued numerous press releases detailing the tendering for, and awarding of, new franchises but, as yet, cable coverage here still appears to be patchy. Almost as patchy as the roads that have to be dug up when the actual cables are laid.

A colleague recently remarked that they—to the British there is always a mysterious 'they' digging up the roads for seemingly no good reason—were carrying out excavations in his street. While he accepted the inconvenience with typical Brit stoicism and resignation, he did voice the hope that 'they' would put down cable while 'they' were about it.

LOOKING AT THE figures, the initial conclusion is that cable is, indeed, beginning to take hold in the UK, although it is upsetting some nature lovers who are worried about excavations under-mining tree roots in leafy suburban areas. According to this year's *Guardian Media Guide*, the cable TV market is turning over £250 million, with companies just starting to pay back the £10m spent on digging holes and laying new cabling.

The big success story is the town of Northampton, where over half of the homes that have access to cable are connected. In other parts of the country it appears a little more arbitrary; where one area may be fully cabled up, a neighbourhood nearby will be completely bereft of the facility.

Despite this piecemeal implementation, cable was starting to be seen as a lucrative area. Such companies as Telewest (one of the leaders) has used the stock market to gain extra finance, while also absorbing rivals (SBC Cablecomms in Telewest's case).

Although all this activity shows a change in the UK attitude towards cable, it is significant that the main players in the field are not British, or wholly British, companies. The major influence is North American, with such companies as Diamond Cable, Nynex, and South-Western Bell either owning operators or holding large shares in them.

Mainland European companies have also seen opportunities here but the entire market was shocked recently when one of the big Continental concerns, Le Groupe Vidéotron, announced that it was to pull out of the UK after eight years. It is to sell its 56% stake in Videotron Holdings, which runs franchises in London and the south-east. From comments made by its Chairman, the company does not seem to see the UK as an expanding cable marketplace.

Perhaps something like this should have been expected. The UK is a small country and only a certain number of players can be sustained. Examining the names that are left also shows where the market is going: the word 'Tel' crops up in the title of many of them and, as with satellite communications, telephony is seen as more of a priority than the more glamourous and obvious area of entertainment.

In the middle of last year the ITC reported that half a million new telephone lines had been installed by cable companies over the period of a year. The growing importance of cable as a provider of telephony services is demonstrated in other ways, away from statistics, some of which are purely semantic.

When the ITC was created under the 1990 Broadcasting Act, the Cable Authority, which had previously overseen the sector, was absorbed into the new body, thereby taking it out of its isolated niche. The industry's trade organisation, the Cable Television Association, dropped 'TV' in favour of 'Communications', further demonstrating the convergence of technological areas.

As broadcasting and telecommunications have come closer together, it might have been thought that the former would have dominated, given its higher profile. But telcos are the senior partners and this is being reflected in a number of ways. The UK government plans to give licensing powers for encryption services to OFTEL, the communications regulator, rather than the ITC, which has already lost out to OFTEL on conditional access systems.

Brits alone in the Dutch fun capital can console themselves with relays of BBC services, if they're sad enough not to find something better to do

Just to show that this is not merely the direction of one political party, the Labour Opposition has said that if it comes to power it will scrap the Radio Authority and form a new broadcasting regulator, OFCOM. Note the prominence of 'Com'.

While delivery mediums are being increasingly shared this does not mean that the expertise and knowledge in administrating them is the same as well. The success of cable as a viable alternative to the more conventional forms of broadcasting is to be admired—it should not necessarily be seen a sign to homogenise everything. Life is getting too samey as it is.

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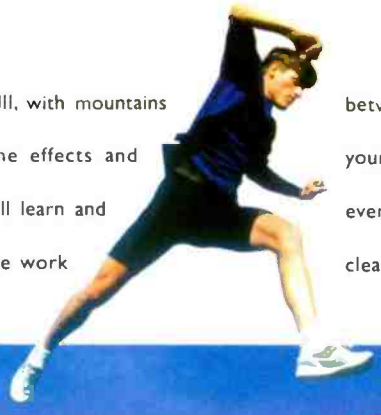

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Dimensional

DALLAS SIMPSON explores the world of opportunities offered by binaural recording and offers a timely insight into the finer workings of our hearing

INTEREST IN 3-D sound processing is on the rise. The time is right: many recordists are ready to explore this medium of sound presentation, and the introduction of inexpensive preproduction techniques of binaural sound recording is overdue.

In this setting, it is appropriate to establish a dimensional theory of creativity in sound: such a theory is revolutionary as, with it, we are able to define reality and creativity in a way which does not limit either the nature of reality or the expression of creativity. Once the underlying principles are understood such knowledge may inspire a new direction both in creative art as a whole and sound art in particular.

There have been three major steps in the dimensional evolution of sound recording: mono, stereo and 3-dimensional (binaural and surround sound) techniques. In binaural systems the 3-D sound source is compacted onto two channels of conventional stereo and then may be reproduced on headphones or speakers. The word 'binaural' actually refers to the use of ears and, historically, the technique arose through the development of the dummy head. The recent development of electronic processors to create surround sound from mono or stereo sources on two reproduced channels is not strictly a binaural process. Hence it is referred to as '3-D sound processing', but in theory the results should be the same as directly recorded binaural (rarely the case in practice), and the source of sound may be perceived as arising from any location from within a spherical soundfield around the head, defined by front-rear, left-right, above-below planes. One of the most stunning aspects of binaural sound, especially when heard for the first time on headphones, is the realisation that you are hearing sounds apparently coming from empty space from outside your head. This is totally unlike the normal perception of stereo sound on headphones which mainly sits between your ears or may hover around your forehead.

Q Sound and RSS (Roland Sound Space) systems are examples of the spatial electronic processing of mono or stereo sourced material intended to provide a 3-dimensional listening experience. At the encoding stage, these approaches employ sophisticated filtering and delay algorithms which can be applied to a monophonic sound source to simulate the effect of sound from a specific location in space. Movement in three dimensions, rotation and similar effects can be controlled manually, but the preference is for full computer MIDI control. Personally, I would refer to such equipment as 'stereo spatial enhancement' rather than true 3-D or binaural processing as sound presentation, if expressed in a true 3-D soundfield, should enable sound to be located anywhere in three dimensions of space.

There is currently only one way of achieving this using a 2-channel source and this is to use stereo headphones with some form of binaural encoding. If the sound is encoded at source using a microphone technique the dummy head, or my own special device, can be used.

Recording with a dummy head or the 'Simpson Device' can produce stunning 3-D sound on headphones. Aircraft flying overhead, the crunch of footsteps at your feet, someone talking immediately to your left, a car passing in front of you and a train behind you are all possible simultaneously on stereo headphones. But this is what distinguishes a full-blown binaural presentation from the rest, and the effect—especially when heard for the first time—is impressive.

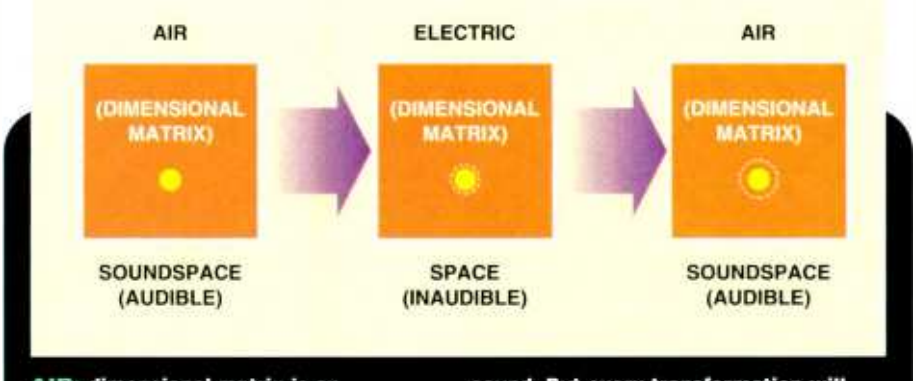
Creative potential is phenomenal but comes at a price (not necessarily purely financial) for it involves sophisticated perceptual encoding, which means that some speaker compatibility must be sacrificed. Reduction to mono can give rise to phasing and tonal distortions which for some material content may be unacceptable. And this is where the advancement of full binaural sound as a commercial proposition is failing at present.

I am confident that it is possible to market a device that would allow the direct recording of full 3-D binaural stereo at a price to take your breath away—and I'm not even talking three figures.

FIRST A LITTLE diversion into the theory of 3-D binaural sound recording.

The perception of 3-dimensional hearing and the recording of binaural sound on two stereo channels are intimately related, it is a combination of psychoacoustics and physics. The trick is essentially the same as the encoding of two stereo 3-D image pairs on a single, flat, 2-dimensional paper surface as found in Magic Eye 3-D pictures. A carrier is required to encode information of a third spatial dimension. Hence a pseudorandom pattern, often with a repeat distance, is used as a carrier and the two stereo images are encoded as discontinuities or interferences within the pattern. Each image is displaced by about 2–3cm and when the 3-D image is viewed, by temporarily shifting the focal plane of your eyes, placing a single finger on the surface of the picture will be perceived as two fingers separated by the image displacement distance. The problem with this technique is that the picture is covered with the carrier pattern, but otherwise it's a great illusion. The innovation is that two physically separate images have been encoded onto one image —this is the incomprehensible pattern that is first seen.

An important consequence of the above visual analogy is that we recognise the essential nature of some form of carrier in the sound information which enables us to



AIR: dimensional matrix is an expression of sound 'potentiality'.
ELECTRIC: dimensional matrix is an expression of sound 'potentiality' transferred into 'electrical space'. (The signal.)
AIR: dimensional matrix is an expression of sound 'potentiality' as audible sound. But every transformation will introduce some error however small.
NOTE: that there must be some transformational loss at every transformation. This information loss gives rise to distortion and noise of various types.

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ecstasy

encode the spatial dimensions within conventional stereo.

It is the presence of such a carrier which can lead to both incompatibility between different systems of sound reproduction and tonal distortions if the encoding is not perfect or not optimised, interferences occur at the playback stage or when we attempt further spatial compaction such as reducing to mono.

All the above arise due to 'distortion of spatial encoding', particularly on speaker playback and, as we shall see, are in fact dimensional phenomena. Because of these inherent problems, many electronic 3-D sound-processing systems can suffer phasing and tonal distortions. In a sense this is a consequence of the compaction of three spatial dimensions of the sound space and most manufactures of these devices place restrictions on the encoding to minimise compatibility problems, each manufacturer choosing their own particular compromise with its inherent advantages and disadvantages. For instance, vertical movement inevitably introduces a tonal distortion akin to the gentle use of a 'wah wah' pedal in the upper-mid frequencies. While this may be acceptable for an ascending rocket but it may be disturbing to hear a violin passing heavenward. And the effect is totally devastating if reduced to mono. Because our perception is critically tuned to natural sounds we tend to ignore such tonal distortions when we hear them naturally.

So what is the nature of the information carrier in sound? Any sound source from any location in space must impinge upon each of our ears and the separation distance of the two ears, the shading of the mass and shape of the head, and the interference produced by the asymmetrical conformation of the external ear provides the transformation of the sound wave. This physical transformation, which must be highly dependent upon the location of the source of sound relative to the head, is what the brain then decodes to perceive where the origination of a particular sound was located in real space.

We then have an interference pattern superimposed onto the sound which our brain can decode and determine exactly where the sound originated from. We are attempting to record this interference pattern by placing microphones into the ears of the dummy head. On playback we must reproduce this sound exactly as it would have appeared at our ears but we must avoid any further interference pattern arising on playback from the presence of our head and ears as we are listening. Any such additional encoding on playback I refer to as 'secondary encoding'. In-the-ear headphones are, for this reason, the best means of delivery. Open headphones come a close second but closed headphones can, in some cases, cause spatial distortion due to secondary coding. Note that this is spatial ☞

THE DIMENSIONAL THEORY OF HEARING.

IN A DIMENSIONAL MODEL we consider hearing as a continuous projective process into attributed spaces within the auditory cortex. Each attributed space, or 'audiode' is a specialised function within the auditory cortex which allows the expression of a particular quality of the sound being heard within it. Any other quality of perceived sound cannot be expressed in that particular audiode and hence will not be detected. In conventional physiology we may think of each audiode as a specialised neurone which responds to a single attribute of quality of the the perceived sound, in fact each audiode may consist of a collection of neurones and other unspecified physiology and neurology within the hearing apparatus.

At this level of analysis it may be seen that perception is 'automatic' once the audiodes have been brought into existence, and requires no processing or calculation in the conventional sense. Every aspect of distinction of an audible sound will be projected simultaneously onto a set of audiodes as sound is received by the ear. As each audiode will only allow the detection of one unique characteristic, we may regard the perception of sound as a continuous projection onto the total audiode set. Interrogation by the active consciousness allows the continuous perception of sound.

In the case of binaural hearing, we may consider the perception of the location of a sound source as the sum of the expressions of the sound within a set of spatial audioles which are created at birth as part of our 'hard wired' hearing neurophysiology. The rudimentary audioles may be modified and developed in response to perceived sound as part of the developmental plasticity of the infantile brain. Note the radical difference in the dimensional model. There is no actual 'calculation' involved in spatial sound processing within hearing. The 'attributed spaces' of the audioles will only allow the expression of a particular spatial sound quality within them, so when the sound in the form of neural information is projected onto the audiole set all the perceptual spatial information contained in the original sound is decoded automatically due to the properties of the audioles themselves.

They have been created through evolution to respond to the spatial qualities present in the sound source, which arise as a natural consequence of the intrusion of the human head and ears into a soundspace.

To use a trivial familiar example, the film in a camera does not have to calculate to form the negative when exposed. The negative image arises automatically because of the properties of the film and the effect of subsequent development, and nor does the developer have to 'calculate' the image which forms. The image develops due to the intrinsic physio-chemical properties of the film-developer combination. To use an example familiar to sound engineers, nor does the microphone have to 'calculate' the electrical output in response to a sound-pressure level, the transformation from sound pressure to electrical output is automatic and Intrinsically associated with the physio-electrical properties of the material substances and construction of the microphone.

We may say then, in dimensional terms, that the presence of the substance and material configuration of the microphone in space-time, in the presence of a sound input, provides a transform of that sound in 'airspace' to an expression of that sound in 'electric space', in conventional terms this is the electrical output.

By direct analogy the presence of the 'audiodes' in human consciousness allows the transformation of sound in airspace to the perceived sound in the 'acoustic mindspace' of the listener. But we must also remember that the 'audiode set' comprises a complex physiology including the physical structure of the head, ears, inner ear, auditory nerves and the auditory areas of the cerebral cortex. Also that in the comprehension of language additional audiodes will be involved. The dimensional model is a high level architecture. Each transformation will not be perfect and contain transformational loss in the form of distortion, noise addition, frequency limitation, phase shift, dynamic compression, spatial distortion, etc.

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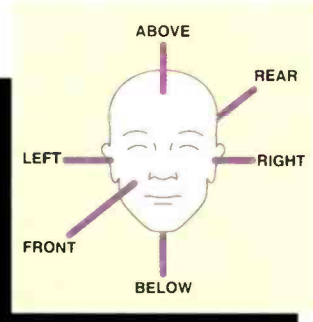
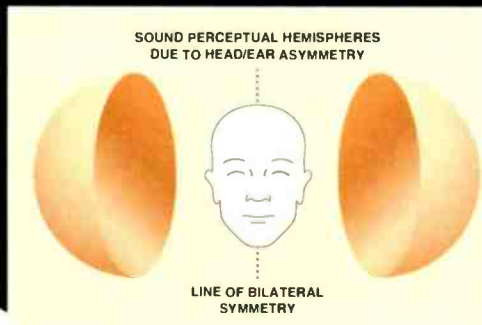


RECORDING SPATIAL SOUND **The human head (see right) has asymmetry about three major axes, (left-right, front-rear, above-below) in fact we can divide the asymmetry into two hemispherical regions (see below) about the vertical line of bilateral symmetry shown by the human body. Within these hemispheres the view of the head, and ears, from any angle is *different and the* left-right halves are mirror images, thus giving the physical spherical transform of sound from any external location onto the the human head and ears and subsequently into the auditory spatial audiodes.**

The dimensional model suggests that the intrusion of the human head as a physical object into the soundspace itself provides the transform to the eardrum. This is known as the 'head transform'. The dummy head as used in binaural recording is successful in this application to the extent to which it emulates the physical properties of the average human head and ears.

In electronic synthesis of spatial sound, the electronic processing must create the effect of sound waves reacting with a real human head and ears, hence the sound must be transformed according to the properties of the head transform and which consists of two major components, the separation distance of the two ears and the physical conformation, that is morphology and modulus of elasticity, of the skin, cartilage, flesh and bone associated with the head and ears.



distortion (a change in the apparent location of the perceived sound), not tonal distortion.

In electronic encoding we eliminate the dummy head and process the sound to create the spatial interference carrier using time delay filtering algorithms as outlined above.

And this is the dilemma. If we are to preserve the best 3-D spherical presentation on headphones there must be no secondary encoding on playback. On speakers the encoded (headphone) transform will be inappropriate because the sound is being presented from two external locations in space and will suffer severe 'secondary encoding' as we listen. In practice the stereo separation reproduced on speakers of a headphone-processed recording is still very good, but the spherical soundfield will obviously be very spatially distorted. In addition, spatial coding (which was optimised for headphones) may now appear as tonal-phasing distortion on speakers, whereas on headphones the brain will correctly interpret the 'distortion' as the spatial information carrier, it will therefore magically disappear, and we hear sound appearing from the empty space all around.

Experiments I have conducted, and this is confirmed by others, suggest that some secondary encoding is unavoidable. It results in some sound sources close centre-front being perceived as disperse and difficult to locate on headphone playback. It depends on many factors including the frequency range of the sound source and the exact means by which recording is effected also the psychoacoustics of the sound itself–we would expect a voice to be at eyelevel in front but an aircraft to be passing overhead. However, with this reservation the sound sphere recorded using my device is complete and centre-front location can be achieved either by recording at a distance of about 1.5m or more. I am sure it is possible to improve the direct-recorded, close-front image but I have no resources at present to develop this.

There is also the question of whether our normal hearing is designed to locate sounds at close-centre front with accuracy, after all in the normally sighted person eyesight would be the sense most appropriate in this situation. So here's an experiment you can try. Find a trusting friend and a pitch black cellar.

Using my recording device, the pin-sharp detail of the side, off-centre and distant-front location has to be heard to be believed, and the rear image is generally good although occasionally there is some front-rear ambiguity. There is also acceptable above and below resolution when using my device. Well, I was impressed for a less than £25 for the prototype.

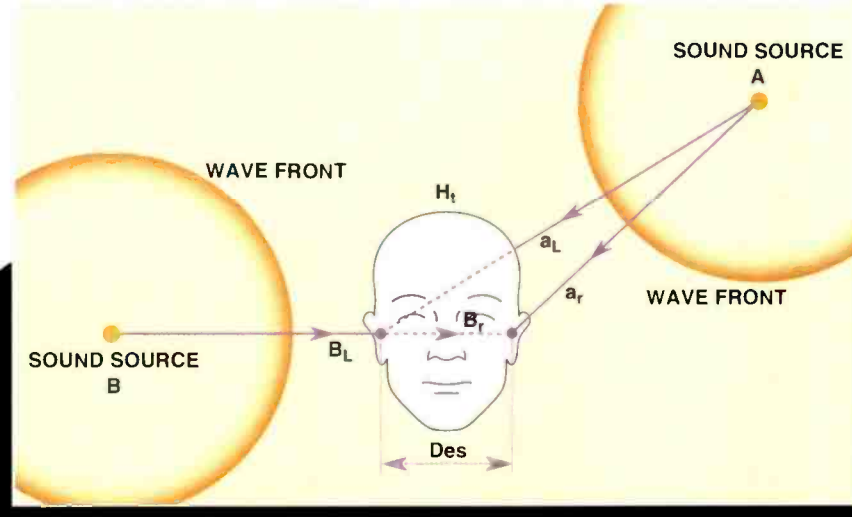
It must also be said that there is some individual variation in perception and not all people perceive the same spatial positioning on playback. This is a common phenomenon–we do not always perceive colour as the same value and frequently each eye will be different.

For the direct recording of full binaural sound a carefully designed dummy head can provide a useful emulation of the human head and excellent 3-D recordings may be obtained. Unfortunately, dummy heads are expensive and can be disturbing in locations where there are people, especially children.

Postproduction techniques using electronic 3-D processing are usually very expensive and the quality of overall effect is variable. A good article dealing with this approach to 3-D recording has appeared elsewhere.

One of the main purposes of writing this article is to communicate the results of my theoretical and practical researches into the nature of reality and creativity. This is particularly relevant to sound art in the New Age of 3-D sound recording.

We do need to carefully consider the nature of the information carrier in music, for, in some instances, there may be little to be gained by spatial expansion into a 3-D soundspace. We must always ask, if the music stands in mono or stereo (processing for increased clarity aside), is there any necessity in dimensional expansion? In musical form the information is carried by rhythm and melody, harmony and dynamic–the basic rules of composition. Apart from separating out the instrumentation most melodic music would stand admirably in mono. We must therefore ask what extra element of information, which is essential to the creative expression, is being conveyed by the extra dimensional expansion of the piece. For if such expansion is simply 'gloss' to attract attention we are in the same category of 'tarting up' a poor photograph with toning or image processing



Des = Distance of ear separation. aL, ar = path lengths of the wavefront from source A to the left and right ears respectively. bL, br = path lengths of the wavefront from source B to the left and right ears respectively. Ht = the head transform which is unique with respect to the left and right ears for any location within the sound perceptual sphere. Note that the human ear has a totally asymmetric conformation in 3-dimensional space, that is it possesses asymmetry in the front-rear, above-below, and left-right axes

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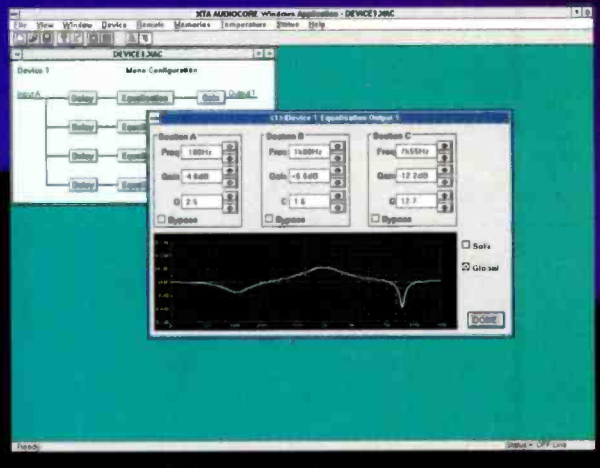

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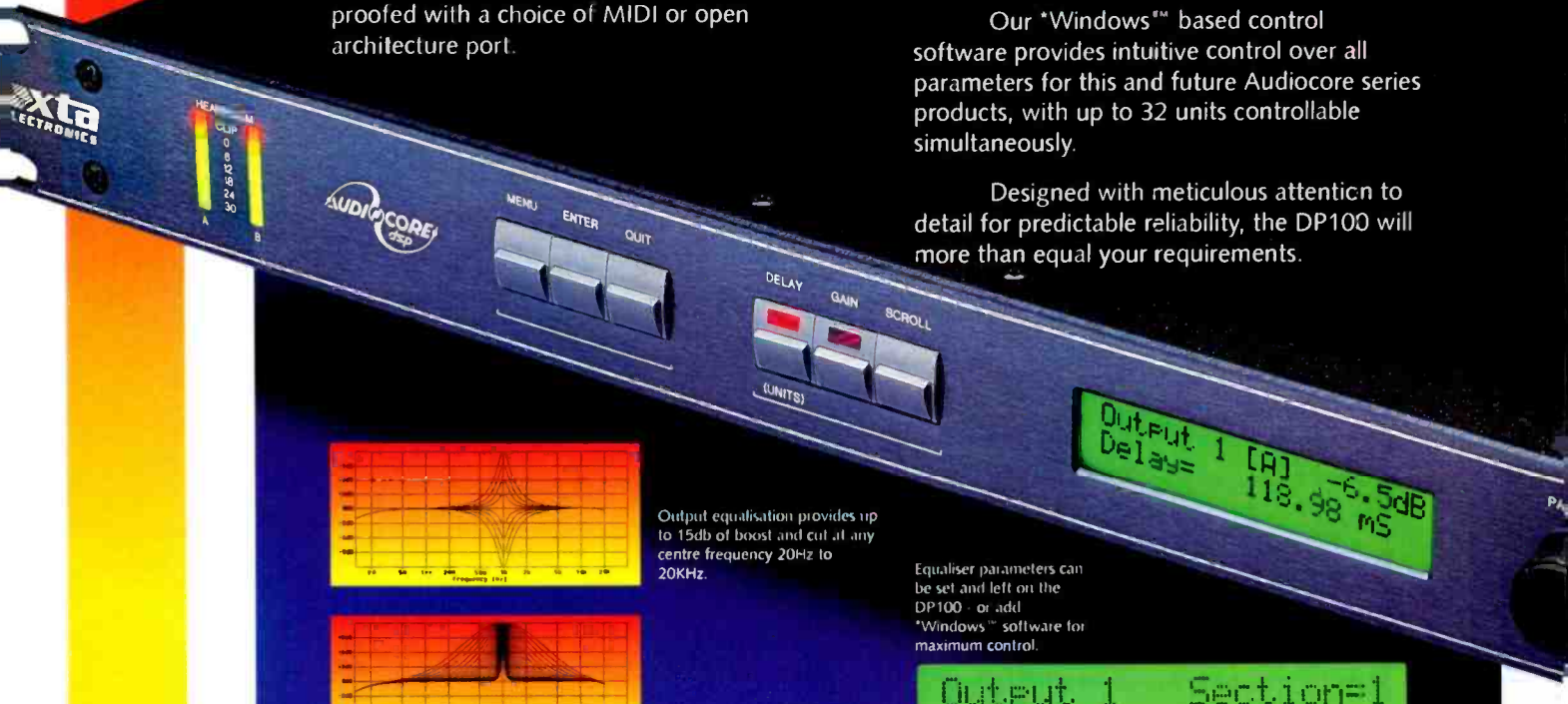

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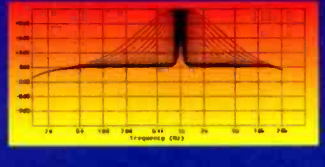

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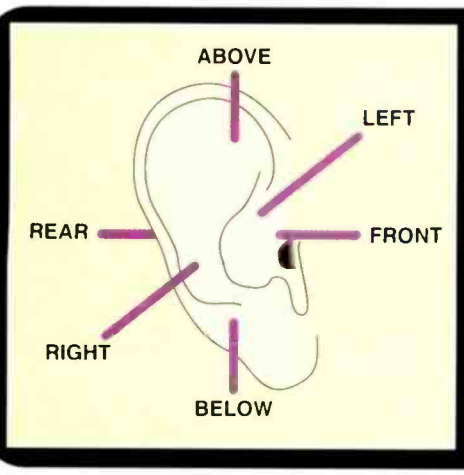


SOUND ARRIVING from any external location will have a unique transform for a particular angle and distance (its vector), but we also note that the definition, or degree of transformation must be frequency dependent and that mid to high frequencies will show a higher transformation than low frequencies.

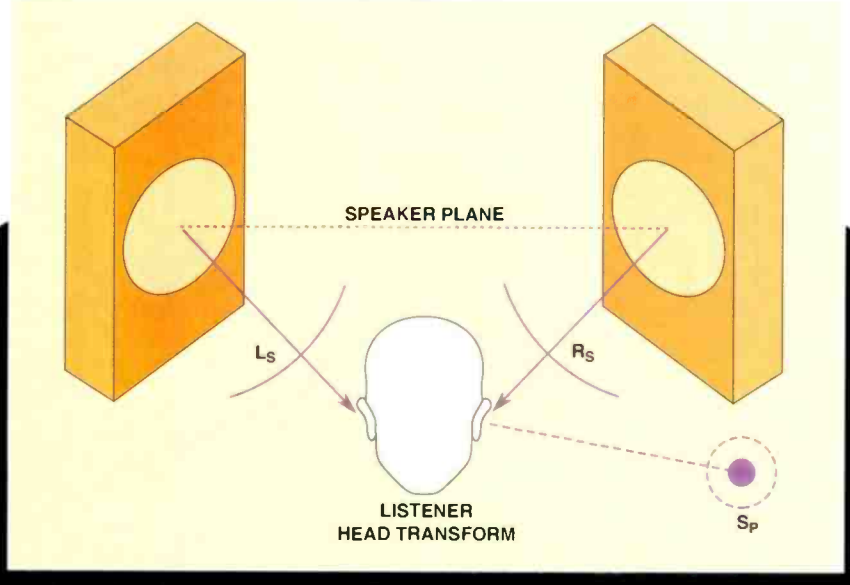
In recording 3-D sound, the sound material must contain dimensional information derived from the real or synthesised interaction of that sound with a human head and ears. All systems that record 3-D sound must employ some means by which this transformation is achieved.

to try to make it better. Sadly in most cases we still have a set of variations on the sow's ear.

AT THIS POINT we need to introduce and define a few terms.

Any reality may be described as a set of potentialities, qualities by which that reality has distinction and can therefore be recognised. If the reality is not expressed it is nonexistent or invisible for any number of reasons. When a set of potentialities is expressed then it has reality. There is a limitation on expression: a set of potentialities can only be expressed in a form in which the dimensional matrix which supports that expression will allow.

In the case of sound, the only form in which any reality has meaning is if it can be expressed in some form of sound. Pictures on the wall of the studio will never be recorded by the microphone –although paper on a wall may alter the reflection of sound and confer unique attributes on the acoustic of a the sound space. The acoustic may be recorded, the picture never. Its visible potentialities in the realm of sound can never be



Sp = Perceived sound location of 3-D encoded sound; Ls = Left hand speaker sound source (encoded); Rs = Right hand speaker sound source (encoded).

THE ENCODING on speaker playback must be such that when the listener head transferral takes place, the projection of spatial information from two sound sources, Ls and Rs, onto the audiodes results in the perception of a single sound source at Sp.

PLAYBACK With stereo speaker presentation we are projecting a plane of sound between the two speakers. Normal stereo perception is the presence of a line of sound between the two speakers. With sophisticated microphone techniques we can present this extended in 2-dimensional space giving the perception of depth, that is front rear spatial definition, relative to the horizontal line between the two speakers.

With binaural or 3-D sound expansion, the plane may be extended forward from the speaker baseline forward to (and even behind!) the listener, and also beyond the physical limit of the separation distance of the two speakers, however the spatial information encoded into the stereo signal must be such that when the head transform of the listener occurs the actual sound location in full surround space, is projected into the spatial audioles, rather than the perceived location of the sound plane arising naturally from the two speakers. The practical limitations of this approach have been outlined earlier.

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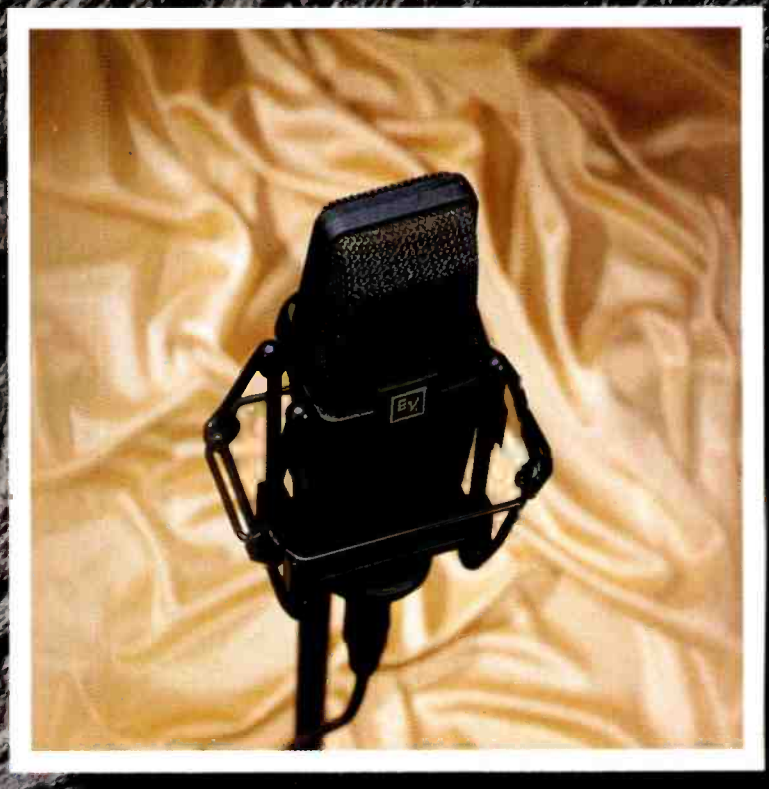

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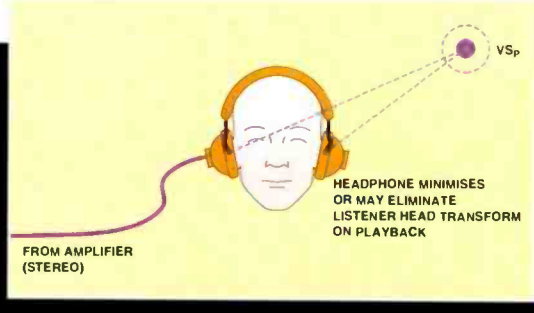


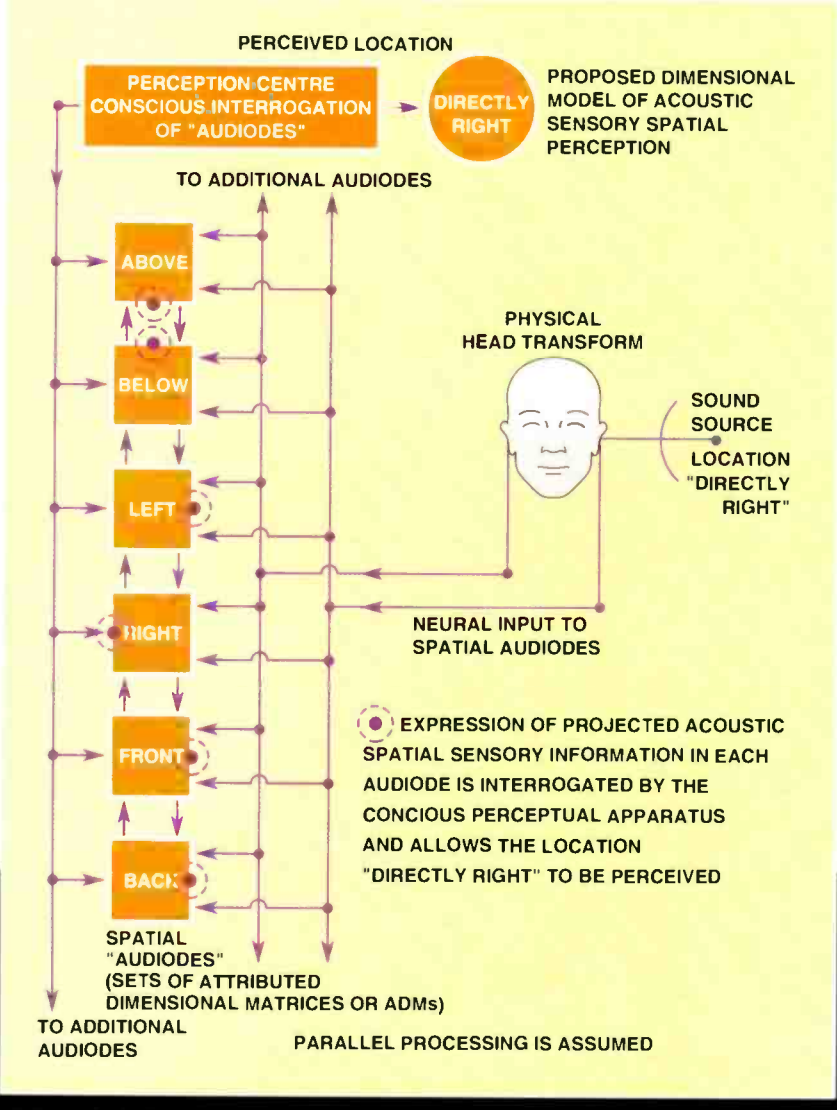
HEADPHONE PLAYBACK Because of the head transform of the listener involved in speaker playback it must be appreciated that 3-D sound presentation by headphones, which can effectively eliminate the head transform, will not be entirely compatible with 3-D sound presentation optimised for speaker playback, which contains information allowing for the head transform of the listener.

It is for this reason that I advocate the adoption of separate speaker and headphone mixes which can be fully optimised for each form of sound presentation.

expressed. In the realm of the soundspace the picture is nonexistent and has no reality, it is unexpressed. The clap of my hands express sound potentialities which can be recorded, but I cannot record the sound of the clap when I take a photograph of my hands clapping. In the realm of the photograph sound potentialities remain unexpressed and have no reality.

This is the dimensional principle of expressed and unexpressed potentialities and it determines the nature of reality. Do not be fooled by the obviousness or simplicity—we can unravel some of the paradoxes of quantum physics using this theoretical dimensional approach.

The form or nature of a set of expressed potentialities is determined by the dimensional attribution of the realm or matrix in which the potentialities are expressed—as outlined above. Dimensional



BLOCK DIAGRAM showing the proposed schematic architecture of the spatial audioles involved in 3-D human sound perception

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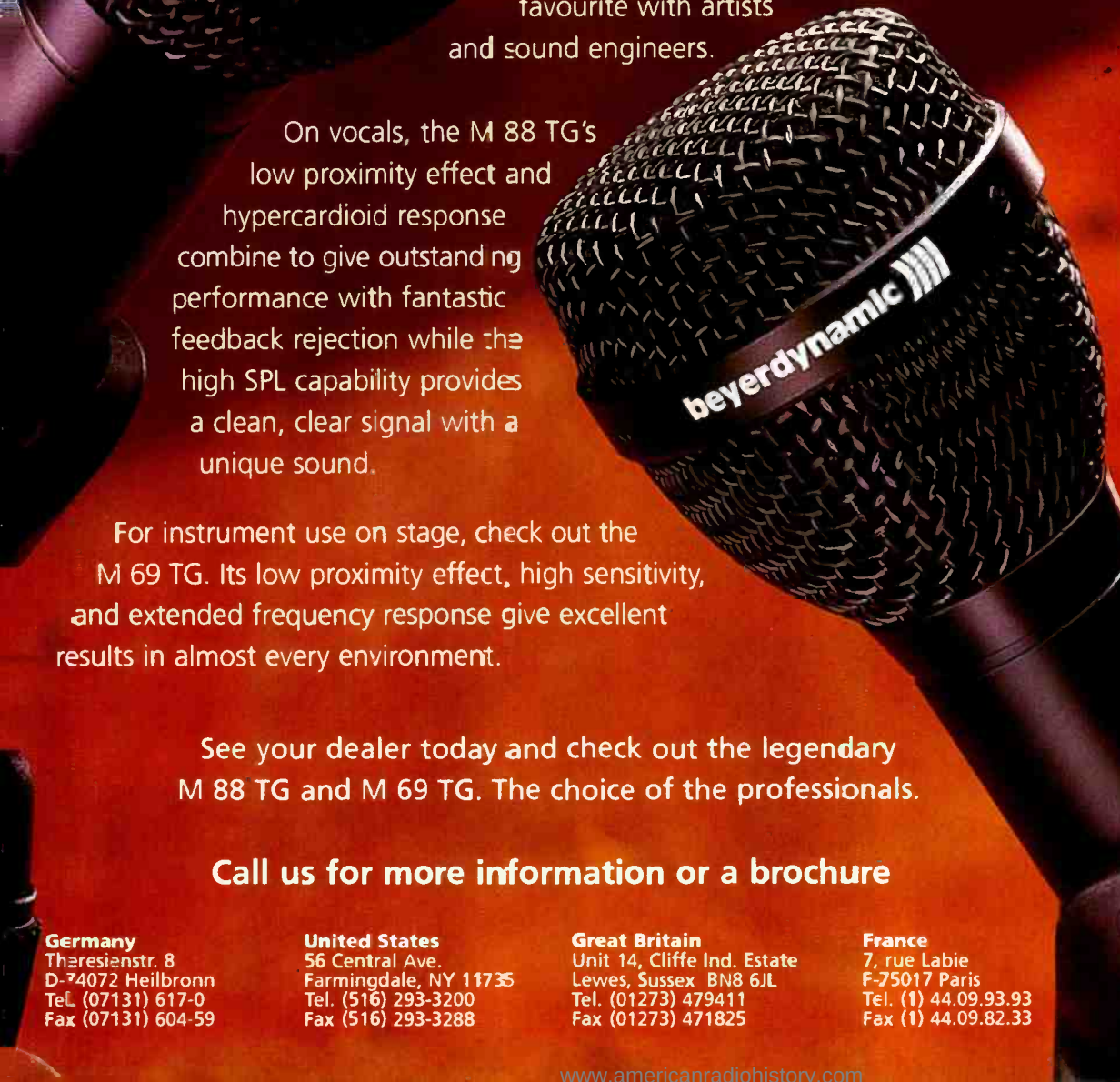

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transformation of the potentiality occurs when a set of potentialities in one matrix is expressed within a different matrix.

I alluded to this in the example above. If the expressed potentiality is a set of clapping hands, the sound of the clap is the dimensional transformation of that set of potentialities into the soundspace, the *image of the hands*, but no sound, is the transformation into image space and so forth. Note also that the potentialities of the picture on the wall have no direct transformation into sound. The reality of the picture therefore has no reality in sound. (Moussorgsky?) And from this brief definition we are now in a position to define creativity, all creativity in a simple and unambiguous way.

Creativity is simply the expression or transformation of potentiality by human means. For if we interpret the picture musically we have made a transformation of the visible potentialities into the realm of sound and by definition this is a creative act.

Note carefully the form of the description I am using. The concept appears trivially simple, but in the above I have now given you the means by which any reality may be defined and described—logical, physical, abstract or spiritual.

To return to the problem of creativity in a spatial soundfield, we now have a framework within which we can operate. Certain questions can now be asked, for instance in the case of a picture being transformed into sound what kind of coding of potentialities do we feel is appropriate? We may consider a melodic theme to describe the flow of water, a phrase to represent a character portrayed, or are we simply trying to evoke mood or feeling. This is the stuff of traditional musical composition and will undoubtedly sound great in mono.

As we are dealing with music in space it is important that we consider the properties of space in the context of sound. Here we make an important discovery. Most of the recording done today is totally in the realm of virtual space. The qualities or 'acoustic' of that space is created electronically within the matrix of some electronic processor. In dimensional terms the potentialities of ambience are expressed in an electronic matrix and then transformed on playback to expressed potentialities in our observable 'real' space, at least if speakers are used.

I was interested to read of the latest Beatles 'reunion', that George Martin insisted on using the old, original, echo chamber at Abbey Road, literally a room with a massive pipe in it as '...it gives a colour to the vocals which is unique—its that old EMI Studio Two sound.' ('Get Back to Abbey Road', *Studio Sound*, October 1995, p55.) This is an example of the attribution of space. The presence of matter in space creates a different quality of space, this is the principle of dimensional attribution. It affects the nature of the expression of sound potentialities in that space and therefore the reality of sound expressed is unique. This is a perfect example of dimensional theory. It is the sublime beauty and wonder of matter-acoustic and in this world of electronic processing we seem to have forgotten it.

Let us now consider the unique spatial properties of headphone binaural sound. What is uniquely exciting about this form of sound presentation is that two dimensionally separate soundspaces are available: the external soundspace outside of the head and body, and the internal the sound space in our head between our ears.

In the headphone presentation of binaural sound we have unique access to both spaces individually and we can pass sound realities between them if we wish. Pure binaural encoding occupies external space on headphone playback, while conventional (unexpanded) stereo and mono occupy the inner space of our mind! Not only that, the presentation is highly uniform and controllable not being significantly affected by listening-room acoustics. Now think of the creative potential here—plays about schizophrenics and ghost stories take on a new meaning. For the creative musician or sound artist we have a veritable explosion of possibilities. For this is pure application of dimension theory. We have two differently attributed spaces in which we can express and transform potentialities of sound—or to use those immortal words: There is an infinity (actually two infinities!) of creative potential available for next to nothing by simply exploring the quality of sound in real spaces and virtual spaces and by applying the principles of dimensional theory to the expression and transformation of sound potentialities within them.

DALLAS SIMPSON has a current patent application for a novel, portable and inexpensive microphone device for the direct recording of binaural headphone sound. It uses neither a dummy head or electronic matrixing

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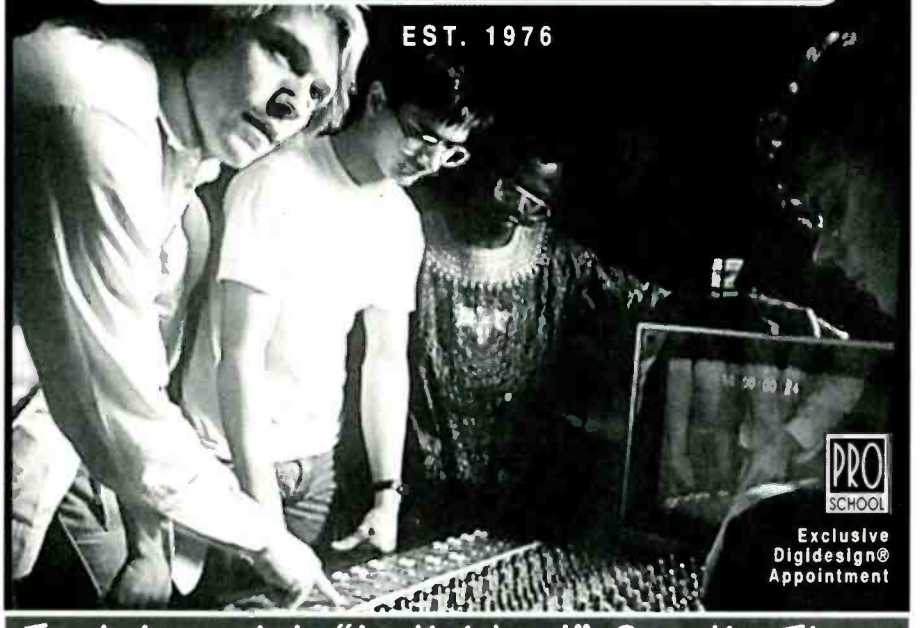

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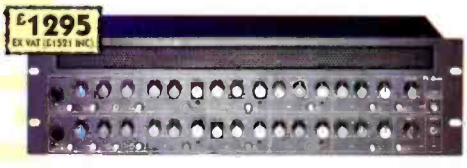

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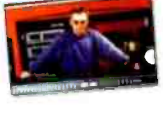

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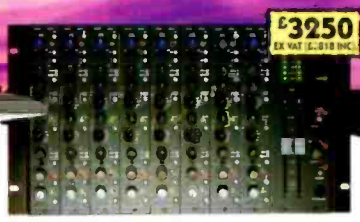

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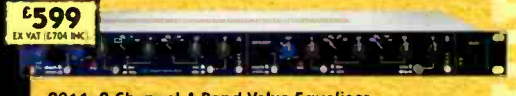

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Mike Exeter - DEP International *(Commercial recording facility owned by UB40) - "The EQ on the M-1 is very smooth. The broad bandwidths are great, with particularly nice results on acoustic guitars and bass sounds."*

David Yorath - Surrey Sound Studios *(Commercial recording facility) - "I tried the PA-1 Pentode Pre-Amps for recording a whole drum kit straight to tape with no EQ. The result was amazing! I have never heard a kit so vibrant."*

Dennis Charles & Ronnie Wilson - 1st Avenue *(Producers - Eternal, MN8, Michelle Gayle, Dana Dawson, Louise) - "The EQ-1 and C-1 units helped us put the power into the EMI album "Power of a Woman" by Eternal."*

Alex Marcou - Abbey Road Studios *(House recording engineer) - "The VI-1 makes hard sounding digital sound like cosy, rounded analogue - a joy to listen to. The control that the EQs, Pre Amps & Compressors give is excellent."*

Chris Porter *(Producer - Take That) - "I bought one of the first EQ-1s and I've enjoyed using it immensely. It gives a unique quality to the vocals in particular - Take That's 'Back For Good' is a typical example of the EQ-1 adding depth and presence to a vocal track."*

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Stepping out of

The designated day for humans to look at the paintings on the wall of the digital cave was 8th February 1996. The aim was to spend 24 hours in cyberspace as **KEVIN HILTON** reports

DURING THE LATE 1950s and into the 1960s, there was a fascination with satellites and space travel. They would make the world smaller, hasten communications and bring everyone together. In the 1990s it is telecommunications and the Internet—the Space Age giving way to that of Cyberspace.

For many, one of the defining events in the history of satellite communications was the global television show *Our World*, which was beamed to an audience of 200 million on 25th June 1967. The aim was to spread a message of peace, strengthened by the new technology.

One segment endures today: The Beatles singing 'All You Need is Love' at Abbey Road.

But all the worldwide audience could do was watch these icons perform; those at home couldn't interact or contribute to what was going on. They could only feel that they were a part of something huge simply by watching a series of flickering images on their TV screens.

If the world is truly to come together, then everyone has to take part in such an event as *Our World*, otherwise it is merely a case of fortunate media figures performing for a passive audience. Cyberspace, albeit still in its rudimentary stages and a long way from William Gibson's vision of a virtual, parallel existence, offers the chance for interaction, while also affecting the way people communicate.

THIS THINKING LED to an event and date that could rival *Our World* and 25th June 1967 in the significance stakes (although, depressingly, many of those involved with the more recent project claimed never to have heard of the progenitor). The date chosen was 8th February 1996. Surrounded by the latest communication links, high-powered computing tools, image processing and digital-audio techniques, Rick Smolan, creator of the *A Day in the Life of America* photojournal and the CD-ROM presentation *Passage to Vietnam*, decided to take a look at what was called 'paintings on the wall of the digital cave'. The aim was to spend 24 hours in cyberspace.

Explaining the thinking behind what turned out to be a massive technological and logistical enterprise, Assignment Editor and Audio Director J Carl Gantner says, 'The Internet is extremely interesting but it's a very inhuman place. We decided to take our experience and put a human face on high-speed telecoms, looking at how they're changing people's lives, which is something that we don't get to see.'

With this aim 1,000 photographers,

Left: Dan Augustine, Networking and Systems Manager for Sonic Solutions, edits a piece for inclusion in the *24 Hours in Cyberspace* web site

PHOTOGRAPHS BY J CARL GANTNER

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the digital cave

including 100 leading photojournalists, were dispatched all over the world. 'Their brief was to photograph and document this thing called "cyberspace",' explains Gantner.

The assignments were of varying degrees of complexity, the locations ranging from the remote and forsaken to centres of show business and government. One photographer was sent to the jungles of Malaysia to see how elephants are being relocated to new preserves and then tracked by satellite. The information gathered on their progress and habits is then loaded onto the Internet.

A country that has found e-mail and the Internet one of the few reliable forms of communication for several years is Bosnia, whose computer users, in tandem with old-style radio hams, have given an immediate and human edge to events in the former Yugoslavia.

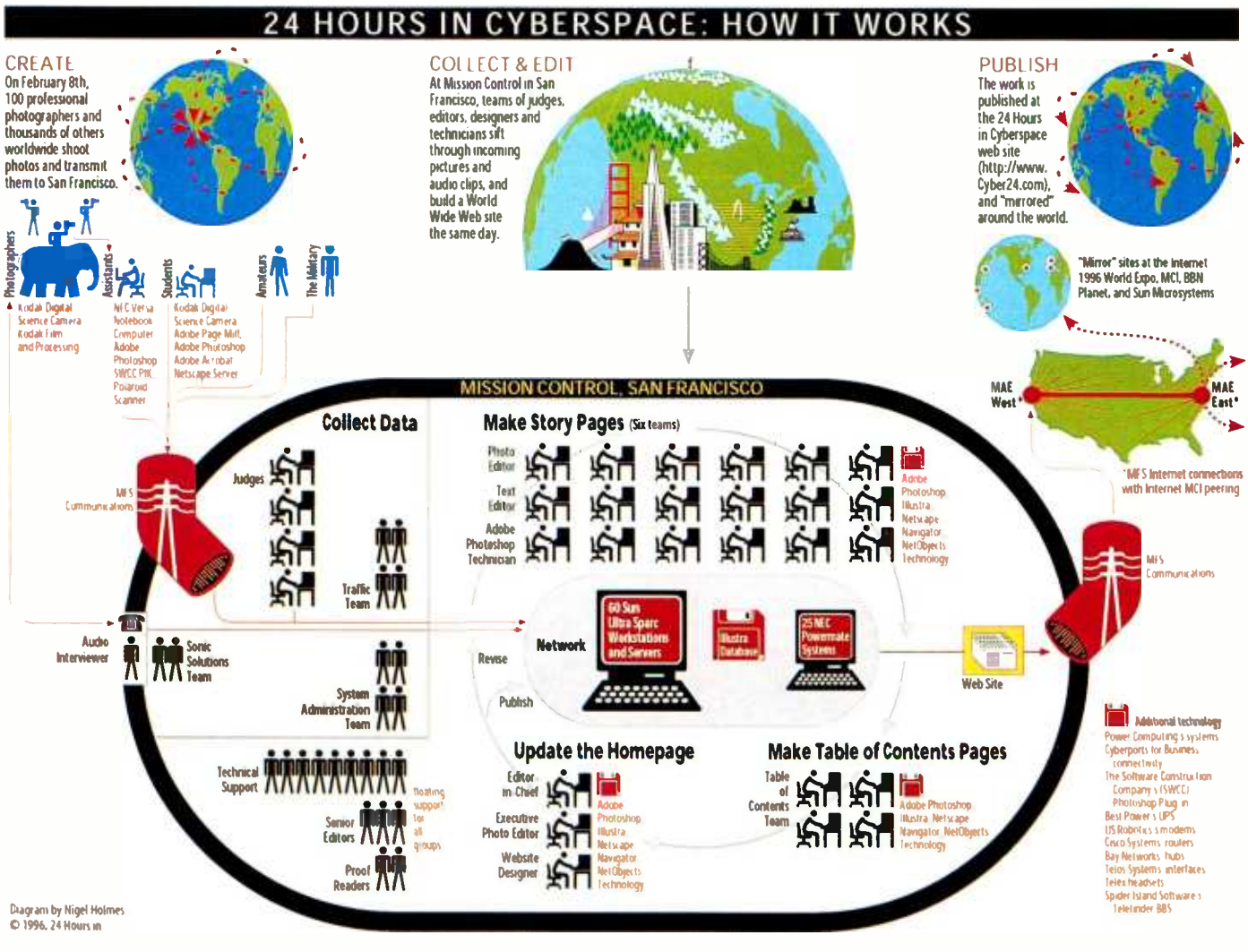
While Bosnians use the Internet to break their conflict-imposed isolation, the Inuit people of North America and Greenland use it to cope with their geographical remoteness. Other assignments saw inner-city school children designing home pages for fat cats in Silicon Valley, while military doctors from Haiti to Bosnia sent details of tough cases down the line to the telemedicine department at Walter Reed Army Medical Centre for consultation.

The photographers were equipped with digital cameras; those in the more outlying sites also had a lap-top computer, a mobile 'phone and a modem, through which they could transmit both the final image and their report back to base.

All this was assembled and published on an 'instant' World Wide Web site. Visitors to the page were presented with a photograph and text describing it and the background to the story, while double-clicking on another icon would trigger an audio clip, adding more immediacy and personality to the story.

'It was a newsgathering event as far as looking at how the world is becoming more connected is concerned,' observes Gantner. 'We're using this image of the paintings on the walls of the digital cave and what we mean by that is creating a time-capsule of where we are going on the so-called information highway. I suppose that in five years time people will look back at this and say "Wasn't that crude?".'

Despite the global communication aspect of the Net, it has been dismissed by many (including a large number of writers and columnists) as merely a toy that is only of interest to research scientists or rather sad young men who have no life away from the computer monitor and keyboard. As well as this cheap shot, Net surfers have to put up with cracks about the present technical limitations of the system, particularly with respect to moving images and good quality audio. All this diminishes the Internet as a ☞



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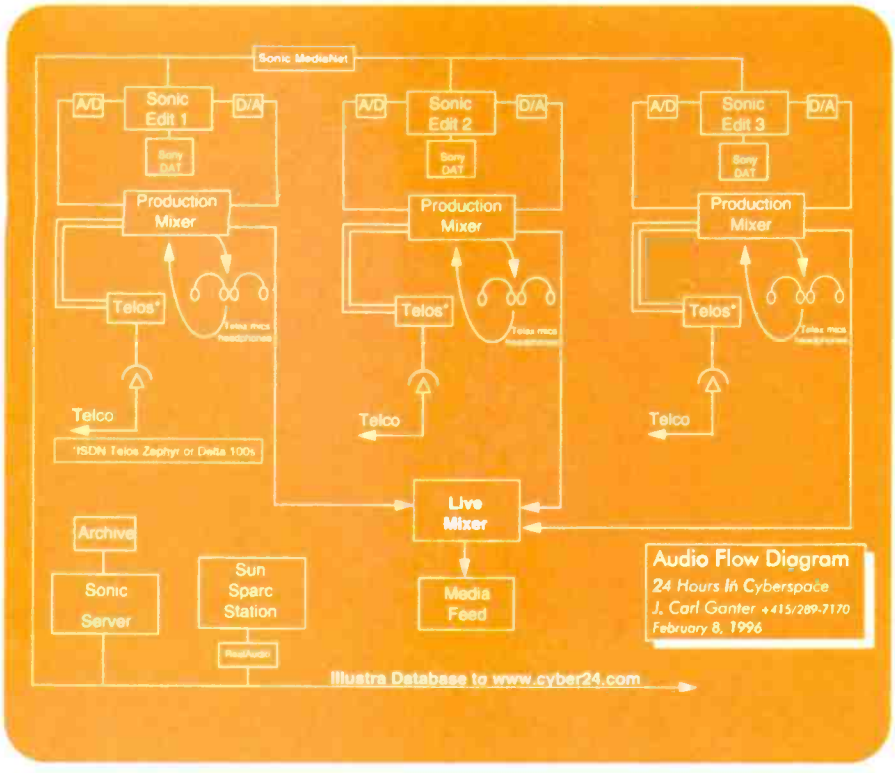

potential new form of broadcasting.

Gantner acknowledges these points and says, 'What we tried to do with *24 Hours in Cyberspace* was come up with a mid-denominator, where the site could be viewed with lower speed modems but were also available to those with high-speed units, with better graphics and audio. Once everyone jumps on and there is the provision of higher data flows, then things like mono FM audio will be a thing of the past.'

SOUND WAS A CRUCIAL element to the project, particularly in making *24 Hours in Cyberspace* more than just another computer text page, however compelling the story or graphics. 'Rather than have just a flat, 2-D publication that was transposed to the Web with text and pictures, we wanted sound as well,' explains Gantner. 'An audio element directly from the field adds a unique perspective of having the photographers describe their emotions. For example, the photojournalist sent to Malaysia called in on a cell phone and told us about the privations he encountered.'

PHOTOGRAPH BY SHANE ISEMINGER

J Carl Gantner, *24 Hours in Cyberspace* Audio Editor (left) and Eileen McCann Operations Manager for Interlochen Public Radio

The heart of the operation, rather grandly dubbed Mission Control and staffed by 150 controllers and technicians, was located in San Francisco. All editorial and technical aspects of *24 Hours in Cyberspace* were carried out here and demonstrated the wide and converging nature of those involved with the Internet today. The three main partners supplying equipment and expertise were Eastman Kodak (digital cameras, PhotoCD technology, film and processing), Sun Microsystems (servers, storage and workstations, plus programming and security precautions) and Adobe Systems (graphics, publishing and Internet software).

Given the size of the undertaking a number of other software and Net specialists were also involved, including NEC Technologies (notebook and desk-top computers), while non-computing know-how came from Sonic Solutions (digital-audio workstations), Telos Systems (telephone hybrids and ISDN codecs), Sony (DAT machines) and Telex (combined headphone and mic sets).

THE 150 OPERATORS in Mission Control were divided into technical and editorial departments. Photograph and text editors (many of whom were on loan from publications like *Time*, *NewsWeek* and *Stern*) worked alongside audio technicians, engineers, computer programmers, Internet specialists and security experts.

'With a major Internet project of this kind, we needed virtual security to keep mischievous hackers from trying to

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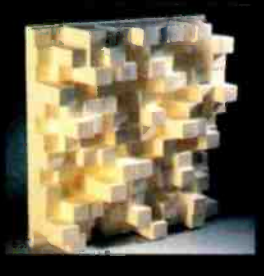

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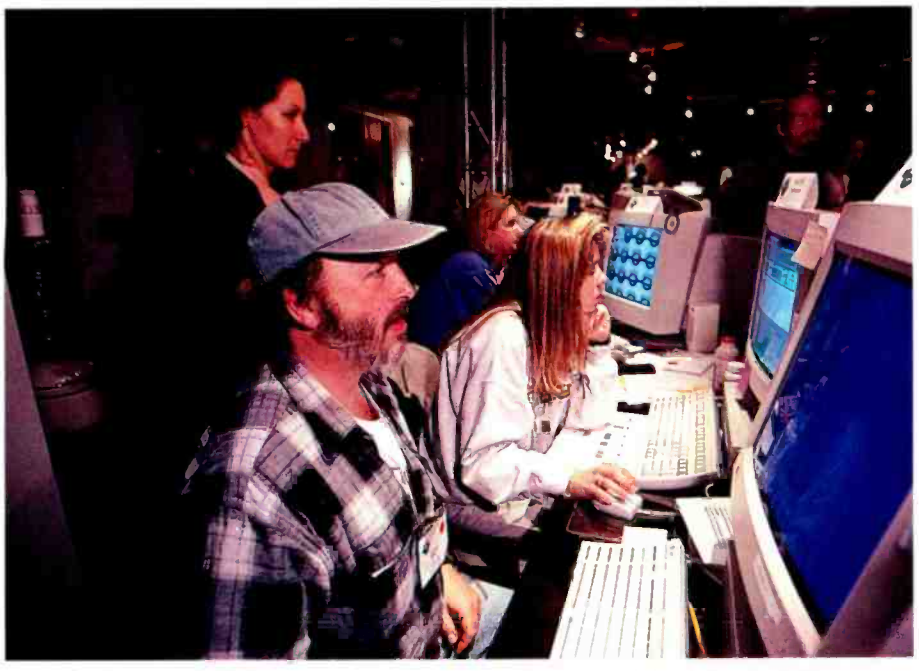

'Mission Control': all eyes on screens as 117 finished audio clips are exported via fibre-optic cable over Sonic Solutions MediaNet

wander into the action,' explains Gantner, who reports that there were no intruders. On the activity in the ops room, Gantner says that it was 'like instantly becoming the single air traffic control for O'Hare International.'

With the present technical limitations encountered once material enters cyberspace, the best possible source material was required. Telephone interviews came into Mission Control through a bank of Telos 100 Delta hybrids, which were recorded directly onto one of four Sonic Solutions hard-disk workstations.

The interviews were conducted by either National Public Radio (NPR) correspondents or local Bay Area media figures who were drafted in for the day. Because of the proximity of the workstations, as much separation as possible was needed, so that the journalists and operators could hear what they were doing. Interviewers wore Telex V220 headphone sets, with a MB11 dynamic microphone on a boom. These mics featured noise cancelling technology to cut out as much extraneous background as possible. Audio editors were equipped with the monitoring-only version, the V200.

THE BULK OF audio preparation was carried out on three of the Sonic workstations, which were equipped with NoNoise software (to further clean up the finished clips) and A-D convertors, all hooked up through Sony PCM2600 DAT machines (for dubbing off material), Telos telephone hybrids and the overall production mixer. The fourth DAW was used for minor editing and the exporting of audio files in AEIFF.

Linked together by the MediaNet networking system, the Sonic workstations were also configured for multitask operation, which allowed one workstation to be used for editing material while another interview was recorded onto the same unit. 'Audio was probably the most active department from the get-go,' observes Dan Augustine, the Sonic Solutions Systems Administrator who was responsible for sound operations during the *24 hours in Cyberspace* event.

As well as material coming in via telephone lines, there were some live interviews– including chats with Second Lady Tipper

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The *24 Hours in Cyberspace* audio team

Gore and the manic Robin Williams–and input from ISDN sources, which were brought in through a Telos Zephyr codec. This unit was also used for out-going interviews, as *24 Hours in Cyberspace* became a news event itself. Among those queuing up for interviews were ABC Radio, the BBC, CNN and NPR, which devoted an hour of its *Talk of the Nation* show to an interview with Project Director Rick Smolan.

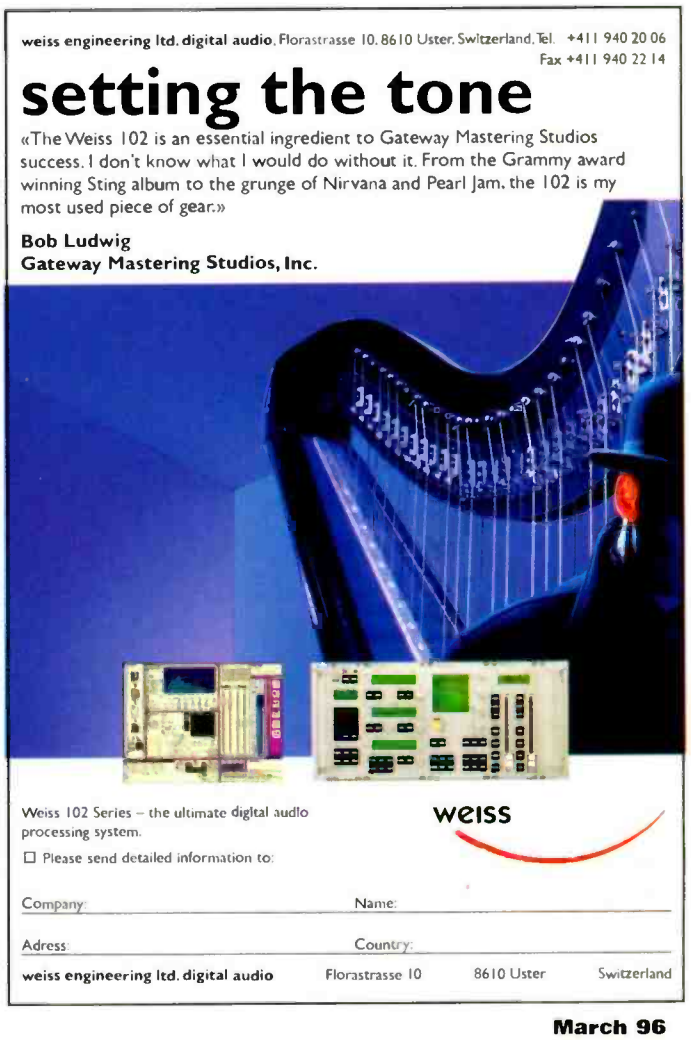
FROM THIS MASS of source material, pertinent audio clips were created, which were then saved as AEIFF files using the latest version of RealAudio software. 'It was AM quality before,' says Dan Augustine, 'but now it approaches FM. The RealAudio package is real picky about what material is put to it, so we had to make sure that the clips were in the best possible condition to start with, which is why we used compression, equalisation and NoNoise. In the end we came up with a recipe that worked quite well.'

After the clips had been saved as RealAudio files, they were exported over the fibre-optic network to one of 60 Sun UltraSparc workstations where they were combined with the text and photographs and then up-loaded to the Web site as a complete package.

During the 24 hours that this massive Web page was operational, approximately one million people called up the site and experienced what was going on in some of the world's most remote regions. After getting plenty of rest, the Cyberspace team will be preparing a permanent Web page, which is due to go on the Net in the middle of March, a CD-ROM and a book.

Carl Gantner acknowledges that this kind of cyberspace broadcasting still has a long way to go but is content to think that a start has been made. 'This was the first step out of the digital cave,' he says, 'proving that it could be done. Somebody has to pick up on it now.'

You can still access the 24 HOURS IN CYBERSPACE site via www.cyber24.com or through a hot link via Sonic Solutions site at www.sonic.com



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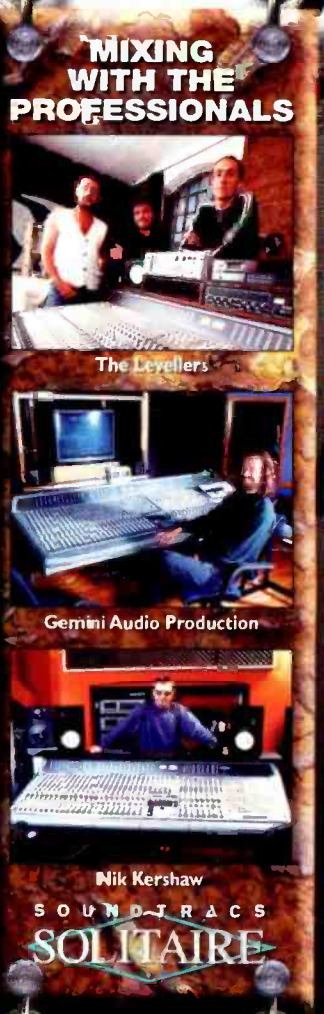

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Digital highwaymen

Manufacturers governing the production of hybrid silicon chips containing both analogue and digital electronics may be the gatekeepers of the project recording studio's future writes **CHRIS EDWARDS**

There is no real limit to what you can put on one silicon chip, but there are practical and economic reasons why semiconductor manufacturers refrain from packing everything in. And because of the way that chips are made, there are few plans to combine analogue circuits of pro-audio quality with digital processing.

In terms of project studio work, the more that can be done in the digital domain, the cheaper–in due course–you will be able to build the resulting equipment. It is the analogue circuits that cause the problems for designers. At the same time, these are crucial to the performance of any piece of pro-audio equipment. If you want four channels of audio feeding an effects unit, you need that many A–D convertors. And an equivalent number of D–A convertors unless the unit is going to mux them. For many systems, this cost is worthwhile –just look at the number of multifunction outboard effects units that have appeared on the market. Many of these have used internal conversion to offer a wider range of effects than would be possible using purely analogue circuitry. In the project studio, hard-disk recording is likely to prevail as the cost of disk storage continues to plummet and the ideas of non-destructive editing and recording, without being constrained to tape tracks, take hold. That means more A–D convertors: one on each input to get everything into the digital domain.

THE BEST WAY to reduce the cost of the equipment is to get most of the functions implemented on one chip. The optimum, in principle, is something like an 8-channel A–D convertor coupled with a high-speed 24-bit or 32-bit DSP, or its equivalent.

We are beginning to see in this PC-grade hardware. One of the DSP suppliers is expected to start making a combined A–D, D–A and DSP chip for PC sound cards very soon. But the convertors on this kind of chip are going to be 16-bit devices at the very most. And they may not be the most accurate devices on earth.

Although there are moves to improve the quality of A–D convertors in multimedia PCs, it is very difficult to get the cost down because of the problem of mixing high-quality analogue circuits with digital logic on the same chip. One of the biggest problems lies in the fact that the digital circuits are noisy. Even on a dedicated A–D convertor chip, squeezing every last bit of resolution out of the design when you are dealing with 18-bit or even 20-bit designs becomes progressively more difficult. The digital circuits on a predominantly digital device, which is what a combined DSP and A–D convertor will be, interfere with the analogue circuits, rendering them less accurate. This is exacerbated by the way that sigma-delta A-D convertors are generally designed and they are used in almost all pro-audio equipment.

Although manufacturers often refer to them as oversampling convertors, most designs cheat by simulating part of the oversampling process using relatively sensitive analogue circuits called integrators. It is possible to replace these integrators by boosting the real sampling rate, but this can produce extra noise that affects the input. The problem for combined DSP and conversion is that these integrators are more difficult to implement cost-effectively.

WE ALSO have to contend with the fact that high-quality equipment often uses discrete implementations of these circuits because some common analogue components are very difficult to put onto silicon in the first place and have resisted efforts to get them onto one chip. The price of project studio equipment is falling rapidly, driven by the plummeting price of digital circuitry. But the curve is likely to flatten out as the cost due to analogue electronics begins to dominate the equation. You could anticipate a situation where the cost of an outboard is almost directly proportional to the number of analogue inputs and outputs that it carries, as opposed to the speed of its internal DSP and the amount of memory that it holds. Such a situation may drive efforts to standardise more on digital interfaces for certain types of equipment. Effects units with SPDIF connections in place of analogue jacks are not inconceivable, or even systems based around new cable buses such as IEEE 1394. However, this would fragment a market where analogue signals carried on jacks and XLRs are the lingua franca. That would keep the cost of the purely digital implementations higher than expected for a while.

IN A SIMILAR to way the polarisation in high-end mixing-desk design, we might see a similar split in project studio equipment. We either get highly analogue-orientated studios with the relevant equipment catering for those producers who like the sound. Or we get studios that consist almost entirely of digital equipment, studios made up of DSP farms linked by digital buses intended to capitalise on the lower cost of digital silicon.

Even on a dedicated A–D convertor chip, squeezing every last bit of resolution out of the design when you are dealing with 18-bit or even 20-bit designs becomes progressively more difficult

It is this latter group who could stand to lose the most from the growth of the personal studio where artists can choose to use commercial project studios to record basic live tracks before working on them at home with their high-powered PCs or Macs and banks of synths linked up by digital connections.

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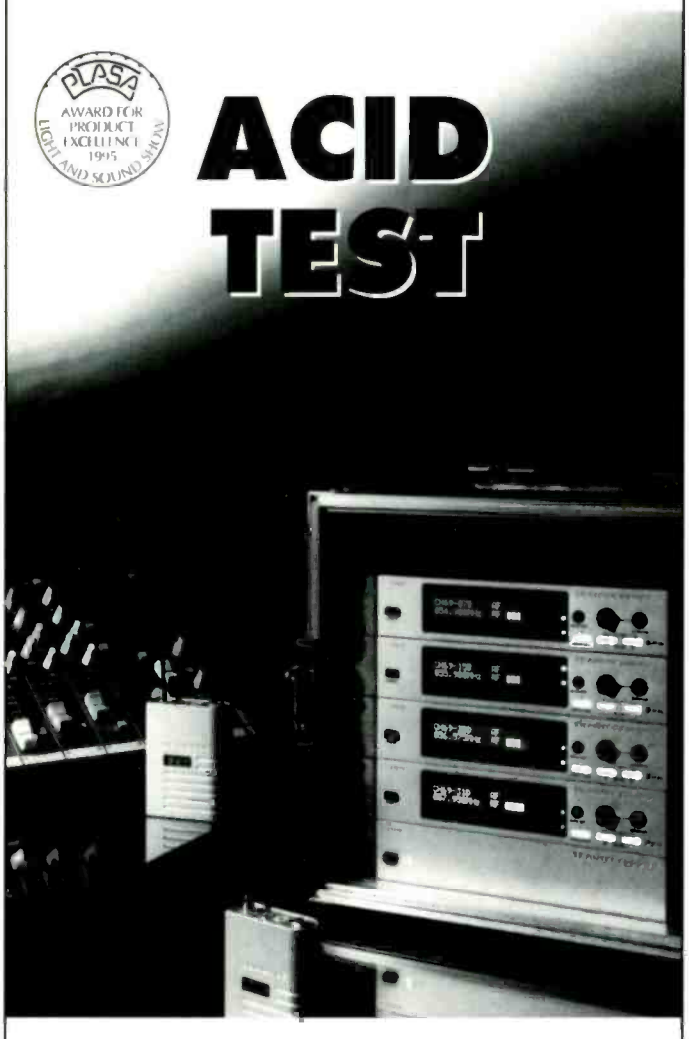

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JOHN WATKINSON proposes a hypothetical ideal loudspeaker as a yardstick for the assessment of real speakers and draws some conclusions which do not support conventional wisdom

A theory of loudspeakers

WE CAN'T build it but we can draw a lot of useful insights from the study of a hypothetical device. Exactly this approach is taken in the theory upon which other disciplines are based. Take communications theory: what Claude Shannon did was to work out from first principles the maximum amount of information that can be passed down a given channel. Shannon's theory assumes you can make perfect encoders and decoders, but doesn't tell you how to do it. In aerodynamics a similar theory will tell you the maximum thrust you can get from a perfect propeller using a given amount of power, again without giving any constructional hints. Aerodynamics is a useful discipline to study because it has a lot in common with acoustics. As Philip Newell points out in his recent book, supersonic aircraft have to be carefully shaped because stuff moves past at the speed of sound. Now, sound also moves, at the speed of sound, over a loudspeaker, yet most speakers have the aerodynamics (and indeed the styling) of a house brick.

Engineers find the concept of an ideal device extremely useful for several reasons. First, if someone proposes a device which has better performance than the ideal, you know it's a turkey. Second, in engineering, nothing is ever perfect, but a device which gets reasonably close to an ideal is often all that is required. In general, trying to get too close to an ideal model results in the law of diminishing returns where value for money makes a rapid exit.

As a speaker designer, what I'm looking for is a sort of Shannon's theory of loudspeakers so that I can compare the performance of proposed techniques with an ideal. You might call it a turkey filter. Any idea, however bizarre, which gets through the turkey filter might be worth pursuing. This article sets out the progress I have made to date with the theory and some tentative conclusions. I have so far failed to disprove the theory, because loudspeakers which I find sound realistic appear to operate nearer to the ideal and loudspeakers which I find objectionable appear to operate further from the ideal. Naturally, if anyone can rationally explain where I have gone wrong that could only be for the greater good.

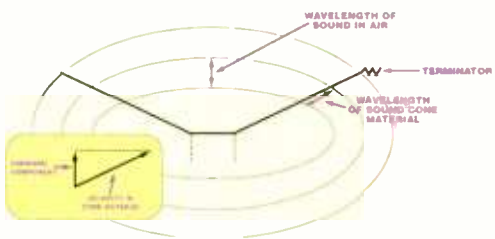


Fig.1a: Suitable cone angle compensates for finite rigidity of cone

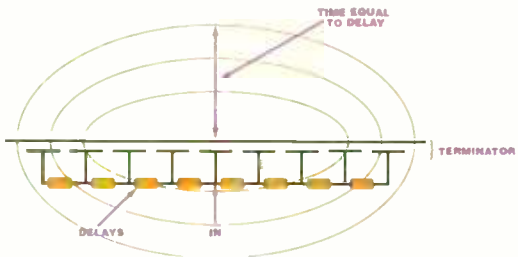


Fig.1b: Delay lines feeding flat electrode system simulates a spherical sound source

AUDIO SIGNALS are waveforms where the voltage is proportional to the desired air velocity. If we intend to control the position of some transducing diaphragm it is necessary to differentiate the input signal. If we could make a sphere whose radius was proportional to the differential of the input signal, life would be great. Such a device would behave as an ideal point source, having frequency-independent dispersion and a frequency response like a ruler. What is more it would be perfectly linear and would not exhibit energy storage, which would also make it perfectly phase linear.

Some of these consequences bear explanation. A pulsating sphere acts as a point source because wherever you stand, the part of the surface nearest to you is moving directly towards and away from you. Consequently, where you stand is irrelevant so the thing is omnidirectional. All points on the surface move in the same phase, therefore there can be no vibrations propagating across the surface of the sphere. Consequently, there is no requirement to suppress such vibrations. Radiation cannot occur after the input ceases. If the output stops when the input stops; the system is phase linear.

In practice, the materials we have are not infinitely rigid, and so a moving-coil transducer cannot meet the requirement that all radiating parts move in phase because the driving force is concentrated at the coil and has to propagate across the diaphragm. An electrostatic loudspeaker can move all points on its diaphragm in phase because it is driven with a uniform electric field. Unfortunately, it is only practicable to make flat electrostatic panels.

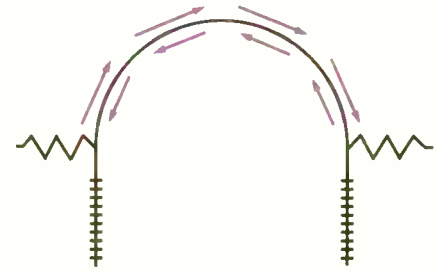
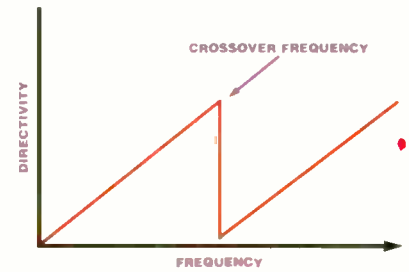
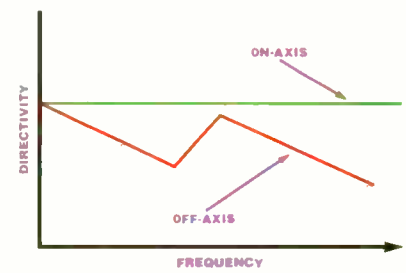


Fig.2a: A dome has no means to terminate vibration reaching the apex





Figs 2b: Crossing over between large and small drivers puts a step in the directivity which makes the off-axis frequency response highly irregular

A spherical diaphragm could not maintain tension and would be nonlinear.

However, all is not lost, because we can get certain moving-coil and electrostatic transducers to approach the ideal if we are devious enough. **Fig.1a** shows that if the flare angle of a cone-type, moving-coil unit is correct for the material, the forward component of the speed of sound in the cone can be made slightly less than the speed of sound in the air, so that vaguely spherical wavefronts can be launched. Whether we like it or not, the cone is acting as a mechanical transmission line for vibrations which start at the coil former and work outwards. If we are even more devious we can introduce frequency-dependent loss ☞

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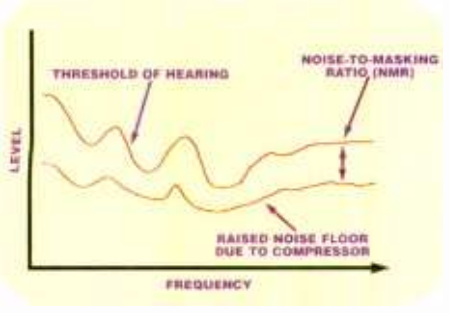

Fig.3: In compressors, the threshold of hearing is calculated allowing for masking in the input spectrum. Noise is added by the compressor in such a way that it is always masked

into the transmission line so that the higher the frequency the smaller is the area of the cone which radiates. If we get this right we can have a constant-dispersion drive unit which simulates a sector of our ideal pulsating sphere. The main violation of the theory is that we have vibrations travelling out across the surface and we must have a cone surround which acts as a matched terminator so that there can be no reflections.

While it is possible to make an electrostatic cell which has single curvature, we are stuck with a flat diaphragm if we want high SPL, low distortion and a wide frequency range. This is why Quad ditched the curved cells of the 57 in favour of the flat cells of the 63. Unfortunately, a large, flat, uniformly moving diaphragm beams dreadfully at HF. The elegant solution of the Quad 63 was to make the mechanically flat diaphragm behave like a sphere by splitting the electrode structure into concentric rings fed by lossy delay lines as shown in **Fig.1b**. The outward propagation of vibrations across the diaphragm again allow us to simulate quite closely a sector of the ideal pulsating sphere. Again matched termination at the perimeter prevents reflections.

The similarity between the dynamics of the Quad 63 and the transmission-line cone driver is striking and led me to believe that it would be possible to build a moving-coil driver which had many of the attributes of the Quad. Having successfully built one I can assure readers that it is. These units share with the Quad the optimal dispersion characteristics which eliminate the sweet spot and allow a large listening zone.

If we consider a dome driver, to the casual observer it looks like a section of a sphere and should therefore be close to the ideal. Unfortunately, as Stanley Kelly has pointed out in Butterworth's *Loudspeaker and Headphone Handbook*, this is a myth. The dome moves on a single axis, and this is not the same thing at all as a pulsating sphere. Domes cannot be rigid, and so the vibrations from the coil must propagate inwards from the circumference to the apex. This gives me two problems as shown in **Fig.2a**. First, when the vibrations arrive at the apex, there is nothing to terminate them, so they must continue on until they arrive back at the coil. Consequently, rigid domes must suffer from energy storage and hangover. The alternative is to use a 'soft dome' which is lossy. In this approach, losses in the dome mean that the amplitude of vibration falls towards the centre. This is the exact opposite of what is wanted for good dispersion. Consequently, domes can only work over a narrow frequency range and need to cross over to smaller units at frequencies where a transparent crossover cannot be achieved. As **Fig.2b** shows, this causes the directivity index to resemble a dog's hind leg. While the on-axis response may be flat at the sweet spot, the reverberant field will be extremely non-uniform.

From the theoretical standpoint the dome has no acoustic merit. The practical advantage of the dome is that it can be fitted with an immense coil which can dissipate a lot of power without cremating itself. Unfortunately, the contrary dispersion characteristics mean that domes can only be used in dead rooms where the inaccurate reverberant field is suppressed. This is self-perpetuating because such dead rooms need a lot of power to get a reasonable SPL. With the availability of new materials and constructional techniques it is possible to raise the efficiency of moving-coil drivers to the point where the dissipation advantage of the dome is superfluous. As an alternative, by removing the low frequency requirement from a phased-array electrostatic panel it is possible to get staggering SPLs in the midrange and treble because of the sheer volume velocity available but without sacrificing the low distortion and near ideal dispersion.

Turning to low frequencies, the wavelength is long compared to the loudspeaker, so that it no longer has to be spherical, and the whole surface area need not move. However, the requirement for all the parts which do move to do so in phase must remain. As far as I can see, reflex, transmission line and ABR speakers violate the requirement. The finite propagation time from driver to port-ABR is unacceptable and must result in energy storage and lack of phase linearity. Again most of these techniques are used for economy or to get high SPL with old-fashioned magnet technology. The only published techniques which do not violate the ideal are the infinite baffle and its relative the isobaric.

Clearly, a loudspeaker cabinet must be totally inert. As the interior of the cabinet is driven by a secondhand signal from the back of the drive units, there is no way that this can be allowed to radiate. Furthermore, the cabinet must assist the surround to dissipate any energy propagating outwards in a cone.

In the case of a practical loudspeaker, non-ideal drivers will be fitted in a non-ideal cabinet. As a result there will be a certain amount of energy storage or delayed resonance in the drivers and the cabinet. Effectively the speaker will radiate a highly coloured version of the input after the input has ceased. On continuous programme, effectively the signal-to-noise ratio is marred by the stored energy. There is no doubt that all loudspeakers do this to some extent. The question is what extent is allowable? It is my view that provided the radiation due to stored energy is always masked by the programme material then the effect can be neglected. When I hear designers saying that the sound of this tweeter doesn't match the sound of that midrange unit because they are made out of different materials I worry. If drive units have a characteristic sound then they are not masking their delayed resonances.

THERE IS a close parallel here with compression technology. Compressors raise the noise floor of the audio in such a way that it will be masked. Compressors are tested using the concept of the noise-to-masking ratio (NMR) shown in **Fig.3**. If the NMR is always positive, the compression artefacts are inaudible. Surely the same test can be made with a loudspeaker. **Fig.4** shows that if the spectrum of the input is known, the masking threshold can be calculated. Cumulative decay (waterfall) data can then be used to predict the amount of delayed resonance which would result from that input. The difference between the input spectrum and the decay spectra at various delays will reveal the NMR. Clearly, this would have to be done with a lot of different programme material. Any time the decay spectrum fails to be masked there is a problem.

A further consequence of the NMR concept of loudspeaker performance is exposed when we try to assess compression systems using loudspeakers. I would maintain that there is no point listening out for unmasked compression artefacts with a loudspeaker in which the delayed resonances are themselves not masked. I believe that some loudspeakers would reveal compression artefacts better than others. The one which revealed the most artefacts would be the cleanest speaker.

I was able to compare two speakers in this way recently when I had access to a variable bit-rate compressor which could be bypassed. I found that the inferior speaker only revealed the use of a substantial amount of compression whereas the better speaker revealed the use of the compressor even at its maximum bit rate. I learned that before you use speakers to audition compressors, you have to use a compressor to audition the speakers.

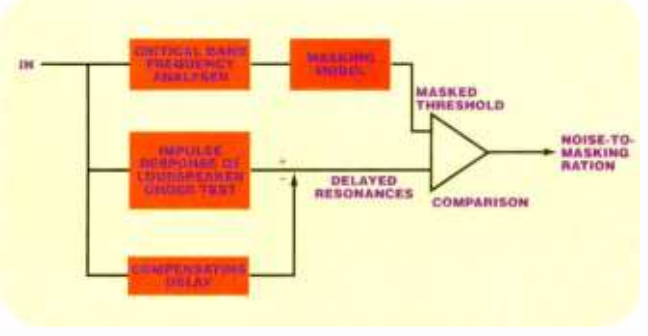

Fig.4: Suitably delayed input is subtracted from speaker simulation to reveal delayed resonances. These are compared with the masking model for that input to establish the noise-to masking ration

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◆ **March 12th**
UK AES Section Meeting: Noise Reduction Techniques, Imperial College, London, UK.
Tel: +44 1628 663725.

◆ **March 12th-15th**
Aseanplas 96, Jakarta, Indonesia.

◆ **March 13th-15th**
The Television Show
Business Design Centre, London, UK.
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◆ **March 13th-17th**
Musikmesse and Pro Light & Sound, Messe, Frankfurt, Germany.
Tel: +49 69 7575 6662.

◆ **March 13th-17th**
ITA Seminar: Rapidly Changing Technologies in the Late 90s, Arizona Biltmore Hotel, Phoenix, Arizona, US.
Tel: +1 212 643 0620.

◆ **March 29th-30th**
Multichannel Audio Alliance Conference, Los Angeles, US.
Tel: +1 213 743 1759.
www.tmhlabs.com/tmhlabs

◆ **March 14th-16th**
USITT, Fort Worth, US.

◆ **March 20th-21st**
European Cable & Satellite 96, Le Grand Hotel, Paris, France.
Tel: +44 171 915 5103.

◆ **March 24th-27th**
SIB, Rimini, Italy.
Tel: +44 1323 442747.

◆ **March 25th-26th**
UK AES Section Conference: Audio for New Media.
Tel: +44 1628 663725.

◆ **March 26th-30th**
The Pro Audio Show
The Holiday Inn Crown Plaza, Karachi, Pakistan. Tel: +9921 498 4012.

◆ **March 28th-29th**
Conference: Consumer Access to Multichannel and Interactive TV, Four Seasons Hotel, London, UK.
Tel: +44 171 637 4383.

April 1996

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Broadcast Thailand
Queen Sirikit National Convention Centre, Bangkok, Thailand. Tel: +66 2 503 2199.

◆ **April 10th-11th**
ABTT Show
Royal Horticultural Halls, London UK. Tel: +44 171 403 3778.

◆ **April 14th-18th**
NAB '96/Digital '96
Las Vegas Convention Centre, Las Vegas, US.
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◆ **April 16th-18th**
REPLITech Europe 96
Jaarbeurs Congress and Convention Centre, Utrecht, The Netherlands.
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◆ **April 21st-23rd**
Mideab & Midsat 96
Abu Dhabi Exhibition Centre, UAE. Tel: +971 4 310551.

◆ **April 23rd-25th**
Entech 1996, Sydney Exhibition Centre, Sydney City, Australia.Tel: +61 2 876 3530.

◆ **April 23rd-27th**
Information Super Highway China 96, Beijing Exhibition Centre, China.
Tel: +86 841 5250.

May 1996

◆ **May 2nd-3rd**
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◆ **May 11th-14th**
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◆ **May 12th-14th**
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◆ **May 14th-16th**
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◆ **May 25th-28th**
Pro Audio Light & Music China 96, Beijing Exhibition Centre, Beijing, China.
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◆ **May 28th-30th**
7th Conference and Exhibition on Television and Audio Technologies, Thermal Hotel Helia, Budapest, Hungary. Tel: +36 1 153 0127.

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Expo Show 96, St Petersburg, Russia.
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June 1996

◆ **June 1st-4th**
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◆ **June 4th-6th**
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◆ **June 6th-9th**
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August 1996

◆ **August 7th-10th**
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September 1996

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Broadcasting China 96 Exhibition & Symposium, Beijing, PR China.
Tel: +86 10 609 3775.

◆ **September 4th-8th**
CEDIA, Dallas, Texas, US.

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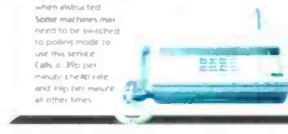

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Farewell to arms

Dynamic mix automation is coming of age and winning converts at every turn. One such convert, **KEITH SPENCER-ALLEN** discusses its perception and its potential applications

TOTAL DYNAMIC Automation is a wondrous tool. Over the last six months I've had the opportunity to experiment with a couple of console-automation systems that go far beyond levels, mutes and a few extra switches. I'm a complete convert. However to take full benefit you need to take a fresh look at how you approach mixing and possibly the design of mixers.

If you were to describe a simple musical sound to a colleague over a telephone there would be many aspects to put into words, all of which create the character and nature of the sound we hear. If we look at the mixing process, how many of those sonic parameters used to describe that sound are we really able to fully control? For most, average automation systems bring us control of just level and mutes. What about everything else? Isn't it like a cooking recipe that just lists the ingredients (channel mutes) and quantities (levels) yet ignores all the other aspects of a successful dish.

Okay you say, most automation systems control levels and mutes because that is the bulk of the automation requirements. The reply has to be that if there has been no easy way to access and dynamically automate other parameters then how can it be argued that there is no need for full automation of what are seen as secondary features in a mix?

MANY WILL tell you that you don't need TDA. But this must be challenged. If you look at a mix that has taken some time to complete it is frequently due to individual tracks being inconsistent in a range of parameters with level being only one of them. If the performance is synth or sampler derived and is parameter consistent, then it may be that you need to introduce variation in parameters to make it fit within a mix. Unfortunately for years we have frequently tried to solve all mix problems with control of levels but in so many cases it is just this limitation that takes mix time. A more realistic attitude to mixing should encompass dynamic variations in EQ, dynamics, delay, panning, ambience, and, of course, level.

Take a simple example and some alternative solutions to a common mix problem. You have a featured item that will just not cut through enough at a certain point in the mix. Traditionally, there are, perhaps, three solutions–increase the level of the item; decrease the level of the other items; or turn to the EQ to find a frequency to boost to add an edge. In so many cases the problem is not in the level domain and adding an EQ adjustment for audibility reasons rather than taste frequently doesn't work artistically.

TDA offers some solutions not otherwise available. Changes made to the featured item need to be gentle due to the audibility, so the first stop could be to look at the dynamics of the item. With a little time and a flexible digital dynamics section it is possible to reshape changes in dynamics –variations in compression, the threshold and release over the passage of the track can sound quite natural and can be added carefully with no real audible change.

Because it is as easy to control many channels as a single one we could look to reshaping the mix under the featured item. In the same way that you can duck levels behind a featured item, with TDA you can do a similar action with EQ or dynamics. Under the featured part, the EQ could gently slide into attenuation. Spread over a number of channels and with a little experimentation the effect is inaudible, masked by the featured item, and then returning to normal either side of the difficult area. Where the featured item is very similar to others in the mix, such as electric guitars, rather than cutting EQ, the frequency curve could change to a less competitive position on the secondary tracks to allow the featured item to cut through and then slide back. The background tracks need to be treated on a one-by-one basis or changes will be audible. This is closest to the way that musicians control their own internal balance when playing together.

A similar option is to use a small amount of compression or limiting behind the featured item that literally just slides into use on several channels under the critical area and then back to normal. Stereo positioning could also be considered. In a solo situation, conflicting sounds could gently move a couple of steps to the left or right. In stereo this frees up the centre stage for the featured item while in mono, there will be a slight level drop in those items moving away from the centre. Again spread over many channels the effect is subtle.

Dynamic control of channel delays offers immense musical possibilities. If all channels are delayed by a fixed amount say 20 milliseconds, it is then possible to move tracks both forward (reduce delay) and back in time (increase delay). This allows the creation of differing musical emphasis in choruses or correction of fine timing errors.

These are just a few of the new tools that can be employed with TDA. If you can think in terms of the multiple sound parameters available to you and that the solution may not just be a level adjustment then the possibilities are endless. The increasing availability of TDA on consoles at all levels will open the possibilities of totally new ways of solving mix problems.

Unfortunately you will also find that a knob is not the easiest of controls to adjust dynamically with precision and with most of these new control capabilities using them, the next step has to be a fresh look at mixing console design. But that's a further battle.

It could have gone one of two ways: technology stepped in where Roger Dean's 1973 vision of evolution failed to deliver

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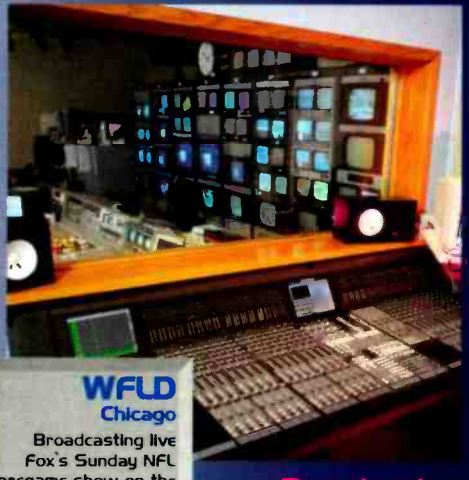
Music

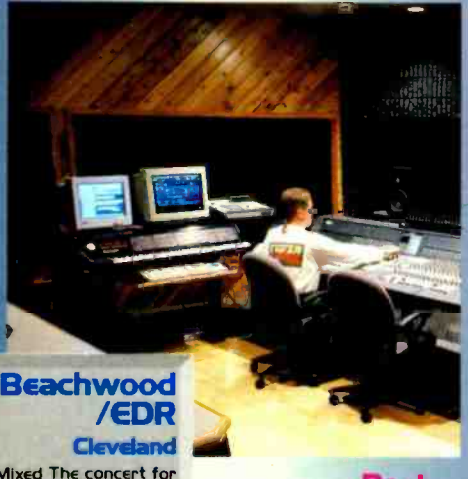


WFLD
Chicago
Broadcasting live Fox's Sunday NFL pregame show on the first CS2000B

Broadcast

Crawford
Atlanta
The first film system, a two operator CS2000F now being used to mix TV spots for The NBA on TNT

Post



Beachwood /EDR
Cleveland
Mixed The concert for the Rock 'n' Roll Hall of Fame Grand Opening with their CS2000D

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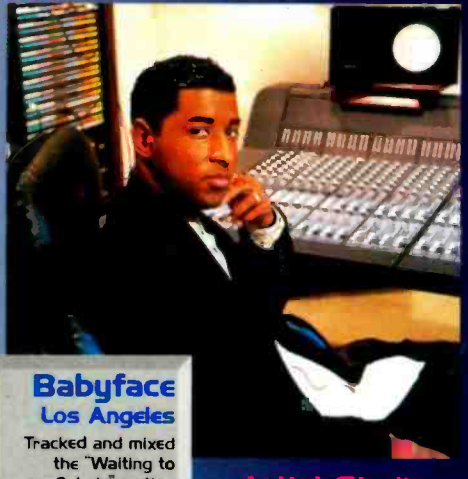

Babyface
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