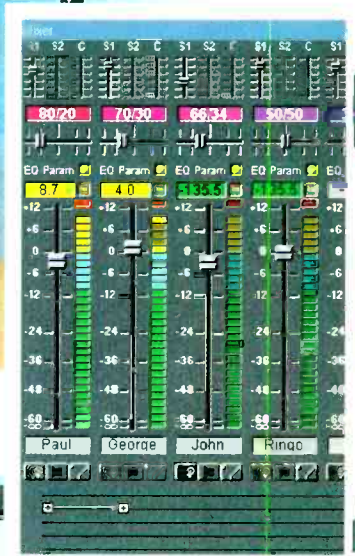


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Studio Sound



INTERNATIONAL TECHNICAL MAGAZINE FOR
PRODUCTION, POSTPRODUCTION & BROADCAST

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SAKAMOTO INTERVIEW

Where the artist, engineer and producer meet: Ryuichi Sakamoto gives a rare and exclusive interview to **Studio Sound**

For some people, only one console is good enough.



Nippon Columbia, Tokyo

"It was important that the new console met our sound quality requirements and provided enhanced operational use. The SL 9000 easily did so."

Mr Yamamoto, General Manager, Recording & Engineering Department



Mega West, Paris

"The SL 9000 is the only console able to deliver our high standards - and sounds 'magnifique'."

Thierry Rogen, Owner



Masterfonics, Nashville

"We needed a 'no compromise' console in 'The Tracking Room' to achieve our ambitious goals. The SL 9000 became the only logical choice."

Glenn Meadows, Owner



Studio Guillaume Tell, Paris

"The SL 9000 delivers excellent sonic quality and impressive automation features, yet is familiar to most users."

Roland Guillotel, Owner



Phil Ramone & Brian Setzer

"Those of us who have used the SSL 4000, 6000 and 8000 console know what we're looking for. The SL 9000 sounds great, and that's the key."

Phil Ramone, Producer



Kevin Mills & Dave Bianco, Larrabee North, LA

"The SL 9000 sounds fantastic." Obviously there are a lot of console manufacturers out there - but for my money it's 100% SSL."

Kevin Mills, Owner



Ocean Way, Hollywood

"Great low end impact, effortless open top end and exceptional overall clarity are not qualities I normally associate with modern consoles. The SL 9000 exhibits all these attributes."

Allen Sides, Owner



Gary Paczosa, Dolly Parton & Steve Buckingham

"We found the SL 9000 to be a superb complement to the digital recording process. It uses state-of-the-art technology to create that wonderful sound associated with classic consoles."

Steve Buckingham, Producer



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THIS EDITION'S CONTRIBUTORS



JIMMY 'C' combines his love of photography with that of thrashing his electric guitar. The perpetual awe with which he still regards all aspects of recording studios and the technology they operate ensures his continued popularity with journalists in need of a freelance photographer.



KEVIN HILTON's fusion of technical expertise, broadcast equipment and practices, and British television culture give him a unique ability to commentate on the broadcast market. The exceptional rate of change in this area make his name an invaluable asset to these pages



JOHN WATKINSON is an author, AES member, independent audio and video consultant, and regular *Studio Sound* contributor. His passion for these pursuits is matched by that for helicopters and radio-controlled boats. His web pages are at <http://www.pro-bel.com/>.

Under the influence

Demographics—that rocked the soapbox. With a single, unqualified word I'd managed to stem the stream of rhetoric being delivered by a respected British broadsheet music critic to a captive audience of 'lesser' journalists. I'd also effectively identified what was at the heart of the most ridiculous application of the word 'influence' that I've heard in years.

Trapped in the kitchen at a party heavily populated by members of the British 'quality press' I was being told that Oasis' (*What's the Story*) *Morning Glory* was a more influential than anything I cared to name—The Beatles' *Sgt Pepper* and *Revolver*, and everything by Led Zeppelin had already been singled out as examples of less influential works. The basis of the argument was an uncorroborated sales figure (which I later found to be fallacious). Now, it's true that I couldn't claim to have been to a jungle or trip-hop club more recently than my adversary, nor could I claim to be too close to 20 years old any more. But these supporting 'facts' did little—in my opinion—to strengthen his case.

Somewhere between the Stella Artois and the Jim Beam I suppose you could look to define 'influential' in some terms that might give (*What's the Story*) *Morning Glory* an edge over other, better, albums but I'm confident that the index of appropriate definitions you and I would most readily recognise would not accommodate it. Influence in any musical context must surely involve affecting the musical activities or interests of a significant number of people, not simply selling a lot of records to a lot of people who's response takes the form of dance-floor or drive-time miles. So where do demographics come in? As part of RecordCoSpeak, that's where. Our man had inadvertently betrayed the fact that he'd become unhealthily sensitised to the propaganda of major record companies' marketing efforts. Probably over lunch.

BUT INFLUENCE is an important issue. If it's not, how the hell did you end up in this business?

It has to be possible to examine musical influence in broader terms than the number of guitarists who owe something to Robert Johnson, or the relationship between the British band Killing Joke and Seattle's Nirvana. Alternatively, we could assess the role of Frankie Goes to Hollywood's *Welcome to the Pleasure Dome* (900,000 plus sales) or the Human League's *Dare* (also 900,000 plus), not in terms of putting Trevor Horn and Martin Rushent on the map as record producers, but in showcasing new production values. Then what might we say about Paul Hardcastle's single *19* and the use of samplers or Giorgio Moroder's affinity for sequencers?

Numbers make sweet music to record companies, but they don't necessarily translate into influence—or do they? Michael Jackson's *Bad* (approaching a cosy 4 million sales) or Take That's *Everything Changes* (1.2 million) for instance, or even Billy Ray Cyrus' *Some Gave All* album (at a modest 100,000) certainly haven't brought forth a generation of songwriters or virtuoso players. But they must have played a part in shaping the policies of their respective record companies—and if those companies decide that what budget they can spare from the CD reissue programme should be devoted to similar styles of music—then they've helped invigorate the studio market in specific areas.

Influence takes many forms—including our friend's influence over this column—but to analyse the influence of one factor over another requires something more than a simple correlation between record sales, dress codes and popular press penetration.



Tom Power
editor

Sound in

Manufacturers start to take Latin America seriously



MEXICO:

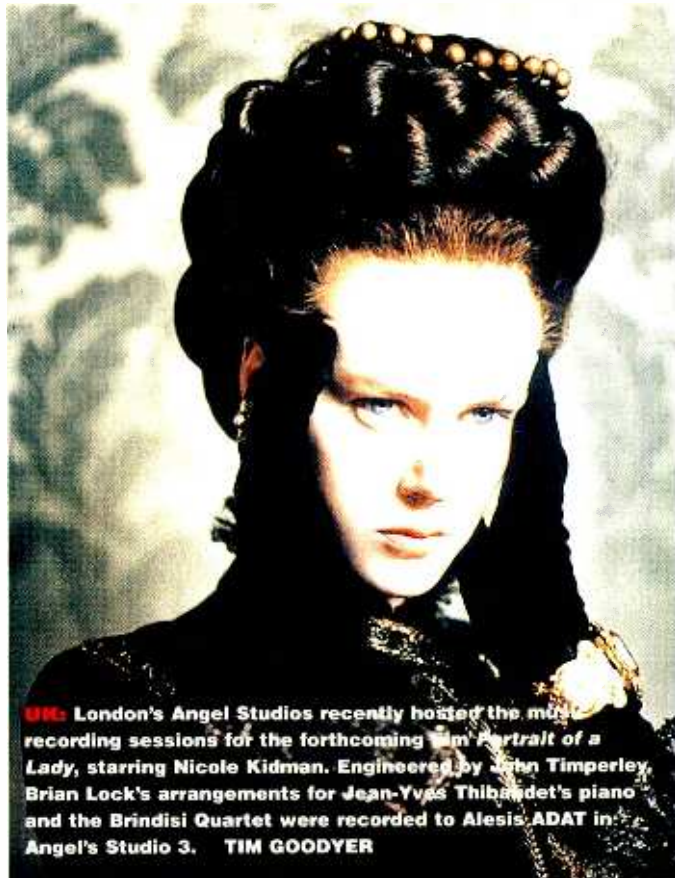
What's generally known as Latin America's music industry capital, Mexico City, hosted the third annual Latin American Pro

Audio and Music Expo. Although hosted in one of the world's most impressive exhibition venues—the city's new World Trade Centre—compared with international shows such as the AES this was a modest affair characterised by a lack of major console manufacturers in attendance and a proliferation of exclusive distributors serving the Latin American market only.

That there was nothing new on offer should be neither a surprise nor a disappointment as

this is a developing market where punters still seem to be in awe of decade-old technology, while finding the most cutting-edge stuff simply unfathomable. Despite all, the market grows rapidly and the manufacturers with the fore-sight to invest now will surely be reaping their rewards while others are wringing their hands when they realise that they have left it too late to make any impact.

A good example of this visionary approach was the debut attendance of Meyer Sound Labs, having made the decision to take over its own distribution for the territory. According to Meyer's Scott Gledhill: 'It's a signal to the market of our seriousness. We're here to tell the market of our new service centre, staffed by our own employees. The size of this market now justifies taking responsibility for our own service arrangements. All our exhibits here you could have seen at Copenhagen or New York [100th and 99th AES shows respectively] but this is the first time the Latin American consumer can get acquainted with our product: this market is starved of



UK: London's Angel Studios recently hosted the music recording sessions for the forthcoming film *Portrait of a Lady*, starring Nicole Kidman. Engineered by John Timperley, Brian Lock's arrangements for Jean-Yves Thibaudet's piano and the Brindisi Quartet were recorded to Alesis ADAT in Angel's Studio 3. **TIM GOODYER**



US: Walt Disney Records is debuting a new country album entitled *Country Disney: the best of country sings the best of Disney*. Recorded and mixed in Nashville on the new Solid State Logic SL 9000j Series console at Masterfonics Tracking Room, Walt Disney Records' latest release features artists Tanya Tucker, Kathy Mattea, George Jones and many more singing your favourites from such classic movies as *Snow White*, *Pinocchio*, *Dumbo*, *The Little Mermaid* and the recent *Hunchback of Notre Dame*. Pictured at the console are (seated from the left) Gary Burr, producer; Kathy Mattea, artist; (standing from the left) Greg Kane, engineer and King Williams, Assistant engineer. **NICK SMITH**

information.'

Similarly, recording media specialist Zonal was conspicuous by being the only European manufacturer at the show, with its ranges of analogue and digital tape and film. Zonal's Mark Heise saw the event as doubly important in the light of 3M's withdrawal from the global tape market, and felt that the company's presence at the show demonstrated a commitment to the territory. He also added that Zonal would be announcing a distributor in the near future as a direct result of contacts made at the show.

Euphonix made its presence felt with demonstrations of one of the show's most popular products—the CS200 digitally controlled analogue audio console. Although not exactly new, it represented, as Systems Specialist Richard McKernan was eager to point out 'stepping into a new realm of technology in this territory.' He also added: 'Broadcasters love it because of its presets. We see it replacing

10–15 year old technology in this area. The time is right for people to invest.'

Show organiser Chris Adams, with his Uruguayan background, fluent Spanish and twenty years in the music industry, is ideally qualified to gauge the condition of the market. He commented: 'Given the chaos of the Mexican economy—the devaluation of the Peso—it's been a double success for the exhibitors. The growth of the show has been slow, but I'm encouraged and there are good indicators for improvement. We're currently discussing making the show biannual, anchoring once a year in Mexico and serving the rest of the Latin American community with shows in South America. This means we're heading for Rio de Janeiro in '97. So the whole thing is gathering momentum.'

The decision to stage the show on a biannual basis will also entail the prestigious—if somewhat provincial—Latin American Pro Audio and Music Expo Awards

gs

Contracts

becoming biannual, and will almost certainly involve Rupert Neve filling up yet another passport as he continues to endorse the parallel conference programme with his presence and by delivering papers.

Prospective exhibitors and visitors to future Latin-American Pro Audio and Music Expos should contact Chris Adams at Studio Sound International (no relation—Ed) NICK SMITH
Tel: +1 914 993 0489.
Fax +1 914 328-8819.

UK: Soundcraft has appointed Alison Brett as Managing Director. The announcement comes at a critical time in the company's development as it prepares to make the technological leap forward with the Broadway console's assignable technology, while making major investments in the people and equipment necessary for a digital future. In the US the sales operation is being radically restructured, starting with its relocation to the ever-more important Nashville, Tennessee.

For the last three years Brett has held the position of Marketing and Business Development Director, and the in-house appointment reflects the company's confidence in her ability to repeat the successes of her

previous new product launches such as Delta, Spirit, Europa, DC2020 and, most recently, Broadway.

Commenting on her appointment, Brett said: 'We have the broadest portfolio of products in the industry as well as a great network of worldwide distributors. It is a privilege to be given the opportunity to manage the business at this critical stage in its development.' NICK SMITH

BOSNIA: The Dayton Peace Accord sees British broadcasting specialist NTL building a new national independent TV network in Bosnia. The project includes the construction of new studios, a satellite distribution system, two OB vehicles, a satellite newsgathering vehicle and terrestrial transmitters to serve the war-torn community with a balance of state and ethnic programming and unbiased news and current affairs. The network's multimillion pound costs are being met by a collective that includes the UK, US, Germany, Japan and Sweden but the timescale for the construction is just 10 weeks—a prospect described by NTL's International Managing Director, John Buckley, as presenting 'a major logistical challenge'. TIM GOODYER

US: Winner of four Tony awards and the Pulitzer prize for best drama, the new rock opera *Rent* is going a long way to restoring credibility to a much ridiculed genre. Composer and author Jonathan Larson has used a virtually unknown cast to play his modern-day treatment of Puccini's *La Boheme*, only instead of its predecessor's artistic poverty and tuberculosis, *Rent* is predictably brought into the Twentieth Century with the introduction of the spectre of AIDS and, perhaps more scarily, *Kids From Fame* clones. The show's Sound Designer, Kurt Fischer, chose predominantly Aphex gear: to control the dynamics of the five-piece rock group he selected Aphex

compressors and gates; for the monitor system, six Aphex Dominators. Fischer comments: '*Rent* depends on the energy of rock'n'roll. Yet, it's a Broadway show, and the audience expects to hear every word. In most rock songs the lyrics come at you time and time again, so if you don't hear them the first time, you'll get 'em second time around. That's not the case with *Rent*. Vocal intelligibility—spoken and sung to a rock score was the goal. Aphex helped make that goal attainable.'

NICK SMITH



◆ Korean broadcaster KBS has ordered five Studer D940 digital mixing consoles—four for permanent studio applications, the fifth for OB use in a van built by Texas-based Shooke Electronics.

Studer Revox AG, Switzerland.

Tel: +41 1 870 75 11.

◆ Los Angeles audio production

facility 7th Level has opened with a Euphonix CS2000 console and Spectral digital workstations at the heart of its operation. The brainchild of Bob Exrin and Scott Page, 7th Level was designed by Studio 440 and has already generated the sound for a series of CD-ROM games called *G-Nome*.

Euphonix, US. Tel: +1 415 855 0400.

Spectral, US. Tel: +1 206 487 2931.

◆ MTV Europe's TV studio complex has purchased six Sennheiser radio mic systems. Comprising six SK50 belt transmitters, six EM2004 receivers and four EK4015 camera-mounting receivers, the systems are to be used on a live special, *Hanging Summertime*, involving live music and interaction between the studio and viewers.

MTV, UK. Tel: +44 171 284 7777.

Sennheiser, UK. Tel: +44 1494 551551.

◆ Athens' Era Studios has become the operator of the first DAR Sabre Plus to make its way into Greece. Complete with DAR's Moving Fader Surface, the 8-channel system will see service on Era's staple of film and video work. Another Sabre Plus has been installed in the UK-based Southern FM radio station where it will be used in conjunction with a Yamaha 02R desk for trailers and indents.

DAR, UK. Tel: +44 1372 742848.

◆ Nashville's Hilltop Recording Studios has recently installed a 32-channel Neotek Elan production console. Now 32 years old, Hilltop specialise in a heady mix of rock, blue grass, jingles, spoken word and demos and has placed the Elan in its Studio B where it replaces a Sound Workshop Series 34.

Neotek, US. Tel: +1 818 281 3555.

◆ Irish-based double BAFTA winning sound mixer, Kieran Horgan, has recently 'gone digital' with a Fostex PD4 DAT machine. A veteran of such films as Roddy Doyle's *The Snapper*, Horgan is preparing to take the PD4 on the set of Nell Jordan's forthcoming feature *The Butcher Boy*, starring Stephen Rea.

Fostex Corporation, US.

Tel: +1 310 921 1112.

SCV Electronics, UK.

Tel: +44 171 923 1892.

◆ New York's Battery Studios is currently moving into the second phase of an extensive refurbishment.

Following last year's rework of the K2 studio, Control Room A is receiving the attention of UK design outfit Harris Grant Associates. Other recent New York activity for HGA's sister operation, systems installation specialists Discrete Systems, involved the installation of The Hit Factory's new SL9000J console.

Battery Studios, US.

Tel: +1 212 627 8200.

Hit Factory, US. Tel: +1 212 664 1000.

HGA-Discrete Systems, UK.

Tel: +44 1753 631022.

◆ Belgian national broadcaster, BRT, has installed five Digidesign Pro Tools III PCI systems. Each is installed with an 888 interface, Video Slave Driver and Opcode Studio 4 Interface and will be used for music and sound editing on pre and postpro TV and video work.

Riverside Music & Technology,

Belgium. Tel: +32 3 860 9090.

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

◆ Tokyo's NHK national broadcaster and Asahi Sound studio have both recently ordered AMS Neve mixing consoles. NHK is set to take a second Logic 2 while Asahi Sound is ready for its third VR Legend which will be used for music recording duties in Studio 401.

Further activity in Tokyo involves the installation of a Genesis ada 20.16 A-D/D-A convertor in the Suntory Hall where it has been used for a classical concert.

NHK, Japan. Tel: +81 33 465 1111.

AMS Neve, UK. Tel: +44 1282 417282.

General Traders, Japan.

Tel: +81 3 3291 2761.

Genesis Pro Systems, UK.

Tel: +44 181 386 1001.

Continental FarEast, Japan.

Tel: +81 33 583 8451.

◆ The Netherlands' new Teelen Multimedia Studios has opened with a 40-channel Soundtracs Jade console at its centre. The facility was designed by Alex Balster and is aimed at high-end music and multimedia work.

Teelen, Netherlands.

Tel: +31 57 12 75 574.

Soundtracs, UK.

Tel: +44 181 388 5000.

◆ Chicago's Swell Inc post house is about to open a third room completing the latest phase of development of a 19-room facility. Designed by LA's studio bau:ton and equipped with a 48-channel Logic 1 and 24-track AudioFile, Swell Inc is the first Chicago facility to hold THX certification.

Studio bau:ton, US.

Tel: +1 213 251 9791.



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What bit rate?

Digital sampling rates and wordlengths have not changed much in over a decade, yet we still hear complaints that digital doesn't sound as good as analogue. Could there be a fundamental problem here?

I am often mistakenly accused of being biased towards digital audio whereas in fact I only wrote a book about it. I would admit to being biased towards audio—good audio at that—but I have found that much better results are obtained over any problem by showing dogma the door and keeping an open mind until I have an answer that makes sense and doesn't violate the laws of physics.

I don't have a problem with analogue transducers and circuitry. Analogue techniques can in principle go beyond human hearing in microphones, loudspeakers, mixing consoles and power amplifiers, and indeed have done so in practice in some well-engineered hardware. Where analogue falls down is in recording.

Analogue recorders are linear and editing with a razor blade is irreversible and primitive. Although Mr Dolby has done wonders, analogue still suffers from dropouts, hiss, phase errors and modulation noise as well as requiring huge and heavy hardware. Vinyl discs pop and click, and suffer from distortion and wear. Digital recording using error correction has the potential to take the recording medium out of the quality loop. Random access is easy and the quality is limited instead by the word-length and the sampling rate used.

Now, I don't miss pops and clicks and hiss and all that other muck, and getting rid of them was an enormous leap forward. However, as Arnold Bennett said: 'Any change, even a change for the better, is always accompanied by drawbacks and discomfort'. Despite the overselling and hype which we for some reason employ people to generate, digital audio is not perfect, but simply replaced the glaring defects of analogue recording with different, more subtle ones.

Although I prefer the apparent cleanliness of digital audio, I still meet people who tell me that when they listen beyond the muck of analogue tape they hear things that digital can't reveal. I have identified three possible reasons

why I am being told this. The first is that people are imagining things. That is unlikely because the individuals concerned are too good at what they do and have been right on other occasions when pointing out extremely subtle deficiencies in audio equipment. The second is that the basic sampling rate and/or wordlength of digital audio currently used could be inadequate. The third is that there's nothing wrong with the theory, but available hardware is just not sufficiently well engineered.

LET'S START by taking a look at bandwidth. Whatever bandwidth you believe is necessary for human hearing, both analogue and digital-recording systems have fundamental bandwidth limits. In digital the bandwidth is restricted to a little under half the sampling rate by the anti-aliasing filter. In analogue tape the bandwidth is limited by the gap in the replay head. In vinyl disc the limit is due to the finite radius of the stylus being unable to follow short wavelength detail in the groove wall. If there is a subtle effect due to bandwidth limiting, then analogue and digital must both suffer from it equally. It wouldn't be too hard to build a digital system in which the filters have an identical frequency and phase response to a given analogue recorder in order to make a comparison. If analogue still appears better, then it's not bandwidth which is lacking.

I somehow doubt that sampling rates are inadequate. After all, if Shannon's theory was wrong, someone in another communications discipline would also have noticed, but this hasn't happened.

Now let's look at resolution, linearity and SNR. In digital, linearity and resolution are both infinite provided the correct level of dither with the correct probability density function is used. I've spent a long time studying Stanley Lipshitz on this one, and I can't see where he's wrong. Properly implemented, the dither causes a noise floor and the SNR is limited by the step size, which is easily calculated from the sample wordlength.

In magnetic recording, the medium noise is due to the finite size and

number of magnetic particles. The quantum jumping of domain walls in magnetism has an uncanny similarity to quantising in digital. Sorry guys, down at a microscopic level, analogue tape is digital! In vinyl disc its the size of the particles in the groove wall and dirt in the groove that determines the noise. Thus analogue and digital both have SNR limits with digital systems comfortably in the lead for low SNR.

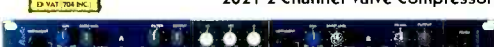
So both analogue and digital have fundamental quality limits which could experimentally be put at the same level so that a direct comparison could be made. Since sampling and quantising are independent processes, it should be possible to build a sampled analogue system in which there is no quantising in order to find out whether the subtle reported differences are due to sampling or quantising.

My third possibility is that digital audio equipment is just not designed stringently enough. I know for a fact that most commercially available D-A converters, even some expensive ones, sound different when a reframer is fitted in the input-data cable, and this is an infallible test for poor clock design because the performance of an ideal D-A is independent of the data jitter. If existing converters are obviously flawed in that respect, why not in another? Could it be, then, that all that is needed is a more rigorous approach to converter and filter design so that a theory which has been correct all along is properly implemented?



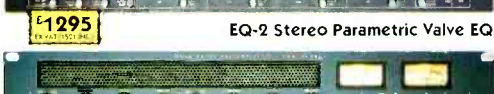

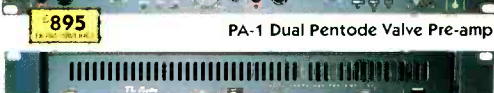


My view is that we should make some carefully controlled tests comparing analogue and digital on the finest speakers we can find. Furthermore we should seek out converters which are designed with ultimate rigour so that the quality is determined only by the sampling parameters. Until that has been done I believe it would be foolish arbitrarily to increase any sampling rates.

John Watkinson

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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."



Andy Jackson - Pink Floyd (Sound engineer) - "All the lead vocals on the 'Division Bell' album mix were run through the EQ-1 - I certainly prefer the EQ-1 to other Valve Equalisers for vocals. The new EQ-2 is probably the best all-round EQ I've ever used."



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."

Tom Lord-Alge (Dual Grammy Award Winning Engineer) - "The Indigo 2011 EQ has given me the ability to EQ with clarity, rather than just tone. I find it to be very musical. Any problem sound I have come across, I patch in the 2011 and it allows me to add depth and clarity."

Stephen Coes (Producer, Arranger, Engineer, Fleetwood Mac, Kenny Loggins, Jennifer Warnes) - "The Indigo 2011 EQ and 2021 Compressor are exceptional - both responsive and flexible. I can stomp or be subtle, hype a sound or just dial it. These are real tools for any level of music production."

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TL Audio

Surfin' USA



If the ability of the Internet to handle audio leaves it unable to support many services, it is still being embraced by pro audio writes **DAN DALEY**

Did you ever have a notion—like some sort of 3-note melody—that you simply could not shake off? That's what's going on here; last month I stated that the concept of heading this column with a famous song was kaput, finished, over, done, its initial cuteness reduced to banality by overuse. Yet when I settled on discussing how US studios are relating to the Internet this month, the Beach Boys' *Surfin' USA* jumped into my mind like a rabid tick and would not let go.

Sure, it's a good title: Surf the Net, USA and so on. But the obsessive nature of its coming to mind makes me realise that the whole title concept has become fused to my synapses. So, once again, I swear that this is the very last time.

That said, the Net has become something of a dark charm for American facilities, some of whom embrace the idea of their own websites, some of whom still regard the Internet as an underdeveloped concept with limited potential, particularly for recording studios and some of whom regard it with a borderline Luddite view. Yet, the ability of the Web to handle audio—albeit with a confusing range of proprietary software and shareware—functions as a beacon for studios, either guiding them into the harbour of the future or luring them onto the rocks of questionable marketing ideas.

In New York, several studios have made the move towards the Net, with mixed results, and it's spawning a new market niche for some enterprising media wranglers who can glean fiduciary benefits from websites without even owning a studio. Pilot Recording was an early adaptor of the website approach, putting its site (www.interport.net/~pilot) up nearly two years ago. Owner Will Schillinger reckons it's been effective in bringing in new clients, particularly some jazz clients from overseas, adding that it's also brought in resumés and in some instances new employees, and, via the site's e-mail option, it's widened his range of contacts.

'It's a high-gloss flyer that can be updated easily,' he says. 'The thing is, you do have to work to keep it current.'

Greene Street Recording Studio Manager David Harrington believes that studio's site is undergoing a reconstruction. 'It's pure image you're dealing with here,' he says. 'If your site doesn't look cutting edge and looks dated, so does your studio. I'm not sure what the ultimate effectiveness of a site is, though. I think the whole computer thing can tend to get boring to people real fast.'

Greene Street's new website will incorporate greetings from staff engineers who will offer visitors the chance to hear work they've done. Both Pilot's and Greene Street's original sites were done by Johnny Ricco, owner of Media Streams (www.realitysfx.com), a site builder who has done sites for several studio clients in Manhattan. Ricco claims that studios are similar to other website clients in that they want to show a facility or product to its best advantage in what is still a 2-dimensional medium.

BUT MOST AMERICAN STUDIOS still have nothing to do with the Net. Carl Tatz, owner of Recording Arts in Nashville, an SSL G+-equipped mix and overdub studio, was just pricing his first desktop computer last summer.

'Ignorance appeals to me,' he laughs. 'Seriously, the whole Net thing is beyond me in a lot of ways. I guess I'm just at that stage. Nothing really hits me about it as a great idea. I hear things about it all the time but they don't connect with me as

a useful business idea.'

The ambivalence of US studio owners to the Net is in contrast to the fact that the US has arguably the most highly evolved virtual infrastructure in the world. Add to that the fact that computer industry trade publications have been heralding the Net as the audio distribution model of the future, which, in light of how many studios are themselves becoming record labels in the States, adds both urgency and irony to the equation.

'Something like 64% of all the Internet access in the world is in the US,' comments Chris Stone, founder of the World Studio Group. Stone says that use of the Net amongst studios is often determined by socio-economic status.

'All the top end, major city facilities use it,' he continues. 'You get a pretty quick drop off after that, though. It's not that US studios are unaware or afraid of it; it's more that they don't understand it.'

Paul Christensen, who runs Omega Productions in Dallas and who builds websites for a limited number of companies, sort of in his spare time, says that the usage of the Net, as American as it started out, is rapidly transcending national boundaries as well as socio-economic ones.

'I'm constantly surprised at who I do see and who I don't see using the Internet,' he says.

'There are some small studios on there and individual pro-audio people—little guys. And then I try to find a major remote recording company in London for a shoot I'm doing there in October and they don't even have e-mail, much less a website. You log onto the APRS website and less than 20% of the studios on it have hypertext links to their own websites. So it's the same all over.'

Stone finds that Japanese studios are the most comprehensive users of the Net; Christensen says in his his experience it's the Australians. So the very American Internet becomes a truly international entity, one in which American users have no real advantage other than the per capita density of computers here. But no matter how many computers there are in the States, or how many there are in each studio, they are more often running Performer or Vision than they are pulling down audio bytes or even sending e-mail.

The Net is not the American stronghold it's often portrayed as in much of the media. And even as the number of ISDN-type audio sessions increases, the Internet remains a cypher to many studios here. Both Stone and Christensen independently use the fax machine as the metaphor for the course of Internet acceptance among studios—'They'll get to it when everyone has one and has to have one,' Stone says. But by then, it will no longer be an American phenomenon. On the other hand, neither was America itself. And there might come a day when the Statue of Liberty cradles in her arm a PowerBook instead of an analogue tome. ☹



The Beach Boys taking life a little too literally as they prepare to Surf the Net

Information overload



The EU data-protection legislation threatens to give digital audio and video operators a headache to accompany the one given by conflicting announcements regarding Nakamichi's plans writes **BARRY FOX**

It all seems so remote and tedious. An obscure Directive, drafted by faceless lawyers on the EC gravy train in Brussels, is ratified by governments round Europe because that is what they are obliged to do. The next step, after a couple of years' cosmetic consultation, is for all the national governments round Europe to pass laws that conform with the Directive. Harmonisation, they call it. Then—bingo—you're caught in the trap. Things that were previously legal, no longer are.

We have seen it with EMC and copyright extension—of which more later. Now there is a new Directive which should strike terror in the hearts of any studio, radio or TV station that is using digital storage, editing and signal-processing equipment. And frankly who isn't these days?

In short, as soon as a studio stores and processes sound and picture recordings of identifiable individuals they are caught by a new European Directive on data protection. The same Directive catches journalists who type text into a computer and then process it by editing or searching for keywords. Still picture photographers are caught, too, if they use the new generation of digital cameras. Most TV and radio stations now

use hard-disk stores for easy editing, special-effects processing and instant access for transmission.

'All this is comprehensively covered', says Francis Aldhouse of the UK's Data Protection Registry, warning that broadcasters do not understand the legal risks they run.

British law would already let people complain about being unfairly pictured or recorded, and the studio could be fined. But few people know their rights. When the Directive is made law, in 1998, it will widen awareness.

The EU Data Protection Directive (95/46/EC) took five years to draft and

is based on the UK's Data Protection Act of 1984, but with some tougher clauses. European governments must pass local laws to meet the Directive by October 1998. The 1984 Act 'regulates the use of automatically processed information relating to individuals'. Anyone who stores computer data that relates to a 'living individual who can be identified' from the data, must register their database with the Data Protection Registrar, at a cost of £75 for three years. This allows anyone to check what data is stored on them, correct or erase it and complain to the DPR about misuse.

Around 3,000 people already complain in the UK each year, most about the misuse of credit card information and unfairly obtaining information. The offence carries fines of up to £5,000. The EU Directive adds the right to block use and makes it easier to claim compensation.

Elizabeth France, the UK's Data Protection Registrar confirms that any digital recording, whether of text, picture or sound, falls under the Directive unless it is used solely for social and domestic purposes, such as a Christmas card list or family snapshot album. She is urging the government to strike a balance between privacy protection and freedom of the press.

'The Directive does not allow full exemption for the media,' she warns, 'but it does allow some balanced exceptions and

we are asking the Home Office for them to be clearly framed. I can ask for this now, but once the law is passed, it becomes my duty to enforce it'. Fine words, but I would have been more impressed if the Registrar had also warned that she was making her speech just two days before the British government closed the doors on consultation. It is almost certainly now too late to make representations anywhere else in Europe.

'We have been trying to tell the media what the Directive means for two years,' says Deputy Registrar, Francis Aldhouse.

So have any of Europe's studio, audio, video, TV or radio trade bodies been warned about the Directive and lobbied their government? If so, I've not yet heard about it, but would certainly like to. I'll pass on any news.

IF YOU USE Nakamichi cassette decks—to audition rough mixes, say—grab any that you see for sale because there are unlikely to be any more.

Earlier this year, Nakamichi's British agent, B&W, told the trade that the Japanese company was ceasing production of cassette decks because sales had been falling by 6% each year and manufacture was no longer sustainable. So Nakamichi would now concentrate on computer peripherals.

Subsequently, in mid May, B&W told the press that after 23 years in the cassette deck business, Nakamichi 'is withdrawing from the hi-fi market to concentrate its resources on its computer division.

'When stocks of cassette decks and CD players are exhausted', the statement continued, no further supplies will be available'.

'A sad end to what was a great company,' added Chris Hugill, B&W's sales director, explaining that despite B&W's 60% share of Nakamichi's distribution company, they had been 'unable to get much more information on exactly what Nakamichi are planning, if anything, in the long-term'.

Richer Sounds, a British dealer chain that specialises in end-of-range bargains, had been advertising both DR-2 and DR-3 decks at £250 off the list price. Don't bother to rush; they have now all gone. There will be no more, the shops will tell you, because Nakamichi has stopped manufacturing.

The news spread like wildfire in America, and Nakamichi US exploded, branding it a 'tabloid-style... false announcement'.

'We were shocked, outraged and demanded an apology and retraction', said Tsuneo Kobayashi, President of Nakamichi America.

B&W then put out a carefully worded statement which promised further news 'when available'. 'Nakamichi advise us they are continuing to manufacture and market some products for home audio,' so the original announcement 'might be misleading to readers in non-EEC markets'.

'If you ask me what products will be available I cannot say because I do not know,' says Managing Director Paul Wilkins. 'There is just no information.'

Nakamichi still sells high-end AV amplifiers in the US and Far East. These are unlikely to sell in Europe, because of the high cost (several thousand pounds a time) of winning European CE marking (the result of another EU Directive).

Accessing Nakamichi's Web site on the Internet left me even more confused so I faxed Tsuneo Kobayashi in the US, asking whether Nakamichi was still making cassette and CD decks for sale to the consumer. What came back gave me first hand sympathy for B&W's frustration.

'In answer to your question, yes,' said Mr Kobayashi. ☺

Now there is a new Directive which should strike terror in the hearts of any studio, radio or TV station that is using digital storage, editing and signal-processing equipment. And frankly who isn't these days?

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Culture shock



With the emergence of its own hi-tech facilities and services, the Far East is set to join the West in its news and entertainment programme standards. But where does this leave Eastern culture, asks **DAVID LI**?

Back in February of this year, Singaporean chanteuse Ella had to make the trek to Los Angeles in order to record a duet with American vocalist and EMI stablemate Richard Marx. Since the official opening of Synchrosound Studios in August, however, she and other artists based in the Asia Pacific region will have a pretty good case for inviting Western artists to come to them. Add to this development that of ISDN with its ability to propel audio and video around the world at the speed of light rather than the speed of sound, and it's easy to see that there will be a new geography for the next decade's media.

Quoted recently in Singapore's daily newspaper, *The Star*, Asian Pacific President of the LaSalle International Fashion school, Donald Kelch said, 'What is needed locally is a higher level of confidence and increased opportunities, and those two things together will help Malaysian design move into the international community.'

The fact that Kelch was speaking more generally than about pro-audio and video is not insignificant, and the relatively large proportion of 'imported talent' is a further clue to the region's reluctance to rely on its own talent when producing radio and television programmes—Australian, American and European skills are still regularly regarded as


essential to any production that is to equal the excellence of the West. But there are those, like Kelch, who are now seeking to put Asia-Pacific talent on the map.

'It's true to say that the major Western labels have captured most of the talent and bring huge experience in merchandising and distribution to both the fashion and music industries,' *The Star* article continues, 'but Malaysia is growing in stature economically and socially, and before it's too late will hopefully not abandon the beauty of its own culture in pursuit of the facade of sophistication offered by image-makers from the West. In the past there was an argument that ran: to get the best experience and access to the latest equipment Malaysian musicians had to leave behind many of the influences which was the source of their creativity, and live in NY, London or LA. But now the facilities on offer here are on a par with almost anywhere in the world, and over time, as experimentation and confidence bring success, creative people will, hopefully, choose to stay and explore their talents in local studios.'

THE DETERMINATION of the East to gain recognition in the world of professional audio and video—should it be allowed to flourish—could hardly be better timed. With Europe and America locked on a collision course over the development of larger and faster airliners (two distinct projects rather than one), international travellers are likely to be caught in the crossfire between the posturing of high-level international politicians and the extensive rebuilding of the airport facilities necessary to serve these next-generation aircraft—in fact, all but one of London's international airports will see a decrease in passenger capacity during the transition to the larger planes.

Until now, everyone involved in the sound, TV and film industries—from technicians to stars—has found the 'glamour' of jetsetting a necessary evil. Indeed, exposure to foreign peoples and places has often been cited as being an influence by those artists involved in it. Yet in accepting these influences, those same artists have consistently undermined the world's diversity. Could it be then, that a move away from travel, and therefore personal experience of the world, and towards the remote interaction offered by ISDN-based systems would go some way to restoring the old order? Or will improved news and entertainment distribution services provide an equally effective alternative?

Reasonably enough the designer of Synchrosound, Richard Stewart, has focused on the rapid rate of change involved in today's technology and media business, and attempted to make provision for the future. Similarly, those involved in the other areas of technical development have their eyes on this horizon—*The Star* observes that 'As the Malaysian broadcast landscape prepares to be transformed by the imminent broadcast of 20 TV channels and eight radio stations from Measat, a new chapter will be written in the history of the nation, just as the completion of the twin Petronas Towers, Kuala Lumpur International Airport and Monorail in time for the Commonwealth Games will signal the readiness of Malaysia to compete internationally'.

So while the demands of the 21st Century are being recognised in technological circles, the cultural issues remain to be resolved. 



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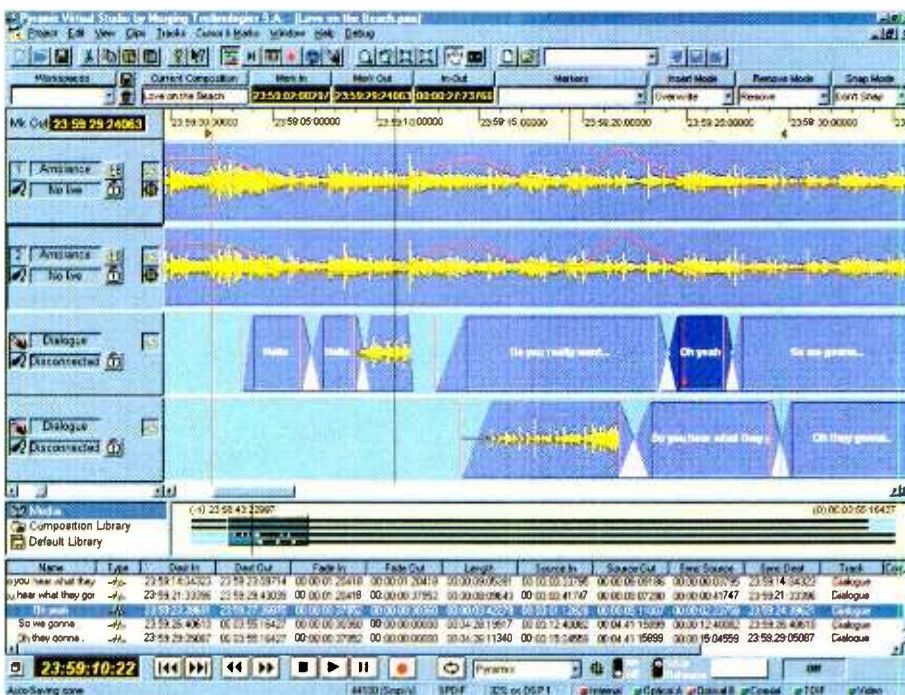
Seen by a select few at recent trade shows, this Swiss workstation receives its formal international introduction in **TERRY NELSON'S** exclusive evaluation. Is it sufficiently powerful for the market to make room for another DAW?

REGULAR EXHIBITION-GOERS will have noticed a small company from Switzerland called Merging Technologies showing its Pyramix digital system in its various stages of evolution. The Pyramix Virtual Studio is the result of a collaboration between some of the leading Swiss digital engineers (known in Swiss audio circles as the 'digital mafia') and the cream of software engineers graduating from the EPFL (University of Engineering) in Lausanne. The whole team has been under the direction of ex-Nagra Kudelski expert Claude Cellier.

In a world abounding with DAWs of differing capabilities and performances, Pyramix is set apart by its flexibility and cutting-edge technology. The exhibition visitor will also have noticed that, although the system is in its formative stages, it has been evolving and the first release version incorporates a lot of feedback garnered from conversations and discussions with potential users.

'We really wanted to have a v1.0 software at release that was as complete and bug-free as we could get it,' confirms Claude Cellier. 'It was a definite policy decision not to hurry in getting a system out that sort-of-worked onto the market, but rather to have fully working system that could be a source of creation rather than one of frustration.'

As the name may suggest, Pyramix is a virtual studio built up from a selection of flexible software



Detail of Pyramix' Editor page

Merging Technologies stress that is very much a plug-and-play system offering easy installation and minimum setup time

modules which are used as required, rather than dedicated units which remain redundant unless their specific function is needed. The system is comprised of an 8-channel digital mixer, a powerful DSP section with a selection of processors, an 8-channel hard disk with editor and a CD-R mastering package.

The components of Pyramix include the Kefren DSP ISA board which can be installed in a standard PC (Pentium, preferably 120MHz or faster) plus the associated software. Merging Technologies stress that is very much a plug-and-play system offering easy installation and minimum setup time. However, at least one full-length ISA slot in the computer motherboard is required and a PCI bus is recommended. Pyramix can also be supplied as a full turnkey system, complete with a dedicated 4U-high rackmount unit

computer, for professional studio applications.

Connections to the outside world include two optical I-Os plus co-axial (SPDIF) I-Os. The optical connectors can be set in software to operate either in ADAT or SPDIF mode, the former providing eight discreet channels of audio per connector with the latter giving two audio channels per connector. The system can also be supplied with options including a video/time-code synchronisation bracket, ADAT sync and control interface bracket, Tascam TDIF digital I-O interface bracket (for DA-88), high performance DSP expansion board with four additional DSPs, the Pyramix audio interface and an upgrade kit for Quadrix to Octrix (4-track to 8-track recording).

RATHER THAN BUILDING on current (read old) techniques, merging Technologies started from scratch and use technology, based on Object Code C++. The system also use Windows 95 (and NT). Merging has also been able to enter into a close collaboration agreement with Microsoft and this ensures against compatibility problems with existing systems.

'The recent acquisition of SoftImage by Microsoft brings an enormous amount of software knowledge to an already large pool,' comments Cellier, 'and our close relationship with Microsoft means that we will benefit from this with Pyramix and future products.'

'Pyramix is the only workstation that we know of that uses the computer for storage—what we refer to as Open Storage as opposed to Proprietary Storage. Other systems tend to use a dedicated SCSI controller which cannot evolve and thus holds the system back through built-in limitations. However, Open Storage does require a Smart Management System in order to avoid breaks during commands and this may be why others have avoided it. Apart from the obvious advantages of using the computer for storage, it also enables us to take advantage of the newer—and faster—communication links for storage which is now coming up.'

Moving on to applications, Merging Technologies is keen to stress the integration system, consisting as it does of a virtual console, a DSP pool of real time effects, an 8-track hard disk recorder and a CD-R mastering package. There are no external additions required so the system can be used as a stand-alone studio package or with existing digital recorders—such as ADAT or DA-88—as both source material and tape storage. The A-D and D-A converters in these recorders can be used with Pyramix to avoid the expense of separate converters.

At present Pyramix is intended to be primarily for audio applications, although it will integrate perfectly well into AV situations and this represents on direction of future expansion.



A selection from Pyramix' effects pool—these all run in real time

ON A COMPONENT LEVEL, the mixer provides the possibility of setting up the mixer configuration for the job in hand, from a simple 4-channel unit with no EQ to an 8-channel with as much processing as the DSP capacity will allow. Input to the mixer from external sources is via the digital inputs and these can be set up on screen and displays the different modules that are available in order to build a mixer.

In terms of facilities, the mixer offers 16 inputs, 16 outputs, two effects sends, one cue send, main left and right outputs and monitor outputs. These inputs-outputs break down as follows and can be considered the I-O points of the console: eight inputs sourced from the eight outputs of the hard-disk recorder (HD 1-8 and eight inputs sourced from external audio sources (AIU 1-8); eight outputs to the hard-disk recorder (HD1-8) and eight outputs to external destinations (AIU1-8). The inputs-outputs are then routed to and from the eight Channel modules, two Send-return modules, Cue module, Master module and Monitor module.

The modules break down as follows: the Channel module features two switchable inputs (HD or AIU), effects insert point (selected the DSP), channel fader, two auxiliary sends, one cue send, a main output and direct output. There is also a channel level meter which can be switched pre or post the channel fader.

The Send-return module is essentially an 8:1 submixer with an integrated effects loop, the effects being selected from the DSP selection. The summed output is then sent to the main mixer or an external output module. As the last sentence implies, the module can either be routed internally within the mixer or the output switched to an external processor and returned to the effects return input of the module.

The Cue Mix module is a simplified 8:1 mixer for cue mixes and so on. With the mix being derived from the cue level control on each Input module. The summed output is then routed to an external source. Metering is also included in both of these modules.

The Master Mix module features 10 main mix

inputs which can then be panned between the left and right master outputs. The left-right outputs are doubted in order to handle situations such as mastering to DAT while also recording to hard disk. Other facilities include an inline effects section (again selected from the internal DSP and stereo linked), main output faders with pre or post metering, pre-effects monitor mix and post-effects/post-fader outputs.

The Pyramix virtual console incorporates all of the features that would be found in the monitor-comms sections of a standard studio console. These include left and right outputs to control room and studio monitors plus an auxiliary output, talkback microphone input with gain, oscillator with slate function, stereo/mono switch and -20dB dim switch.

Routing is managed by clicking on one of the outputs or inputs of a module, an icon showing a jack-plug then appearing on the screen. If you have clicked on an output, red dots will flash on all of the inputs that are available for patching. Similarly, if you start with an input, red dots will flash on all of the outputs that are available for patching. To make a connection, you click on one of the red dots and a routing bus will appear on the screen. If you change your mind or make a mistake, double clicking will remove the connection.

While building your mixer, it is important to keep an eye on the top of the screen where a meter shows the estimated load on the DSP resources available. While there is no general rule, it is wise to keep within the 90% as a maximum. However, should you overload the system, a message will come up asking you to reduce the load.

The configuration completed, the mixer surface can be shown in the form in which it has been created. Moving from left to right, this layout shows the input channels followed by the effects return, left and right outputs and monitor levels. All faders show segment meters alongside them. The auxiliary and cue send level controls and pan control are shown at the top of the channel fader plus and DSP effects which may have been

assigned to the channel. All inputs and outputs can be named as required.

Operation of the mixer is exactly as you would expect on a standard mixer—an important point in itself. However, there are advanced features such as the FlexLink which allows channels to be linked in much the same way as free-grouping or stereo-linking. A single line under the channel faders shows the FlexLink bus and this is terminated with an ON-OFF switch. Clicking under the channels that need to be linked brings up a '+' icon and moving any of the faders within the group will cause the others to follow. Should you need to introduce an offset(s), the bus should be turned off at the end switch, the offsets set with the faders and the bus switched back on again for linked operation.

Another useful feature is reverse linking, that is turning a channel up will turn another one down or vice versa. This is accomplished by clicking on the '+' icon of the channel that you wish to be reversed, this now becoming a '-' icon. Again offsets can be introduced as required.


As well as saving different mixer configurations, the automation system offers full dynamic automation of main faders, auxiliary and cue sends, mutes and pans. Synchronisation is via internal or external time code and the moves may be entered via the mouse or by an external controller such as a JL Cooper CS-10 or Penny and Giles MM16. In order to have a visual feedback of the automation process, the moves can be overlaid on the audio waveform display of the hard-disk recorder as a red line. A menu allows the selection of which parameter is to be shown levels.

DIGITAL PROCESSING employs a central pool of digital effects which can be assigned to channels and main outputs as required.

Assigning effects is done from the Routeing window: clicking on the 'insert point' of the module brings up the Effects Setting window which shows the list of effects available and allows their selection. Ten effects are currently available and in theory can all be assigned to one channel. The order of selection determines their position in the signal chain.

Parametric EQ is a 4-band equaliser with switchable peak-shelving characteristics for the high and low frequency bands. The screen display can either be in the form of 'standard controls', a graphical representation or both. The graphical representation of the EQ curve is extremely user friendly, with each band being shown as a separate colour within the complete curve. Small squares—or Control Handles—allow which selection to be grabbed by the mouse in order to change settings and the fact of just using the frequency curve to find the right sound is so much more creative than twiddling knobs. The overall response of the EQ is excellent.

The 10-band graphic is a straightforward 10 band one-octave graphic equaliser with master gain control and auto-gain function. The tone control features high and low-pass filters plus a band-pass filter for the mid-frequencies centred at 2kHz. The same gain functions as for the other EQs are also included. Though simple, the tone control proved surprisingly flexible in use and would often prove sufficient for many situations, thus avoiding the use of unnecessary DSP power which could be better employed elsewhere.

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REVIEW

compressor-limiter-expander-gate with the screen display showing all controls plus a graphical display of input-output levels and compression metering. Once again, in use, the graphical display of the curves selected in conjunction with the Dancing Star response indicator proved to be very useful and speeded up creative operation considerably in finding the dynamic effect required.

All four functions are available simultaneously and though this does take more time in setting up, the results are well worth it. Each section features a threshold and ratio control—with the exception of the gate and limiter which only feature thresholds—plus overall system attack and release controls. The compressor is also divided into two sections (Compressor 1 and 2) for flexible control over the response curve. The flexibility of the dynamics processor is increased by the addition of a parametric equaliser section for de-essing and selective limiting functions.

Digital delay processing features five digital delays, ranging from a simple digital delay to echo effects, comb filtering, all pass filtering and a matrix delay which combines the outputs of four different delay lines for a variety of reverberation and reflection effects. Again, a wide palette of interesting effects is available and includes a line-pulse oscillator—this is not really an effect but allows test signals to be routed within the Pyramix or to external devices being used with the system. All effects settings can be stored to an effects library and most effects can be linked for multichannel operation.

THERE ARE TWO principle ways of recording with Pyramix: via the mixer, in which case any processing that may be required can be applied, and via the Digitise tool which addresses the tracks without using the mixer. This could be useful, for instance, when compiling effects tracks from sound effects CDs. The various screens associated with the Digitise tool allow parameters such as track routing, sampling frequency, time code, labelling to be set up, as well as providing machine control with record in and out points when using an external recorder as the signal source.

The recorder itself provides all of the recording and editing functions that one would expect from an advanced DAW and space prohibits more than a brief overview. However, there are principal features that are of particular interest and that should be touched upon.

The screen layout is clear and does not use page-style operation. As a general rule, there is one main screen for all operations and though windows can be inserted as required, you tend to find that you are working with a particular screen for a job in hand—be it setting up the mixer, operating the mixer or setting effects—all of the time.

The main screen for the recorder is the Composition Editor; here you have all of the essential elements necessary for the completion of a recording project. The different tracks can be shown as either block or waveforms, there is an EDL panel at the bottom of the screen, all transport controls are readily available and you have all the information necessary concerning labelling, project details, time code and so on. In addition, there is ready access to all menus and tool bars.

One of the most useful features is the Composition Overview (or Time Line) display

underneath the track displays. This shows at a glance which tracks have been recorded and where and thus allows fast and easy access to edit points without having to scroll through the main track display.


Looking at the editing functions, the Pyramix features flexible cut-and-paste operation as well as useful features such as AutoSplice, where the in-out points of an edit are automatically spliced together without it being a separate operation, or automatic crossfades between edit points. Operation via the computer keyboard is straightforward: play and stop use the space bar while the 7, 8, 9 keys can be used to marking edit points on the fly.

For AV work, track slipping is easy and there is the added facility of being able to move a clip within the media chosen. Pyramix uses the term Clip to designate a section of recorded material. Media is the actual length of the recording and can be likened to a reel of tape—complete with leader tape and insertions—the total running time from start to finish. Let us say that you recorded over a certain length of time to be in sync with the picture. If somebody changes their mind and you need to move the music back by five seconds while still keeping the same length of 'tape', there is no problem. Edits usually involve removing a section of the recording which leaves a blank space or requires the two bits to be spliced changing the timing. All of these functions are available, of course, but being able to shuffle material around within a predetermined time frame can be very useful.

Other edit functions include Insert where material can be inserted between two edit points and Overwrite where new material will replace the original signal in that particular section.

The management system allows extensive files and libraries of settings and effects to be built up in addition to managing the various projects under production. Libraries can also be edited and new files built up with segments from existing files.

The last aspect of Pyramix is a CD-R mastering function—this provides all the necessary facilities for the creative of CD-R masters to Red Book standard and is the icing on the cake of a fully integrate production system. Two modes are supported: Disc-at-Once for a complete transfer to CD-R and Track-at-Once for recording tracks one at a time.

In summary, it is rare to find a brand new product brought to such a high level of operation before release and for this reason alone, Pyramix is worthy of attention. As with all software-based systems, nothing stands still and so the next AES Convention in Los Angeles will see other DAWs moving forward, but it is also sure to bring some interesting further developments unveiled. However, as it stands v1.0, Pyramix certainly has 'pyramid power'. 

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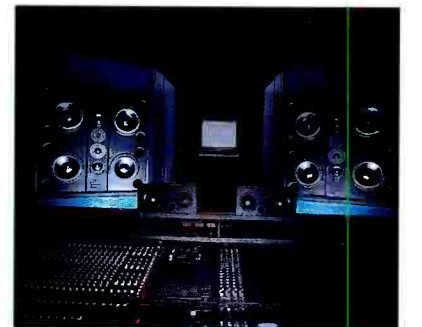
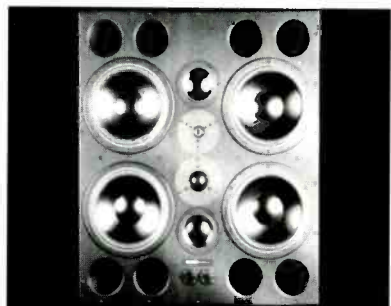
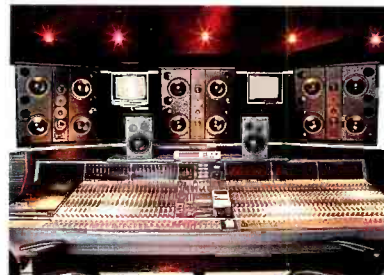
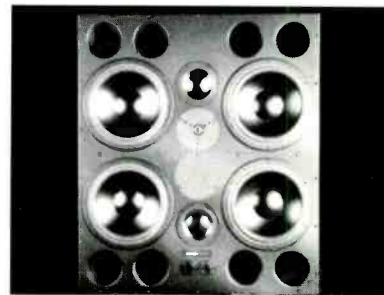
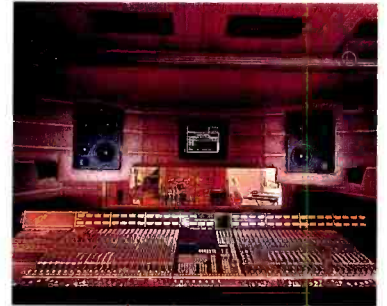
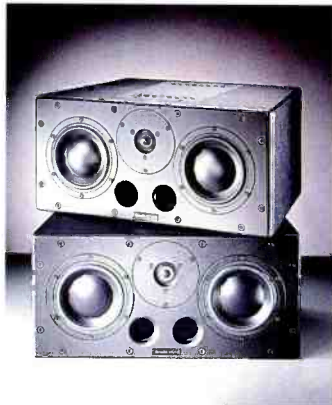
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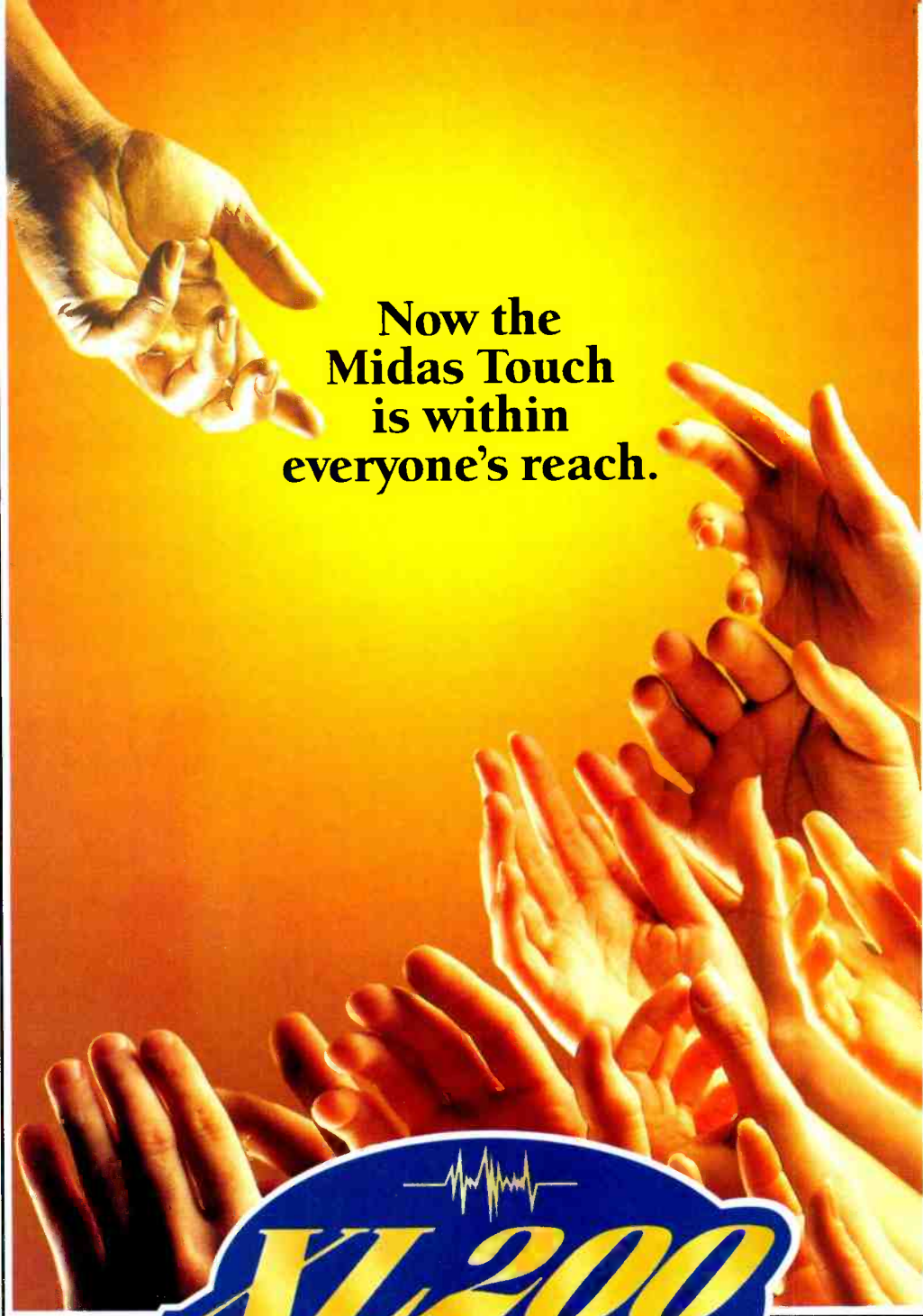
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Daniel Weiss GAMBIT ADC1

Challenging the popular practice of incorporating A-D conversion in a high-quality mic preamp, Weiss' ADC1 is a modular convertor that includes preamp options. **DAVE FOISTER** investigates the art of German engineering

ALTHOUGH THE QUALITY of audio conversion from analogue and digital, and back again, has long been recognised as the most crucial element of the digital recording and mixing process, few would deny that many digital recorders and mixers fail to fulfil their potential due to the convertors. It all too often seems that this aspect of performance is the last consideration in the list of features—sometimes almost an afterthought. The anti-digital lobby is constantly being handed ammunition by equipment that appears to say, 'look at all the bells and whistles I've got—and by the way I sound sort of okay as well'. The 'it's digital so it must be all right' attitude lingers in some circles even though most of us grew out of it some time ago.

The conversion from analogue to digital is often the only element defining the sound of a piece of equipment, and if it's not well executed then everything that follows is compromised. The need for dedicated high-quality outboard convertors is still widespread, and being addressed by many companies in the usual variety of ways from the clinical to the wacky. Some believe that the only way to convert to the digital domain is with laboratory accuracy, while others clearly feel that digital is intrinsically less than a good idea, and that its shortcomings must be compensated for with an extra helping

of analogue character, usually in the form of valves. Swiss manufacturer Daniel Weiss Engineering is a digital-audio specialist who could be expected to approach the job as an exercise in precision, and that, indeed, seems to be the case.

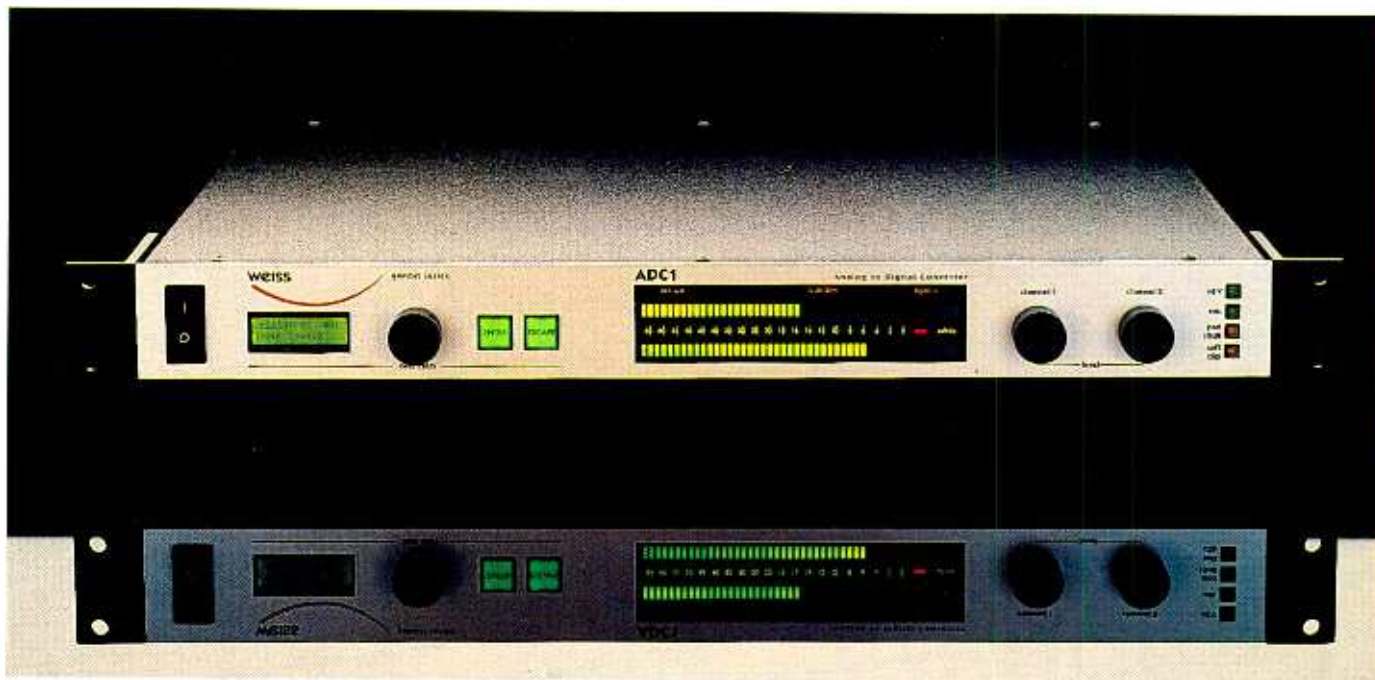
THE ADC1 belongs to Weiss's Gambit series of processors, which also includes a new 7-band digital parametric EQ, and it sets out to provide a complete 2-channel signal path from line level or optional microphone sources to digital input. A central feature is its internal modularity, enabling various links in the chain to be upgraded or augmented either as customer options or to follow new developments from Weiss. For instance, various types of convertors are available, used in pairs or even fours per channel to achieve improved signal-to-noise and to allow click-free gain changing.

There are now a few microphone preamps on the market that also contain convertors, but the Weiss takes the opposite approach: this is a convertor that can also contain microphone preamps. The difference is subtle, but indicates the level of priorities assigned to each element, and in fact in the case of the ADC1 the microphone inputs are one of several options on the basic unit. Having said that, there is nothing at all wrong with

the Weiss preamps, which include switchable phantom power and a 12dB pad, and are clearly of high quality. Line inputs are standard, and are on separate XLRs selected from the front panel.

The apparent simplicity of the front panel belies the range of facilities the ADC1 has to offer, which goes some way beyond what might be expected from a straightforward convertor and demonstrates the technical approach that characterises the unit. Several parameters are adjustable, and apart from the obvious switches on the right-hand end everything is controlled in software using a series of simple menus on the small screen.

Input level setting is accomplished from the first screen, and is independently controlled for the two channels by means of rotary encoders. Moving these at any time calls up the Level screen for immediate adjustment. Levels are calibrated in terms of the input level in dBu which causes a full-scale digital output, and is variable in 0.5dB increments. There is no default 'calibrated' position, and the standard (if you can call it that) most of my equipment follows, where digital full scale equals +18dBm, is not accommodated within the adjustment range without the use of the pad. In practice I found that most line-level sources needed the pad switched in to keep them within limits, despite the manual's suggestion that the



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pad should be used with caution. Note that although the same switch is used to introduce the pad to both microphone and line inputs, the actual pad circuits are quite separate.

Analogue sources can have soft clipping applied to them for safety if required; this raises the output level by 0.6dB and bends the transfer curve over at the top to lessen the risk of overload.

Fortunately, keeping track of actual signal levels is very easy to do, thanks in part to the wide-ranging and commendably bright meters, that read as low as -65dBFS and have short-term peak hold, including overs. There is also a long-term store for peak values on one of the screens, that can be accessed at any time to show the highest level recorded since it was last reset. This Peak Capture feature again shows overs, although for once the definition of an over is user-settable, reflecting the wide variation in the industry's view of what constitutes an over.

Previous *Studio Sound* articles have discussed the difficulty of deciding how many consecutive maximum digital values are acceptable before audible clipping makes its presence felt, and the inconsistency with which various manufacturers address the issue. Clearly, it is feasible for a given waveform to produce one maximum without clipping, and probably two; how many more does it take before it becomes a problem? Some say four is a reasonable guide, but others feel this is too lax. The Weiss allows you to make your own mind up, with the number of consecutive maxima which will cause its display to indicate an over adjustable from as low as 1 up to 16.

CONVERSION TO the digital domain will be at least 20-bit, depending on the actual convertor modules fitted within the ADC1. The manual gives full specifications and graphs for the two convertors currently available, of which the more sophisticated, the ADC1 C2, is particularly impressive, with distortion figures improved over the A2—which itself is more than capable—by 13dB. Rethiering is switchable, giving outputs at 18 or 16 bits, and uses second-order noise-shaping to produce a very low noise power around 4kHz. This is currently the only DSP function available within the unit, but it warrants the inclusion of a digital input in AES-EBU format. Eventually, Weiss plans to have further processing available which will make more comprehensive use of the input.

The input connector also allows easy synchronisation of the ADC1 to existing digital signals when it is being used for conventional analogue to digital conversion, and it also has a BNC for word-clock input. Both of these have switchable termination within the software to allow them to be used as part of a daisy chain (high impedance) or on their own or at the end of a chain (low impedance). Sample-rate conversion is not possible, and the manual points out that the external syncs are processed with a very low jitter, narrow band, phase locked loop and must therefore be reasonably accurate—within 100ppm or 0.01%—to begin with. Only 44.1kHz and 48kHz are supported.

Outputs are slightly unconventional. AES-EBU is on an XLR as usual, but there is also an SDIF (not SPDIF) output on a 9-pin D-connector. This is software selectable to be unbalanced—for Sony 1630 systems, Sony editors and some DAT machines—or balanced for DASH multitracks. Word sync output is

independently available on a BNC, regardless of the signal-output type chosen.


With so much available for adjustment, it is less of a surprise than it might otherwise be to discover that the ADC1 has 20 user-memories, which it describes as Workspaces, for storing complete configurations. These are fully non-volatile, and can all be initialised to the values of Workspace 1 at any time by way of clearing them down. Obviously this would make it possible, for instance, to take the unit out on location as a microphone front end for a DAT machine without disturbing the normal line-level studio settings.

Navigation around the various functions is extremely simple; nothing is ever more than one menu deep, and everything is dealt with by two

A high quality unit like the Weiss is going to remove the weak link and allow any digital equipment to perform at its best

buttons and a rotary encoder. It seems strange, perhaps, to be discussing the ease of use of something as simple as an A-D convertor, but then few have quite so much to deal with as this, and the Weiss does present it all very well.

And the same goes for the audio material passed through it. The review sample was fitted with the higher-spec C2 convertors, and although it had no microphone preamps it handled its line inputs superbly, producing a clean and accurate transfer into the digital domain. This is just what is needed for so many DAT recorders and DAWs, where even the most sophisticated signal handling and functionality can be let down by mediocre transfer of the raw material. It follows that a high quality unit like the Weiss is going to remove the weak link and allow any digital equipment to perform at its best. I found that even with my main mastering DAT, using the ADC1 opened the sound up quite noticeably; highs were more clearly defined and lows seemed more comfortable, with an overall improvement in transparency and detail. There was also an audible reduction in noise in the presence of low-level signals. The differences were subtle, but with a less expensive machine or DAW they would be much more significant.

This is a flexible, quality piece of kit that pays far more attention to the detail of its job than most of the competition and should constitute an upgrade to virtually any 2-channel digital system. Further additions to the DSP functions should be watched for eagerly, because if they are in the same kind of league as the existing facilities the ADC1 will become a very powerful unit indeed. 

CONTACT
DANIEL WEISS ENGINEERING
Florastrasse 10, 8610 Uster,
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Klark Teknik DN3698

Finally freed from the restrictions of having to operate his DN3600 equaliser from the rack next to the front-of-house console, **TERRY NELSON** takes Klark Teknik's DN3698 remote controller for an exclusive guided tour of the venue

THE ROLE of remote controllers is usually to make things easier for the operator—be it seated in a chair to push the RECORD button on a recorder, or the ability to adjust the parameter of an effect while listening to it at the mix position rather than from in front of a rack below the console. For live work, a remote allows you the freedom to audition the sound reinforcement from all point within the arena or the foldback on stage.

So it is that we have the new Klark Teknik DN3698 hand-held controller, designed specifically to complement the DN3600 program-mable equaliser (see *Studio Sound*, April 1994) which is primarily aimed at live applications over those of the studio. Accordingly, with the DN3698 in hand, you can wander around the stage in front of wedges, or in the house itself, in order to get a true impression of what the musician and/or audience is hearing at any given spot—and then make the adjustments deemed necessary. It's simple idea but very useful in practice.

The DN3698 is essentially a portable version of the DN3600 control surface, but it offers easier access to some of the main units controls. The remote takes the form of a rectangular metal chassis with a large display screen surrounded by control buttons, a large thumb-wheel on either side and two keypads for channel select and programming functions.

It can control up to 49 equalisers (either the DN3600 or the slave version, the DN3601) for 98 channels, or mixes, of EQ, and is connected to the equaliser(s) via standard XLR leads (professional MIDI standard) for send and return, although a radio link option is now also available.

The DN3698 is powered by either an external PSU (supplied with the unit) or by four internal Ni-Cad 'D' cells. When the PSU is connected, the batteries are automatically on charge and should you need to walk around a lot, the remote will function for approximately six hours on one charge. The 'Battery Low' LED will illuminate when the batteries are starting to run down and the 'Recharge Now' LED means plug in the PSU urgently.

Powering up the remote controller

prompts a welcoming message from Klark Teknik to the 'wonderful world of equalisation' and pressing the FUNCTIONS key puts you into Setup mode for how you want to use the remote.

The latest software has two pages—Rotary Swap and Solo Mode On-Off. You can assign the two rotary thumb-wheels to control frequency and level as required: for instance, you may wish to assign the left wheel to select filter frequency and the right wheel to control level.

Solo mode allows the equaliser currently under control to be soloed in order to make fine adjustments, all other channels are muted. This mode can be toggled on or off as required.

Page 2 brings up Solo Safe—this allows or blocks access to the solo facility, Morphing channel selection for the radio link

(again, more later) and Stereo Link. The latter has the same function as on the DN3600 where the two channels of an equaliser are linked together for stereo operation.

FOR THE PURPOSE of this review, I used two DN3600 EQs equipped with v3.0 software. After several problems


experienced with the review DN3698, this was updated with the latest software from Klark Teknik and everything fell into order.

Using the remote is simple and, as explained, is connected to either end of the daisy chain of EQs in order to access them.

The main advantage of v3.0 software is that it continues to display the fader screen rather than just telling you it is now under remote control. Whereas this may not be important for a single operator, if you are working as a team it does give visual confirmation of what is happening.

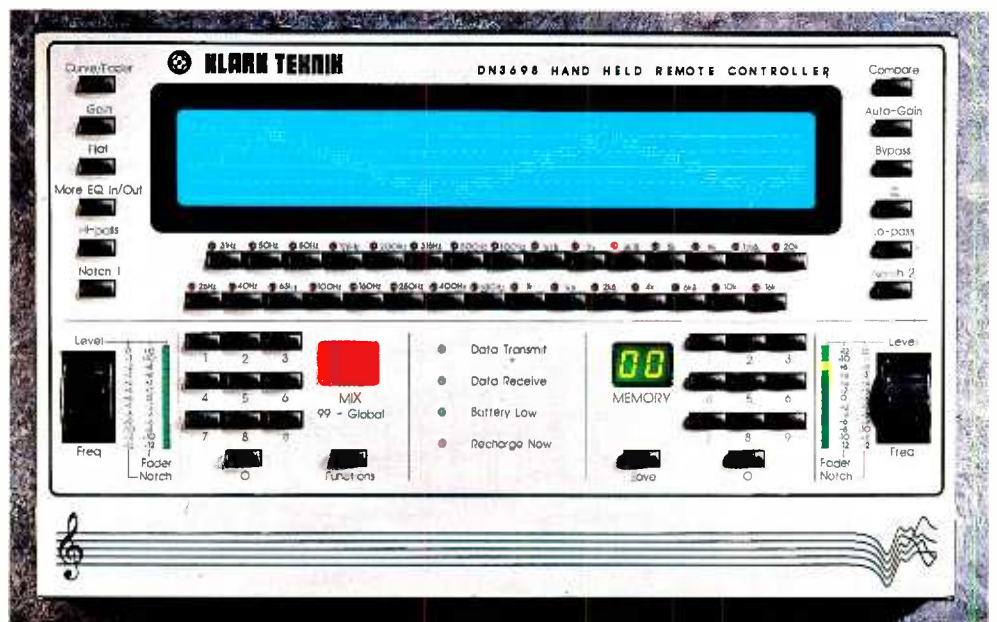
Selecting a Mix allows settings to be modified as required, with the desired frequency being selected by the Frequency keys or one of the thumb-wheels. Having trimmed up the EQ on the main faders, high-pass/low-pass filtering is available via the MORE EQ key. The turnover frequency can then be adjusted by a thumb-wheel, a central window displaying the actual frequency.

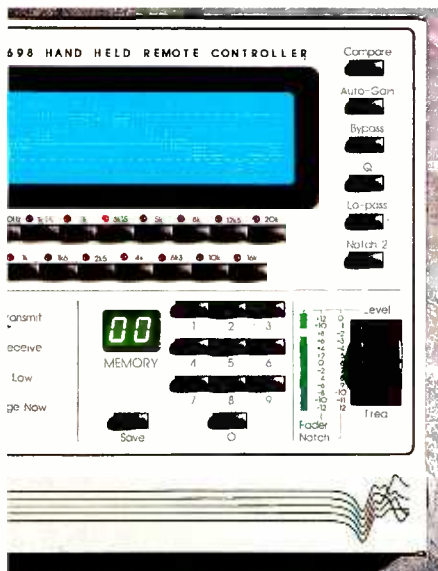
One or two problem frequencies might require some notch filtering. Select Notch 1 or 2. The LED meter next to the level thumb-wheel will indicate if any filtering is already active or not. The required frequency can either be selected with a thumb-wheel or approximately by the third-octave frequency keys, thus allowing an approximate frequency to be chosen before fine-tuning with the gain wheel.

You also have the possibility to make global changes to all EQs—access to all units is by pressing '99' on the keypad 

The DN3698 is essentially a portable version of the DN3600 control surface, but it offers easier access to some of the main units controls

Visual detail of the DN3698 showing thumb-wheels and display





DN3698 in the rack, the Station is connected to the EQs with the remote being connected to the Docking Station via a single 5-way cable which can be up to a useful 100m long.

An extension to this is a radio link which plugs into the Docking Station. This is a low-powered 2-channel system which has the distinct advantage of not having to be licensed. This means that the link can be used anywhere without fear of reprisals from the Wireless Police. The latest software for the DN3698 now makes it impossible for radio channels to be changed while in Solo mode. Similarly, if a channel has been changed, the Solo Safe function will be automatically enabled.

The obvious advantage of 2-channel operation is that two operators can access different equalisers at the same time should this be required—with the software being designed to prevent erroneous commands. The only operational difference with two channels is that the response of the system is slightly slower due to the same frequency being used for both channels when two remotes are used at the same time.

THE DN3698 DOES what it sets out to do, and I feel hard pushed to find anything negative to say about the unit. This said, there were problems with the original software but some speedy fixes between myself and KT resulted in the latest addition software chips arriving and all the problems evaporating.

There are still one or two niggles, of course—for instance, when you are in Curve mode and you select Auto Gain, exiting from this brings the Fader screen back when you might not really want it. This appears to be due to the intensive number-crunching required to switch between these functions. You also have to be quite nimble with your fingers when recalling a two-figure memory slot since, if you leave too much time between presses, you may end up selecting the memory associated with the first digit. Apparently this has been optimised after

user-feedback, and it is quite easy to get into the rhythm.

Another possible catch is that if you power down the remote before exiting Remote Control mode by pressing the 0 key on the mix keypad, you will lock all the equalisers out. Again, you just need to get into the routine of things and remember that you are dealing with software.

The DN3698 is heartily recommended to all DN3600-3601 users requiring an operational extension of their setups, and the entire DN3698-3600 system is worthy of attention from people looking for a software-controlled EQ system.

CONTACT

KLARK TEKNIK, Klark Industrial Park, Walter Nash Road, Kidderminster, Worcestershire DY11 7HJ, UK.
Tel: +44 1562 741515.
Fax: +44 1562 745371.

—useful for making a basic curve for all equalisers or to make a global trim setting.

Whereas the graphic display of the 'fader' positions is handy, a frequency curve can be selected with the FADER-CURVE key. The curve will show the effect of the HP-LP and notch filter, even if they are not switched in. This means that you can trim the curve visually before putting the filters in circuit. Once all settings are made, you can save them to memory by pressing the SAVE. The screen will now display the frequency keys as an alphanumeric keyboard, allowing you to name the memory. A prompt will show Old Name and New Name. You can either type in the new name then hit SAVE or keep the old one. DN3600 users will appreciate the difference between actual keys and pressure pads.

Calling up a memory is also very simple and is a big improvement on the memory screen in the DN3600. At this point the memory selected is not loaded and you can either scroll through the memories with a thumb-wheel to compare settings, or choose another location via the keypad. Pressing 0 on either key pad will load the memory with the subsequent change to the audio signal.

Extended functions include a COMPARE key that allows you to compare the current setting with a previous setting and to copy the current setting to another mix. An extension of the compare function is Morphing which causes two settings to crossfade—or morph—although the transition is simply either Slow or Fast. Apart from providing entertainment watching the screen as the fader icons move, this facility allows you to better judge the differences between settings. The advantage is that you can stop the movement at any time, particularly at that point where the setting is just as you would like it.

The remote can be used with up to 15m of cable. Further flexibility is provided by the optional Docking Station.

As well as providing a handy home for the

An extension of the compare function is Morphing which causes two settings to crossfade—or morph—although the transition is simply either Slow or Fast

International Head Office
Grimhøjvej 3, 8220 Brabrand, Denmark
Phone: (+45) 86 26 28 00
Fax: (+45) 86 26 29 28
Email: tc@tcelectronic.com
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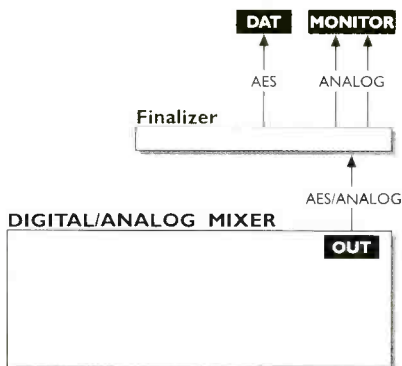
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CEDAR DH2

The release of CEDAR's first stand-alone de-hisser represented a breakthrough in real-time audio-restoration technology and an important lead for the company. **DAVE FOISTER** gets an exclusive look at the second generation DH2

CEDAR IS NOT the company to let the grass grow under their feet. Already this year it has launched a major new product in the form of CEDAR for Windows (*Studio Sound*, July 1996), and it is less than two years since its award-winning DH1 hiss removal processor first appeared. Nevertheless, the DH1 now gives way to the DH2, which is a major rewrite rather than new revision software.

The DH1 broke new ground in making hiss removal a self-contained real-time process in a box, joining the existing CEDAR modules derived from the big PC system. It had only three controls and was simplicity itself to set up to produce striking results, free of both noise and unwanted side-effects. If it had a drawback it was a tendency to be a bit particular about how it was set up for a given recording; some users found it hard to achieve the radical noise removal they wanted in some instances without affecting the wanted signal, and it was also found that music with an especially wide dynamic range would cause problems as the optimum setup for the loud parts would not be quite right for the softer passages.

Accordingly, CEDAR set about improving the DH1 and the result was a significant rethink that the designers feel is getting ever closer to their ideal. It uses the latest multiresolution techniques, similar to wavelet transforms, and combines a more coherent set of algorithms to make up what is in some ways a simpler system than its predecessor. No more than half the original software is carried forward to the DH2.

ALTHOUGH the internal engineering and board construction have been upgraded, the DH2 is virtually indistinguishable in appearance to the other CEDAR modules. The front panel logo goes blue in recognition of the new generation of software, whereas the other modules will retain the red logo despite adopting the new hardware construction. The only other outward sign of the new process is revealed when it is switched on and the main control screen is seen to carry an altered set of parameters.

The first two of the three adjustments remain the same and provide the fundamental control over how the unit removes noise. The first is called simply Level and allows the user to tell the system what to regard as noise; with the attenuation at its most extreme the LEVEL control is adjusted until the noise is gone,




regardless of any other side effects which may appear at this stage. The Attenuation is then reduced to a value which removes the noise without eating into the wanted signal, and, as with the DH1, this value is generally in single-figure dBs, 7dB to 9dB of attenuation often being quite sufficient to get rid of the hiss in even quite noisy sources. Having said that, the first sign that things have changed is the fact that the attenuation can be pushed much further still—often to 40dB—without sacrificing anything like as much as would have been the case on the DH1. I remember when the DH1 was first demonstrated to me thinking that the CEDAR people using it were being rather cautious, leaving audible traces of hiss rather than risk compromising the wanted signal even slightly; the need for such caution seems now to have been eliminated. Even more radical noise removal is now possible with few trade-offs and a more musical end result even when the process is deliberately overdone.

This is partly made possible by the new software's better transient analysis and in particular its improved algorithm for dealing with ambience. The DH1 had an Ambience control which helped the process distinguish between low-level information, such as reverberant tails, and genuine noise, but the DH2 is so much better at doing this by itself that this control has gone. In its place is a parameter called Brightness, to my mind a slightly dangerous label as it suggests (a) that the noise-removal process removes treble and (b) that the DH2 bodes it back in afterwards. Neither is true; the Brightness adjustment ensures that the

Although virtually indistinguishable from its predecessor, the DH1, the DH2 houses a major software rewrite

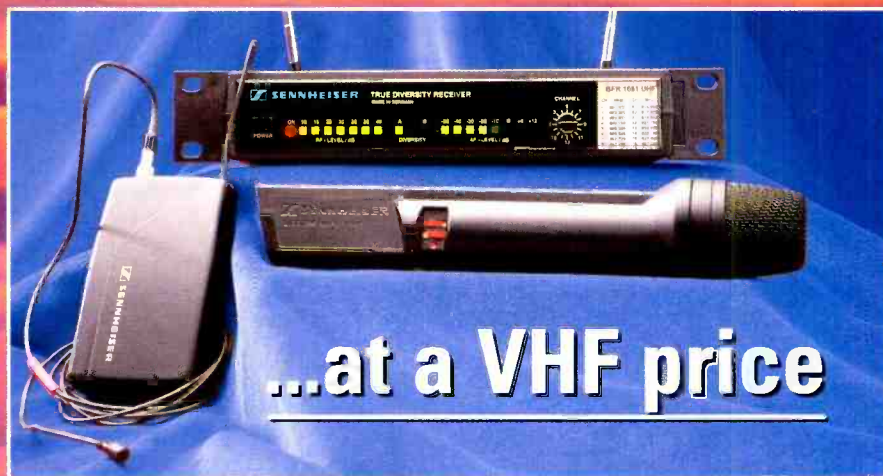
process treats transients properly and is an integral part of the setup, not a compensatory device following it. Its theoretically correct default setting is in fact 50%, allowing it to be reduced as well as increased, and unusually it gives a little more creative control than most CEDAR restoration processes as it is possible to make certain signals, particularly those with strong percussive elements, sound more punchy and dynamic than the originals, still without the noise.

I suggested to CEDAR at one point that trying to get the noise out of an audio signal was a bit like trying to get the milk out of a cup of tea, and to my surprise they agreed; CEDAR processors have nevertheless been getting the milk out for years, and the accumulated expertise shows in the DH2. It is at once even easier to get right than its predecessor and more impressive, to the point of spookiness, in its ability to do its job. 

CONTACT

CEDAR AUDIO, 9 Clifton Court, Cambridge CB1 4BN, UK.
Tel: +44 1223 414117.
Fax: +44 1223 414118.
UK: HHB Communications.
Tel: +44 181 960 2144.
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EV RE1000 AND RE200

Building on the foundations laid by its RE2000, E-V has launched two further condenser models. **DAVE FOISTER** checks the evolution of the American company from the dynamic into the condenser microphone market

THE ELECTRO-VOICE RE2000, on its launch last year, represented a significant departure for the company (see *Studio Sound*, April 1995). Until this point, E-V had made its name with dynamic microphones, and has probably done more than anybody to drag the dynamic into the late 20th century and demonstrate its capabilities. The introduction of a substantial studio condenser model was, therefore, something of a surprise. But if the endorsements listed in E-V's advertisements are anything to go by, the microphone has made quite an impact and stands up well in the company it chose to compete with, bearing out the impression it made on me at the time.

Not content with this, Electro-Voice has added two more condenser microphones to the portfolio, the more significant of which is the RE1000. This is quite obviously a simplified relative of the RE2000, sharing its essential styling and much of its electronic design.

The RE2000 has a dedicated high-grade power supply, and is supplied as standard with a substantial suspension mount into which it is pretty well permanently built. Both of these have been dispensed with for the RE1000 in order to slot it into a more modest price bracket. It runs off conventional phantom power, and attaches to a stand by means of a simple clamp around its neck, which locks on tightly with a knurled screw. Otherwise it looks virtually identical to the RE2000, with a forward-leaning front-back asymmetry and a slim side profile in contrast to its substantial front view. It looks like a big microphone, in keeping with the size of its diaphragm, but its weight comes as something of a surprise; it's noticeably lighter than a 414, despite being a good bit bigger.

Just like the RE2000, only one switch adjustment is provided, inserting a high-pass filter which rolls off at 12dB per octave below 130Hz. No pad is fitted, as the microphone claims to handle 130dB SPL with only 1% distortion at 1kHz, and no polar pattern alterations are possible—this is, perhaps unusually, a supercardioid microphone pure and simple. The published curves for the polar pattern are commendably uniform with frequency, showing a slight high frequency rise in the small rear lobe. Personally I would rather have a little clean off-axis pickup than less of it with coloration, and that is what the RE1000 seems to provide.

All this combines to produce a

microphone which concedes little to its more elaborate—and more expensive—forebear. Dynamic range and environmental stability were the reasons for the special power supply used with the RE2000, with its special capsule heating arrangements to minimise thermal alteration of the characteristics, and these parameters will no doubt suffer from the simplification of the design. Nevertheless, the RE1000 gives a very good account of itself, with the breadth of response required of a quality workhorse microphone combined with the incisive character often asked of a vocal specialist. It certainly performs well on vocals, but I also enjoyed it on piano, violin—anything for which openness and accuracy are needed. This is far from being a poor man's version of the RE2000, coming much closer to it in most circumstances than might be expected.

THE SMALLER, end firing RE200 suffers slightly by comparison with its big stablemates, but that is to be expected and does not detract from its capabilities. It, too, is a true condenser—E-V are determined not to let us forget that these are not cheapo electret microphones—with a capsule assembly based on the design used in the RE2000. While aimed at a broad cross-section of the pro-audio market, it lays no claim to clinical accuracy, having a deliberate and quite pronounced presence lift. The spec sheet describes this as gentle, but as it is 7dB up at 7kHz–8kHz compared with its 1kHz response it is rather more obvious than that. Even the inherent noise, several dB higher than the 1000, sounds brighter and less neutral, although it is still a quiet microphone.

It also turns in a creditable performance, with its tilted frequency response never sounding unduly harsh and with plenty of low frequencies surviving intact. It, too, claims to handle 130dB SPL, which should make it suitable for close drum work, and its behaviour on piano was nothing to be ashamed of. It would undoubtedly make a good dependable all-rounder, with an undeniable, but useful, character of its own which will sometimes be a definite advantage yet should never cause problems. Unfortunately, it's a rather ugly microphone IMHO, finished in what E-V unappetisingly calls non-reflective fawn beige. Of course, this doesn't detract from its performance, but it does make it look a bit cheap and less of a serious contender



'A quality workhorse'—the RE1000

than it actually is. It comes with a blue foam windshield and an adequate stand clamp.

This ever-growing range of condensers from Electro-Voice is clearly more than a cynical attempt to get a foothold in new markets: it shows a commitment to real quality and demonstrates that E-V knows more than one set of tricks. Roll on the multipattern models. **S**

CONTACT

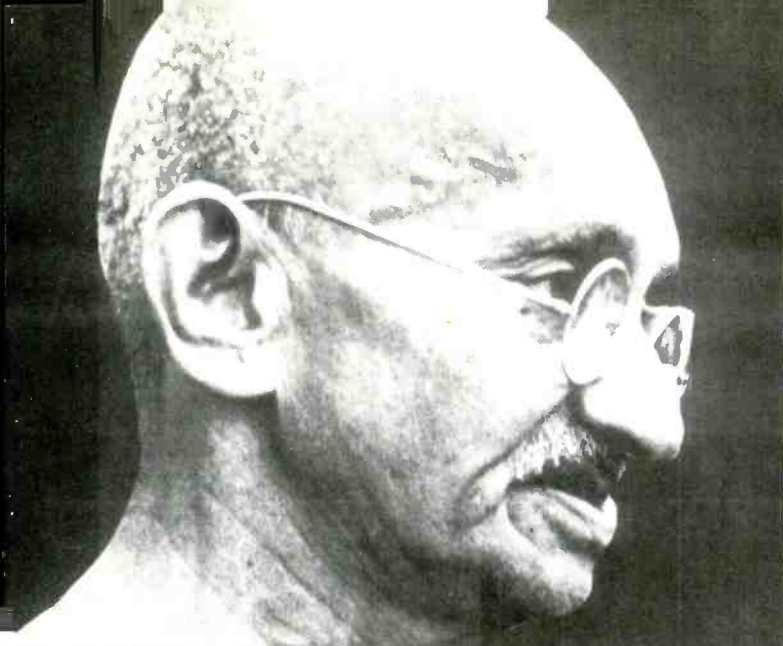
GERMANY: Mark IV Audio
Deutschland, Hirschberger Ring
45, D-94315 Straubing.
Tel: +49 9421 706 0.

Fax: +49 9421 706 287.

SWITZERLAND: Mark IV
Audio (Europe) AG, Keltenstrasse
5, CH-2563 Ipsach, Switzerland.
Tel: +41 32 51 68 33.
Fax: +41 32 51 12 21.

US: Mark IV Pro Audio Group,
448 Post Road, Buchanan,
MI 49107. Tel: +1 616 695 6831.
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New Technologies

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Studer Digitec Numisys

Numisys provides complete computer control of audio broadcast sources in a variety of jobs from journalists to DJs. It directly manipulates audio from hard disk; CDs in juke boxes; CD-ROM; M-O disks; and external signals allowing cueing and playback from all media using their own time-code systems. This allows many operating modes, from completely manual source selection to semi-automatic or completely automatic broadcast. Numisys has been conceived to allow last-minute modifications; to be able to adapt the on-air timing when necessary, and features on-line help; drag-and-drop facilities and other aids to easy and efficient operation. *Studer Digitec. France.*
Tel: +33 34 80 87 00.

Fostex DAT machine upgrades

Fostex' two flagship DAT recorders now have upgrades available. In response to comments from users, the PD-4 portable machine now moves to a MkII version, that incorporates a time-code battery backup, allowing the main batteries to be charged without interrupting generation. A 3-position microphone-attenuation switch has been added, along with a 1kHz slate tone generator, and a parallel remote control connector is fitted. The top-of-the-range D-30 master recorder now has a full copy mode available, that allows a pair of machines to perform a full-tape clone including all the subcode data via the AES-EBU ports. This and the PD-4 upgrade are available as retrofit modifications to existing machines. *Fostex. US. Tel: +1 310 921 1112.*

Sound Check II CD

Stephen Court and Alan Parsons' Sound Check CD has become a widespread reference and test CD, and is now joined by Sound Check 2. The new CD contains all the original Sound Check tracks for audio assessment, and adds some unique operatic vocal and music tracks, bringing the total number of tracks to 100. The double-CD case has a built-in microphone and sound level meter to provide an instant system response analysis. *Sound Check. UK.*
Tel: +44 181 450 0363.

Carver Pro PX Series

The first new range of power amplifiers following last year's acquisition of Carver Professional by Phoenix Gold is the PX Series, comprising three models with a maximum power-output rating of 950W per channel into 2Ω. All feature Neutrik Combi connectors and gain controls that can be switched from front to rear depending on the installation. Signal Smart Standby circuitry, fitted to all models, powers down the amplifier when there is no signal present to extend the life of amplifier and fan, and to save energy. *Carver Professional. US.*
Tel: +1 503 978 3344.

Mackie FR Series M1200

Mackie has a new power amplifier, the Fast Recovery Series M1200, with high specs and several built-in features at low cost. The amplifier delivers 600W per channel into 2Ω, and has built-in, sweepable, constant directivity, horn compensation; a sweepable high-pass filter; a switchable low-pass subwoofer crossover; and a defeatable clip eliminator. High reliability is claimed, partly by virtue of constant-gradient T-design cooling. *Mackie. US. Tel: +1206 402 6148.*

Garwood ADA8, System 3

Garwood has branched out by introducing its first product that is unrelated to in-ear monitoring. The ADA8 is an antenna distribution system designed for use with any radio microphone system, eliminating the need for individual aerials on receivers. It is a diversity system with two

antenna inputs and two blocks of eight outputs, supporting up to eight diversity microphones or 16 nondiversity systems. Multiple ADA8s can be daisy-chained using buffered antenna link outputs. Supplied as standard to operate on Channel 69, it can be built to any set of VHF or UHF frequencies to special order. A new mid-price in-ear monitoring system (half the cost of a Garwood Radio Station) has also appeared, aimed at bands making their first foray into the technique. The System 3 comprises a 1U-high transmitter unit, a belt-pack receiver and Garwood IEMII earpieces, offering full stereo transmission on a single UHF frequency. Both items will be launched at PLASA. *Garwood. UK. Tel: +44 181 452 4635.*

Hyperprism-PPC

Arboretum Systems has announced the release of the PowerMac native version of its Hyperprism real-time effects software, following the recent introduction of the TDM version. Hyperprism-PPC offers 21 effects from reverb to filters to ring modulation without any additional sound cards, for use with Performa, PowerMac, PowerBook and compatible computers. It includes a new proprietary effect called EchoTranz, a simulation of analogue tape delay with smooth real-time variation of delay times for pitch-shifted delays. *Arboretum Systems. US.*
Tel: +1 415 626 4440.

Symetrix 551E

A new equaliser from Symetrix features a new approach to equalisation circuitry that Symetrix calls UltraQ, the 551E incorporates five fully-overlapping bands, each covering a range from 10Hz to 20kHz, with independent controls for frequency, bandwidth and boost-cut. THD+N of <0.002% is quoted, low-cut and high-cut filters are both fitted in addition to the EQ. *Symetrix. US. Tel: +1 206 787 3222.*

Improved lock-up and performance characterise Tascam's MkII DA60



E-mu Darwin ADAT sync

E-mu is now shipping software v1.10 for the Darwin disk recorder, supporting the ADAT sync option card. The card allows up to 16 Darwins to be synced together or integrated with any ADAT-compatible tape machine or control device, appearing to the ADAT system to be an additional ADAT machine. Besides full transport control, it supports track arming; punch-in/punch-out locates; and time-code and word-clock sync. The new software also adds a few further features including: record-abort for instant cancellation of takes; and a nonmodal transport feature that allows the user to switch back and forth between screens without having to stop playback or record. *E-mu Systems, US. Tel: +1 408 438 1821.*

Tascam DA-60 upgrades

Tascam's DA-60 DAT recorder becomes even more of a grown-up machine with its new upgrades. The MkII has a built-in chase synchroniser, locking to, and generating, all time-code formats and locking to external word-clock and video sync. The new RS-422 implementation provides extensive machine emulation with faster lock-up times, thanks to improved servo hardware and control software. Audio



Mackie power—horn compensation filtering and clip elimination

performance is also updated by new, 64 times oversampling, 1-bit Sigma-Delta A-D and 20-bit Sign-Magnitude D-A converters. *Teac, UK. Tel: +44 1923 819630.*

Antex SX-34

A new PC card from Antex offers multiple compression algorithms and comprehensive facilities at a new low price. The SX-34 gives multichannel direct-to-disk recording and playback with a choice of formats including MPEG Layer I/II, based round a Texas DSP on a half-size ISA card, and a dual device design allows recording on one stereo channel while playing back on another. Mic, line and aux inputs feed an onboard mixer, and a high-level Application Program Interface is available supporting C, Pascal, Basic and Assembly. *Antex, US. Tel: +1 310 532 3092.*

ARX AFW-1

New from ARX is an Anti Feedback Workstation, the AFW-1. The unit incorporates a genuine FBX feedback exterminator, and combines it with a third-octave graphic equaliser and a peak limiter in a 2U-high chassis. The idea is to provide all the treatments necessary for tuning and controlling a system in a single 2U-high package. *ARX, Australia. Tel: +61 3 9555 7859.*

Vocality ISDN enhancements

Extended use of standard ISDN facilities is offered by two products distributed by Vocality. The Sosoft Cantata provides free telephony and fax over ISDN broadcasting links in conjunction with several models of codec. It connects to the mostly unused 9.6kbps 9-pin data channel on the back of nearly all manufacturers' codecs. A second company, Data TeleMark, offers the DICA 6100, that allows ISDN lines to be extended over satellite or radio for wireless transmission independent of land line cabling. Its main use is expected to be extending ISDN lines over 64k or 128k radio modems. *Vocality, UK. Tel: +44 1494 485021*

Dialog4 developments

Dialog4's range of codec systems has seen further enhancements. The MusicTAXI VP is now in its fifth generation, and combines MPEG Layers I and II in one unit. The master-slave architecture of the system means that the receiving unit automatically adapts the compression algorithm and other parameters to those of the calling unit. The portable counterpart, the MT-Reporter, also has new features including switchable phantom power, limiters on both channels and four selectable

ISDN protocols. Also recently developed is DALI, an interactive audio library system. This allows audio to be downloaded to a library complete with header information, as well as database enquiry and export of audio. It can also be used with Dialog4 codecs for a real-time transfer of live reporting to a broadcast centre together with header information directly into a server, for later editing and transmission to the library. Dialog4 has installed its own DALI server at its premises in Ludwigsburg for demos.

Dialog4, Germany. Tel: +49 7141 22 66 0.

HNB professional MiniDisc recording media

The latest addition to the popular HNB line of professional recording media is the MD74 MiniDisc. As its name suggests, the MD74 offers 74 minutes of recording time, and claims to have a performance that gives it a block error rate some 10 times lower than that of consumer blanks. As is the case with HNB's DAT media, particular attention has been given to the durability of the MD74's shell. Users of the new format already include the BBC's Radio 1, Outside Broadcast and News services as well as numerous local news-gathering services and theatre productions for effects work. *HNB Advanced Media Products, UK. Tel: +44 181 962 5000. HNB, US. Tel: +1 207 773 2424.*

Musicam CDQPrima enhancement

Musicam USA's established CDQPrima digital audio codec now claims to be the only codec in the world with both MUSICAM and MPEG Layer III, and the only US-made codec that has full contribution quality Layer II and Layer III. The upgrade also provides 15kHz mono audio on a single ISDN B channel. *Musicam, US. Tel: +1 908 739 5600. CCS, Germany. Tel: +49 81 15 5160.*

Fidelipac Dynamax MX/D

Making its debut at IBC will be the new digital on-air console from Fidelipac, the Dynamax MX/D, which the company hopes will be the first digital console to be used on air by US radio stations. Mixing, switching and signal processing are performed by a modified version of the main processor section from Graham-Patten Systems' D-ESAM 200, and form the basis of a 16-input console with an 8-channel control surface. Digital and analogue input modules are available, and outputs comprise three digital and three analogue channels. *Fidelipac, US. Tel: +1 609 235 3900.*

Digital Genius adc 20.16/2

New to the range of converters from Digital Genius is the adc 20.16/2 A-D converter, complementing the established ada 20.16 integrated A-D/D-A unit. The new converter simultaneously provides 20-bit (AES-EBU or Serial) and 16-bit SPDIF outputs, and incorporates linear phase filters and variable input headroom. Like the rest of the range, it can operate in Master or Slave mode to provide a multi-channel synchronised converter package.

Kinetic Systems, UK. Tel: +44 181 953 8118.

Soundcraft B800 surround module

Soundcraft's B800 broadcast console can now be configured for surround work with the addition of a new surround module. The new system features connection to four, five and six channel surround systems, with integrated monitoring, routing and dual LCRS panners. Processor controlled direct-replay switching; calibrated monitor level adjustment; and assignable speaker cut groups, add to the flexibility.

Soundcraft, UK. Tel: +44 1707 665000.

Oram Octasonic

Oram's microphone preamps have a new guise in the form of the Octasonic 8-channel preamp, suggested for use with project studios and DAWs. The preamp circuit is the same as in the Microphone Work Station and the new BEQ consoles, but with eight of them in a 1U-high rackmount package there is only room for gain controls and phantom power switching on the front panel. Input levels can be as high as +22dBu, and frequency response is quoted as 20Hz to 40kHz within 0.75dB.

Oram Professional Audio, UK. Tel: +44 1474 815300.

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Sound in the round

The radio renaissance continues apace with sound-only productions increasingly using film's surround techniques to great advantage.

KEVIN HILTON visits an enthusiastic advocate of surround for radio—the UK's Wise Buddah

THERE ARE SO MANY visual stimuli flying around these days that it is sometimes easy to overlook radio. Many have come to regard radio as the background noise to which they drive a car, or potter around the house, but its supporters say that it retains the potential to be much more: 'it's the movies without pictures', they claim. And as today's biggest movies rely on surround sound, some radio producers are now taking the multi-channel route to re-energise the medium.

The latest convert to pictureless surround sound is independent production house Wise Buddah, founded by BBC Radio 1FM disc jockey Mark Goodier; engineer, producer

Wise Buddah: representing an early move into surround productions for independent studios

and musician Bill Padley; and 'radio nut' Jeff Smith. Earlier this year the company moved to a 3-studio complex in the West End of London, suitably equipped to deal with not only radio

work (including music and discussion programmes) but also club-radio remixes, TV audio-to-picture dubbing and music recording.

Wise Buddah has been operating for two years and its portfolio boasts three shows for R1—Pete Tong, Collins & Maconie's *Hit Parade* and Trevor Nelson's *Rhythm Nation*—plus celebrity interviews that are ISDN-ed around the UK to a large number of regional radio stations (both BBC and commercial) and remixing and compilation. In recent weeks the company secured the contract to produce a new album chart show for R1, which will be presented from Birmingham by Stuart Maconie.

Because of this breadth of work, Wise Buddah houses a wide range of technical equipment, with a considerable investment in digital, particularly hard-disk storage and editing systems, specifically Digidesign Pro Tools running v3 software; a Tascam DA-88, which was installed for multitrack projects, although Pro Tools is now being largely used for this; a networked PC with access to the WavCart virtual cartridge machine program; and CD and MiniDisc players.

There are two main studios, plus a third room for editing and preproduction. Studio 2 is the main radio 'on-air' room, housing a Soundcraft SAC200 for conventional programme work and a Don II club DJ mixer for disco projects. The SAC200 has been heavily modified to take a row of Denon MD machines in a rack above the meter bridge, as Wise Buddah has completely dispensed with tape-based carts. Studio 1 is the complex's main facility and has been designed to be as flexible as possible, with a Soundcraft DC2020 Surround at its core.

Padley comments: 'We needed a desk that would sit well in the radio production sense but which could also switch into music and offer automation and surround. It's been modified for this dual purpose, of course, and does it admirably!'

The studios were acoustically designed and built by AVD, who became involved with Wise Buddah after one of the company's directors, Mike Thorpe, 'met'



On the web: formative surround production for BBC radio

Padley during an Internet broadcast forum.

'We gave AVD a bit of a difficult task,' admits Padley, 'because it's not the biggest place in the world and we wanted so much in it.' Thorpe acknowledges the extent of the task: 'With the acoustics we had to play a few tricks. The ceiling wasn't as we would have liked it, so we put in hard and soft fabrics. The whole studio was floated, using a box-within-a-box construction. As this facility is for voice-over work, we had to make the booths very dead.'

AVD brought in Andy Munro for Studio 1's monitoring system, primarily because of the designer's experience with surround-sound rigs. Based on a DynaudioAcoustics Active Bass Extension system, the rig has front left, right and centre speakers supported by two loudspeakers in the side walls, two in the rear and a sub under the console, all powered by Dynaudio amplifiers.

'We've got Dolby Surround,' says Goodier, 'and we'll do soundtracks for films and TV shows when it's appropriate—we've also got the electronic music-MIDI capability, which can be used for commercials and themes for radio and TV.'

STUDIO 1'S RACKS contain a variety of processing gear, including Focusrite Red compression and the necessary Dolby Laboratories encoder and decoder.

Discussing specific surround-for-radio work, Padley says: 'We'll do it when the right thing comes along, not just because we've got the equipment there. There are a variety of things that we could use surround on and there will come a point when it will happen. The ideal would be a discussion programme but that's not possible right now. We've tried it out as an experiment and, unfortunately, with the single-channel, matrixed nature of DPL, any voices placed there don't sound right in surround and almost disappear in mono.'

Padley points out that there is also the





Left to right: Wise Buddah founder Mark Goodier, and AVD directors Mike Thorpe and Bill Padley

Question of who will be able to hear audio-only surround productions. 'It's all a learning curve at the moment,' he says. 'One point is understanding the matrix itself because it's not something that you can just say "Okay, let's do this", it does require some practice. It's not so much with the desk but with the concept of surround. So, at the moment, we're testing the water with music because I can see the sense of putting reverberations in the rear pair. Club mixes will be good for it as well but you've got to think "Who is going to hear this?". After all, who sits at home listening to the radio like that? We have to convince a lot of people that it's something they should try.'

EVEN BEFORE establishing the new Wise Buddah facility, Mark Goodier had been involved, albeit peripherally, in some of the pioneering radio surround-sound work. When Matthew Bannister took over as Radio 1 Controller nearly three years ago, he promised to increase the amount of speech-based programming on the station, which included a number of episodic mini-dramas involving Marvel and DC Comics superheroes, which were broadcast on Goodier's afternoon show.

These effects-heavy segments, which have also been released to great success on CD and cassette, were produced by Dirk Maggs, a former senior BBC light entertainment producer whose first foray into the field, he has made pretty much his own, came in 1993. After a number of successful productions in straight stereo (including *The Adventures of Superman*) and a few disappointments, Maggs was looking for inspiration around the time that DC Comics decided to kill off Clark Kent and his alter ego. 'I thought that it would be really cool to write up to the point where he died and then have him come back,' explains Maggs. 'DC was being very cagey so I said let's really go for cinema sound and get in Dolby Surround.'

Superman-Doomsday & Beyond was recorded away from the BBC at West London recording studio The Soundhouse, founded by Phil Horne and Paul Deeley, who have worked on a number of TV and film projects, many of them in surround. Their main facility for radio is the newly built Studio 3, which features a DDA

Q-series console and, like Wise Buddah, a Pro Tools hard-disk system.

Bizarrely, *Superman-Doomsday & Beyond* was initially transmitted on BBC Radio 5, a mono, medium wave service. However, this brought it to the attention of Matthew Bannister, who was looking for 'zippy, noisy' drama and wanted something involving the Caped Crusader. This resulted in the 1994 serial, *Batman: Knightfall*, followed by *The Amazing Spider-Man*, prime-time R1 repeats of *Superman-Doomsday & Beyond*, a remixed *The Adventures Of Superman*, *Judge Dredd* and an adaptation of *Peter Pan*, which finally got Maggs away from comic books.

Maggs left the BBC last year to go freelance and has now formed a company, Audio Movies, with Paul Deeley and Phil Horne at The Soundhouse to concentrate on 'sophisticated audio entertainment'. Horne says he and Deeley enjoy working in DPL without pictures because their main interest is the audio: 'This way we don't have another factor to influence us'.

The main difference between radio and TV or film surround is the positioning of the dialogue: with pictures, convention deems that the voice should be tied to the centre channel, with ambience, effects and music left and right and some atmosphere, effects and reverberation in the rear pair. Maggs' work has been characterised by the hard-panning of character voices left and right.

'Because we wanted to make the whole thing exciting, everything tends to jump out and shout at the listener,' says Horne. 'With the quite violent panning, a conversation moves around the room—it's a bit like the shakey-cam on *NYPD Blue*, moving all the time.'

As productions become increasingly involved, the limitations of the Dolby DPL matrix are becoming more obvious. Horne comments, 'We're now finding that the matter of mono compatibility is an issue and that the centre speaker can give us phase problems. If anything is too subtly panned either left or right, it tends to get sucked back into the middle, which is one of the reasons we pan so violently.'

Maggs acknowledges the limitations of DPL and says that he would like AC3 'next week, please' but tempers his enthusiasm with the knowledge that nobody is currently equipped for the discrete 5.1 system. 'It won't be for another ten years yet,' he says, 'but six discrete channels? What a joy!'

Other radio surround productions have included R4's in-house adaptation of Len Deighton's *Bomber* and *The Life Of Jesus*, which was recorded at The Soundhouse for American radio. 'It was very different to Dirk's stuff,' says Horne, 'because there was more ambience, which we put in the rear. With scenes in temples we could put hushed whispers around the soundscape as people reacted to Jesus' parables. This gave you a feeling of being central within the story.'

Audio Movies has now entered into a deal with 20th Century Fox, which resulted in *Independence Day UK* (see 'The making of *Independence Day UK*' on page 44). Upcoming projects are a prequel to the new *Alien* movie and, away from Fox, a 50-episode version of *An American Werewolf In London*. ☐



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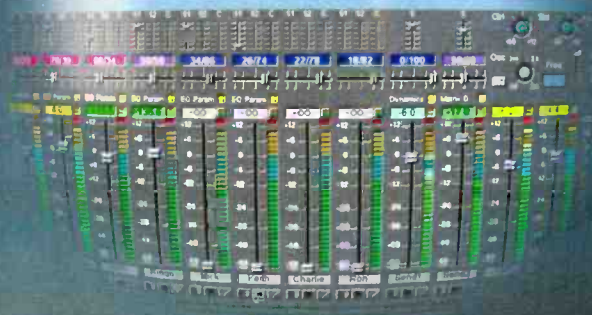
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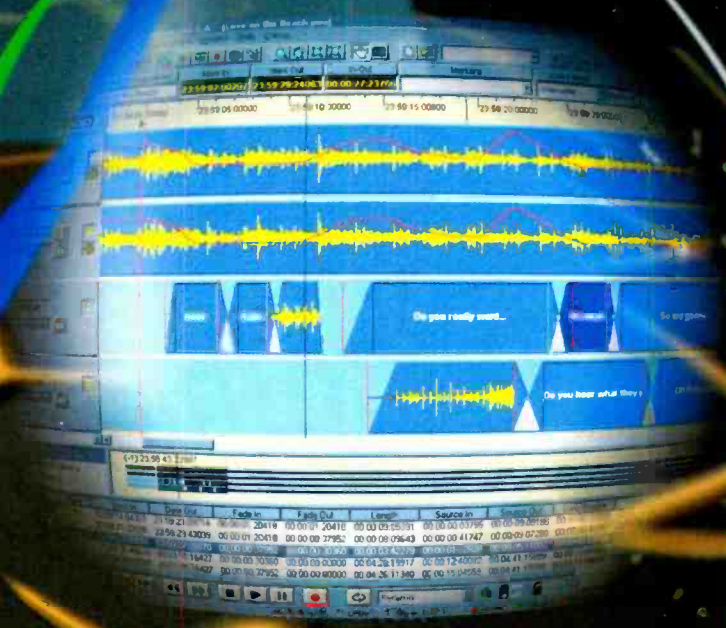
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THE MAKING OF INDEPENDENCE DAY UK

THE LATEST RADIO surround-sound production is BBC Radio 1's first foray into full-length drama. As part of Audio Movie's link-up with 20th Century Fox, *Independence Day UK* is an audio-only version of this summer's big science fiction blockbuster, which is already hailed as the fastest grossing film of all time.

The hour-long drama was written, produced and directed by Dirk Maggs as the British perspective of what happens when aliens attack the earth. Not only does it follow the plot of the movie but it also pays due homage to Orson Welles' classically infamous version of HG Wells' *War of the Worlds*, which, when it was broadcast live on Halloween night in 1938, panicked its listeners. Many fled the cities, convinced that little green men had invaded America.

Today its is movies and television that hold sway, not radio, as acknowledged in the Wellesian prologue to *Independence Day UK*, intoned in true Orson style by actor William Hootkins: 'Sixty years later [from *The War of the Worlds*], radio's influence has withered—it is a spent medium. It could never happen again—could it?'

It is clear that Maggs wanted to restore such influence and power, but by playing TV and the cinema at their own game. Like Welles's production, *Independence Day UK* starts out masquerading as a standard broadcast, with DJ Nicky Campbell and astronomer Patrick Moore onboard a Sentry observation aircraft (the RAF's version of AWACS), monitoring wireless transmissions from outer space.

After 20 minutes, recorded sans surround, London is destroyed and the fight is on to defeat the alien invaders, amid much zapping, kapowing and aircraft flying left, right and overhead. Maggs says that this production used Audio Movie's highest proportion of original sound effects, many of which were specially recorded for the purpose, rather than relying on library CDs. While some of the FX had also been used in the movie of *Independence Day* (specifically the alien attack ships and creature noises) and were sent over from Hollywood, the majority of the sounds used were either created at The Soundhouse or recorded on location at RAF Coningsby, as much of the later action takes place in Tornado jet fighters. These were recorded onto DAT by Darrin Bowen and then mixed at The Soundhouse with the rest of the effects, backgrounds, dialogue and music by Paul Deeley, with partner Phil Horne acting as audio consult.

Musical backing was the same stirring David Arnold score as used in the film, with additional sequences supplied by regular Audio Movies collaborator Mark Russell. Maggs says that his productions usually work on a 4-day cycle, with one day spent on recording the actors and as many of the effects as possible, the second

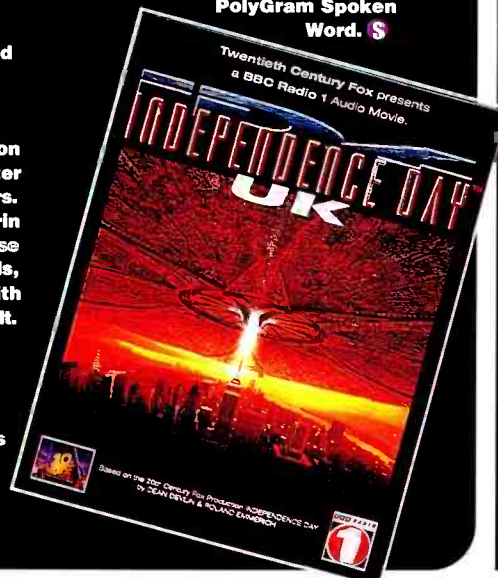
editing to time and polishing, the third track-laying effects and music and the fourth taken up with music, remaining effects and the final mix.

With *Independence Day UK* this schedule was extended by an additional day for track-laying, due to the complexity of the production. Everything was laid onto Pro Tools, mixed through Soundhouse's DDA Q-series, Dolby Surround encoded and mastered onto DAT, with a 1/2-inch tape back-up. In addition to Campbell and Moore, other actors include one-time Dr Who Colin Baker, Toyah Wilcox and the multi-voiced Toby Longworth, who impersonates Prime Minister John Major and Opposition Leader Tony Blair pledging to work together.

As much of the action takes place in jet fighter cockpits, some time was spent fiddling with EQ settings to get the right, distorted effect. Maggs admits that eventually the actors ended up cupping their hands round their mouths to simulate the sound.

As with all other Audio Movies productions, much of the action was recorded using a stereo mic, with actors moving around the sound picture. At the preview of *Independence Day UK*, Matthew Bannister, Controller of Radio 1 and now also Director of BBC Radio, commented: 'I want to do some drama on R1, but it's got to be the right type. It's got to have good production values and be fast-paced because it's going to be broadcast in between some of the most expensive productions around, that is pop records. We've tested the water with the episodic dramas and now this is our first full-length drama. I think that Dirk was finding 3-minute segments restricting.'

Like the movie, *Independence Day UK* is fast-paced, filled with effects and doesn't take itself too seriously. The recording and production are excellent and anything that contains the surreal image of Patrick Moore the astronomer fist-fighting with an alien has got to be heard. The programme was broadcast on Sunday 4th August, after R1's most listened to show, *The Top 40*. It has now been released onto cassette by PolyGram Spoken Word. **S**



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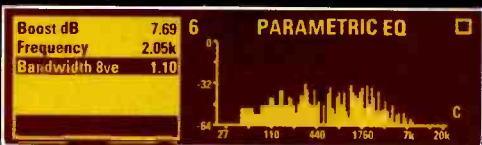
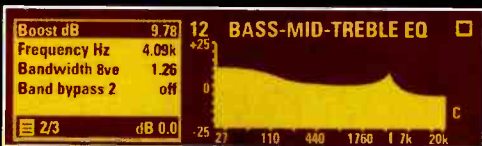
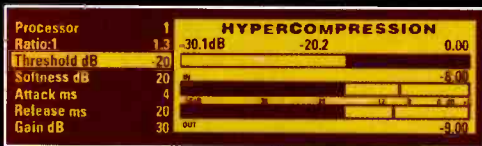
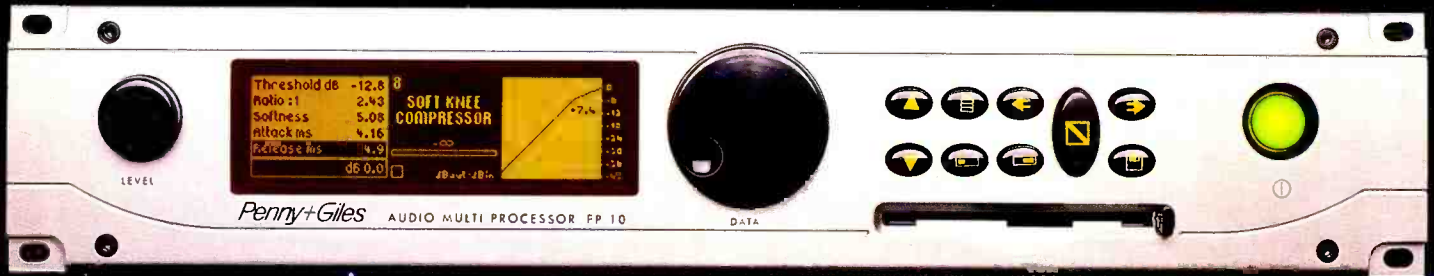
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A Star is born

The balance of power in America is about to change. **TIM GOODYER** brings the exclusive story of a new Nashville studio that will put the C&W capital on a par with New York and Los Angeles

THE TENSION in Nashville's music community is palpable: there's a new boy in town and everybody wants to know his name. As one of the first outsiders—and certainly the first of the world's press—to cross the threshold of the new Starstruck empire, I can tell you the interest is more than justified.

As such, Starstruck Studios represents two of six new rooms opening more or less concurrently in the heart of Nashville's highly concentrated music community. Part of what sets it apart is the fact that it is Nashville's first purpose-built studio building, and that its design, staffing and equipment have been approached in a thoroughly uncompromised manner. The term 'world class' is to crop up countless times during my 3-day stay and it is evident that the facility has been conceived to have a far broader appeal than to country artists.

Certainly, the facility is an impressive sight. Located at one extreme of a new building built specifically to house it, and 11 other companies which represent the related activities of the husband-and-wife team of singer Reba McEntire and musician-turned entrepreneur Narvel Blackstock. Starstruck enjoys a fashionable—and arguably essential—Music Square address. What I'm told about the location is undeniably true: throw a stone

in any direction and you're almost certain to break the window of a record company, publishing house or even another studio.

The sculpted horses and pond that front the studio entrance lend an air of calm that is continued throughout the facility. Nothing here has happened by accident. The 3-year project has been directed and executed in the pursuit of perfection, and the tidiness and attention to surface detail of the finished rooms belies the level of technical and operational sophistication. This impression is endorsed repeatedly by the elite visitors I meet at points during my stay.

Architectural duties fell to Kentucky-based CMW Architects who had no previous studio building experience and liaised heavily with Harris Grant Associates whose acoustic design highlights custom Boxer T5 monitors. An identical pair of 72-input SSL 9000j consoles (bringing Nashville's total to five) occupy the control rooms along with a selection of outboard equipment that challenges the use of the word 'selection'; being as comprehensive a set of processors and preamps as I've ever seen in one place. The mic count currently sits at 135—but is expected to rise imminently.

The two studios have been christened The Gallery and the The Pond in response to a couple of their respective features—and

in reaction to the usual soulless Studio A—Studio B formula. The Gallery refers to a feature in the live room of the main studio: a platform set at the second-floor level of the 2-storey room and sharing its acoustic space, while The Pond takes its name from its view of the studio approach outside. Each recording area may be used as one large space that accommodates varied acoustics or may be partitioned off with sliding screens to provide a number of booths with individual acoustic characters. Both studios share a common machine room that houses comprehensive patching and identical recording machines for each—Sony 3348 DASH machines; Studer 827 and 820 analogue machines; and a Sony PCM9000 M-O recorder. In contrast to the differing recording spaces offered by The Gallery and The Pond, the two control rooms are as near identical as it has been possible to make 🗑️

Neil Grant on The Gallery's gallery





them. They differ slightly in line of sight to the recording areas and finishing detail, but in terms of acoustic character and equipment—from the Boxer T5s to the selection and location of outboard—they are completely interchangeable.

'It was our dream to someday build a facility that had every possible amenity that we needed to build an artist's career,' reflects Blackstock from the comfort of The Gallery's control room. 'Not just to do things better, but more comfortably. One of the things I've always tried to do is find an easier, better way to do things. I guess from experiences that I've had, Neil's had and the other architects that have been involved in this project have had, the mission was to make this as beautiful and user-friendly as possible.'

From this conception, the project was hosted by Studio Manager Robert de la Garza and Neil Grant with reference to Blackstock for final approval—although

The view from the gallery showing RPG diffusers and plain plaster walls

Blackstock says: 'Neil had a green light on everything in the studio, and Robert had a green light on the equipment. Basically, I told both guys that I wanted it to be the very best. Those were the orders.'

'Our main philosophy was to bring a world-class facility to the Nashville music community,' de la Garza confirms. 'I know that there are other players who are also bringing world-class facilities to Nashville, but my feeling is that if you've got a couple of great new rooms in Nashville, fantastic, but if you've got a half dozen great rooms that are new and offer all the facilities of a world-class operation, then you've really got something as a music community.'

'We're confident that we have the very best of everything that's available today,' Blackstock asserts. 'One of the frustrating things about the project is that because it started two years and four months ago on the construction, and we were talking about it before then, what is available today was not available when we started. We tried to plan for it, but by the time the project was one year in, new things had become available and many times we would have to

go back and redo different things because of one addition.'

COUNTRY MUSIC is to Nashville what champagne is to France. And certainly, Starstruck expects to see more than its fair share of country acts passing through its doors. Yet the design of the studio challenges so many of the established Nashville practices that its viability was seriously questioned at one point in the construction.

'I had visited, I suppose, the top 10 or 12 Nashville studios reasonably recently, and more in times past, such that I sat down with Narvel and Robert and said: "I have a real concern that so many of the things you are doing are so different from the industry standard that I want you to be aware of the risks we are taking",' Neil Grant recalls.

'As a piece of studio design it was a leap of faith that people would want to use all these different spaces when they're making a record. My problem is that I hate booths and partitions. I've designed studios like Peter Malfay's Red Rooster that have no booths, and yet you have a system of alcoves and spaces that will provide sufficient track-to-track isolation if necessary. I think it's a conservative reaction that says give me a live recording space and six booths. What we have here is a compromise—you can have five isolated booths, or you can buy the European view and open them out into the rest of the space. The Pond is the same; you can use it as one studio or three studios just by folding back the doors. I have come to think that the recording of music is a communal business and not a series of isolated events.'

'Nashville studios are quite small places,' he continues, 'Nashville studios are short decay-time spaces, Nashville booths are dead, Nashville monitors are almost all horn-loaded and we were putting a console of which there wasn't another in town at that time. Any one of these things was bucking a trend and there was some real concern that it might cause indigestion.'

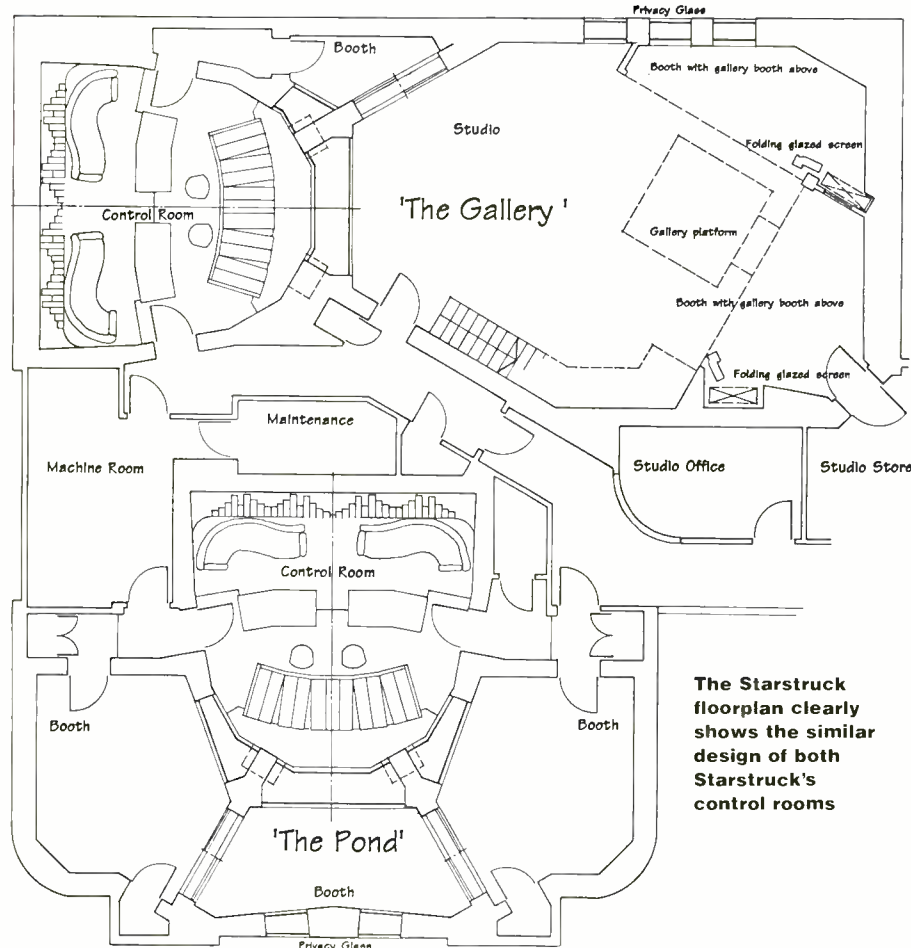
With the studio finished, however, and a new Reba McEntire album satisfactorily completed within it, everyone is confident that more than being accepted, Starstruck is poised to change Nashville's ground rules.

'These are acoustical spaces rather than rooms that have just been made into a studio,' explains resident engineer Scott Ahaus. 'Okay, Masterfonics has been built from the inside to be a studio, but I don't think there is another building in this town that's been built to be a recording space. In 10 or 12 rooms in this town you walk in and go: "this used to be the bathroom and the wall used to be there going into the bedroom so I guess this is now an iso booth..." That makes Nashville unique, but it's kept it in the 1980s in my opinion, so we're jumping 10 or 15 years ahead with this room.'

'Neil has created some space in the studio that allows you to explore other creative ways of making sound,' offers de la Garza.



Robert de la Garza takes five from managing Starstruck to water the horses



The Starstruck floorplan clearly shows the similar design of both Starstruck's control rooms

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The Gallery's SL9000j backed by custom Boxer T5 monitors and custom ceramic diffusers

For us to have a new traditional facility would have been great in itself, but to have the added advantage of new surfaces to create new sounds is tremendous!

Grant: 'It's an unusual recording space by Nashville standards; it's light and diffuse rather than being a dead box. There are other big stages—the Masterfonics tracking stage is large, but it's not nearly as live and diffuse a space as this. It will certainly



Starstruck's resident engineers, Scott Ahaus (left) and Patrick Murphy

encourage a different methodology and a different way of working.

'The difference from other studios is not a problem,' says Ahaus' partner, Patrick Murphy, 'it's a refreshing change. Because lot of studios have been built in buildings that were not meant to hold a studio, they've jammed a console in a small

room and it's dark... They're completely functional, but they not always that comfortable. Here we've got the best of all worlds!

Ahaus: 'It's jaw-dropping. The select few who have come through have been so comfortable with all the acoustics and the flexibility of the booths. It's a no-sell, it sells itself.'

Better than this, it's generally believed that the arrival of the studio on the Nashville scene will materially raise the standards of record production.

'It's a difficult and dangerous question,' says Grant in response to the suggestion, 'but I'd like to think so. I've heard some really great Glyn Johns records that were recorded with monitors I'd regard as unworkable; I look back at albums like *So* which was recorded in a cowshed, where I know they couldn't hear stereo, and where the monitors were appalling, yet it's a wonderful

piece of music. If you buy that argument you have to ask what point there is doing any of this when people make music under the most difficult of circumstances. I'd reply, however, that it is because they're consummate musicians and they rise above all these difficulties. And if you put these people in a room that accurately reflects what's going on and provides all this flexibility, then, of course, their standards are going to rise. They will finally hear what's going on and they'll make better records.'

'Wherever we have gone, whichever music centre it's been, and designed a new 'A' room, we have reset the standard of what constitutes an 'A' room facility. And I believe that's what we've done here in Nashville. I don't think that belittles what has gone before or the quality of the players, producers and engineers, but it gives a new and better tool for them do things even better.'

'Once creative people see that there are other avenues, they will explore them and they will show up on record, de la Garza adds. 'That in itself will raise the stakes.'

GRANT DESCRIBES the technical installation as having been 'thought through in incredible depth'. His assertion is borne out by the evident sophistication of the facilities and the transparency of its support. Tie lines and patching are comprehensive and go as far as to provide support for live television feeds to be derived from the studios and other areas of the Starstruck complex. It is a further testament to Dave Bell's installation that the Reba session ran so smoothly.

THE GALLERY & THE POND EQUIPMENT

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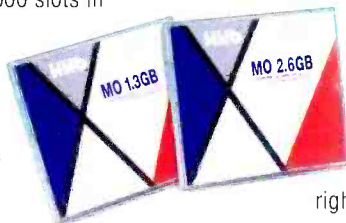
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One of a pair of Yamaha grands; this one is in The Pool's recording area

worked out,' Blackstock recalls. 'But there was never a moment in the whole session from start to finish that we had a problem. Everything worked first time.'

A further session has since been run—this endorsed another aspect of the Starstruck philosophy. Where Nashville's accepted *modus operandi* has engineers owning or hiring large amounts of outboard equipment in order to complete a session, Starstruck already has it.

'I've been an engineer for a long time and I know vintage gear for its sonics and I've been exposed to all the new gear,' explains de la Garza. 'What I endeavoured to do was to provide the best sonics and the widest choice possible. If you were engineering a R&B project one day and a classical project the next day, you would have enough gear in here, enough variation of colour, to cater to everybody. We wanted to have a complete colour palette. We've had people in here and asked them what's missing, and I think we've got it covered.'

'Most of the engineers are used to running big racks of their own because most of the studios in town aren't well equipped at all, Murphy confirms. 'One of the engineers who mixed in this room brought in his rack on the first day, then after the first song he rolled it out and we didn't see it again.'

'Even if you're not an SSL guy we've got

Everybody seemed sure that it was going to be a disaster because—beautiful as it was—it usually takes time to get everything

24 outboard mic pre's, 26 channels of outboard EQ; and at least that many channels of outboard compression so you can run almost a complete basic session without having to use the console except to monitor,' Ahaus continues. 'Everybody who walks in here says: "Man, you got a shitload of outboard gear!" Then they go next door and say: "You've got nearly as much in here!" and you go: "No, the two rooms are exactly the same...!"

And those 135 mics...

'We've been very, very picky with microphones because they're the first thing the sound hits and you have to get it right' says de la Garza. 'We said "okay, microphones provide a colour palette and we want to be able to offer the widest choice possible" so we identified all the microphones we thought were really worth having for that palette. We still have a few purchases to make, so there will be more than 135 in the end. The hardest mics to come across were the Elam 251 Telefunks—they've proven to be phenomenal mics over the years and they have yet to be reproduced by anybody to that degree of fidelity. They have their own sound and presence and depth so because we're so big on sequential serial numbers and matched pairs for stereo use they've been very difficult to obtain.'

'One thing in particular with vintage gear that you have to be aware of is that it is what it appears to be—because a lot of old stuff has been modified and customised, and you really have to get inside and check that you're getting what you think you're getting.'

Another unique aspect of Starstruck's

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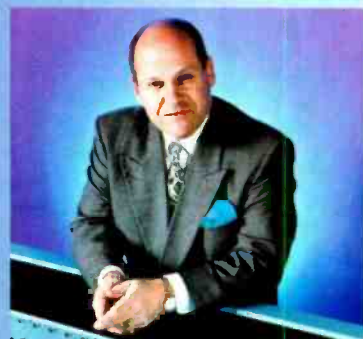
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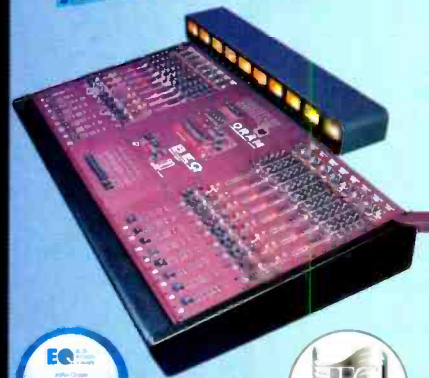


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The High Definition EQ really came into its own on live recording in Europe and the US. I recently used it for recording a performance with the Hudson Valley Philharmonic. At this moment I'm recording my new album using my BEQ Series 8 board, and it's so quiet.

John Cale, 'Velvet Underground'
Project Studio, New York HD EQ-2, MWS and BEQ Series 8.

I've been working as a tech for 30 years and in all that time I have never heard a quieter desk.
Gaston Nichols Pro Audio Installation.

The Pre-amps sound like a huge Nerve, I've never had a better bass drum sound.
Jason Elgin, Synchronesh Studios. BEQ 24.

The bottom end of the HD EQ-2 is extremely warm and musical, the top end, you can keep piling on and it doesn't crunch up. The sound is definitely lush and I also like its fine detail control.

Paul Libson, Profile Studios
Mastering suite, Milan Italy.

This is the quietest, most inspiring console I've ever used. I've changed my Trident for this board and the Oram Sonics are all there. The EQ magic™ of John Oram is musically most satisfying, it's simply the best. I've ordered a second unit for my new studio.

Uli Jon Roth, 'Scorpions' and Symphonic Musical Director. BEQ 24 Owner.
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the story: 'I didn't feel at the time that digital consoles were as far along as they needed to be for us to put our efforts in that direction. I did feel that analogue consoles that could be tied into the digital world were the way to go. Analogue is in its mature stage, and at its peak, but digital is still in its infancy—it's walking, but it's not quite able to run yet. That's not being negative, I love the concept, but I felt that we were best served by a top-of-the-line analogue console that could be tied into the digital world.'

'One of our concerns was in terms of warmth and punchiness, and the sonics of the SSL 9000 are amazing, and the noise floor is so low that if you put any signal through it you're dealing with the sound you want to deal with rather than noise floors. The SSL9000 with Disktrack is perceived by us to be a digital console with the warmth and punchiness of analogue.'

As a direct consequence of the result of the choice of console, the digital presence at Starstruck begins with the Disktrack system, and continues with the Sony PCM9000s.

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AKG C414 B-ULS (6)
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AKG C12 VR (2)
AKG D112 (4)
AKG C3000 (4)
AKG 4808 CK-91 (12)
AKG C391 B (12)
AKG CK93 (Hyper) (2)
Audio Technica AT4050 (4)
B&K 4007 (4)
Coles 4038 (Ribbon) (2)
Electro-Voice RE-20 (2)
Neumann U87 (8)
Neumann M268 (2)
Neumann SM59 (stereo)
Neumann KM184 (8)
Neumann M145 (2)
Neumann TLM170 (4)
Neumann TLM193 (4)
Sanken CU-41 (2)
Shure SM57 (12)
Sennheiser MD421 (12)
Sony C900 (2)
Sony C900 G (2)
Telefunken Elm 251 (2)

Equipment is the custom cue mixer—the pet project of house technician Jim Rogers. Around the recording areas are littered mini-mixers offering eight mono faders (two of which are normalled to the console's foldback A bus) and four stereo faders (which are normalled to the four stereo bus outputs) and inbuilt talkback mic.

'That was a fun project,' Rogers enthuses. 'We talked about it, and we decided it was one of the things we could do to make this place special. Everybody in town had been using the Formula 8, and Robert said he's heard a lot of session players complain about being in mono so we went ahead and did it. It's something else that allows the engineer to get on with the job,' Ahaus elaborates. 'You just say to

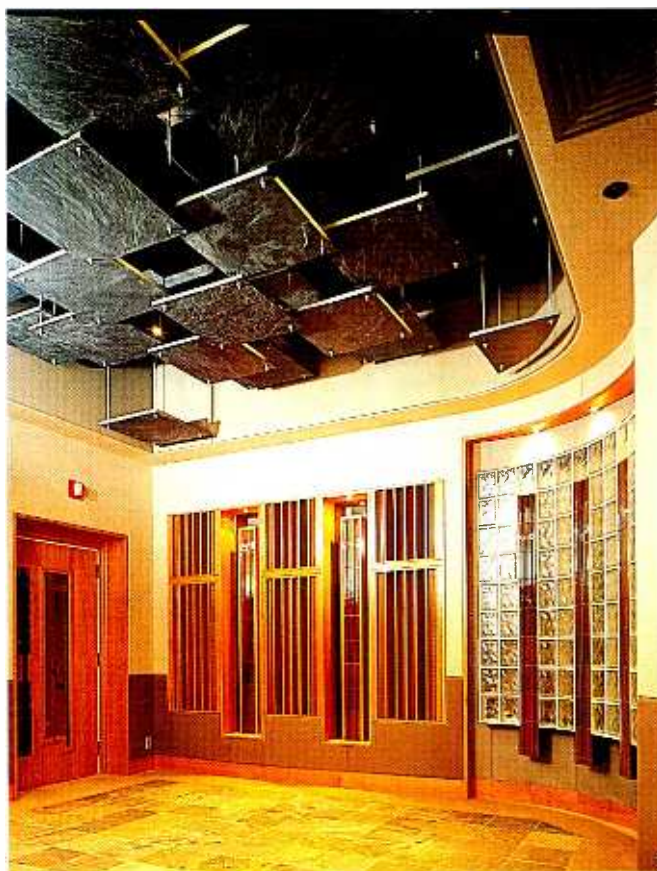


Jim Rogers' custom cue mixer

the guys: "You've all seen a mixer before—up is louder...". Before I used this I was regularly running four different head-phone mixes, and worrying that if they can't hear it they can't be creative so you're not getting what you need on tape. And you can set it up anywhere—we were recording the B3 in The Pond while we were doing the main tracking session in The Gallery, and we just patched it in, and he'd got everything he needed including a talkback mic.'

Back at the desk, the selection process was begun before the SL9000j was available. Consequently, it involved earlier plans to equip one room with a G-plus, and the other with a Neve VR. AMS-Neve was reluctant to build a new VR—suggesting a Capricorn or a secondhand VR instead. The delay gave Neil Grant the opportunity to evaluate an early SL9000 and a recommendation followed.

De la Garza picks up



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FACILITY



Sony 3348s, Studer 827 and 820 machines in the common equipment room. Note the comprehensive patching arrangements above the machine bay

companies coming together as a team to make the most incredible dithering unit that we can have. Our main concern is that all the little bits you struggle so hard to record get down onto CD.

Of course, the kind of excellence offered by such a sophisticated facility comes at a cost, both to its owners and to its clients. Blackstock declines to put a figure on his investment—in fact, he claims not to know what it is: 'I couldn't tell you exactly what we've spent. The thing that I'm proud of is that money was not an object—and if I'm comfortable with it, it's only going to irritate me for some-

one else to read it and think that I'm crazy. I'd just as soon people come here and see what a beautiful place it is, enjoy the environment and use the studio without worrying about the cost or whether we're crazy.'

On rates, Starstruck comes into line with the top-flight studios on America's east and west coasts, but sits above the Nashville norm. Again, Blackstock claims that this was not a

'The next great challenge to the industry is to standardise on how to dither 24-bit to a 16-bit format'

specific consideration in the studio's conception. Ahaus offers another rationalisation: 'Everybody who works around here ends up renting microphones, but here they walk into the mic closet and say "Wait a minute, is this extra?" and it's not, it's included with the room. The Sony 9000s are with the room, the analogue machine is with the room, the digital machine is with the room... Everything you need is here. Then they look at the rate and say "Well, I guess I'm not spending \$300 a day on a digital machine, and I'm not spending \$200 a day on microphones". And then you're working.'

'Hopefully these are the most awesome studios anyone would ever want to record in and hopefully our artists will want to record here,' concludes Blackstock. 'But the studios service anyone and any kind of music.' **S**

'We've experimented some with 16-bit, 20-bit and 24-bit, and we like 24-bit very much,' de la Garza continues. 'I think that the next great challenge to the industry is to standardise on how to dither 24-bit to a 16-bit format. Obviously, there are systems already on line, but we need to standardise on a way of getting it onto 16-bit CD. I think that it's just around the corner—we'll see

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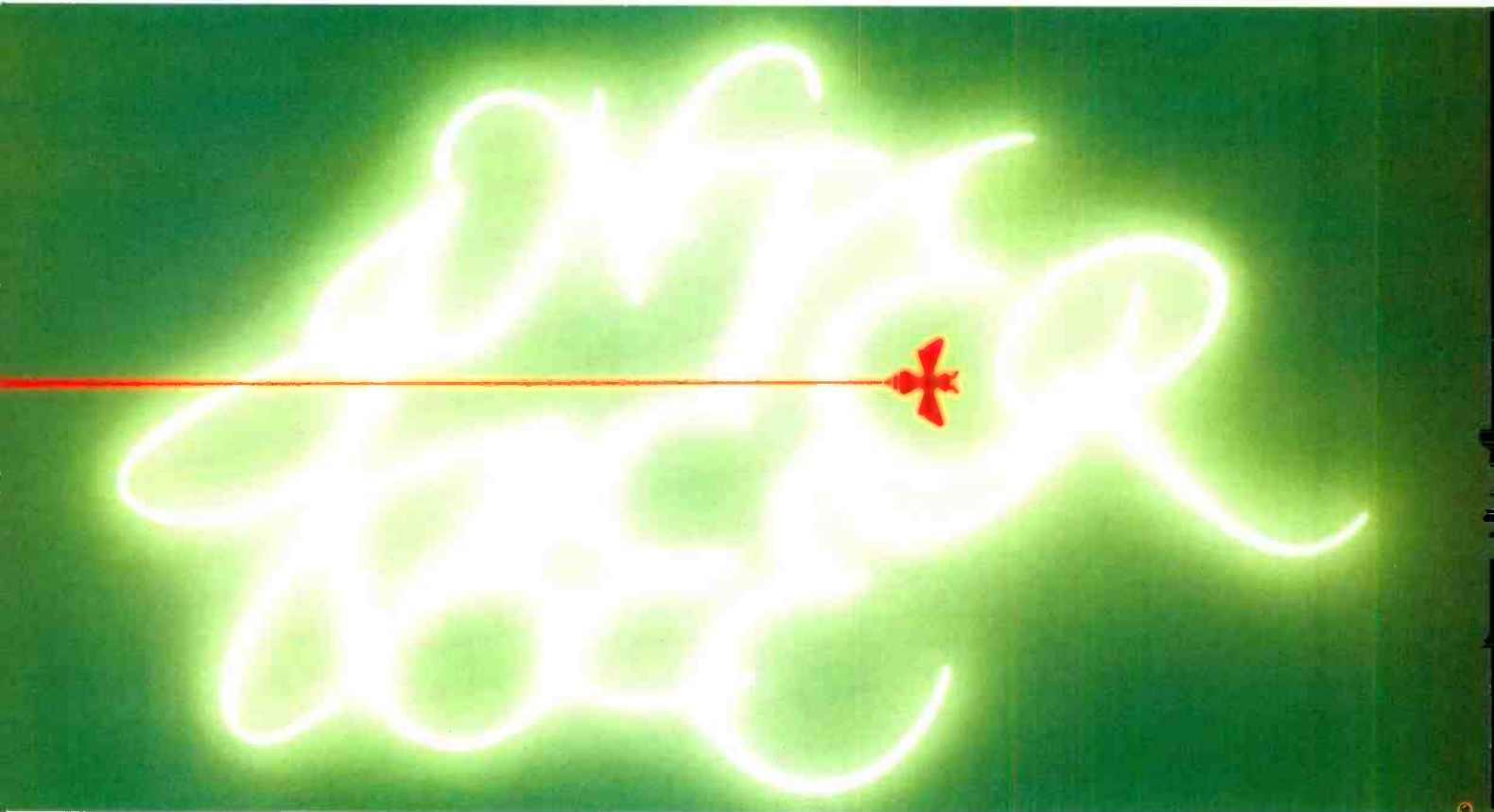
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Radio silence

If the BBC were put up for sale, it would not only represent a fundamental change in the structure of world broadcasting but cause a furore of press interest. Or, then again, maybe it wouldn't, writes **KEVIN HILTON**

We all knew it was going to happen: it had been discussed for a number of years, was included in the Broadcasting Green Paper at the end of the 1980s and a final framework was published in the draft BBC Charter and draft Agreement of November 1995. This last document formally announced that the BBC's transmission service would be privatised, which was generally seen as a sop to the hardline Tory MPs who wanted the whole of the Beeb sold off to punish the public service broadcaster for allowing interviewers to ask ministers difficult questions and showing subtitled French films.

Now it's going to happen for real and nobody's really saying anything. The document that was sent to journalists merely said that a company called Lehman Brothers International (Europe) was issuing, on behalf of the BBC, a confidential Information Memorandum to applicants who had registered interest in the BBC's Home Service and World Service Transmission business (known as BBC Transmission). According to the release, the Memo describes the businesses that are for sale, some of the proposed terms of sale and the key investment considerations.

Then there was a series of platitudinous quotes from Deputy Director General Bob Phillis—'unique business', 'skilled employees', 'extensive network', 'BBC Transmission is a world leader' and so on—and that was about it. The announcement of the sale of an important infrastructure resource and it says nothing, apart from the fact that it can't say anything.

In an ideal world the licence payer should have the right to know what is going to happen to something they have contributed to. It galls me all the more when I think back to an incident last year when, not long after I had moved into a new flat, I was visited by a postman who was checking licences in the area. Because most of my stuff was still in boxes, I couldn't immediately find my licence, even though I knew I had one. Regardless

of this, I was issued with a caution and told to send a copy of the licence to the relevant office. Things turned out okay but I resented the suspicion, but then this is a country where judges have sent single mothers on benefit to jail for not stumping up the £89 fee for a colour set.

IF MY STATUS as a licence payer can't get me the details, surely my credentials as a journalist can. Well, yes and no. Officially and on the record, the press handlers couldn't tell us anything, not even confirming the fact that this is a Trade Sale and therefore confidential. But very few things are air-tight, so some snippets have slipped out. The fact that this is Trade Sale was confirmed by going back to the draft BBC Charter and draft Agreement, which says that the revenue raised by the sale will be reinvested in new digital production technology and that the BBC will handle the sale.

By other means we also know some of the details of what is on offer, to wit all 500 of the BBC's UK transmitters that make up the national TV and radio networks, plus three World Service sites here and the right to manage seven in other countries. In effect the sale is two sales but it is thought that most buyers will bid for both. The only World Service transmitter not on offer is the one at Orfordness in Suffolk, as it is still owned outright by the Foreign and Commonwealth Office. Also not on the table are the actual links to the transmitters, which means that the BBC will retain a telephony capability along with the broadcast links, so it could supply trunk dialling to cable head-ends, much in the way that NTL is preparing to do with its new owner, CableTel.

Which brings up the subject of who is allowed to bid. Despite the fact that it would create a monopoly, NTL is eligible, but its spokespeople would not confirm or deny that it was interested, although, given the constraints of the sales memorandum, they wouldn't be able to talk about it if they were.

Aside from NTL, the list of likely suspects is not very long. A telecoms provider like British Telecom might be interested; a spokesperson confirmed that the company was interested in

anything to do with digital television, but would not comment on any current speculation. Outside of those two, it gets a little tricky trying to think of likely candidates, although there is always the possibility of a management buy-out.

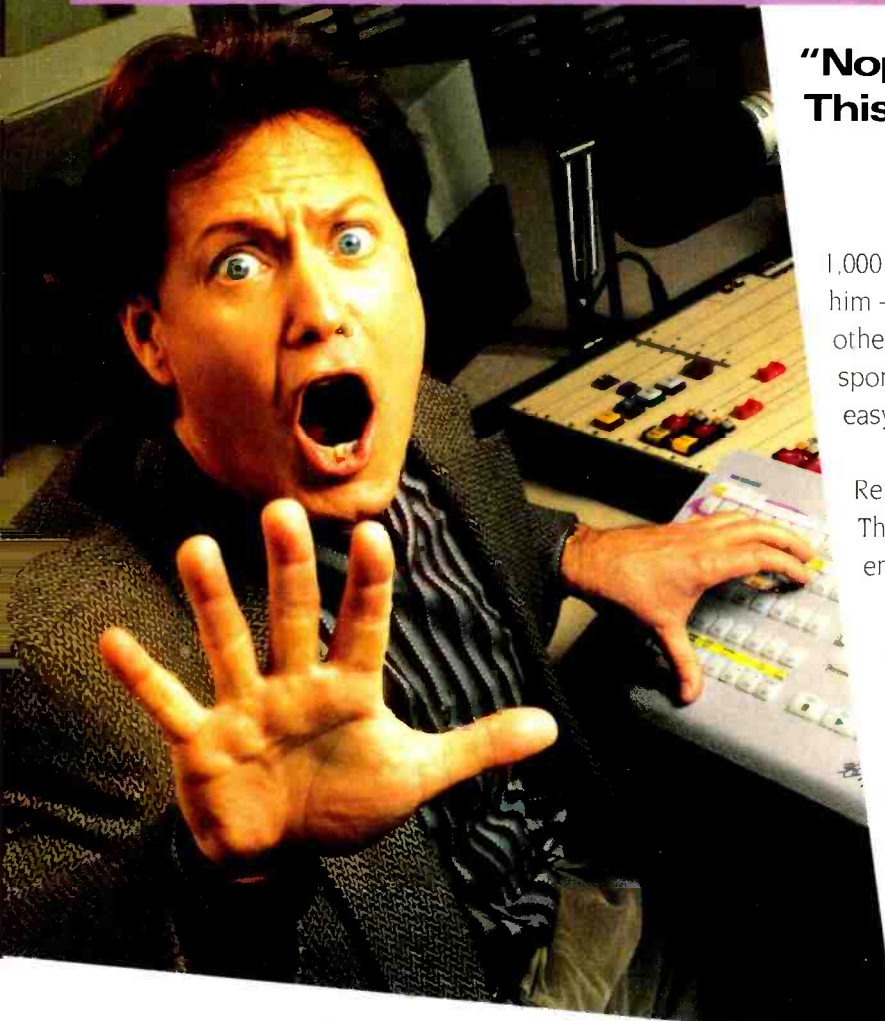
Because of the nature of this business, there are going to be very few people who would either consider the proposition or who would be considered. And whoever is chosen, we are still not going to have an open market: if NTL has bid

Concern has been voiced over BBC Transmission changing hands, would the integrity of the service be threatened if its transmitters were managed by somebody else? It would be good to say that there will be some public debate about this

and does win, it will end up as a monopoly, but even if someone else pips them to it, it will still be a duopoly.

Concern has been voiced over BBC Transmission changing hands, with some being very jumpy over the World Service sites, particularly as the whole of that organisation has been earmarked for some kind of change. Would the integrity of the service be threatened if its transmitters were managed by somebody else? It would be good to say that there will be some public debate about this. But given the secrecy surrounding the whole issue, that won't happen. Whatever happens, remember that you nearly read all about something or bits of something here first.

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1996 and all that

Although MIDI's children have found scant respect from much of the pro-audio establishment, there are those who can reconcile the recording arts without compromising them.

TIM GOODYER talks to Ryuichi Sakamoto

SOMEWHERE BETWEEN Joe Meek's claim to being the first producer-engineer and the wave of producer-engineer-musicians thrown up by the 1980s dance scene there is a missing link. Somewhere between the recognition that there was a clear distinction between 'the musician' and those who provided the technical skills necessary to turn a musical performance into a recording, and the realisation that the gap between writing and recording music could be bridged without 'conventional' playing skills there is a discontinuity. Somewhere there must have been a musician who could embrace the demands of technology without devaluing

his 'chops' or an engineer who resisted the lure of technology to render redundant the study and practice necessary to produce the master of an instrument.

Should this modern-day renaissance man exist, he would have the musical education and coordination of a trained musician and be versed in the nature of sound and the means by which we capture and control it. He would have studied technology for technology's sake, studied music for arts' sake, and probably have chalked up a series of musical and technical successes spanning a wide variety of styles and cultures.

The theory is good, and our man is one Ryuichi Sakamoto—a 44-year-old Japanese resident of New York who recently began an extensive world tour to promote his latest studio album. On his travels he also found time to attend the screening of two feature films at London's National Film Theatre to discuss his work on the soundtracks to these and other films, and to talk technical with *Studio Sound*.

Sakamoto's is not a name you'll find on many lists of 'requested producers' (although he has albums for Virginia Astley, Friction and Aztec Camera under his belt) as this side of his career has been largely dedicated to one artist—Ryuichi Sakamoto. His name does, however appear on seven of his eight solo albums as producer—the exception being 1987's *Neo Geo* which he coproduced with Bill Laswell. As an artist, Sakamoto's

list of collaborators is as long and varied as it is impressive, including Bootsy Collins, David Byrne, Brian Wilson, William Burroughs, David Sylvian, Iggy Pop, Robbie Robertson, Thomas Dolby, Youssou N'Dour, Robert Wyatt, Arto Lindsay... His film scores include *The Last Emperor*, Bertolucci's *Little Buddha* and *The Sheltering Sky*, Oliver Stone's *Wild Palms*, Pedro Almodovar's *High Heels* and Hiroyuki Yamaga's animated tale of early space exploration, *Aile de Honneamise*. The two films recently highlighted at the NFT were Nagisa Oshima's *Merry Christmas Mr Lawrence* (in which he also starred) and Peter Kosminsky's *Wuthering Heights*.

DRAWING ON The Beatles, Beethoven, John Cage and John Coltrane as early career markers, Sakamoto entered Tokyo University of Art in 1970 to study composition and in 1974 went on to study electronic and ethnic music. A solo album, session work and a stint as Taeko Ohnuki's arranger followed, but it



Sakamoto as stereotypical Japanese officer in *Merry Christmas Mr Lawrence*



Driving force—Sakamoto with David Bowie in *Merry Christmas Mr Lawrence*

awareness of them —does he regard them as academic distinctions or do they play a part in his working methods? 'It's very hard to split myself into artist and producer because they have different egos and different perspectives,' he concedes. 'There is a big difference between a technical engineer's work and a musician's work. I'm happy to live in these two worlds and I go back and forth between them. In my mind, the producer's side and the artistic side are always fighting, and

was with the Yellow Magic Orchestra that his career took on an international profile. The 1979 single *Computer Games* (the theme from *Space Invaders*) saw Yukihiko Takahashi, Haruomi Hosono and Sakamoto presenting a bizarre and challenging image to the world of pop—that of three intense Japanese coaxing a unique blend of arcade ambience and formative electronic pop from banks of synths and sequencers.

YMO lasted for five years and four albums, giving Sakamoto ample time to consolidate his academic music studies with his emergent interest in technology and music production. These days he describes himself as 'pretty technical—and I like that'. His claim is born out by the abundance of equipment he has used over the years and continues to pursue, and the list of studios with which he has become familiar—New York's Right Track and Power Station, LA's Complex, Tokyo's Zero, Platinum Island, Paradise, Onkio Haus, Take One, Sedic and Sound Inn, London's Metropolis and Westside... The new album, entitled *1996*, was recorded at New York's Right Track Studios' Studio B using the AMS Neve Capricorn. 'The music is thoroughly analogue,' Sakamoto explains, 'I didn't use any computers, sequencers, synthesisers or drum loops or samples. But the recording system was totally digital apart from the mics which were mainly AKG C12s.'

The ease with which Sakamoto's activities cross the lines dividing artist, engineer and producer beg the question of his own

always the artistic side wins. It is an internal conflict, yes.

'As a musician I'm looking for new experiences, new sounds, new environments, so as soon as I get a new gadget I check all the factory patches. Nowadays a synthesiser will have at least 256 sounds but maybe only ten are useful. As an engineer, whenever new equipment comes out—consoles, effects, samplers, synthesiser modules—I play with them for days. As a producer, I find

'There is a big difference between a technical engineer's work and a musician's work. I'm happy to live in these two worlds and I go back and forth between them'

producing other people is easier than producing myself.'

In general, Sakamoto's music lacks a discernible consistency of style. Rather it combines the many influences and interests the artist has collected in the course of his studies and travels. At worst it emulates too closely banal Western styles, at best it fuses oriental elements (generally Okinawan) with those of a collaborative partner under the guidance of a producer-engineer who understands both almost equally well.

'I don't want to label myself or my music,' he protests. 'I don't want to categorise anything—categories are good for record shops and maybe writers. You can have a variety of different pleasures: to act, to live in different environments, to work with different people. Sometime my role is as a producer, engineer, musician, actor and label owner too.'

This latest venture casts the quietly spoken Japanese in yet another role: that of A&R man at the label he helped establish two years ago—Good Records, released by Full Life Records in Japan. 'We have released 12 to 15 records so far, including my solo albums,' he explains. A&R decisions are not only my decision, I discuss it with other people involved but I have full responsibility for signing artists. On some of the records I have been involved as a producer and



Lending an acoustic air to 1996: Left to right, Jacques Morelenbaum (cello); Everton Nelson (violin); and Ryuichi Sakamoto (piano)

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arranger, and I've provided some ideas for lyrics and helped with marketing plans.

EXPLORING the different sides of Sakamoto's character reveals some of the conflicts of his activities—and his solutions to them. Probably the most obvious one is that of being limited to having one pair of hands and one pair of ears. Here the solution is simple, if unattractive to someone so accustomed to being in control.

'Obviously, I can do everything by myself,' he says of the recording process. 'I have

'I would love to have a producer to give me ideas but I cannot wait while other people make decisions or programme equipment—I am always faster than them'

mixed lots of tracks for myself before, but nowadays I've been working with a guy called Fernando Aponte—he's my assistant and also my main engineer and mixer. He's from Venezuela, about 29 and has lived in New York for about five years. We share the same knowledge about everything I've got. Probably he has more knowledge about regular recording techniques—about mics, consoles and other gear—but we could probably exchange our roles. We both know a lot about hard-disk recording, about MIDI, about wiring...

The second most obvious problem is one of allocation time—and some things demand a lot of it.

'Checking presets on synthesisers and effectors takes a lot of time, and when I've finished I can lose my energy to make my own sounds so I sometimes use the presets but in a different context. The context is very important and it's very rare that you hear just one sound on its own. Nowadays music is very complex and uses all kinds of different sounds and you cannot tell what is a sampler, say, and what is not.

'Obviously characters are stronger on analogue synthesisers. Digital synthesisers are all the same; there's not much character. Maybe the design engineers try too hard to put all the possible functions onto them. It's also true of effectors—again they have maybe 128 or 256 presets but it's rare that

I hear very characterful treatments. I'm using three effects from Sony—the DPS-R7, D7 and M7. The D7 is only for delay-based effects and there are at least 100 presets and they don't sound very different. Probably Korg's first rackmountable delay had more character. You can love it.


'About three years ago I got back an ARP Odyssey that I had been using maybe 15 years ago. It was a very strange experience because when you hear an Odyssey—on, say, a base-line—it sounds sort of poor. It doesn't sound like a huge bass but as soon as you hear the Odyssey with the rest of the track it's got an unbelievable, huge, warm sound. And I still don't know why.'

The nostalgia bug that keyboard players caught from guitarists some years back, and that was more recently passed on to engineers has infected Ryuichi Sakamoto twice; once through synths, and again through valves.

'I have also used a lot of tube-based equipment,' he confesses. 'It's becoming a world recording standard now to use tube-based compressors and EQs. That trend started from New York maybe over ten years ago. The first time I was aware of them was at the Power Station in New York in around 1985-86. I asked them why they were using these antiques and it was obviously for their warmth. But they had found the original engineers who had made this stuff and got them to maintain it.

'For recording drum sounds and vocal, surely they are effective. Even with synthesisers or a Fender Rhodes, you can put them through a tube preamp and they have a certain presence, something that makes them sound more real. I like that.'

But the future is not contained purely within the past, and Sakamoto's typically Japanese pragmatism comes into play on recording media.

'I'm a crazy fan of digital recording systems,' he asserts. 'What digital technology can do best is to represent what you have—if you put a synthesiser through a tube compressor you get something special and you want to be able to play back exactly that sound. Digital technology is the answer. 



Sakamoto strikes a contemplative pose in *The Last Emperor*

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INTERVIEW

☞ 'Sometimes I do choose to use analogue for the particular purpose of getting tape compression and when we mix, sometimes we mix onto DAT and onto analogue half-inch to compare the results. What we choose to use depends on the style of music.'

Perhaps the most telling question to ask is how Sakamoto would respond to working with another producer. He points out that *Neo Geo* was produced by American bass player and producer Bill Laswell, but does not talk about that experience specifically. Instead, he says, 'It would be very frustrating to see someone else working on my tracks without being involved. I can't take that. I would love to have a producer to give me ideas but I cannot wait while other people make decisions or programme equipment—I am always faster than them. I do my own programming on Studio Vision and Digital Performer. I learn very quickly—I'm always the fastest!'

If Sakamoto's career is facilitated by his gift for music and technology, it seems to have been driven by his influences. We last spoke around five years ago at which time he seemed to have deliberately made his horizons as broad as possible. Today the strategy seems to have served him well both in terms of his musical output and his access to every aspect of technical progress. And his influences?

'There are many people. People I have worked with or haven't, people I know or I don't. Inspirational sources are here and there, anywhere. To me, watching CNN, seeing tragic things happening in the world can be very moving and inspirational. My influences are very wide but someone like Brian Eno might be bring me something, a new level to my creativity.'

'As you know, I have so many different roles and sides; I can be very conservative—I think *1996* sounds conservative, it's



almost like a classical record. Although that's new for me because I hadn't done anything like that since university. I want to expand my influences as much as I can and working with someone like Brian Eno or Laurie Anderson, or musicians from South America or Africa might help a lot. I'm always looking for people with different ideas and different aspects.

'I don't listen to my past work so much. That's good because I forget the past easily; I'm always facing the future. I don't have to feel regrets, it's past and I have lots of things to do in the future.'

'Obviously the older material is green, young, and I can see how much I've learnt. But sometimes there are good things in old material—like how radical I was, how much I didn't care about other people. That's the meaning of being young: you don't care about other people, you just care about yourself.'

Curious, is it not, how the same imperative that drives all the world's youth is capable of turning out such a diversity of individuals. And Ryuichi Sakamoto is certainly one of them. ☺

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NOTABLE COLLABORATIONS

TAEKO OHNUKI

Sunshower
(1976)

KIYOSHIRO IMAWANO

Ikenai Rouge Magic
(1982)

DAVID SYLVIAN

'Red Guitar' from *Brilliant Trees*
(Virgin Records, 1984)

'Weathered Wall' from *Brilliant Trees*
(Virgin Records, 1984)

THOMAS DOLBY

'Fieldwork' from
Illustrated Musical Encyclopedia
(10 Records, 1986)

IGGY POP

'Risky' from *Neo Geo*
(CBS, 1987)

BRIAN WILSON

'You Do Me' from *Beauty*
(Virgin America, 1990)

YOUSOU N'DOUR

'Diabaram' from *Beauty*
(Virgin America, 1990)

DEE-LITE

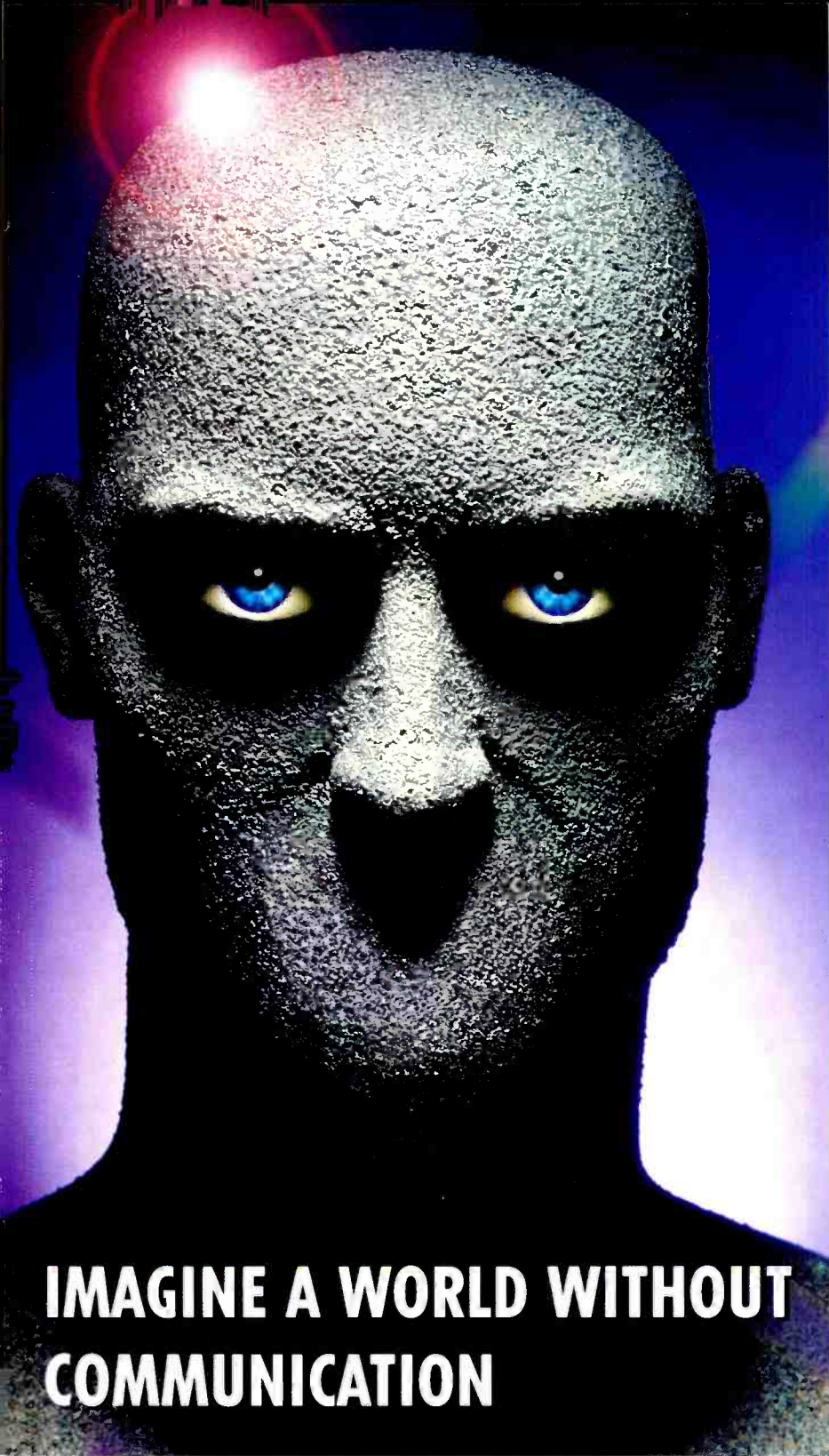
'Rap the World' from *Heartbeat*
(Virgin America, 1992)

DAVID SYLVIAN & INGRID CHAVEZ

'Heartbeat' from *Heartbeat*
(Virgin America, 1992)

HOLLY JOHNSON

'Love & Hate' from *Sweet Revenge*
(Elektra, 1994)



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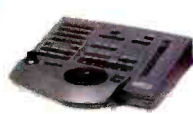
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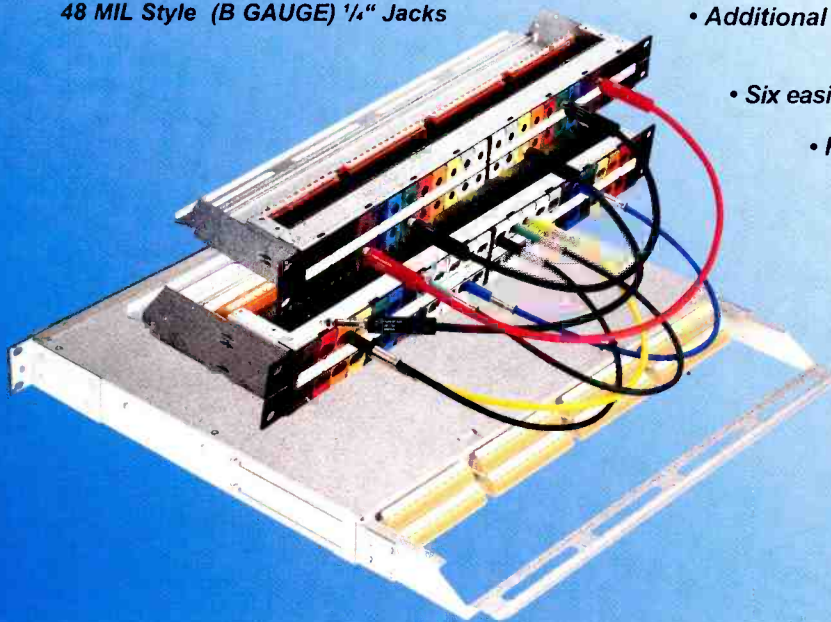
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The Island of Dr Moreau

Hollywood film director John Frankenheimer sets out to remake H G Wells' eerie tale of mutant genetic engineering and madness. **DAN DALEY** discovers that the process nearly drives composer Gary Chang crazy

THERE ARE TWO old things being used here in a very new way. 'Here' is the breathtakingly beautiful home that Gary Chang has built in the Los Angeles suburb of Calabasas last year, overlooking the sagebrush-covered mountains that ring the area east of Malibu Beach and onward out into the high deserts and canyons of Southern California, where new and often palatial, security-gated residences are springing up, offering a quick drive down to the beach and a less-quick, but equally sinuous and scenic run up Mulholland Drive into LA proper.

One of the older things that concerns us is the remake of H G Wells' *The Island of Dr Moreau*, from which the biologically militant catch phrase, 'Are we not men?' entered the lexicon and spawned Devo, which was the basis of an early sound film made in the mid-1930s, its black-and-white graininess lending that much more of an ambient chill to an already frightening story.

Veteran director John Frankenheimer shot the new version, starring Marlon Brando and Val Kilmer, and it was scheduled for release in late summer of this year.

The second old thing we're concerned with is the Synclavier, which, dating from 1977, is not as old as the film but compared to the waves rapidly proliferating digital

audio workstations is a certified antique. However, you'd not know that from the avidity and enthusiasm with which its remaining 200-odd adherents around the world use this aged, but apparently still robust, engine. Despite its relative crepitude and the fact that the Synclavier's parent company, New England Digital, essentially went out of business in 1993, with the remnants of the company being sold off to a Canadian software developer late last year, the venerable Synclavier continues to state its presence in film audio. And Gary Chang is one of its most ardent proponents.

Thus, when *The Island of Dr Moreau* hits the local bijou, it will be with Chang's Synclavier-driven score propelling it. 'I don't know what I'd do without it, other than slit my wrists,' says Chang of his 1986-vintage Synclavier, on which he has also scored a wide range of films, including *Under Siege* and *The Breakfast Club*. Not exactly faint praise from someone who once worked as a Fairlight rep after graduating from computer, music and composition studies at Cal Arts Institute.

Chang became a protege of both personal recording pioneer and electronic music maven Morton Subotnik, and film score composer and record producer Giorgio Moroder (who gave him his scoring start as an additional

composer on the 1980s film *Electric Dreams*), as well as playing keyboards for scoring excursions by Robbie Robertson and Jack Nietschze.

'You couldn't ask for better role models in terms of working on film music or working in a home studio,' Chang observes.

Born in Minnesota and well-travelled by the time he was in his teens, Chang could have used the Biblical Job as a role model on this particular film, however. 'They test-marketed this one late in the game, so we have a lot of changes coming down as they figure out how to end it,' he only half-laughes, knowing that as soon as we end our visit he will have to get back the myriad number of new edits that keep flowing down from Frankenheimer's editing room, which is working just as furiously in the wake of admittedly poor test-marketing results of the initial cut of the film. It's an unfortunate reality of contemporary Hollywood that modern films are scrupulously scrutinised by a whole new breed of experts via dozens of private screenings for a few hundred carefully selected average moviegoers, whose post-screening comments are distilled into new cuts and sometimes entirely new footage and multiple endings, until the right celluloid combinations are found that offer the best



Val Kilmer as Dr Moreau's assistant, Montgomery, took the rare decision to kill himself off before the end

chances for the film studio to recoup the production costs of ever more expensive movies. The costs on *Dr Moreau* are not yet official and change with each re-edit (Brando does not come cheap, despite a lack of recent successes—he is Brando, after all—and one other bit of insider information that emerged was that Val Kilmer, who was given more artistic latitude this time out, insisted on killing off his character two-thirds of the way through the film, which did not sit well with test audiences, probably particularly their female component). And in true Hollywood style, some of the brainstorming interface between Chang and Frankenheimer is accomplished on a nearby tennis court, which doubles as part of Chang's health regimen to offset studio pallor. (He's also a gourmet cook and the spacious kitchen took as much of his attention in the 5,700-ft² house's design as the recording studio itself.)

Chang's methodology is to compose on the Synclavier while alternately experimenting with obscure ethnic acoustic instruments—for instance, *Dr Moreau* utilises an Australian didgeridoo, which provides eerie low-frequency pulsating effect that takes centre stage for several nondialogue scenes. Recording is done both to the Synclavier's internal sequencer (that data is dumped, when necessary, to E Magic's Audio Logic software program to convert it into a printed score when live musicians are required) and to the venerable Sony-MCI JH-24 multitrack deck that serves as Chang's studio's main storage system.

Chang tends not to let himself get too embroiled in the mechanics of recording, acknowledging that it can get in the way of the creative process. Long-time friend and engineer Brian Reeves handles most of those chores. The third person in the audio brigade that Chang has cobbled together for his normal routine, and which now works like a

well-oiled machine as the pressure grows, is digital music editor Richard Whitfield whose father, Ted, is a well-known and—regarded analogue sound editor in Hollywood and who was one of the first sound editors Chang worked with when he began his scoring apprenticeship a decade and a half ago.

In the case of *Dr Moreau*, Chang also flew to Toronto in June to record a 90-piece live symphony orchestra and choir to augment other compositional elements.

'This kind of stuff really puts the pressure on when a film gets so many edits towards the end,' says Chang. 'It's not so much the

amounts of money spent on things like the orchestra—John [Frankenheimer] likes to have things done right and if that's what it needs, then that's what it gets. But you're talking about a lot of edits to entire musical pieces and you want to try and do those carefully in order to maintain some of their original musical integrity—to make them continue to make sense as pieces of music as well as to fit the action on screen. You're not only trying to edit [the audio] to fit what's going on on-screen, but also trying to keep a musical balance alive.

'You can fix certain things like faster cuts with signal processing, such as a [tacit stop] with a nice reverb tail if it has to cut before the piece was originally supposed to end. But you're always looking for a logical place to do that within the piece, and at the same time still working to conform the music to the new picture edits. After all, the music is still always subordinate to the picture. It's a constant effort for balance.'

Once the elements are created and edited roughly against picture (Chang works with a

THE SYNCLAVER LIVES AGAIN

THE KEY remaining assets of SOC Associates (Synclavier Owners Consortium)—for the last four years the main operating entity of Synclavier developer England Digital—were sold to AirWorks, a Canadian software developer, in March, 1996, by the Bay Bank of Boston, the prime lender for the former New England Digital which held those assets as collateral for a reported price of approximately \$400,000. Simultaneously, the rights to service remaining New England Digital products

and develop and sell software upgrades for them was purchased for an undisclosed sum by Enfield, NH-based DEMAS, Inc. headed by former NED technical employee, and director of operations for SOC, Brian George. Founded in 1976, New England Digital rapidly became

the low six-figures, and the company's peak year of 1989 had revenues in excess of \$24m, according to one former NED employee. It's estimated that between 400 and 500 NED systems are still in use today. But New England Digital's larger contribution to the industry was its close parallel of the computer industry.

'NED was the first company to apply the same principles as CAD-CAM to audio,' recalls Ted Pine, former VP of marketing and development at NED and now chairman of InfoTech, a multimedia market research company in Vermont. 'They combined the computer-assisted paradigm and the CMX-generated EDL list that had been developed in video and for the first time integrated those into an audio postproduction system. A lot of the non-destructive editing concepts that we take for granted now were originally developed there.'

But the same financial edginess that characterises the computer startup industry plagued NED, and by the early 1990s the company was teetering economically; NED's market share slipped rapidly to the plethora of lower priced competition. In the wake of the sale, Brian George, former director of technical operations at NED and The Synclavier Company, and now president of New Hampshire-based Digital Equipment Maintenance & Support (DEMAS), has big plans for the nine-lived Synclavier system, including technical support for existing systems, and plans to issue regular software upgrades—the first is planned for later this year—at significantly lower prices than the NED ones cost users.

'This is the first time that a post-NED entity will be free of debtor liabilities,' says George optimistically. 'We'll be able to operate much more freely and responsively, and make decisions without corporate politics or venture capital people haunting us. It gives us the opportunity to bring the Synclavier into the 1990s in a very real way.'



Jack Dario and Gary Chang in Mr Chang's project studio built in the Los Angeles suburb of Calabasas

a leading developer, manufacturer and marketer in the, then nascent, digital audio workstation and advanced sequencer-synthesizer market. Its sophisticated, but expensive, Synclavier keyboard-based sampler and storage system became the Mercedes Benz of the music industry, followed by the Post Pro, one of the first digital audio workstations, and which many cite as the product that spurred the film and video postproduction industry's transition from analogue, and mag linear formats, to all-digital, nonlinear postproduction. At its height, New England Digital employed over 160 engineering, sales & marketing and management personnel, with combined sales of Synclaviers and Post Pros exceeding 1,000 units, each priced in

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➤ Sony 3/4-inch video playback deck which synchs to a TimeLine MicroLynx system) they are transferred and stored to Tascam DA-88 decks (Chang's studio has one; others are rented as needed, depending upon the needs of each individual project). Then Richard Whitfield takes those elements and transfers them to his Digidesign Pro Tools system for fine editing. (Also, he and his wife Sherry will create spotting notes for Chang using dialogue quotes and Opcode's Cue program.)

'The editing phase can get pretty interesting,' notes Whitfield, intently peering out from beneath a thatch of blond hair and glasses. 'In one case, the director was listening to the kind of nonsense lyrics the choir had been chanting and found one phrase he didn't like for one reason or another. The solution was to take the same phrase in the Pro Tools system and reverse it, turn it completely around and reinsert it into the same space of time. That worked perfectly. You still didn't necessarily know what was being chanted—the scene is call 'the monkey chant' and it comes at a very high-tension point in the film—but in the director's mind the effect was completely different and better. It really underscores the amount of influence that sound has on the way in which a director conceives the way a film should be.'

CHANG HAS a substantial collection of samples, both from commercial libraries and those he has personally assembled over the last dozen years of working with the Synclavier (he now has a second Synclavier unit, purchased from jazz guitarist George Benson). These are added to the basic sound elements he has composed the score segments with. To them are added whatever acoustical sounds he deems needed. The aforementioned digeridoo was recorded in the studio's main room—the large square room holds all equipment and is where most of the recording with participants on headphones takes place. Multiple instrument or high-SPL isolation is achieved by running a microphone into one of the other rooms, many of which Chang designed in 3-pin cable runs and mic box terminations for.

'This [*Dr Moreau*] is one of the more complex jobs we've done here,' says Reeves, who has been with Chang through the latter's two previous home studio incarnations. 'It does kind of push the limitations of the board,' agrees Chang, who regards consoles

Chang does, however, indulge a proclivity for some pricey vintage outboard, such as his Neve 3104 class-A discrete mic preamps, and some expensive Schoeps and Coles microphones

as 'the black holes of home studios' and has thus opted for the conventional and affordable (\$23,000 new) Megas 40-input console with its Mackie 1202 sidecar off to the side, all designed to be within close proximity to the Synclavier for when Chang works alone. These technology choices, combined with the older MCI multitrack machine, the vintage, but viable, Synclavier, and the inexpensive DA-88 decks (which have become the *de facto* digital-audio interchange standard in Hollywood, at least until the coming digital dubber wars reach some kind of resolution), also reflect his personal predilection against new technology for its own sake.

'At this point I have no interest in reading more manuals,' he says. 'I look at new things to stay current, but I don't feel compelled to buy everything that comes out.' Another good illustration of this is his bank of four Lexicon PCM 300 processors—'read one manual, know four processors,' he laughs. Chang does, however, indulge a proclivity for some pricey vintage outboard, such as his Neve 3104 class-A discrete mic preamps, and some expensive Schoeps and Coles microphones. And he has the Dolby SDU-4 surround-sound encoder feeding three Meyer HD-1 monitors across the front stereo monitoring plane and JBL THX-approved surround speakers on the ceiling.

'That's the way the music is going for film in Hollywood; it's all going to surround,' he says, displaying a balancing act between what one likes and what each niche needs in terms of pragmatism and indulgence. Interestingly, the shift toward surround sound as a standard, rather than a special, occurrence is proving to be something of a bottleneck at the personal-studio stage, Chang points out. The growing plethora of choices, which he refers to as 'decoders du jour', is leading to a mini-panic in the professional home.

Dr Moreau is being produced in 6-channel discrete sound, in response to which Chang is now using an Otari PickMix digital matrix with his console with eight outputs (expandable to 32) each plugged into a monitor amp, and summing to non-discrete stereo for the stems. The monitor playback isn't completely discrete, he acknowledges, which would be a trick beyond the means of the level of equipment he's currently using. However, Reeves has a trick in which he puts just the right amount of phase reversal on the stereo stems that allows them to be played back in a sort of 3-position image that sufficiently approximates 6-channel discrete stereo, with a Lexicon 300 dedicated to each stereo pair.

'We've been mixing for television this way for a while,' Reeves reveals, and it

PHOTOGRAPH: PETER SOREL



David Thewlis as Edward Douglas; an unwanted stranger on the remote island

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It hasn't been a problem because television isn't truly discrete. But that's going to change as more movies get made in multichannel discrete stereo, and then go to television. Richard Whitfield's job is technically off-line from Chang and Reeves, but he's under the same time pressures at the moment.

'The crazy stuff started coming in after we had scored about half the film,' he recalls. 'When the music comes in on the DA-88s to me, I usually make hard edits across all

'The movie is set in the South Pacific and the music is supposed to be indigenous to a certain island. Not necessarily a real island, but you want some sense of consistency to the music'

eight tracks in the Pro Tools, then I make the individual track edits. Some of the really interesting stuff happens when I have to make edits between the stuff Gary has recorded to quantised sequencers in his Synclavier and the unquantised live orchestral recordings he did in Toronto and on the Paramount sound stage. Some of that tends to be a little ahead or behind the beat, so you have to try to make the swings match up closely. That's something that

digital editing is amazing for, and you could never do so precisely on analogue. I'm matching the feels on the waveforms'

FORTUNATELY, Chang's pressure is alleviated to a significant degree by the fact that he and Frankenheimer have found their own personal working rhythm; this is Chang's sixth film for the director, and Chang says that he is given considerable latitude when it comes to setting the feel for the score and executing it.


'John, like all good directors, understands the way a film narrative works,' says Chang. 'And to me the score is the emotional psyche of the storyteller. For *Dr Moreau*, he requested a sort of "indigenous" score: the movie is set in the South Pacific and the music is supposed to be indigenous to a certain island. Not necessarily a real island, but you want some sense of consistency to the music. You want it to be able to evoke a sense of culture that moves through the film and consistently gives you a sense of place and time without saying it directly. I came up with what I call "future primitive". That's where the digeridoo came in. I called John Bergamo, who teaches at the Cal Arts centre and who builds a lot of his own instruments—he came up with a lot of the sounds on *Apocalypse Now* and played with Ravi Shankar at Altamont—and he suggested Susan Rawcliffe, who plays a lot of ethnic instruments. She came over with the digeridoo and we experimented with it, doing some improvisory work and in some cases taking the sounds and making musical gestures with it that matched the gestures in the



Director of *The Island of Dr Moreau*, John Frankenheimer: evoking a sense of culture

picture. It was an interesting sound—I call it "brown noise"

The digeridoo was set up in the middle of the room and microphones were placed both in front of its long tube and on the floor to pick up its resonances. Chang's team was expecting to work well into the night right through the late summer deadline for the release of the film, distributed by New Line Cinema. Murphy's Law was expected to play a significant part in the last dash to the finish line—it always does, says Chang.

'It figures that at the points where the music is most exposed, that's where the sound effects don't cover me for crucial edits,' he laughs. But on a more serious note he adds, 'But that's okay. That's the way it is in Hollywood, and I don't mind the pressure, because somehow it gets done. I like scoring for pictures because in a sense, it's like being a screenwriter. You get to define characters. It's just that, sometimes,' he concludes, wiping his brow, 'You get to define them in postproduction.' 

PHOTOGRAPH: JIM McHUGH

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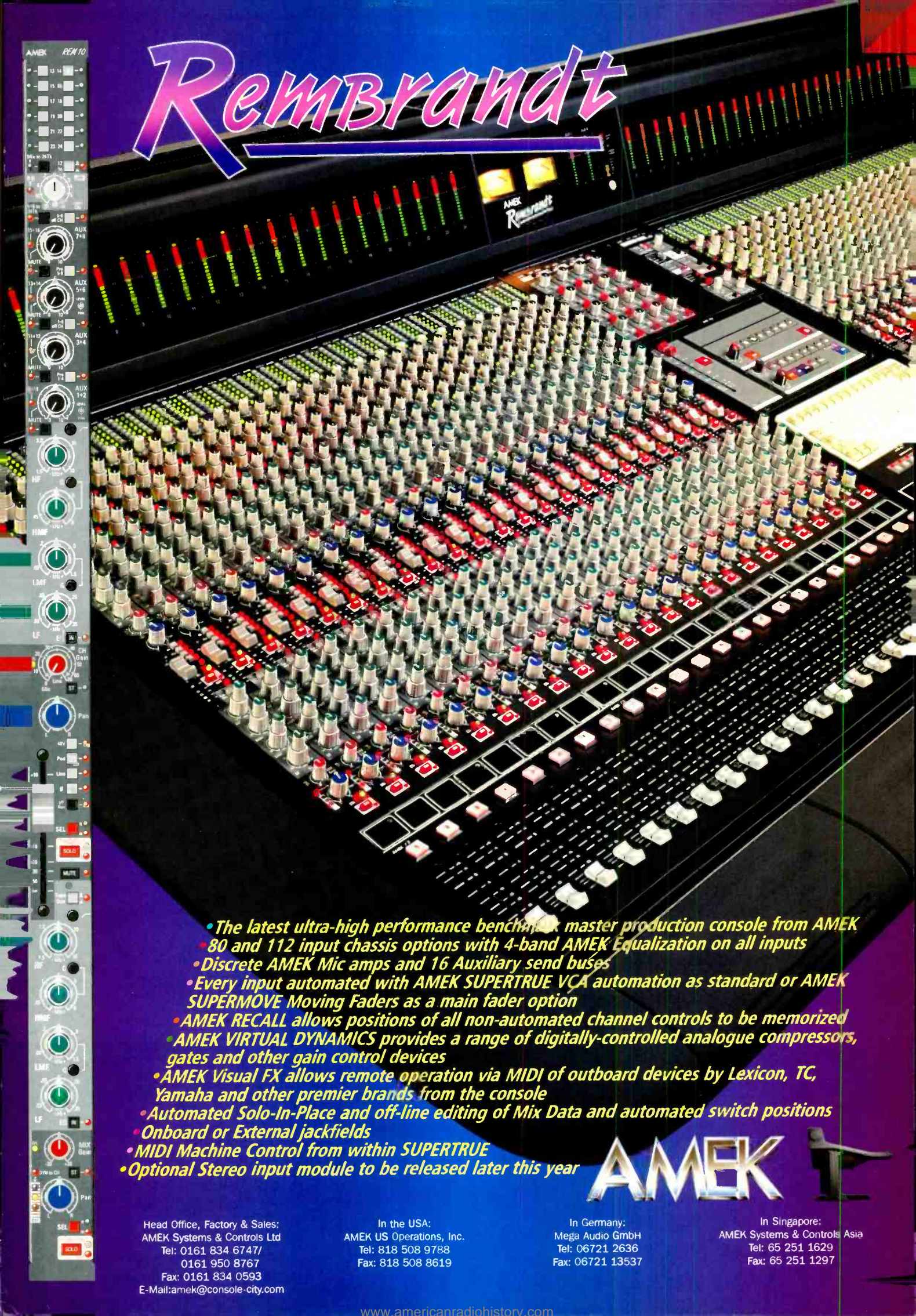
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A rack of audio equipment, likely a mixing console or amplifier, is the central focus. At the top, a small blue screen displays the text "THE END". Below the screen are several rows of knobs, buttons, and sliders, some of which are illuminated with small lights. The equipment is set against a dark background, with bright, colorful stage lights (blue, yellow, and red) creating a dramatic, high-contrast environment. The lights are positioned around the equipment, casting beams and creating lens flare effects.

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WE ALL NEED a point of reference when dealing with things with which we're not completely familiar. When it comes to broadcasting organisations, the typical Brit mindset works in terms of the BBC, comparing all other broadcasters in the world to the UK's public service radio and television provider. At first glance, drawing such parallels with Radio France is a reasonable enough proposition: it is the country's public radio service, but its executives shy away from any direct comparison with the Beeb, pointing out that French radio and television has been separate since 1975.

A similarity is that Radio France is funded by the government in the form of a licence fee, although sponsorship is starting to make

itself felt in some of the service's classical music broadcasts and recordings, many of which are joint ventures with commercial record companies. But despite protestations that Radio France is not like the BBC in some respects, or that the BBC is not like Radio France in some respects, similarities still remain but that is something to expect, what with parallel evolution and the human habit of picking up influences as they travel and hear different things.

A definite parallel is in the adoption of digital technology—particularly the big budget spend on SSLs recording, editing and mixing system, the Axiom. While BBC Radio has housed their Axiom in an OB truck, Radio France's is a permanent studio installation

and has already been used for audio-to-picture dubbing, sweetening and mixing on a production of *Don Carlos*, which is part of a growing coproduction relationship with French national television.

Real differences do exist, however, both in the range and style of programming and Radio France's continuing support for live music, primarily chamber and classical but also rock and pop. The BBC may point to its live relays of such shows as The Sex Pistols and Oasis, plus the historic and important coverage of the Proms each year, but Radio France is actively supporting live music through its orchestras—a luxury that, sadly, the Beeb has had to cut back on in recent years. 



Inset: Radio France's Axiom (with Jean-Michel Melinon in the foreground) is available to Sound Stages 103 (pictured), 104 and 105



It's something that all big public radio stations in Europe have done, to deliver music to the people,' observes Pierre Lavoix, the manager in charge of technical quality and resources. 'We have our own orchestras, which were part of a mission to build a new culture after World War II.'

There are three orchestras, Orchestre National de France and Orchestre Philharmonique de Radio France, which is in reality two in one, making for a full orchestra and a smaller ensemble. There is also a large choir, Choeur et Maitrise de Radio France, supported by smaller youth choruses. Having such a large musical resource naturally calls for a correspondingly large technical infrastructure: the orchestras work in Radio France's two big studios, 103 and 104 (this last one accommodating an audience of 800). While 103 is home to the Philharmonic (double orchestra), 104 handles other sessions and houses a large pipe organ, which features SSL controls.

WHILE THE BBC had a small number of outlets for its orchestras (primarily Radio 2 and Radio 4), Radio France has four, two national, 24-hour stereo channels, France Culture and France Musique, and two satellite services, France Culture Europe (carried on Eutelsat II-F1) and Hector, which is distributed on TDF-1 at 19° West and is dedicated to large-scale concert programming.

In addition to its music programming, which also takes in jazz, Culture carries documentaries and dramas, with the almost inevitable point of reference that it is like BBC Radio 4. The broadcaster's other stations show a distinct dichotomy between music and news: France Inter, a diverse service that includes news and discussion with a strong public service bias; Radio Info, a seven-year-old, semi-automated rolling news station; Radio Bleue, which caters for older listeners; Urgence, a medium wave service confined to Paris that is designed to help such groups as homeless people and provide family and social information

and advice; Fip, which has a general, easy listening musical style, plus film reviews and airport and traffic reports; Sorbonne Radio France, which, as the name suggests, is for the famous Paris university; and 39 local stations. On top of this there is Radio France International, a satellite service designed to provide news and comment for French-speaking people around the world. RFI has recently applied to run the last FM licence in London, proposing a station for the French and Francophile population of the UK capital.

The most popular radio station in France is RTL, much to the chagrin of the Radio France management, who are less than complimentary about this service's populist, music-based approach. France Inter comes in a close second, with France Info third.

'It's something that all big public radio stations in Europe have done. We have our own orchestras, which were part of a mission to build a new culture after World War II'

—Pierre Lavoix

With the obvious exception of the local services, Radio France's channels originate from its building on Avenue du President Kennedy in Paris. In administration terms, the organisation has four distinct divisions: operations, technical, the building itself and the network.

Studios are managed by the CTP branch of the technical department and cover a range of facilities, from small news and talks rooms to larger studios that are used for classical recording or audience



Jean-Michel Maingny at Radio France's SSL Axiom

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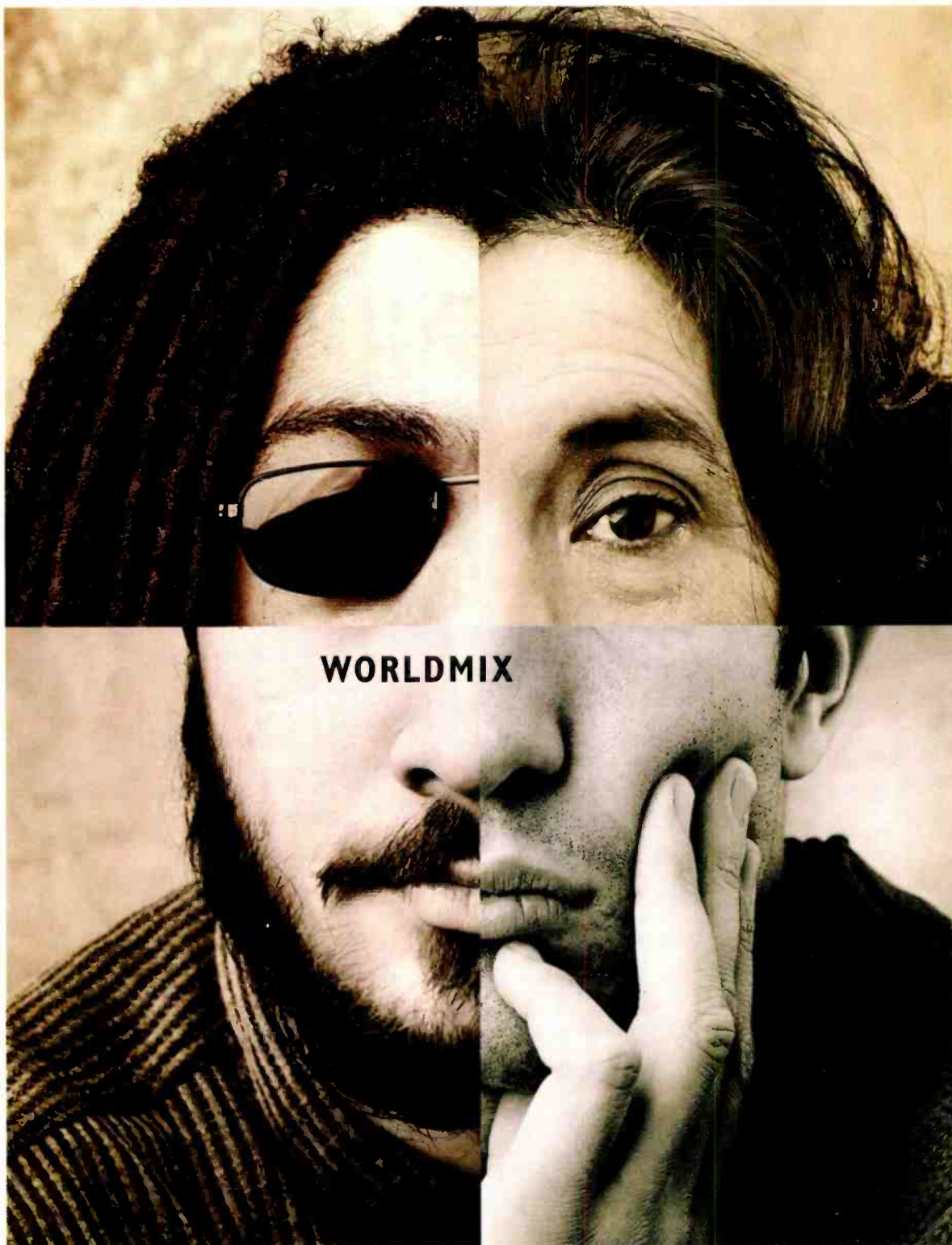
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BROADCAST

participation programmes. Among one of the services offered by Radio France is a free daily lunch-time concert, which is usually staged in the 106 on-air studio, which is large enough to house a small classical ensemble and a medium-sized audience.

SUCH A RESOURCE is not only used for on-air broadcasts; Radio France's estimates claim that nearly 50 sessions a year are released on CD, with some of these releases being double or even triple packages. Pierre Lavoix' responsibilities extend into this commercial work, above and beyond his broadcasting remit of overseeing operations and ensuring technical quality.

'When I came here,' says Lavoix, who was a classical recording engineer before joining Radio France 12 years ago, 'I wanted to maintain a high quality for sound and I thought that the best way to do that was to



'Nothing analogue goes into the Axiom'—instead digital processors such as the tc M5000 and Lexicon 480L are de rigueur

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develop operations, working with outside organisations on coproductions.' Since the beginning of this year Lavoix and his colleagues have been adapting their working practices to include hard-disk technology. While they have consulted the BBC for advice on working with such systems, particularly as both organisations each owns an Axiom, Radio France is implementing specific, tailored guidelines and developing a particular way of working.

'With hard-disk technology coming in, we need to keep up our quality standards,' observes Lavoix.

The broadcaster's digital portfolio

'Why not integrate? It is interesting to diversify because products change so quickly. Really it is better to have a diversity of tools'
—Francois Rochiccioli

currently includes Yamaha 02R consoles, DAT (with the majority of material being recorded onto this format) and, of course, the Axiom. Francois Rochiccioli is director of the technical department and says that Radio France's next step is to look at digital storage, editing and transmission systems, which has involved evaluating such products as Digidesign Pro Tools, SADiE and the DAR range.

'Why not integrate?' he asks, 'It is interesting to diversify because products change so quickly. Really it is better to have a diversity of tools.'

THE FIRST of Radio France's services to go digital is France Info, the rolling-news service that is arranged in half-hour segments, with the engineer building the slot from material on Digitech hard disk. This is calling for a general learning process, which is starting off with the maintenance department. 'They will set the specifications,' says Rochiccioli, 'and we've been training the people working in-house already. We're also now recruiting young people with

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French integration—Yamaha O2R desks have been paired with SSL's Axiom, Digidesign's Pro Tools and SADiE

computer degrees and really the Axiom is the first step in our digital progression.'

Like any major move of this kind, the Axiom was bought after much inter-departmental discussion and the answering of a number of serious questions. Rochiccioli says that although the technical department is autonomous, he still had to take others into account.

'We wanted something that was ours,' he recalls, 'for our own orchestras and technicians but we knew that it also had to be used not only by our technicians but also by those working for the coproduction

'Last year the weakness of the pound made British products attractive, although we were also looking at Studer. But it ended up as a choice between the AMS Neve Capricorn and the SSL Axiom'

partners. It was a balance of commercial production concerns and broadcasting needs.'

Heading up the Axiom project is Jean-Louis Blanc, who says, 'We looked at many systems. Initially we were looking at in-line consoles and we will buy French products if they are there, but if not we will look abroad. Last year the weakness of the pound made British products attractive, although we were also looking at Studer. But it ended up as a choice between the AMS Neve Capricorn and the SSL Axiom. Our choice was made on a combination of quality, particularly for on-air work, and good pricing.'

Rochiccioli adds that there were several levels of decision to be taken: 'The first was technical, asking who actually wanted

to go digital. The second was cost, of course, comparing analogue desks with comparable facilities with digital and seeing how much each cost. (It actually came out that they were more or less the same.) The third point was general strategy, taking the long view of things in going from the production stage to transmission. The last decision was quality but it's very important—we had to be able to use a digital transmission system without compromising quality.'

The Axiom has been installed into a control room that can work across three studios, as well as acting as a stand-alone postproduction suite. The Axiom room has tie-line connections to 103, the large classical and big-band facility, 104, which is used most regularly for concerts, and 105, a live on-air studio.

'It's a way to optimise the investment,' explains Lavoix. 'It was good to be able to say to the finance department that the desk was going into a control room that could record and mix three studios. For me digital brings two revolutions: one is the quality over tape recording. It is something that we can sustain when we master to CD. We can also eliminate some of the connection problems, which again ensures good quality. And these days digital consoles are very close to analogue.'

Among other equipment in the control room is a Philip Drake talkback, for communicating with other studios around the building, a tc electronic M5000 processing mainframe and a Lexicon 480L digital effects systems. 'Nothing analogue goes into the Axiom,' says Blanc. 'All the effects and so on are digital and in full stereo.'

An adjacent space has been turned into a machine room, which houses the desk's control system, a Tektronix synchroniser, talkback, 1.3Gb of SSL storage and a Nvision NV1000, which was used because, at the time of the installation, Radio France did not have a digital interface and so improvised. All this needed to be kept separate from the main suite because of the need to maintain the right



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'We're transmitting on FM and looking at bit rates and different capacities,' with the possibility of creating a bouquet of radio programmes with other big European stations or any of Radio France's programming'

—Pierre Lavoix

temperature for the gear to run, which involves noisy air conditioning. At the time of *Studio Sound's* visit to

Radio France in May, the technical teams had completed a month's training, but were still making small changes to the system's software configuration. Amid this the mixing of the *Don Carlos* soundtrack was taking place. The show was recorded onto two Sony DASH 24-track machines and then transferred into the Axiom for stereo editing and mixing. The production was being prepared for multimedia exposure, with broadcasts on television and radio and a CD release.

'It was a big production because of the television involvement,' comments Pierre Lavoix, 'which was in full multitrack and HDTV. We took our time on this mix because we were also training at the same time. The Axiom was a heavyweight investment based on price and it won't be something that will be replaced in ten years time'

The Axiom is part of Radio France's preparation for expanded digital operation



Sound Stage 103

and, ultimately, the coming of full digital audio broadcasting. Like most of the rest of Europe, Radio France is running a test service at the moment, collaborating with France Telecom, which has been one of the main research bodies behind the technology.

'We're transmitting on FM and looking at bit rates and different capacities,' says Lavoix, 'with the possibility of creating a bouquet of radio programmes with other big European stations or any of Radio France's programming. We've done a lot of quality tests for the compression and our programme department is supplying the material but the real technical research is from France Telecom'

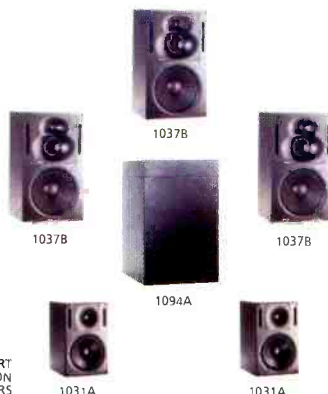
Rochiccioli adds that the DAB multiplex will be distributed using a telecoms satellite and then linked to the main broadcast transmitters: 'A majority of Radio France transmission is done by satellite, including DAB and data. The other thing we are looking at is the different ways of funding the service. There will be state money and maybe some advertising and then, in the future, there's pay-per-listen and sponsorship. But we don't want to change things too much'

As part of the tests, Radio France is supplying 50 pay-per-listeners, who are using decoders in their homes. This experiment, like the broadcaster's main routing, switching and communications management, is based in the CTM distribution room. This area handles 40,000 connections a year and has recently incorporated ISDN and digital links. 'At the moment the CTM controls eight different channels at the same time and it's growing,' says Lavoix.

The close working relationship with France Telecom is evident and to an extent dictates the kind of technology used for distribution, but Radio France says that it is looking at ATM and will probably use it for burgeoning markets. Until then, there is still good old-fashioned telephony and RF. In case of any transmitter failure, the broadcaster has the ultimate stand-in. Even the BBC can't say that it can use a national symbol like the Eiffel Tower as a backup TV mast. **S**



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Armchair theatre

Enough has been written and said about the future of broadcasting for us to be certain of one thing—dramatic change. But just where will future TV and comms technologies take our television asks **CHRIS EDWARDS**

If you thought the format wars in recorded audio were bad, just wait for the broadcast wars to make the news. After years of terrestrial TV with pockets of cable and satellite broadcasting, we are set to be inundated with all forms of interactive services delivered by cable companies, telephone companies, Internet service providers and maybe even TV companies. Or, at least that is the picture you would come up with if you spent some time looking at what is happening in the computing and communications businesses at the moment.

Threatened with a downturn in the fortunes of the business PC, these companies are turning their attention to the home. And—encouraged by the way that digital satellite broadcasting has grown over the past couple of years in the US—they want to turn their PCs into set-top decoders and games machines, connected to digital networks. Interactivity demands a 2-way network, not the 1-way transmission of traditional terrestrial or satellite broadcasting. Enter the telephone companies.

For telcos, 2-way links look like good business in the face of increasing competition from mobile phones and Internet access which only yields revenue from call charges.

One way telcos can improve their position is to improve the speed at which their customers can access services such as the Internet—they can charge more for the privilege and also work to carve out the service providers at the same time. At first sight, it might seem that the big problem is establishing faster access, but this is largely a problem of technological development. The trick is two-fold: to price it at just the right level to offer a service without going bust in the process and to find services that people will pay extra for when they already have satellite or cable.

The equipment needed to support data rates of more than 128kbit/s over standard telephone lines is currently expensive: about \$2,000 for even the basic systems that just about treble the

data rate. The alternative, using fibre-optic cabling, is an even less attractive option. Even if telephone companies go all out to replace the existing copper wiring with fibre, they could only upgrade about 2%–3% of a network in a year. Cable TV operators are in a slightly better position as their networks are easier to upgrade although there are limitations on how many users can share a piece of cable.

In principle, you can get 1.5Mbit/s of shared bandwidth down traditional US-style co-ax, but no-one has yet wired up more than 20 homes on one shared cable with such a system. For the operators, making their networks interactive will entail breaking them down into manageable chunks, each with its own dedicated head-end hardware, and that costs money. The expense is not as great as that demanded from the telephone companies, but these companies have a lot less cash in the bank to play with.

WHAT SERVICES can justify this investment? The original application of higher-rate services was for video-on-demand. That is, you decide which film you want to watch and a server at the other end of the line hands it down to you through a digital set-top decoder. The difference is that the video is meant for you and you alone. Trials have indicated, however, that people are as happy nipping down to the video shop as they are sitting at home downloading videos. At least they can pick up a pizza on the way. Although digital satellite broadcasting cannot give you a video exactly when you want to watch it, the 200 channels on offer from digital satellite broadcasting can get pretty close. It also helps overcome the half-hour of indecision that results when you are faced with a menu of several thousand films to watch.

A similar technique is being used to offer audio-on-demand, or something close to it. There are one or two pseudo-jukebox services that have sprung up recently for cable and satellite networks. They categorise the material they play and broadcast it across perhaps 20 or 30 digital channels along with a couple of information channels: using MPEG

audio compression, they take up a lot less bandwidth than video channels. As video-on-demand was not seen as enough of a draw on its own, a replacement had to be found. At just the right moment, or so it seemed, in stepped the Internet with its clunky modem-based connections. The problem comes when anyone tries to work out what can realistically be sent down the upgraded links. Even the best 2-way systems on offer at the moment demand much higher levels of compression for video and audio than digital satellite or terrestrial DVB. Multiplayer games have a future, but many of these can be

For the operators, making their networks interactive will entail breaking them down into manageable chunks, each with its own dedicated head-end hardware, and that costs money

supported over standard modem-grade lines. Unless the music and sound effects are generated centrally, there is little demand for higher-speed links.

Most of the uses for high-speed Internet connection, for the moment, lie in business use. For studios, it could make for a much faster way of exchanging digital audio and samples. Although these links will eventually move into the home for entertainment, it will take many years for the cost of the hardware to come down to make it viable. Until then, terrestrial, satellite and cable broadcasting still have the upper hand.

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Cabling can be the difference between an installation that performs or one that's nothing but a waste.

JOHN WATKINSON describes the principles behind analogue and digital cabling systems

Money for Old Cabling

A CABLE is just a way of getting an audio waveform from one point to another. Ideally, we would like that to happen with no loss of quality. In practice we can come quite close to this if we exercise a little care.

The main considerations in planning any cabling installation are accuracy, or fidelity, and safety. Inevitably, cabling connects to the grounded (earthed) frames of various pieces of equipment and no technique can be used which compromises electrical safety. A wide number of subjects are covered by the fidelity requirement. It is easy to specify that the received waveform should be as similar as possible to the transmitted waveform, but this has to be maintained in the presence of noise and interference.

The waveforms passing down a cable do not know whether they convey analogue or digital information, so to this extent the problems encountered in each scheme are common. However, in practice there are considerable differences in the approach and different criteria. I propose here to start with analogue transmission principles and then to move on to digital.

ANALOGUE SIGNAL transmission is dominated by considerations such as noise and distortion. The first analogue transmission system was the telephone which carried audio frequency signals over relatively long distances using traditional wires hung on

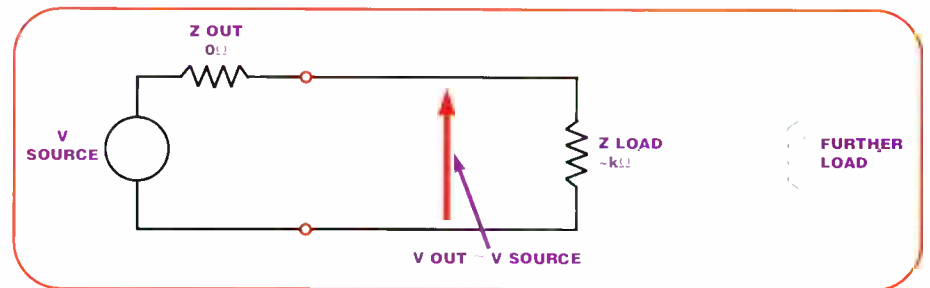


Fig.1: Best approach to analogue signalling is to have negligible output impedance, but a moderate input impedance. Extra loads do not significantly reduce level

poles. When the distance exceeds the wavelength the system behaves like a transmission line and the distributed inductance and capacitance of the line interact to give a characteristic impedance. For best energy transfer, the source and load impedances must be the same as that of the cable. To get 0dB on the line, the driver must generate +6dB because the source impedance and the cable impedance form a potential divider—the well-known 600Ω impedance is that of telephone lines. The original definition of 0dB is the voltage that dissipates 1mW in 600Ω (0.775V rms). While this approach is essential for telephones, it is quite inappropriate for audio wiring in a studio. The wavelength of audio in wires at 20kHz is 15 kilometres. Unless your studio is built

on this scale, you are not using transmission lines and impedance matching is undesirable as the potential divider effect wastes signal level and cable capacitance can cause an undesirable HF roll-off.

Fig.1 shows the best way to handle analogue audio signals in a studio complex. The source has the lowest output impedance possible. This means that any ambient interference is attempting to drive what amounts to a short circuit and can only develop very small voltages. Furthermore, shunt capacitance in the cable has very little effect. The destination has a somewhat higher impedance to avoid excessive currents flowing and to allow several loads to be placed across one driver. Most installations boost the signals on interface cables by 4dB. This gives a useful noise advantage without risking distortion due to the drivers having to produce high voltages.

Balanced line working was developed for professional audio as a further means to reject noise. **Fig.2** shows how balanced audio should be connected. The screen does not carry the audio, but serves to extend the screened cabinets of the two pieces of equipment with what is effectively a screened tunnel. For this to be effective against RF interference it has to be connected at both ends. This is also essential for electrical safety so that no dangerous potential difference can build up between the units. **Fig.2** also shows that connecting the screen at both ends causes an earth loop with the building ground wiring. Loop currents will circulate as shown. This is not a problem because by shunting loop currents into the screen, they are kept out of the audio wiring.

Watch out for poorly designed equipment which routes the X-pin of the XLR via the PCB instead of direct to the equipment frame. As **Fig.3** shows, this effectively routes loop currents through the circuitry and is open house to interference. Needless to say this sort of tat won't pass recent EMC regulations, but there is a lot of old equipment still in service which you won't want to throw out. A simple track cut and a new chassis

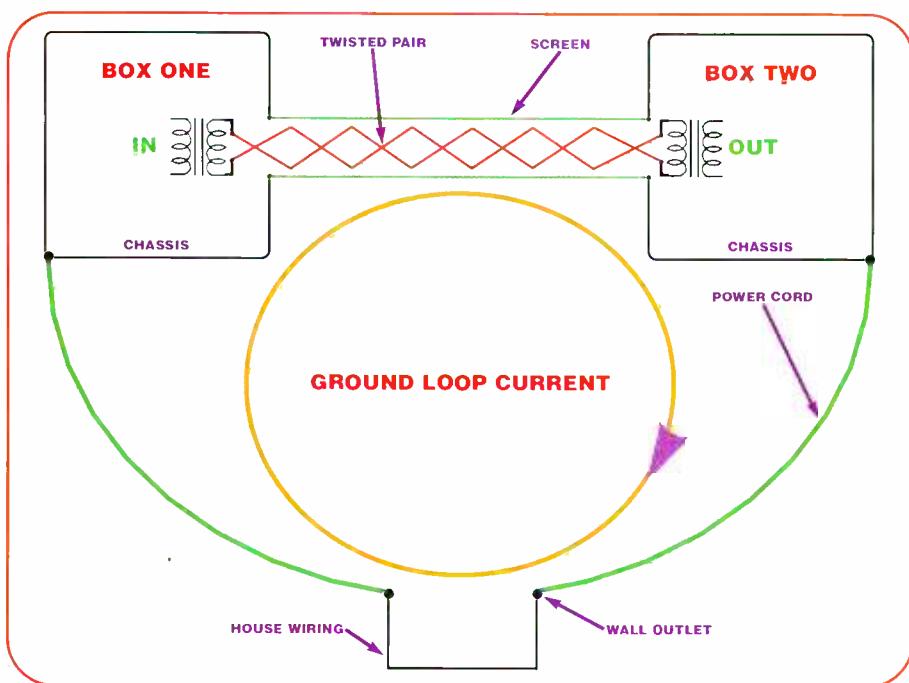


Fig.2: Screens must be connected at both ends. Loop currents do not flow in audio pair and are harmless

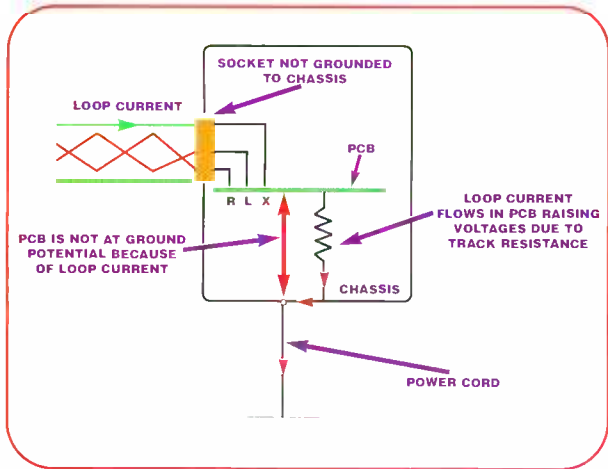


Fig.3 If pin 1 of XLR is not connected directly to chassis, earth loop currents can pass through PCB, causing hum due to common impedance coupling

A bonded XLR socket is often all that's to solve the problem.

Differential working with twisted pairs is designed to reject hum and noise, but it only works properly if both signal legs have identical frequency-impedance characteristics at both ends.

The easiest way of achieving this is to use transformers that give much better RF rejection than electronic balancing. While an effective electronic differential receiver can be designed with care, a floating balanced electronic driver cannot compete with a transformer. A good quality analogue transformer will cost a fair amount of money, but it will pay you back because it always works. If you resent paying the money, go digital.

With single-ended analogue signals using co-ax cable as found on phono, DIN and single-pole jack connectors, effective transmission over long distances is very difficult. When the signal return, the chassis ground and the safety ground are one and the same as in Fig.4a, ground loop currents cannot be rejected. The only solution is to use equipment which is double insulated so that no safety ground is needed. Then each item can be grounded by the co-ax screen. As Fig.4b shows, there can then be no ground current as there is no loop. However, unbalanced working also uses higher impedances and lower signal levels and is just begging to be interfered with. Sorry, but

it just ain't professional.

NOW FOR DIGITAL cabling. The main difference between analogue and digital at the cabling level is that in digital cabling the goal is data integrity. If the numbers arriving at the other end are the same, the cable hasn't lost any audio quality. However, this does assume that any D-A convertor at the other end is properly engineered and capable of eliminating clock jitter. Although the problem is well documented, it is surprising how many D-A convertors sound different with a reframer immediately ahead. Keep

a dustbin handy for D-As that fail this test.

The AES-EBU digital-audio interface is designed to work over conventional, twisted, screened cable. As the signalling is serial, the frequencies involved are much higher than in analogue, and longer AES-

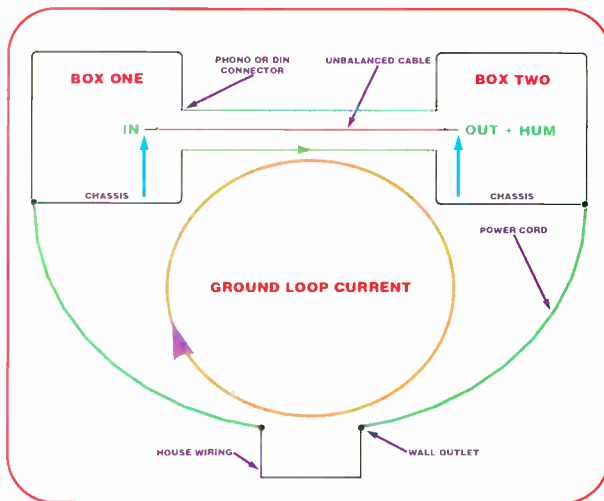


Fig.4a: Unbalanced cables are prone to hum because screen completes hum loop and is in signal path.

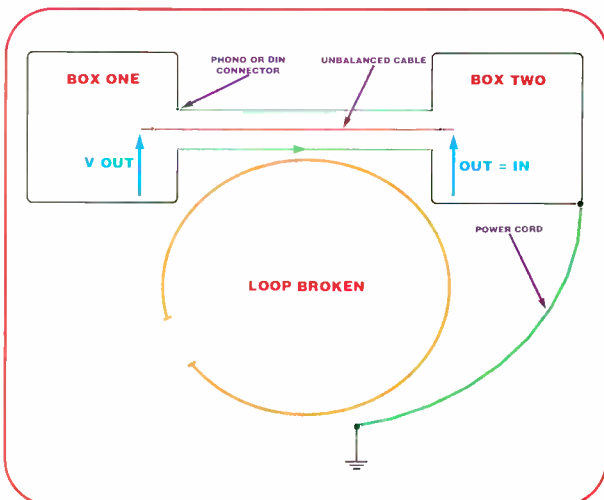


Fig.4b: A double-insulated source device cannot cause a loop

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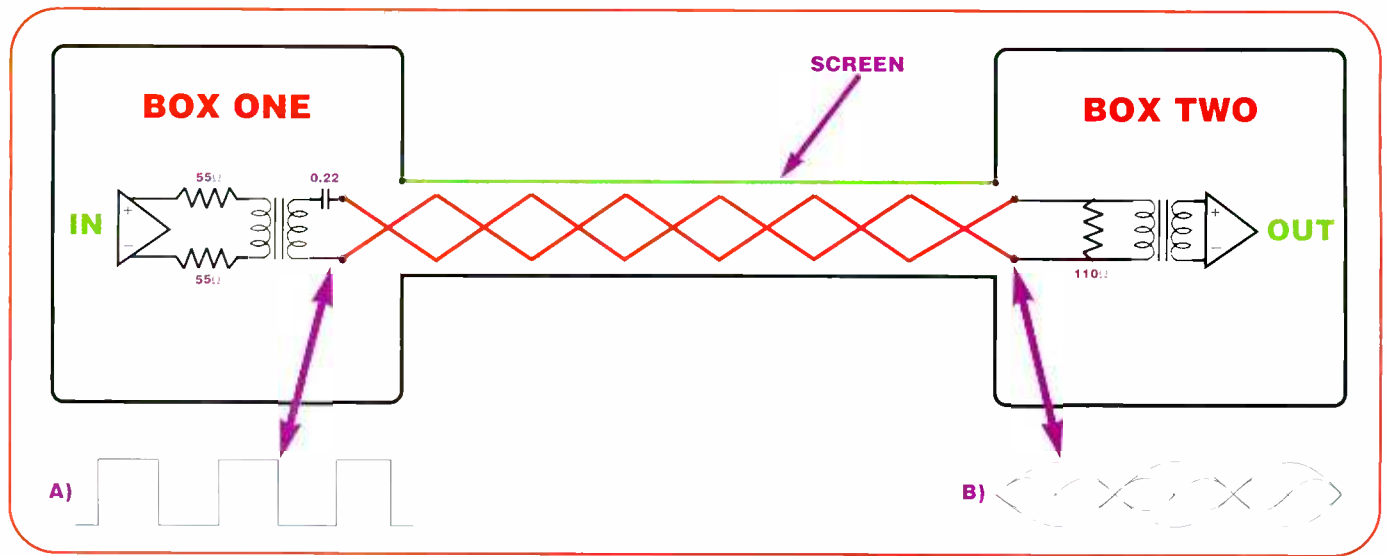


Fig.5: The AES-EBU digital interface uses balanced signalling which does not involve the screen. Consequently, the screen must be connected at both ends. Unlike analogue, it is the data which is important not the waveform. Waveform launched a) is quite square, whereas waveform received b) is well rounded.

EBU cables are definitely transmission lines which have the requirement for matching. However, on shorter lengths of only a few metres you can get away with murder. Like analogue, the screen in AES-EBU is just that; it joins the metal cabinets of the equipment at both ends. The AES-EBU specification is a bit coy about what to do with the screens whereas EMC requirements aren't. Fig.5 shows how the screen again acts as a tunnel for the signal

wires, keeping loop currents out of the data. Sticking to the theory, AES-EBU uses transformers to ensure that the signal wires are truly differential and isolated. The difference is that two of these transformers will fit on your little fingernail and their cost is negligible. Unlike analogue systems where we are trying to preserve the waveform, in digital systems we're trying to preserve the data. Consequently, on a long AES-EBU transmission the waveform

deteriorates from squarish (Fig.5a) to well and truly rounded (Fig.5b). The standard specifies the minimum eye opening required for reliable transmission. If you can't meet this specification by adjusting the equaliser, you need a better grade of cable or a repeater.

Now, the good old XLR connector was designed to withstand being hit by a train, rather than to exhibit constant impedance at 3MHz. Consequently, it does give a bit of reflection when digital signals pass through it. Normally the connector is very close to the transmitter and receiver circuits, so the reflections are so close to the real thing that they have no effect. However, if you make up a long cable by joining lots of short ones with barrels, you will find out the hard way how badly it works.

The AES-EBU specification has evolved over the years. The early specification had different input and output impedances and allowed multiple loads. However, this was found to cause too much grief on long cables and the spec was changed to require source and load matched termination. Older equipment may have the wrong input impedance, but this is easily fixed by fitting a 196Ω resistor in the XLR connector.

On a long cable it is essential to use proper matching, but with only a few metres of cable there is no transmission line at the frequencies involved. Impedance matching is not essential, and any kind of connector from stereo jacks to Woolworths chocolate blocks will do. Take the case of an AES-EBU source feeding several units in the same rack: it's quite in order to connect them all in parallel from one output provided that all of the inputs except the last can be set to a high impedance. Some modern equipment has such a switch and avoids the use of digital-to-analogue converters.

As with so many areas of audio operation, good cabling equates to good engineering practice. And a little effort made in learning the correct practice will pay dividends in operational performance, whether it is of analogue or digital systems. Ⓢ

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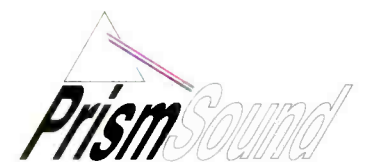
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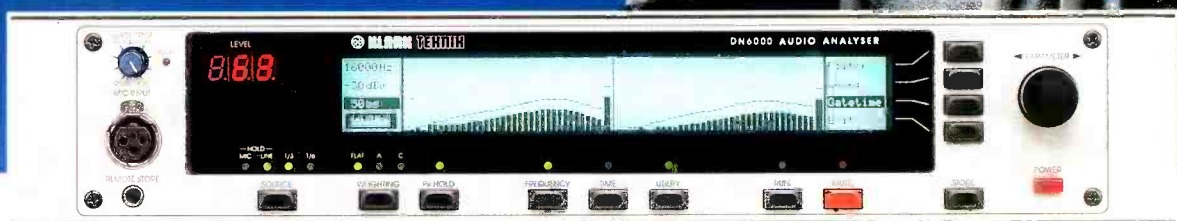


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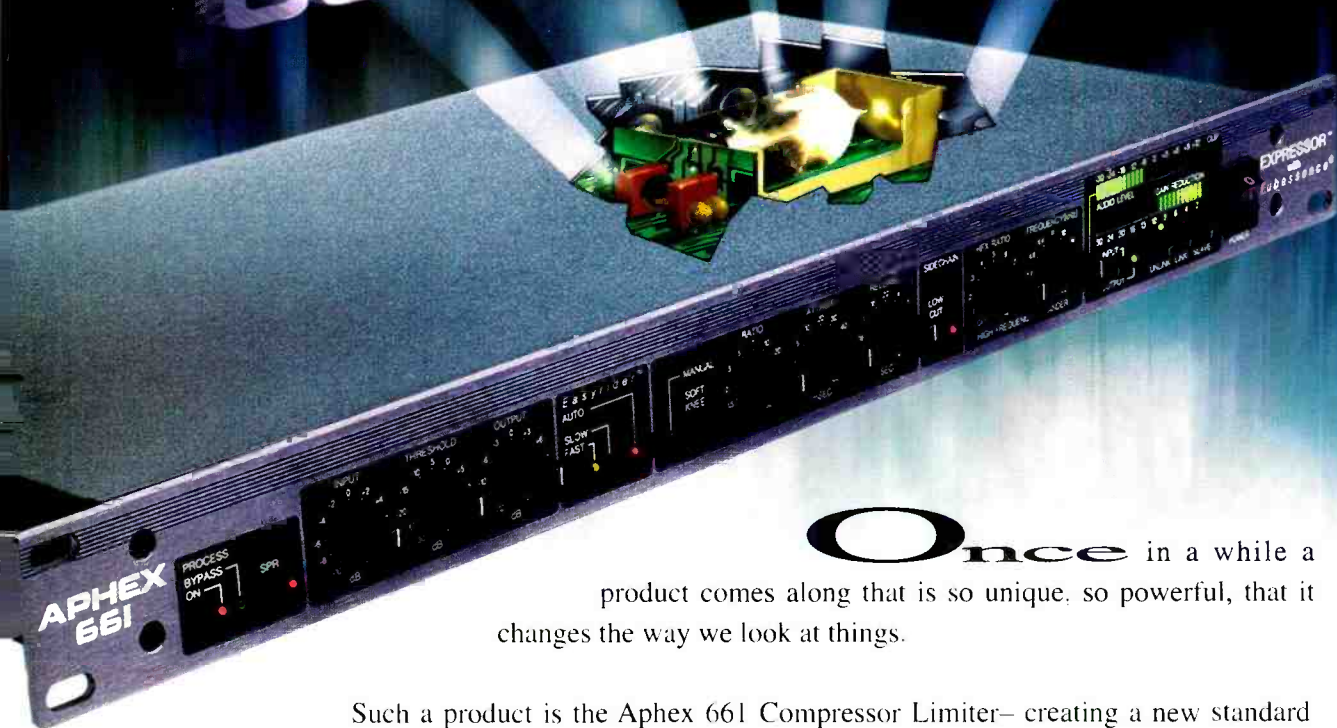


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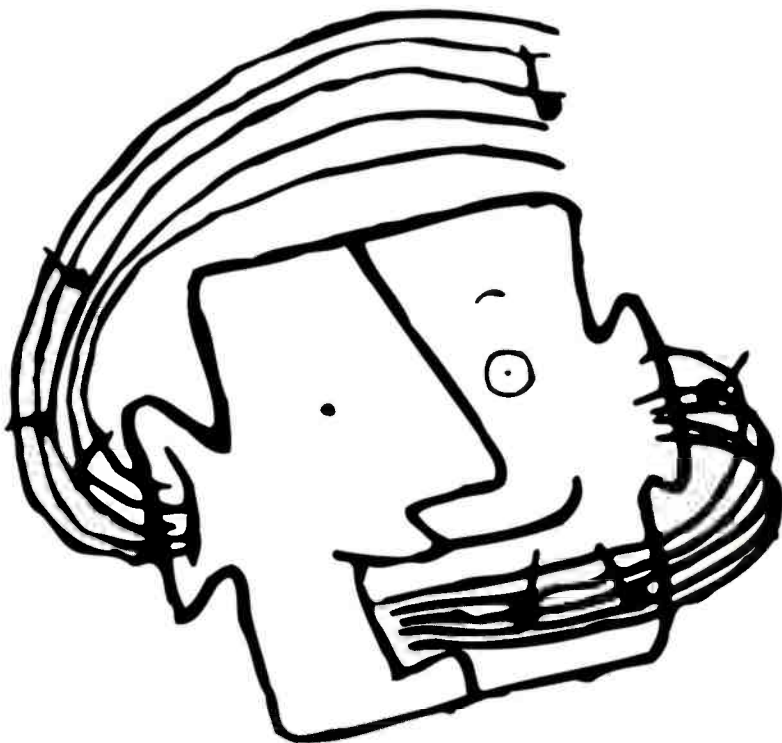
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♦ **September 6th**
International

Monitor Awards
Beverly Hilton Hotel,
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Tel: +1 212 629 3266.

♦ **September 7th-10th**
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♦ **September 10th-12th**
6th Australian Regional

SES Competition
World Congress Centre,
Melbourne, Australia.
Tel: +61 3 9682 0244.

♦ **September 12th-16th**
IBC 96

RAI, Amsterdam,
The Netherlands.
Tel: +44 171 240 3839.

♦ **September 16th-20th**
Seventh International

Symposium on
Electronic Art (SEA 96)
Rotterdam, The Netherlands.
Tel: +31 10 477 8605.

♦ **September 17th-19th**
Intermedia

Association Expo
New York, US.

♦ **September 18th-23rd**
Intermedia

KölnMesse, Cologne, Germany.
Tel: +49 221 821-0.

♦ **September 21st-23rd**
Intermedia

MOC Events Centre, Munich,
Germany. Tel: +49 89 51070.
Fax: +49 89 5107 138.

♦ **September 24th-29th**

Live 96

Earls Court,
London, UK
Tel: +44 181 233 9306.

October 1996

♦ **October 3rd-6th**
International Music
Yarmarok 96

National Exhibition Centre, Kyiv,
Ukraine. Tel: +380 44 261 7546;
UK Tel: +44 171 700 6655.

♦ **October 9th-12th**
NAB Radio Show and
World Media Expo 96

LA Convention Centre,
Los Angeles, California, US.
Tel: +1 202 429 5350.

♦ **October 10th-12th**
World Media Expo 96

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Tel: +1 202 775 4970.
Fax: +1 301 216 1847.

♦ **October 16th-19th**
The End Pan-European
Conference of
Community Radio
Broadcasters

Copenhagen, Denmark.
Tel: +44 114 279 5219.

♦ **October 24th-26th**
Broadcast India 96
Exhibition & Symposium

World Trade Centre, Bombay,
India. Tel: +91 22 215 1396.

♦ **October 30th**
-November 1st

Wireless World Expo
Orange County Convention
Centre, Florida, US.
Tel: +1 301 986 7800.

♦ **October 31st**
-November 1st

ITS 8th Annual Magnetic
& Optical Media Seminar
Mark Hopkins Hotel,
San Francisco, US.
Tel: +1 609 279 1700.

November 1996

♦ **November 1st-3rd**
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Tel: +44 171 242 8400.
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Hotel Taj Palace, New Delhi,
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China International Exhibition
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Republic of China.
Tel: +52 525 592 3257;
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Tel: +852 2862 3460.

♦ **November 6th-9th**
Apple Expo 96

Olympia, London, UK.
Tel: +44 181 390 0203.

♦ **November 7th**
21st Sound Broadcasting
Equipment Show (SBSES)

The Metropole Hotel, NEC
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Tel: +44 1491 838575.

♦ **November 8th-11th**
101st AES Convention

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Expo 96
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♦ **November 15th-18th**
Telekommunikation

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Tel: +49 2204 23595.

♦ **November**
21st-24th

LDI 1996

Orlando, US.
Tel: +1 212 229 2965.

♦ **November 21st-24th**
News World 96

Intercontinental Hotel, Berlin,
Germany. Tel: +171 491 0880.

December 1996

♦ **December 3rd-5th**

Online Information 96
Olympia 2, London, UK.
Tel: +44 1865 730275.

♦ **December 8th-11th**

Broadcast Cable &
Satellite 96 including
Pro-Audio India, Lighting
India and TV India

Pragati Maidan, New Delhi,
India. Tel: +91 11 462 2710.

♦ **December 8th-11th**
Communications India

96 including Networks
India and Wireless India
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India. Tel: +91 11 462 2710.

February 1997

♦ **February 22nd-25th**

World Expo Broadcast 97
Bahrain International Exhibition
Centre. Tel: +973 550033;
UK Tel: +44 171 486 1951.

March 1997

♦ **March 13th-15th**

REPI Tech Europe
Barcelona, Spain. Tel: +44 171
287 2087.

April 1997

♦ **April**

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

May 1997

♦ **May**

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and Music China 97

Beijing Exhibition Centre,
Beijing, China.

Tel: +852 2861 3331.

♦ **May**

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Korea Exhibition Centre, Seoul,
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June 1997

♦ **June 3rd-5th**

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♦ **June 7th-10th**

Nightwave 97
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Fax: +39 541 786686.

July 1997

♦ **July 3rd-5th**

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Bangkok International Trade
Centre, Bangkok, Thailand.
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Fax: +65 227 0913.

August 1997

♦ **August 25th-28th**

SAPTE
Sydney, Australia.

October 1997

♦ **October 16th-20th**

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

♦ **October 29th**

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June 1998

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World Trade Centre, Singapore.
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Incorporating Broadcast Engineering
August 1996, Vol 38, No 8, ISSN 0144 5944

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Miller Freeman Entertainment Ltd, 8th Floor, Ludgate House, 245 Blackfriars Road, London SE1 9UR, UK. Tel: +44 171 620 3636. Fax: +44 171 401 8036. E-Mail: cz73@cityscape.co.uk

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Total average
net circulation
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(UK: 6,917, Overseas: 12,064, (ABC audited)

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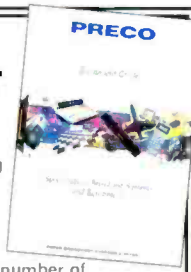


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Digital connection

subtle or what?

The Achilles' Heel of properly implemented digital audio is popularly regarded as being jitter.

BEN DUNCAN looks at the problem and offers a few useful comments on avoiding it

IN THE EARLY DAYS of digital audio, the experts told us that 'digits were digits'. The implication was that digital audio's binary data was highly robust—even if some kind of voltage fluctuation arrived, perfect audio could be reconstructed. It is common for digital conversion devices to have error counting and correction facilities, and these have been used to demonstrate that ordinary CD pressings or DAT tapes played on ordinary, even low-price players, say, have few or nil data errors most of the time.

The reality that has been slow to dawn is that digital-audio quality is highly vulnerable in a different dimension—that of time. Imagine the nightmare of a SMPTE clock signal link that is either slow or fast; or worse, slows down and speeds up erratically, as it is passed around the studio. Something akin to this, on a faster scale, is what happens to the synchronising 'clock' signal when it incurs jitter errors.

In the past six years, jitter has become recognised—at least in the 'high end' audio community—as a principal cause of Digital Sound Malady.

The amount of jitter needed to upset signal reconstruction is minute. The baud rate for 44.1kHz audio is about 5.6MHz. In other words, each frame lasts around 178ns, or 0.178 millionths of a second. But the edges between the bits is where the clocking is taken from, and the operative region of these is as little as 100th of the data period, say around 1ns in duration (a thousandth-millionth of a second). This is the baseline period from which jitter causing deviations of a little as 10ps have been demonstrated as having a significant audible and deleterious effect on music reproduction.^{1,2} The audio consequences of jitter are down-band intermodulation products—across the audio band, and even in the low bass. Hence loss of detail, dissonance, and other effects well known to sensitive listeners.

THE ROLE of digital gear-connection cables in all this is simple enough. First, cables can pick up 'noise'. Noise damages the critical edges—like trying to pour wine on a rolling ship. Just 10mV of noise typically causes 500ps of jitter—or 50% timing uncertainty for a 1ns edge period. The mechanism of noise pickup is hardly different from that in analogue

links. The SPDIF cables of RDAT and CD players are unbalanced and therefore highly vulnerable, particularly in urban areas or wherever RF levels are high. Professional AES-EBU connections are balanced so they should be more immune—but only if the shield grounding connection(s) actually work at RF!³

If your studio has no technical RF earth, adding one could reduce jitter. Whether the cable is balanced (twisted pair) or not, the shield should normally be RF-earth grounded at one end only.

Second, the path used to transfer digital data must behave as an immaculate transmission line. The unbalanced SPDIF (RDAT and CD) cables need to see a 75Ω impedance all along the line. This means using true 75Ω characteristic impedance cables and connectors. Most analogue audio cables are entirely unsuited. K kosher cable is (for example) a quality type made to the RG59 spec, say Belden 89018. RCA phono connectors are not rated at 75Ω, and the mismatch caused by them is surprisingly significant. They may be changed to SMB connectors, which will fit in the existing holes. Otherwise, 75Ω-rated BNC (or other 75Ω type) connectors may be used. Careful—50Ω BNCs look the same but are utterly inappropriate. For balanced AES-EBU connections, the correct 110Ω-rated cable and 110Ω connectors are required. The loose impedance tolerance (±20%) of the AES specification is unhelpful. For consistently high sonic quality, with enough other variables, an impedance match well within 5% is to be preferred.

Once jitter is considered, (fibre) optical cables are not automatically superior. Okay: they are better at noise immunity. But your studio isn't in a steelworks and the bandwidth of Toshiba's appropriately named TOS-link (alias EIAJ optical) is inadequate at about 5MHz; it is today considered that a professional digital link should have a bandwidth above 50MHz, which is barely managed by the AT&T glass optical link, and yet readily achieved by good yet inexpensive cable.

Good digital sound does not depend on wildly exotic, expensive cables and connectors, but on stuff that is RF-matched dead right. Judging any digital device's sonic quality with that moulded phono-to-phono lead borrowed off the old home hi-fi may be a mistake. **S**

Bedtime Reading

1. R Fourré, 'Jitter & the Digital Interface', *Stereophile*, Oct 1993
2. C Dunn & M Hawksford, 'Bits is Bits', *Stereophile*, March 1996 (US)
3. N Muncy, 'Noise susceptibility in analogue & digital signal processing systems', *JAES*, June 1995



A timely reminder Starquad is not ideally suited to all cabling applications.

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Eddie hasn't gotten any more conservative over the years. So it's not surprising that a man with Kramer's receptiveness to change would add a 32•8 to his creative arsenal. A mixing console that costs hundreds of thousands less than those he's worked on for most of his awe-inspiring career. A console he says he likes for its "...sweet EQ, dynamic range, and cleanness."



1. Including Hendrix, Led Zepplin, Kiss, Buddy Guy, and more recently, his work with other Mackie mixer owners: Sung, David Abbruzzese, Vinnie Colaiuta, Stanley Clarke, Tony Williams, Steve Vai, and Carlos Santana.

2. He hates the location of the 8•Bus talkback button.
3. According to Eddie, Eric Smeadman (Spin Doctors), Little Red Wagon Mobile Recording Studio, Bootsy Collins and John McEnrie have purchased 8•Bus consoles at his urging.



Eddie wanted to do more than just take advantage of the creative and lifestyle options afforded by the project studio revolution. He also wanted to help DRIVE it. So a year ago, we agreed to lend Eddie a 32•8 in return for his feedback. Since then, we've learned Eddie is not shy about expressing his opinions. Luckily they're mostly good².

And Eddie Kramer recommends Mackie consoles to his associates, too³. In these cynical times (when pop stars accept millions to "endorse" products they admit later to having never

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a brilliant orchestral homage to Hendrix with an astonishing array of some of the best players in the world. Leave it to Eddie to break more rules. [Net surfers should check out the RCA Victor Web Page @ <http://rcavictor.com>] For a great read, pick up the Jimi Hendrix Sessions book by John McErmott with Billy Cox and Eddie Kramer (Little Brown), and on video, Adventures In Modern Recording (available from Mix Bookshelf, 510-453-3307).

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

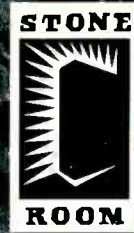
Fisher, famous for his work with "Hated Eyes" and "Climie Fisher" and top recording artists Rick Astley, Amy Grant, and Germaine Jackson continues:

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