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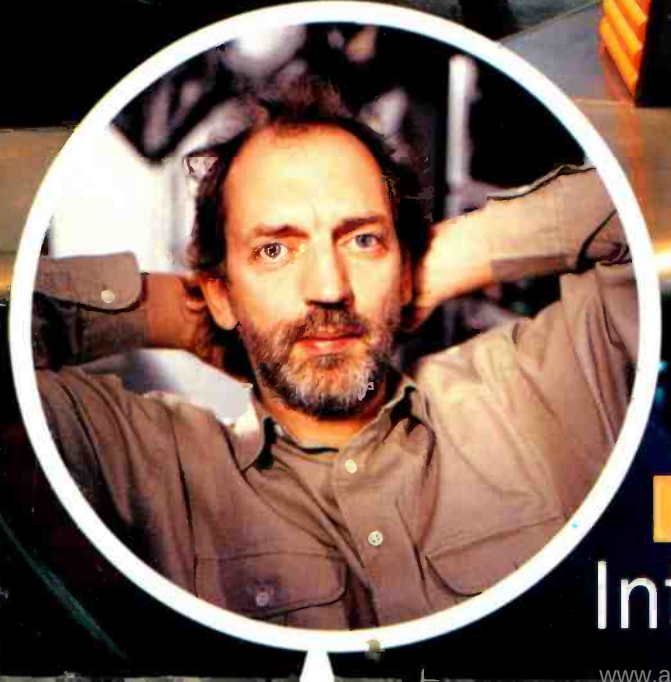

The Steve Lipson Interview

AES show product roundup

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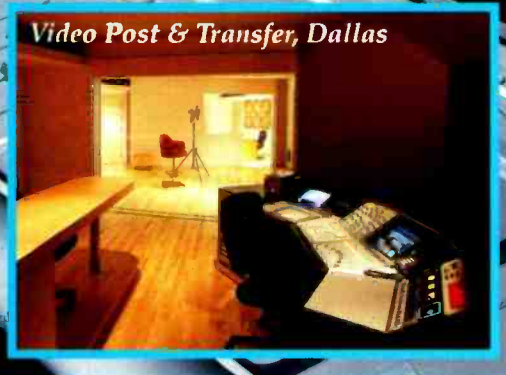
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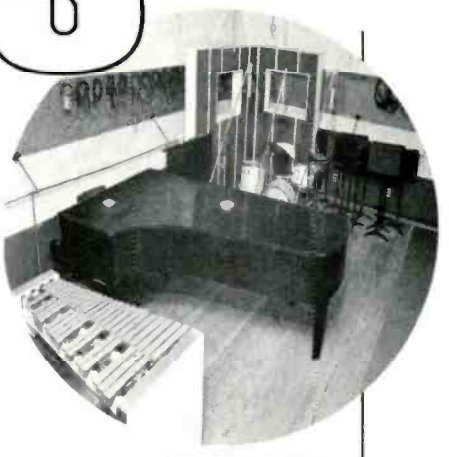

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REVIEW SECTION

This month Studio Sound's reviews-section team of industry experts gets down to business on: the new Octavia nonlinear modular multitrack system from SA&V, the DC2020 postproduction console from Soundcraft, the Rolec-SADiE Mobile hard-disk recorder from Rolec, the CM-700 microphone from Crown, and the Waveconvert audio format-convertor software program from Waves, as well as the usual roundup of new product launches

SA&V Octavia

SADiE is a tough act to follow but SA&V is playing a strong card in its Octavia nonlinear modular tracking system. In an exclusive review Studio Sound presents the findings of BBC Engineer and SADiE user Rob Taylorson who put the system through its paces

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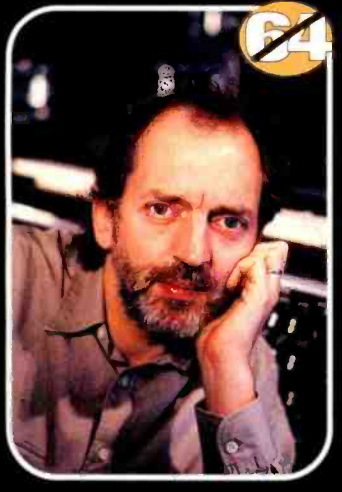

LIPSON INTERVIEW

Cher, Annie Lennox, Trevor Horn and the relentless pursuit of technology: Steve Lipson in interview with **Studio Sound**

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THIS EDITION'S CONTRIBUTORS

FRANCIS RUMSEY is senior lecturer on the Music and Sound Recording degree course at the University of Surrey. He is a Governor of the AES and a member of its working group on digital interface standards. He is also the author of several books including *MIDI Systems & Control*

DAN DALY covers the pro-audio industry extensively world wide, as well as writing for publications like *USA Today* and *International Business*. His involvement in audio includes various successes as a composer, producer, studio owner and substance abuser.

PAUL AARONS is the design mastermind behind the new-style **Studio Sound**. Other offences against style have lead to his designing music titles such as *Q* and *Vox*. He copes with the pressures of fame by dressing up as a football team manager and smoking big cigars in fur coats.

Getting even with video

'Hi, it's Pam,' said the voice on the phone. I know it's cheeky, but I need a favour.'
'Try me,' I replied, ever eager to help.
'I've got to do a piece on audio for my magazine and I don't know anything about it.'

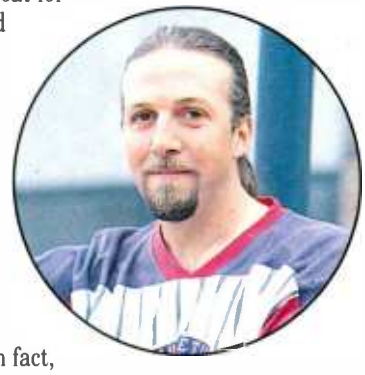
Suddenly I could see why she had prefaced her request with an apology. 'But you work for a video post magazine—you're the enemy!'

So, Pam isn't her name but you get the picture: this is the rich relation of the rich-poor video-audio pairing swallowing its pride and asking for help.

'Okay,' I said, 'I'll tell you about audio in video. Audio people hate video people—hike typical audio equipment prices by an order of magnitude or two, raise the data rate and add a dash of glamour, and you've got video. Video people wilfully misunderstand audio; they compare video and audio data rates and conclude that audio technology is kids' stuff; they assume that video compression techniques are applicable to audio signals and that audio peoples' ongoing concern over data compression is an indication of their ineptitude. They eat up the lion's share of a production budget and leave the audio team with the scraps.

'That's audio in video.'

I concede that it was a graceless display and turned up the following day at the UK Vision show determined to show the video fraternity a little more respect. Yet after just a few hours, it became clear that even if Pam had unwittingly volunteered to be audio's video scapegoat for a few minutes, video people as a whole deserved everything I had dished out. And wasn't it Pam's magazine that had published an article in which the typical delay time for a surround channel was 2.5 seconds? I believe it was.



TIME TO BE more objective. Ranting at video people may feel good but it achieves very little. Better, then, to give audio people something upon which to hang their self respect—a response to the video campaign of disdain. The ultimate aim is to educate video people in the ways of audio, to engender their respect and to have them assign audio personnel to audio duties rather than further damage audio's reputation through ignorance.

Let us begin with the relative merits of video and audio technology. In fact, let's have John Watkinson discuss the matter at some length in this issue of *Studio Sound*. After all, if there is a recognised authority in both fields, it is John. And having read his comparison of the development and standing of these two technologies, I can confirm that he presents a convincing—yet objective—argument for audio's superiority and shows audio in a very favourable light over video. It's a convincing argument for raising audio's worth in the eyes of the video world and the first of many steps *Studio Sound* will take with this goal in mind.

Returning to Pam's 2.5 second surround delay, it isn't that an error had appeared in a magazine that is significant. It is that fact that it was so blatant that I cannot believe that, had it been a error in discussing video technology, it would have been readily picked up and corrected. The fact that it found its way into print suggests that it was either outside the expertise of the staff or that they simply didn't care too much about audio. Or both.

But perhaps I was too hard on Pam—against the current trend, she had called me and asked for help. If we can persuade the rest of the video industry to take audio and audio people as seriously, we will have won back our territory. And there is a lot of new ground to be pioneered by both audio and video people just over the horizon.

editor

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Soundin

special report from The AES

Fairlight and Amek a-courting

IT HAD to happen. Presented with a market dominated by large manufacturers protecting their position as purveyors of exclusive and disparate solutions to user requirements it was inevitable that some of the smaller companies would get their heads together and co-operate. It's been threatening for some time but a natural inertia always accompanies marriages of convenience—even the great leveller of OMF continues to be treated with suspicion by some parties who have problems with the O word.

The surprise revelation at last month's AES in New York that Fairlight is integrating Amek's digital desk surface and its SuperTrue automation as the controller to the mixing capabilities of the Australian company's MFX3 DAW represents the most significant example of inter-company liaison in recent times.

Under the terms of the agreement Amek will OEM the desk surface for Fairlight which will badged it as FAME. Amek continues the development of its own Digital Console for release next year with Amek Chairman Nick Franks stating that Fairlight's badging avoids customer confusion without hiding the fact that the desk surface is indeed of Amek origin.

Fairlight MD David Hannay said the tie-up resulted from his own company's reticence to 'reinvent the wheel' and its willingness to accept that designing a console surface was not really its 'skill set'. Taking on an existing controller left only the writing of link software between the Amek desk and the Fairlight DSP.

The FAME development is just one of a spate of recent releases from Fairlight such as the DALI-2T 2-track stand-alone recorder-editor, the DAD digital-audio dubber for film, and OMF capability. Hannay says the company has undergone something of rebirth.

'We've spent a long time getting MFX right and having done that we've felt we needed to diversify and particularly provide a dubbing solution for the film industry,' he says. But the DALI-2T is by far the cheapest product that the company has ever produced.

'It is but it's got a fairly sophisticated processor in it and the TimeFX algorithm is the same as in MFX3,' he replies. 'It's not a move down market, we don't set out to offer the cheapest solution in any situation because the cheapest isn't usually the best. We try to be cost-effective but even the DALI isn't the cheapest solution you can get.'

FAME talks started at NAB following the previewing of Amek's Digital Console. 'They're established in the workstation business, Amek is never going to make a hard-disk recorder, so we thought there was room for collaboration,' says Franks who adds that Fairlight wasn't the only one to come a-courting.

'We were approached by other manufacturers with the view to providing a control surface for them even before Fairlight had arrived,' he explains. 'The difference is that the other people were not decisive while Fairlight has certainly pursued it. I think we appreciated the sincerity, it was good and we responded very favourably.'

However, he believes Amek is uniquely placed to offer this expertise. 'You've got to think about what else is out there —SSL is locked into its own systems and the same with AMS Neve. Yamaha makes pretty good product but it is what it is and they're not offering what we're offering,' he states. 'Equally, other people may have a digital console and want to work with a Fairlight—Fairlight should not seem to be locked into us,' he adds, 'but if our combined product works they're going to be happy—foaming at the mouth.'

Hannay says Fairlight sees the market moving to a situation where the workstation gradually integrates all the features in a studio. 'Not having mixing was a hole in what we were offering that we had to find a solution for,' he explains. Amek was chosen for a number of complementary reasons.

'It has a first-class worldwide reputation, it's in the process of developing its own digital mixer, it already had a mixer surface, and it has a decent automation package which is well respected and was another feature that we didn't need to write,' he says. 'Lastly, we liked the people —they're good to work with.'

He says that Fairlight intends in the future to enable the MFX3 to communicate on a basic level with the Yamaha digital desk and mentions the Euphonix as another companion product that could be integrated if the demand arises.

'The sort of interface you'd be getting there is one that maybe gives you the ability to type things in on one QWERTY and not have to retype it on the other system because they'll talk to each other at that level,' says Hannay. 'With FAME we're talking about a much greater level of integration because it actually is one processing system.'

He hints that there are other features in the MFX3 besides the mixing that haven't yet been revealed. 'It's a very powerful processing system with a lot of capability which is why when you see it work and execute commands it's so fast,' he says.

According to Franks the tie-up is of strategic importance. 'If this stage works well then perhaps later on, who knows—maybe a full-scale digital desk incorporating a Fairlight system,' he muses. 'The point is that we can move very fast here towards the all-digital future and oblivion.'

Zenon Schoepe

Packed to the gunwales: more than 18,000 people conspired to break all AES attendance records at the 99th convention in New York

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gs

Fairlight MD Dave Hanning (left) with Amek's Nick Franks

Fame: it's going to live forever

AFTER THIS YEAR'S Audio Technology Show, the APRS's annual exhibition has undergone another name-change and alteration in direction. Next year's event will be billed as Audio 96, Technology & New Media, and will be promoted and marketed by Single Market Events, the organisers of the Vision broadcast show.

This last move falls in with industry speculation that, after a series of less than totally successful shows, the APRS was looking to ally itself with other events in complementary markets. A press release contained the sentence, 'The APRS is also moving towards closer alignment of its show with Vision in 1997.'

APRS Chief Executive Philip Vaughan commented: 'Events will take shape as we go on. We will take the experience of this year's Vision show and look at the reaction of previous APRS exhibitors to this announcement. If there is consensus, things will have to evolve with time.' *Kevin Hilton*

LONDON LOGIC What must have been the largest sale of this year's AES Convention went to AMS Neve with the announcement that nine Logic consoles are to be placed with two London postpro facilities as part of an unusual collaboration. Soho-based The Tape Gallery and Central Sound Recording Studios are set to spend £2m putting into practice the strategic alliance at the heart of recent secret discussions.

The facilities will adopt the AMS Neve-Logic platform and OMF to enable a highly co-operative networking arrangement in which clients will be able to take advantage of every aspect of both facilities with minimal logistical problems. Presently claiming to have 10% of the short-form post market, Central MD Carole Humphrey identifies the Logic platform as the optimum route to outperform her competition. The Tape Gallery's MD, Lloyd Billings, claims to have 'explored all current workstations and those in the ether' in their search for the best system before settling on the Logic. He also quotes the compatibility between the Logic and Avid systems as giving 'a clear advantage' as many of the Gallery's clients already use this system.

INFORMATION TECHNOLOGY specialist AT&T has joined forces with digital-audio storage and coding-equipment manufacturer Audio Processing Technology (APT). A strategic partnership has been formed to develop new technologies for the acquisition and distribution of high-quality audio over direct-dial digital networks.

The first result of the joint venture, the APT-Q digital audio compression system, was debuted at the recent AES convention in New York. Designed to give high quality stereo at low bit rates over a single direct-dial ISDN line or switched 56-channel feeds, APT-Q's coding is based on a scalable algorithm working from 256 to 56Kb/s. This allows the compression ratio to be altered between 5:1 and 20:1, depending on the available bandwidth. *Kevin Hilton*

A NEW audio-compression technique for CD-ROM was introduced at the New York AES by Duck Corporation, manufacturer of the TrueMotion S video architecture. Using a proprietary form of adaptive delta modulation that digitalises Red Book audio (44.1kHz, 16-bit stereo), the DK3 can compress audio at a data rate of 132kbit/s, interleave it with video and then reconstruct it on playback.

The 132kbit/s compression rate is said to be better than 5:1 ratio, and Duck claims that the end product is nearly indistinguishable from the source material. 'CD-ROM publishers, telephone companies and others can compress audio to the 132kbit/s rate and restore it without any noticeable difference to the average consumer,' said Stanley Marder, President of Duck.

Marder observes that the technique will allow the audio section of a CD-ROM or CD Plus multimedia track to take up less room on the disc, allowing more video and graphics to be contained, although 'without sacrificing perceived sound quality'. *Kevin Hilton*

AS WORK ON an industry standard for machine control and system management protocols continues, the Harman Pro Group has launched HCA (Harman Communication Architecture), which is currently being studied by the AES protocol working group as a likely base for AES-24 implementation.

Originally designed as a network standard for the new Soundcraft Broadway theatre sound console, HCA is a generic management protocol that can detect, control and display parameters in a generic fashion.

Although copyrighted to Harman International, HCA has adopted research and techniques from amplifier manufacturer QSC. Neither company holds a patent on the protocol, which is being offered freely to the industry. *Kevin Hilton*

Obituary

THE PRO-AUDIO and music fraternities lost a popular colleague during the recent AES Convention. Although British born, John Mosely began his musical career in 1955 at New York's Westminster Records where he specialised in maintaining and building equipment for classical recording.

In 1956 he joined Pye Records in London as VP of Engineering where he took responsibility for design, construction and maintenance of all recording facilities, and in 1959 he returned to New York to assume a similar position with Audio Fidelity Records. John became a full-time consultant in 1962 (spending his time between London and Switzerland and designing facilities and equipment) before joining Sansui in 1972. During his three years with Sansui John developed and patented the Quintaphonic Sound System after which he moved to Los Angeles and became involved in the film world. Most recently, John has held the post of VP Operations and Director of Utah-based Night Technologies International. During his career, John worked with such artists as Rodzinsky, Barbirolli, Louis Armstrong, Lionel Hampton, Elton John, and The Who. His film-sound work included *King Kong*, *Days of Heaven* and *Escape from New York*. John recently completed his greatest work, the production and recording of Handel's *Messiah* in conjunction with Sir David Wilcox and the Mormon Tabernacle CHoir using new NTI technology which he helped develop. The album is expected to be nominated foe a Grammy in several categories.

John died in a private aircraft which crashed during the show. *Tim Goodyer*

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Audio: showing video the way

Audio is more refined more sophisticated and more demanding than its long-standing and more glamourous antagonist

It's official: audio and television technologies are slowly merging, aided and abetted by such developments as multimedia and home theatre.

Having worked in both areas, I have found that it is not just the technology which is historically different but also attitudes, standards and aspirations. If these technologies are to merge satisfactorily, our only hope is to take the best of each. This month I intend to contrast audio and television technology in a radical way.

However you look at it, audio technology is more advanced than that of television; there have been more generations, more quantum leaps, each of which have improved the quality In audio, recordings available to the consumer began with cylinders, advanced through 78rpm shellac disks, vinyl disks, stereophonic vinyl disks and culminated in the Compact Disc. That's five generations.

In television, broadcasting began with monochrome pictures. British experiments with 405 lines prior to WWII led the US to adopt 525 lines, a standard which it uses to this day. Europe then leapfrogged with 625 lines, described at the time as 'High Definition'. All of these were based on the same technology and differ only in the odd parameter. It is worth remembering that all current television standards use interlace which is actually 2:1 compression and causes visible artefacts. The next generation was the addition of colour. This was done using further analogue compression so that channel bandwidth was not increased. The three systems, NTSC, PAL and SECAM all rely on a subcarrier embedded within the vision bandwidth. Compared to non-interlaced RGB, NTSC, PAL and SECAM use 6:1 compression. Next came MAC, which kept the colour signals separate, avoiding decoding artefacts. However, MAC retained the same scanning parameters, so that the resolution of the picture did not increase although the colour resolution improved because the compression is only 3:1. So television is on its second generation, maybe two-and-a half generations, today whereas audio was on its fifth generation over ten years ago. Unimpressive.

I think it is reasonable to compare like with like, so let us imagine a Compact Cassette recording of an off-air FM radio broadcast and compare it with the original. Even a fairly humble cassette deck can produce a convincing replica. However, if we take an off-air VHS recording and compare it with the original, there no doubt that a travesty has occurred. The picture is fuzzy and noisy, and the colour appears to have come out of a paintbox.

There has never really been a video equivalent of hi-fi. Today, the term hi-fi has all sorts of distasteful connotations, not least being the exclusion of the laws of physics from any debate, but there was a time when the consumer understood sound reproduction, and the home experimenter often produced results in advance of what was commercially available. There is no doubt that this contributed to the rapid advances in audio that have been set out above. The question I have trouble answering is whether the lack of interest in image quality has led to the poor progress in television or whether it is the other way round. Either way, the audio community is in a good position to explain quality to the television community.

IN MY VIEW, the section of the market where the action is going to be in the near future is home theatre. A large screen with a good quality picture and surround-sound speakers to go with it. The audio side is relatively easy as existing technology can be used for quality surround sound, although with 4–5 speakers it would be useful to make them smaller if this can be done without losing the low frequencies. The problem is the picture. Today's cathode-ray tubes can be made up to about 36-inch to 40-inch diagonal, beyond which the stresses set up by the internal vacuum become unreal. Flat screen displays are the subject of frantic research but I don't see them becoming economic in large sizes for several years and the CRT will have to do until then. The problem is that on a 36-inch screen the TV lines are obvious and irritating. Many manufacturers have adopted up conversion, the video equivalent of oversampling, which increases the number of lines on the display. The problem is that this oversampling effect increases the display resolution, revealing more of the input signal. Of course if the input is VHS, which doesn't have resolution, the result is simply more noise. Also the time-base error of VHS causes a greater displacement on the bigger screen. It seems that for proper home theatre VHS is out.

The section of the market where the action is going to be is home entertainment

The latest technology to hit television is compression. The scary part is that there seems to be a misconception among the compression community that any compression algorithm which reaches VHS quality is good enough. This thinking is obviously flawed as it assumes that existing television is good enough. For home theatre to become a success, the parameters have to be right for large screens. With high-density CD looming, carrying compressed digital video, an opportunity exists to take television into another generation. Digital compression uses component video and avoids the artefacts of composite, but if the compression factor is too great the result is noise. If this noise is exaggerated by large screens, the potential for hdCD to become a home theatre medium will be lost and the quality audio goes down with it. The best chance television has of advancing is to take audio as an example.

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Stories across borders

The relentless march of technological progress is only one of the advances currently taking place in pro audio writes **DAN DALEY**

Much has been written of late regarding the extinction of the 'middle band' of recording studios, that broad, but now tenuous, market striation that falls in the uncharted abyss between the high-end facility and the 'home' studio. If 'extinction' is too strong a term, then certainly some of these facilities must be considered endangered. As one of the pundits who have commented as much in both print and over a pint more than once, I'm hardly going to take issue with that. Having once been one of those specie and having had the good fortune—if not the good sense—to have bailed out with skin, if not wallet, intact, I can commiserate as well as opine on the matter.

The same phenomenon that smote the recording industry is now attacking the manufacturing arena. Large companies are getting larger, following the economic dictum that an organism must expand or face extinction (the Soviet Union excepted), even as the manufacturing side of professional audio sees more startup companies springing into existence than since the 1960s. The recent AES Convention in New York City was notable for the presence of a number of new boutique-style operations, with limited product lines and even more limited financial resources but with plenty of the personal visionary moxie that also characterised the early days of pro audio. Many of these new companies embark with their limiters and mic-preamps and DSP cards and software in search of a uniquely 1990s phenomenon in this business: the strategic alliance, seeking funding from more established companies for their own technological visions. If evidence of this trend is needed, take a look at Digidesign's TDM bus initiative which gained significant kudos in NYC through its most recent signatories—which include the prestigious British Focusrite and Dutch tc electronic concerns.

MORE EVIDENT EVERY week, and certainly palpable in the hotel suites at AES, if not directly on the Convention floor itself, is that another fundamental notion of the studio business is also reinventing itself. Just as the traditional axis of British-Western European and US manufacturers was extended into Asia by Japanese and Korean companies over the last 20 years, and by Scandinavian and more recently Eastern European companies to the West, so is the London-New York-Nashville-Los Angeles axis of recording centres being diluted. This, of course, is quite obviously the case on the personal recording level, where any four-sided (or even three-sided) roofed structure can be turned into a recording studio. But on the flagship level—the so-called world-class level—the new Diaspora of recording, mixing and posting of audio is challenging the big four anew every time you turn around.

The trend first became most noticeable, I think, with BOP Studios, in 1992 in what was then Bophuthatwana, a quasi-national homeland that's since been incorporated back into a new South Africa. The idea that one could build a facility large enough to service a Boeing 747 fuselage in a place so remote seemed at the time audacious, if not preposterous. But built it was, and while geography and politics daunted it, its establishment seems to have been a kind of triggering mechanism for other pent up dreams of large scale recording facilities elsewhere. Significant new studios around the globe are being announced and built at a rapid pace, from Synchrosound in Kuala Lumpur to Tom Hidley's soon-to-come Moroccan adventure. As technical arguments, such as analogue versus digital and format compatibility, consume our attention, the user base of those technologies is undergoing a sea change.

THE REASONS FOR a proliferation of large recording facilities in cities previously considered well off the beaten track in the audio world are varied and telling. Asia, Eastern Europe and Africa have watched the development in the West of the merging of entertainment and communications into a new culture that is often more than the sum of its parts. And their attention is rivetted not so much by its social implications as by the financial ones. The time when non-Western nations looked to the West for programming and expertise—be it music, television, film—is over. They are at once asserting their own cultural heritages via modern technologies and at the same time getting in on the content ownership pie. Major Asian studios are making deals with major Asian record labels and film producers, deals that once didn't happen without some level of involvement of Western technical, creative or financial participation.

Asia, Eastern Europe and Africa have watched the development in the West of the merging of entertainment and communications into a new culture that is often more than the sum of its parts

This has been an unnerving development for larger Western studios, although it's not immediately apparent in their discourse. But even as they obey market demands of expand or die and as they reach for larger geographical markets, they watch the horizons of expansion recede like Hubble's Red Shift into ever-farther reaches of the marketplace universe.

As though from a observatory, this is observation rather judgment. The globalisation of audio recording is not something that can be controlled, any more than the personal recording phenomenon could, and many large studios still have rope burn marks on their hands from trying to hold back that wild pony. The middle-class studios in America are responding by starting independent record companies, which themselves are sprouting in record numbers. But the large facilities watch, sometimes nervously, as regions that once were unpronounceable destinations on a map become potential powerhouses of audio.

The West has had experience with globalisation of markets; just ask any former steelworker in Pittsburgh or Sheffield, or any of the several hundred thousand laid-off auto workers who saw jobs disappear over the last two decades. But those same changes brought with them as many or more new opportunities. That will likely hold true for audio as it becomes more global. And while the Western recording establishment will continue to be challenged by that change, it can also take heart in another constant of markets and life: *plus ça change, la plus ça même chose.*

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Taking sides in the war

Strategic alliances form in the quest for a new CD but are conspicuously absent from DAB writes **BARRY FOX**

It took pressure from the computer industry to bring the warring factions into compromise over high density CD. Once the SD Alliance had agreed to make its sandwich disc readable from a single side –and so make it possible to build a small computer ROM drive–IBM, Microsoft and Apple started to lose interest in the Philips-Sony MMCD system. The only sticking point was the signal modulation.

Philips and Sony had proposed a system called EFM Plus, or 8/16, which builds on the EFM or eight-to-fourteen modulation system used for conventional CD. Eight-bit digital words are stretched to 14-bit words before recording. EFM Plus then adds two extra bits to reduce the risk of read errors.

Toshiba's SD system (called 8/15) added only one extra bit and offered 5Gb of storage and 142 minutes of movie material on a single-sided disc. But the computer companies agreed with Philips and Sony that 8/15 was too prone to errors, especially with recordable discs since a glitch leaves the laser unable to follow the tracks.

The sticking point for the SD Alliance was that EFM and EFM Plus are proprietary to Sony and Philips. Some Alliance members opposed a deal which would give Sony control and royalties but they also knew that any new format needed the computer companies as well the consumer electronics industry and Hollywood movie studios to succeed.

A month after Philips and Sony first proposed a compromise format, the SD Alliance spent seven hours locked in a smoke-filled room in Tokyo, and came out with a deal

On 15th September, a month after Philips and Sony first proposed a compromise format, the SD Alliance spent seven hours locked in a smoke-filled room in Tokyo, and came out with a deal: the resultant disc is a glue sandwich that can be read from one side. The error correction is 20-year-old Reed Solomon Product Code (RS-PC) and is similar to existing systems. No-one earns anything from this. But the modulation is EFM Plus. Sony and Philips have won some control and royalties. This is vitally important as the patents on ordinary CD run out at the end of the decade.

This is why the capacity of the new, agreed format (lets call it MMSD for convenience) is slightly reduced from 5Gb to 4.7Gb. But this is still 1Gb more than the figure which Philips and Sony had previously said was the practical maximum. The extra bit makes the disc less likely to skip, but soaks up the equivalent of nine minutes of movie time. Toshiba says that changing to EFM Plus will mean a chip redesign which sets the project back by three months. So MMSD will be ready for launch in September 1996, rather than June.

Philips believes that 3M's system of recording two tracks, at separate depths in the same pressing, is still an option. This is despite the fact that Panasonic came up with a way of putting a different recording on each of the two half thickness SD pressings and reading them from the same side.

'There may be logistic problems,' says Henk Bodt, Vice President of Philips Electronics, reminding that Toshiba's method involves gluing together two unmarked half-thickness discs, with a spacing accuracy measured in microns. 'The 3M process can be used with 0.6mm discs as well as 1.2mm discs.'

ANYONE WHO THINKS that Europe is now a federation of states, comparable to the US, should look at the mess over terrestrial digital-audio broadcasting.

The UK is introducing T-DAB services in a slice of VHF Band III at 217.5MHz–230MHz, previously used for Britain's old black-and-white 405-line TV transmissions. This band is still used on the European mainland for TV, so some countries (such as France) will start with T-DAB in the L-band, at 1,500MHz. And these frequencies are used in the UK for fixed telecommunication links, for instance between North Sea Oil gas rigs and platforms. The German army is still trying to decide whether it will give up its right to use the VHF slot for military radio or drive T-DAB up to the L Band. Whatever happens there is no hope for a single low-cost T-DAB receiver that works anywhere in Europe.

Pop groups that use low-power, radio-microphone links also know how Europe is far from a federation. Touring from one country to another, and staying legal, is a logistical nightmare. Ignoring the law is risky because it could mean seeing a concert banned by officious officials at a few hours' notice. The issue came to head recently with Rod Stewart's Spanner in the Works tour. The singer had a 14-piece band on stage, and a 22-piece orchestra, without a single wedge monitor on stage. Europe's radio regulations made it a logistical nightmare.

Rod Stewart is the first major artist to rely entirely on the in-ear monitoring system developed by Garwood Communications. Each system costs around £1,750 (UK) and is tailor-made –silicone rubber moulds are made from the musician's ears and these are used as flexible casings made of flesh-coloured Evoprene plastic, one covering each ear. Martin Noar, Technical Director of Garwood, says : 'Touring is an absolute nightmare. We have been waiting 18 months for a Pan-European standard, but there is still not even a date for one'.

The UK [government?] has allocated a band of UHF frequencies (854.9MHz–862.75MHz) for radio microphones. The Radiocommunications Agency has been flexible and considers in-ear loudspeakers to be microphones. In Austria, Switzerland and Germany the authorities check equipment and threaten to prosecute if it does not operate in the completely different band, 797MHz–811MHz. In France, Spain and Italy no-one is yet sure which frequencies are legal. Bands fear that it is only a question of time before a hot climate jobsworth pounces. In the US the allocated frequencies are different again, 516MHz–602.5MHz. No one receiver can tune over such a wide range of frequencies.

The Pan-European standard that everyone has been waiting for, is due has been waiting for ETSI, the European Telecommunications Standards Institute. This is a generic document on 'radio equipment and systems' which covers 'radio tour guides' as well as microphones. But Garwood could not afford to wait and has now built a modular system. Touring bands can change between three bands of 26 different frequencies by plugging different crystal oscillators into the transmitters and receivers.

'For a band on tour, playing different countries every night, the cost of staying legal is crippling,' says Noar. 'Rod Stewart is using at least 14 different systems on stage at the same time. They all need changing from city to city. Smaller bands cannot possibly afford to do this. They are being driven into breaking the law.'

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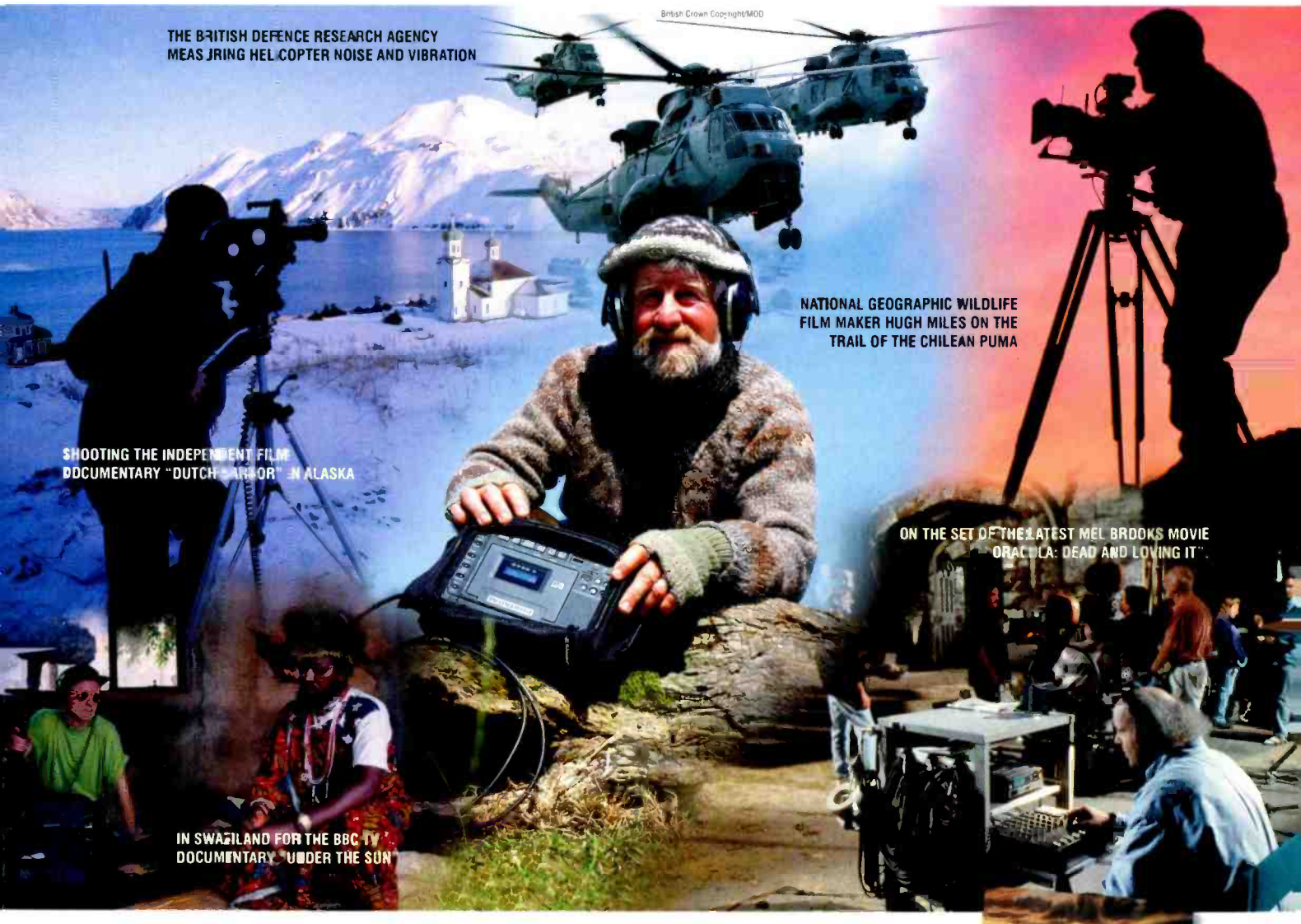

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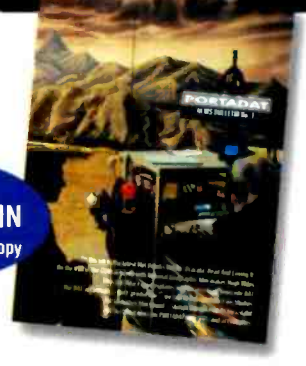

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Asia's interactive appeal

Modern communications systems are opening up opportunities *for new studios in* Asia writes **JIM JAMES**

The audio world is realigning itself after the gravitational shift from October's New York AES Convention to Tokyo's InterBee. Somewhere along the way, it's worth a moment in a transit lounge someplace, to reflect on the reasons why we migrate around the globe several times a year to shows. Surely in this era of high-definition digital images and telecommunications we should be able to access all the information we need from the comfort of our homes or studios.

'Interactivity' is now being redefined to describe new ways of relating to the machinery that we are creating, machines that attempt to go beyond simple replication of the naturally occurring, and offer on-line multimedia virtual-reality worlds. More than this, interactive technology is enabling us to communicate with people to whom we have never have had access before—the fact that we have more partners to interact with should offer (but does not guarantee) a greater potential for information sharing and creativity.

The first generation of digital processors shifted our paradigm in a similar way with a growth in new applications, and most importantly new freedoms. For musicians everywhere it was suddenly possible to break free of the constraints of costly studio time and the logistical nightmares of bringing together artists from around the world. The reduction in price, increasing functionality and reliability of MI gear and the sophistication of software made setting up a project studio anywhere in the world a viability.

Hopefully, as more music is made in Asia that attains international recognition, western artists will actually travel to the region to record here and experience the richness of the cultures and share their skills with musicians

For freelance music producers operating in Asia, there are slightly different constraints than in America or Europe, and it is here that the impact of the new generation of digital technology, especially the telecommunications-based applications, will probably be greatest. In a region characterised by the absence of a well-developed pool of talented instrument players, large distances between recording markets and a smaller number of big budget productions than elsewhere in the world, the ISDN breakthrough will make connecting to the outside music world, and all that it contains, significantly easier.

MIDI, THE MAC POWERBOOK and storage of masses of audio samples in a way created the freelance market, because the requirement for session musicians was all but dead. With a flightcased project studio, freelance composers or producers could move between production houses or project suites in Hong Kong, Kuala Lumpur and so on, trading their creative services as the 21st Century one-man electronic band.

For the 160 or so established studios in Asia, large amounts of electronics are being used on a relatively small stock of highly promoted artists. Made-in-Asia music accounts for over 60% of all record sales, but the studios produce music which tends to follow an established formula and offers a consistent sound signature based on the standard makes of synthesisers and third-party materials such as Sounds-and-Groves.

Just as the first generation of products heralded a new era, ISDN offers a technological solution to what could be considered an undersupply of creative diversity in Asia. As manufacturers like Dolby and CCS are keen to demonstrate, producers and composers can download audio files from a central server or connect in real time to artists or music samples anywhere in the world.

In a region where travel is still time consuming, time zones frustrating, and creative resources not readily available, ISDN connections are more than simply a convenient tool for finishing a project or sparing an artist a flight, they are increasingly a technological gateway to a whole range of creative possibilities.

The main cause of excitement is the prospect of the digital corridors which can lead to rooms of infinite size, number and creativity and it will no longer matter where studios or artists are. Assuming they have compatible equipment, it is possible to have a session which is the result of a limitless number of artists, co-ordinated by the producer at the centre of the web, forming truly world music, not just in terms of content but also creation.

FOR THE NEW breed of world-class music recording facilities being built in Asia this is good news. Having interactive technologies will certainly make it easier for them to attract local record companies, and offers great potential for the record companies throughout the world who manage artists both within and outside Asia.

Presently, this is almost exclusively the realm of a few far-sighted individuals—such as Peter Gabriel and those who run the World Music recording labels. Physical distance is the only remaining barrier to the open mind. To date, only Gabriel's Real World Recording Week (*Studio Sound*, October 1995) and the reel of 2-inch tape sent around the world by Kevin Godley and Rupert Hine have offered any practical working solutions.

Hopefully, as more music is made in Asia that attains international recognition, western artists will actually travel to the region to record here and experience the richness of the cultures, and share their skills with musicians here. A combination of these new influences and record company requirement for new music styles will stimulate a new genre as the Latin American influence did in the early 1990s.

For the people working in Asia, as elsewhere, interactivity is a crucial part of making and listening to music. Technological advances are giving people more choice about where they work, who they work with and how it sounds, but this is still not a substitute for actually getting together and watching, hearing, and sensing how someone reacts to a product, idea or event. This must partly explain why the audio fraternity continues the pilgrimage to the ultimate interactive experience, the trade show.

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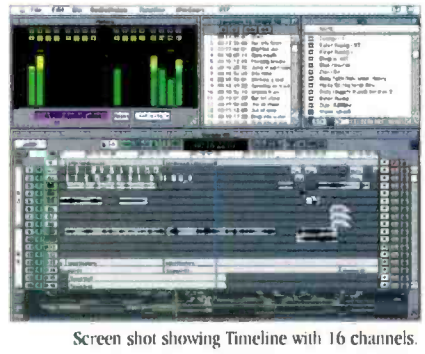

Screen shot showing Timeline with 16 channels.

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№ 16

Solid State Logic

ALSO INSIDE

Axiom Installations at BBC, London ABC TV, NY Radio France, Paris

Audio Preparation Station for Axiom

Hollywood Debut for Axiom Film Dubbing System

Scenaria For New Post Facility in Singapore

SL 8000 In French Mobile

SL 9000 Sales Take Off

Consoles Installed at Major Studios Worldwide

BBC's Axiom-Equipped Mobile at First Night of Proms

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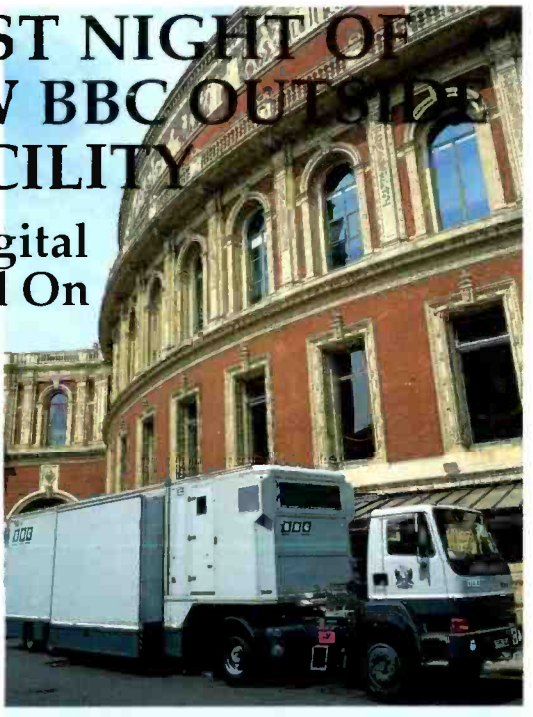
SUCCESS AT FIRST NIGHT OF PROMS FOR NEW BBC OUTSIDE BROADCAST FACILITY

SSL Axiom-equipped Digital Sound Vehicle Impressed On "Monumental" Mahler Symphony



BBC Outside Broadcasts' new Axiom-equipped Digital Sound vehicle outside London's Royal Albert Hall. The vehicle has been used for on-air broadcast of the 100th anniversary series of the prestigious Promenade Concerts

BBC Outside Broadcasts' new **Digital Sound Vehicle (DSV)**, equipped with a Solid State Logic Axiom digital console, was in operation for the first time at the prestigious first night of the world-renowned Promenade Series of Concerts, which celebrates its centenary this year.

The first night concert, broadcast live on BBC Radio 3 from London's Royal Albert Hall, featured a performance of Mahler's Symphony No. 8 'Symphony of a Thousand' by the BBC Symphony Orchestra, together with the Philharmonia Chorus, the CBSO Chorus, choristers from St. Paul's Cathedral, Westminster Abbey and Westminster Cathedral, plus eight leading singers. The performance was conducted by Andrew Davis.

The DSV features a 48-channel Axiom and 48-track DiskTrack™. The Axiom has 108 remote mic amplifiers, MADI interface and a removable wing to enable the sides of the OB vehicle to be retracted for transit.

The Axiom was operated during the first-night performance by Keith Wilson, Senior Studio Manager for BBC Radio Production Resources. Keith has 30 years experience with Radio 3 and has worked on the Proms Concerts for the last 20 years. "Everything behaved as it should on the night," he said afterwards. "It doesn't matter how clever a console is if it doesn't sound good, and the Axiom sounds very good, particularly at the bottom end of the frequency spectrum. The bass is very clean and there is zero sound degradation.

"Mahler's 8th is a monumental work and the flexibility of the Axiom digital console is well suited to a large scale production like this." Keith Wilson continues. "It was also useful to be able to call up input sources simply by allocating a source to a channel with a single button push, and without having to plug up a patchbay. The possibility of knocking an adjacent jack and causing nasty crackles on-air is just not there."

Paul Newis, also of Radio Production Resources adds: "Total Reset on the Axiom is a useful device for these types of classical productions, particularly opera where you have to make fast changes between Acts."

Operator Philip Burnell 'driving' the Axiom console in BBC Outside Broadcasts' new Digital Sound Vehicle during broadcast of the Promenade Concerts

Other Axiom Installations

ABC TV – New York

Leading US television network ABC has installed a specially configured Axiom with 24 mono and 24 stereo channels, together with a 48-track DiskTrack™ recorder/editor.

"The Axiom is located in an entirely new digital control room, TV7, at our production headquarters on West 66th Street in Manhattan," says David Linick, Project Manager for TV7. "We will be using the console on the production of a variety of programming. TV7 is an independent control room and will be used for *Good Morning America* and magazine shows such as *20/20*, *Prime Time* and *Day One* in addition to special news events."

Radio France – Paris

The French state-owned radio broadcasting company, Radio France, has ordered what is probably the world's largest digital console, a 96-channel Axiom Digital Production System.

The desk will initially be installed in Radio France's Studio 120 for training. The station's Studio 103, which is being totally refurbished, will, however, be the final home for the Axiom. Installation here is planned by the end of the year, with the studio scheduled to be on-air by February 1996.

Jean-Louis Blanc, Project Manager at Radio France, says: "When we were planning the refurbishment of Studio 103 we wanted an automated console, and we were also looking at the possible installation of a digital console. Axiom was a complete answer to our needs with its integral DiskTrack™, and its open and flexible architecture. Also, it is affordable and SSL has a very good reputation with our operators."

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Solid State Logic

SL 9000 Users Talk

Allen Sides, Ocean Way, Hollywood: "In my opinion, without reservation, the SL 9000 is the best modern console I have heard to date."

Simon Andrews, Right Track Recording, New York City: "This desk will revolutionise the recording of pop and rock music."

Frank Filipetti, producer/engineer (seated above): "The J Series console blew away all of my assumptions about the longevity of analogue – it is functionally, ergonomically and sonically superior to any other console available today. "

Rick Stevens, Record Plant, Hollywood: "The technology that is represented by the new SL 9000 J Series represents huge possibilities in terms of functionality, yet does not require a huge learning curve."

Glenn Meadows, Masterfonics, Nashville: "The SL 9000's outstanding sound quality, expanded features and functions make it ideal for the critical listening environment of The Tracking Room."

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

Roland Guillotel, Studio Guillaume Tell, Paris: "The SL 9000 J Series provides our clients with excellent sonic quality and impressive automation features, yet is familiar to most users."

SL 9000 J SERIES SALES TAKE OFF

SL 9000 J Series Total Studio System installed at Studio Guillaume Tell, Paris

Since its introduction at the San Francisco AES Convention last October, demand for the new SL 9000 J Series Total Studio System has been considerable, with sales to studios in the USA, Europe and the Pacific Rim.

Ocean Way Recording, Los Angeles, USA
This world-renowned music recording facility based in Los Angeles, has recently installed an SL 9080 J Series console in its Studio B. A 100-channel SL 8000 G Plus desk - the largest music console ever built - is housed in Studio A of the company's Sherman Oaks facility, Record One.

Record Plant, Hollywood, USA
The world-famous Record Plant has recently expanded with the construction of two new studio bau:ton-designed rooms. An 80-channel SL 9000 J Series console with 48-track DiskTrack™ Digital Multitrack Recorder/Editor is installed in one of the new rooms, while the other is home to an 80-channel SL 4000 G Plus with Ultimation.

Right Track Recording, New York City, USA
A 96-input SL 9000 J Series console with 48-track DiskTrack™ is installed in Right Track's Studio A, the facility's main multi-purpose recording suite.

Starstruck Studios, Nashville, USA
This new, state-of-the art studio is owned by Country star Reba McEntire and her husband/manager Narvel Blackstock. They have ordered two 72-channel SL 9000 J Series consoles, both with 48-track DiskTracks, for the studio complex.

Masterfonics, Nashville, USA
An SL 9080 J Series is to be installed in a new 8,500 square foot building, The Tracking Room, to open at Masterfonics in October. This new desk complements the studio's two other SL 4000 consoles in the Mix Room and Track 6.

Wisseloord Studios, Hilversum, Netherlands
This famous Dutch studio complex was the first European studio to order an SL 9000 J Series. Its 72-channel console replaces one of three existing SSL consoles in a major upgrading of Wisseloord's main control room.

Studio Guillaume Tell, Paris, France
This famous French facility now features an 80-channel SL 9000 J Series in its Studio A, complementing the 64-channel SL 4000 G Series in Studio B.

Onkio Haus, Tokyo, Japan
This studio, which is coincidentally the purchaser of the very first SSL console to be installed in Japan, has installed a 64-channel SL 9000 J Series system with DiskTrack™. This is the ninth SSL console purchased by Onkio Haus.

Nippon Columbia, Tokyo, Japan
A 64-channel SL 9000 J Series has been installed at these world-famous recording studios, adding to their existing four SSL consoles. The facility has since ordered a further two SL 9000 J Series.

Platinum Studios, Taipei, Taiwan
Platinum is one of the most successful studios in the region and has four SSL-equipped rooms. It is continuing its expansion by installing an SL 9000 J Series console and DiskTrack™ in a brand new studio facility.

SynchroSound Studio, Kuala Lumpur, Malaysia
An 80-channel SL 9000 has been ordered for the main mixing room of this world-class recording complex. It joins an SL 4072 G Plus console currently being installed at the facility.

In addition, SL 9000 consoles have also been ordered for the private studios of **Whitney Houston** and producer **Mutt Lange**.

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Solid State Logic

HOLLYWOOD DEBUT FOR AXIOM FILM DUBBING SYSTEM

Industry Presentations Held at Todd-AO/Glen Glenn Studios

The new **Axiom Digital Film Dubbing System** was presented to Hollywood's film community at a series of demonstrations held at Todd-AO/Glen Glenn studios.

The Axiom Film Dubbing System is a fully configured, digital dubbing console suitable for work in all surround sound formats, Dolby™ Stereo, and Stereo. Other features include:

- Dynamic automation of surround panning on all channels. Pan automation can be written with pan pot, joysticks or pen interface
- Fully digital, fully automated and resetable

Entirely digital signal path with precise reset and automation capabilities

- Flexible routing across four 8-track stem mixes

Versatile mix stem operation complements simultaneous master outputs

- 128 hard disk audio tracks

SSL's DiskTrack™ provides 128 concurrent access record/edit tracks

- Integral machine control

Four Sony 9-pin ports provide direct control of film chain, VTR/ATR, DA-88, DAT etc.

- One, two and three-man configurations
- Console/editor networking

The first Axiom Film Dubbing System has been purchased by Paris-based **Dovidis**, which has ordered a 48-channel console (24 mono and 24 stereo channels) complete with a range of specific, film-related hardware panels.

AUDIO PREPARATION STATION

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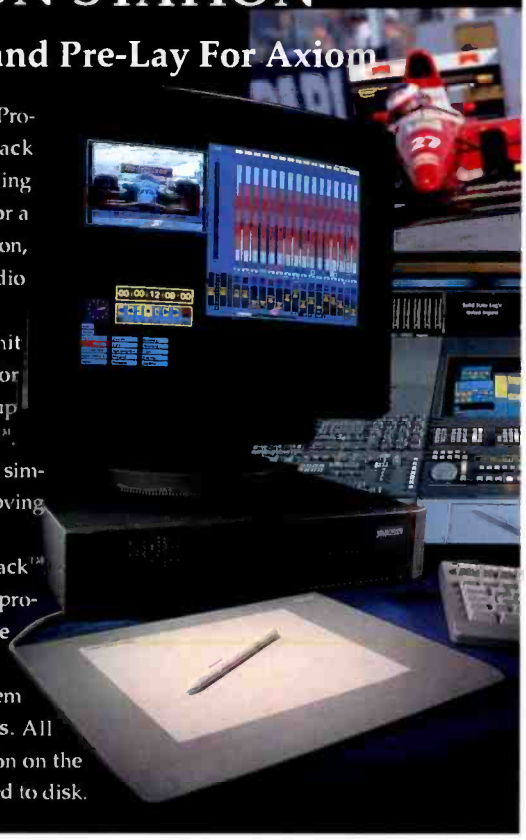

One of the many advantages of SSL's Axiom Digital Production System is its in-built hard disk multitrack recorder and editor, DiskTrack™. While this full-scale recording and mixing capability is central to the appeal of Axiom, for a number of applications, such as video and film post-production, there is the additional need to record, edit and pre-lay audio independently of the mixing process.

The **Axiom Preparation Station (APS)** is a desktop unit which provides shared access to Axiom's DiskTrack™ for recording, editing and pre-lay. The APS system may select up to 24 tracks from the maximum 128 available with DiskTrack™. The remaining tracks continue to be available to Axiom. In a similar way, the APS system shares Axiom's I/O resources, removing the need for expensive duplication of inputs and outputs.

The addition of the APS unit as an extension to DiskTrack™ frees Axiom for large scale mixing projects, while allowing programme preparation to be conducted in a cost-effective manner through shared resources.

In addition to recording and editing audio, the APS system provides a number of sophisticated automation moces. All automation is preserved in a project file for later restoration on the Axiom console. A video guide picture may also be recorded to disk.

Merging Music & Mixing

Making television audio sing is no easy task, whether you're a musician/composer or an audio post production pro. **John Cook**, (pictured below) audio director at renowned Hollywood Digital, has the distinction of being both.

"I was an electronic music composer before I started all this," says the man who posts the audio for programmes like *The Larry Sanders Show*, MTV's *Naked Cafe*, *News Radio* and *The Jeff Foxworthy Show* in Hollywood Digital's Studio One.

Cook's initiation to the world of high-end audio post took place at the control panel of Hollywood Digital's OmniMix digital audio/video production system.

"I use it from start to finish in the post process," Cook says. "First I'll record the voiceover and load other audio elements into ScreenSound. Then I turn to OmniMix to mix. If a dialog edit was missed, I'll just pull up the waveform and make an edit right there. Finally, I stream the DME&L (dialog, music, effects and laugh) tracks off to 2-inch analogue 24-track tape, and shuttle the final mix to D-2.

"Particularly useful is how the OmniMix saves automation settings, fader moves, bus structure setups and input sources, along with other vital information, in memory. If you need to make a change later, it only takes about two minutes to recall settings.

"The point, after all, is to make every program sound better than its competition, be it long-form television or spots for clients like Budweiser, Nike and Volvo.

"OmniMix serves up some powerful tools to help make the audio as dramatic as it can be. The MotionTracking feature is very powerful. It lets you draw the motion of the sound with a tablet and pen. You just draw where you want it to go, and you can even reference it to specific timecode locations."

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Solid State Logic

S. Africa Adds SSL

Since the first sale of a ScreenSound to the **South African Broadcasting Corporation** in 1992, SSL digital systems have become increasingly popular with the country's post-production community.

Henley Television Facilities, a Business Unit of the SABC, is currently installing a Scenaria in its Audio Final Mix facilities, as well as equipping two analogue studios with a ScreenSound each.

Geoff Lowe, Audio Post-Production Manager said: "SSL's digital products provide the necessary increase in speed and flexibility of operation, coupled with the reliability we expect from SSL."

The Video Lab Group is the largest facilities group in South Africa, with audio and video operations in both Cape Town and Johannesburg. A recently installed Scenaria has expanded its audio facilities.

Scenaria is installed at **The Audio Lab** in Johannesburg, replacing the existing analogue 24-track equipment, and catering mainly for the high end commercials market. Two ScreenSounds are also installed in separate recording, editing and mixing suites and are connected (via SoundNet) to the Scenaria.

JukeBox Jungle. This audio post-production services company, run by ex-Video Lab employees, Clive Richardson and Georges Christofides is equipped with ScreenSound and SoundNet. "When planning our own facility there was only one choice – ScreenSound." says Richardson.

Soundnet CC. Hennie Britton, owner of Soundnet CC, used to work for a facilities house that worked in the old way, with flatbeds and mag dubbers, yet he specified ScreenSound when setting up his own audio post-production facility. "I am not computer-literate and all my skill and knowledge is based in sound editing for movies. I therefore wanted a system that enabled me to work in the ways that I know. ScreenSound was the obvious choice." he explains.

FOURTH SCREENSOUND FOR ASPECT RATIO, HOLLYWOOD

"ScreenSound Helps Us Make Unrealistic Deadlines Realistic"

Hollywood's **Aspect Ratio**, a full-service post-production facility creating trailers and TV spots for feature films, recently took delivery of its fourth ScreenSound and upgraded its first three systems to V3 status.

"We added a fourth system because of our constantly increasing workload," explains supervising sound editor David Yablon. "We need a fast, reliable, easy-to-use system that does what we want, when we want it. ScreenSound helps us make unrealistic deadlines realistic!

"In our business, tight deadlines, combined with last minute edits are inevitable, and this is where ScreenSound V5 really comes into play. For example if the producer wants to tweak a particular clip once a trailer or TV spot has been cut, ScreenSound V5's edit peel function and speed increase allows me to make the change with no headaches whatsoever."

Recent projects at Aspect Ratio include trailers and spots for movies such as *Forrest Gump, Jury Duty, Bad Boys, Tommy Boy, The Brady Bunch, Waterworld* and *Crimson Tide.*

SCREENSOUND FOR TITAN SPORTS

"Allows Us To Be More Efficient"

Titan Sports, parent company of the World Wrestling Federation, has installed a ScreenSound digital audio editor in its post-production centre, **Titan Television**.

"Having been an all-analogue facility for many years, we decided that it was about time we brought our technological capabilities into the '90s." explains Larry Rosen, Senior Audio Producer at Titan Sports. "I was already familiar with ScreenSound and what it could do, and realised that it was just what we needed to help lighten our workload."

The World Wrestling Federation Television Network is one of the largest of its kind in the world, with over 200 affiliated broadcast TV stations in the US and distribution in more than 70 other countries in eight languages.

In the United States, the WWF syndicates three weekly one-hour television programmes – *WWF Superstars, WWF Challenge* and *WWF Spotlight*. It has also been a powerhouse in the basic cable programming arena for more than a decade, producing three weekly one-hour programmes exclusively for USA Network.

"I'm currently working on a special for USA Network entitled *Sunday Night Slam*," continues Rosen. "I load in and store two-hour effects loops on ScreenSound, which means I can sweeten the matches in real time. I don't have to re-cue sound reels or search for effects – everything is right at my fingertips. This cuts down on my sweetening time, allowing us to be more efficient."

ScreenSound was used to produce all the promos, commercials and pre-taped segments for the *11th Annual WrestleMania.*

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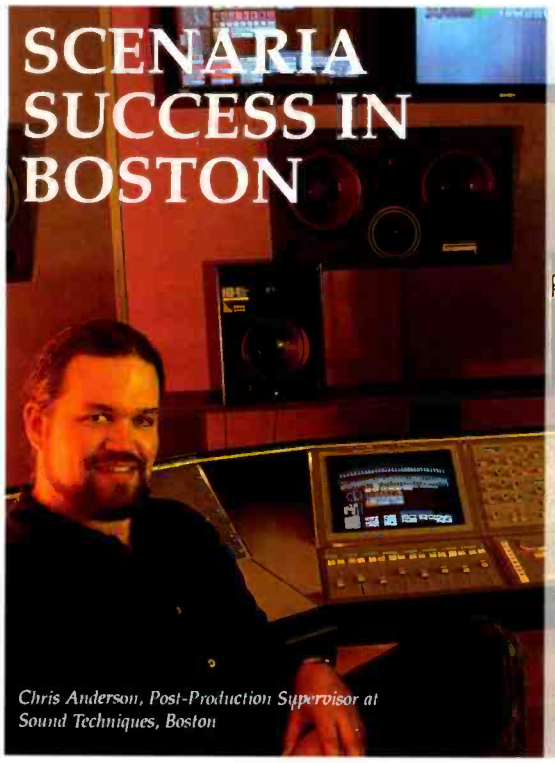
SCENARIA SUCCESS IN BOSTON



Chris Anderson, Post-Production Supervisor at Sound Techniques, Boston

Boston, Massachusetts-based **Sound Techniques** is a serious SSL facility with a Scenaria, two ScreenSounds and an SL 4056 G Series console included in its formidable equipment inventory.

With a work programme that ranges from TV promos and show openers, through video programmes to ADR on feature films, Sound Techniques needs to offer its clients a quick turnround.

Scenaria's non-linear video playback and digital audio are two of the features cited by Sound Techniques which help them achieve that goal. "You can mix 38 channels of audio with Scenaria," says Lance Duncan, President. "Plus, it has signal processing and is an integrated audio/video system. It's so much easier than a component system because everything is instantly resetable. Scenaria's speed makes a great deal of difference because it enables the mixing process to be much faster."

Post-production supervisor/engineer Chris Anderson agrees: "The cost of building a comparable system with individual components would easily be much higher, but not as fully integrated as Scenaria. The system's dynamics, total resetability and flexibility make it ideal for us and our clients."

"Enables The Mixing Process To Be Much Faster."

Ready for Wide Screen TV with SSL

Maryland Public Television, the fourth largest producer of national and international programs for the Public Broadcast System (PBS), has recently taken delivery of its first Scenaria digital audio/video post-production system.

"We are making a large investment for the future of digital television, and Scenaria was the first piece of equipment that we purchased as part of this plan," explains Vice President of Operations Tom Bohn. "Forward compatibility is important, and Scenaria will fit into all of our plans because it can work in either a 4 x 3 or a 16 x 9 format."

The facility handles a wide variety of programming for PBS, including *Wall Street Week*, *To The Contrary*, *Motor Week*, and specials including *After the Warming*, *Legacy of Civilization*, *Sea Power*, *Cooking in France*, and *The Baltimore Symphony Orchestra in Japan*.

"I particularly like Scenaria's ability to mix and edit simultaneously," says post-production supervisor Don Barto. "In the past, making all of the necessary changes and revisions to a project was extremely time consuming, but now I can try all of the options that are available to me at the touch of a button."

The 26-acre complex currently consists of three production studios, three on-line edit suites, five off-line edit suites, and two audio post rooms. A 16 x 9 edit suite is now on-line, while four of the facility's six transmitters will have dual broadcast capabilities by the end of the year.

"Reliability is something of great importance to us," says Barto. "We broadcast seven days a week, and our equipment is in constant use. As a result, downtime is something that we simply cannot afford."

"Yes," continues Bohn. "Maryland Public Television has always been at the forefront of technology innovation, and Scenaria will help us remain as one of the leaders of the pack."

MAJOR ASIAN POST FACILITY CHOOSES SSL DIGITAL

Scenaria Specified For Singapore's First All-Digital Facility

A new all-digital production, post-production and network operations facility owned and operated by **Four Media Productions Asia** recently went on-line in Singapore. The studio's facilities are centred around a Scenaria digital audio/video production system.

"This is our first major investment in non-linear audio post-production," says John Wigglesworth, Director of Production and Post-Production for 4MC Asia. "We were faced with some very difficult decisions matching our operational requirements with the variety of systems available and their differing functionality, reliability and support, but we are very happy with our choice of Scenaria.

"The system integration between the editing, mixing and picture is seamless. Our clients can achieve more in one session and our operators have a flexible system which they can push to the limits, both creatively and artistically."

4MC (Asia), a new subsidiary of the USA-based Four Media Company, is targeting the many satellite and cable programmers currently entering the Asian market, as well as the increasing number of international companies distributing their products in China, India and the rest of the region.

James Conlon, 4MC's Director of International Operations says: "We have built a state-of-the-art operation here. We provide virtually every service that a producer or programmer needs to complete or convert their work for the Asian market."

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SL 8000 For Sports Broadcasting

Turner Broadcasting's Production division has added a new SL 8048 GB console to its Control A room. The on-air production console will be the centrepiece of the studio's revamp-ed audio wing, and will handle the network's live studio sports.

"We went through an exhaustive search for a console," says audio production manager Rob Mason, "We looked at a lot of digital consoles and weren't happy with them for the live productions we do. We knew that the SL 8000 GB was going to be reliable and have enough outputs."

Mason, along with a staff of 15 audio operators, will use the console for live studio sports wraparounds and fill.

While the SL 8000 GB is specifically designed to provide a high level of functionality in on-air production, its unique, switchable modes of operation for Broadcast, Record and Remix extend the range of the console to make it exceptionally versatile in any broadcast production environment. However, for Turner, "Nothing's as important as flexibility," says Mason. "There are a large number of input faders in front of the operator, as opposed to many other units that only have a limited number. With this new unit, we'll be able to provide more to the home audience as far as game feeds and the like. That's the bottom line."

G Plus Consoles for German Studios

Two world-class music recording studios have recently installed G Plus consoles.

Studio 33, Hamburg

This 10-year old facility has refurbished its Studio 1 control room and installed a 64-channel SL 4000 G Plus (pictured above). Studio Manager, Ambrogio Crotti says, "We chose the G Plus for its sound quality and also because the SSL name is a worldwide standard for engineers and producers."

Nucleus Tonstudio, Berlin

This brand new studio features a 56-input SL 4000 G Plus.

LA RECORDING WORKSHOP EXPANDS WITH SSL

"SSL Consoles Are The Best Tools For The Job"

Los Angeles Recording Workshop, one of California's premier music colleges offering courses in audio engineering and video editing has installed a SL 4048 G Plus console with Ultimation™ and Total Recall™ as part of a major expansion programme.

The 10-year old facility has relocated to new, state-of-the-art premises in North Hollywood covering 12,000 square feet and which includes eleven studios.

The G Plus console is installed in Studio A, a brand new room designed by studio bau:ton.

"We constantly revise our curriculum so that it is up to date with the ever-changing requirements of the industry. Our new G Plus will keep us on that cutting edge," explains Workshop Director, Chris Knight. "This is a very exciting time for us. I've been an audio engineer for more than 18 years, and SSL consoles are known throughout the industry as the best tools for the job. Our students can now become familiar with the equipment and standards they are likely to come across in top-notch studios around the world, having received their training on the G Plus here."

FIRST SL 8000 IN MOBILE

Provides Surround Sound Audio for French TV OBs

Alain David (left) head of SSL France, with Jean-Louis Nathan of VCF (centre) and Jean-Claude Guillame of Slade during acceptance testing at SSL's Oxford headquarters of the SL 8000 destined for the Polyson mobile

The first SL 8000 Multi-Format Production console to be installed in France is included in a new mobile facility, known as **Polyson.**

Owned by **Slade**, one of France's leading PA/Sound reinforcement companies, Polyson is operated by **VCF (Video Communication France)**. This is also the world's first mobile to be equipped with an SL 8000 console.

VCF produces and broadcasts a number of channels on cable and satellite, including Canal Horizon, TV Sports and Cine Classics (broadcast on the Astra satellite to Spain). It is currently one of only two companies in France that are able to cover large sporting events such as the *Tour de France* cycle race, *Le Mans 24 Hour* motor race, the *French Formula One Grand Prix* and the *Lancôme Trophy* golf classic. VCF also supplies programmes to the main French broadcasters, including TF1, France 2, France 3 and Canal Plus.

The custom-built 48-channel SL 8000 is effectively two desks in one. This allows independent Dolby™ Surround Sound mixing for live broadcast of events, with commentary in two different languages mixed with ambient sound feeds.

Jean-Louis Nathan, Head of Audio at VCF, explains the reasons for specifying the SL 8000: "The high quality of the audio path, dynamics in every channel, multitrack routing, and the superb ergonomics that allow ease of use in a mobile environment were major considerations," he says. "But most important is the functionality of the console, which allows direct mixing in Dolby Surround, and the fact that SSL could configure the console to provide two independent Dolby Surround mixes."

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SSL STRESSES CUSTOMER SUPPORT

Product Support Director Appointed

John Nemeth has been promoted to the board of Solid State Logic with the title of **Product Support Director.**

John who was previously Product Support Manager, was recruited with the specific brief to set up the Product Support Department. He has built up a well-respected team that is responsible for Product Training, Product Documentation and Demonstrations, plus Technical and Operational Support for the complete SSL product range. They also offer in-depth product back-up to the SSL salesforce, and maintain a very close relationship with all customers throughout their ownership of SSL products. They are also responsible for all software updates in the field.

"I see my appointment to the board as a recognition of all the hard work that the Product Support Team has put in," says John Nemeth. "It is also shows that SSL continues to take its responsibilities to its customers very seriously indeed. We will always keep them in touch with latest product developments to enable them to upgrade easily as their business expands or changes in order to meet new demands."

NEW DISTRIBUTORS APPOINTED

Serving Expanded Markets in Europe and Asia

New SSL Distributors have been appointed to cover Germany, Hong Kong and the People's Republic of China.

Audio Export GmbH, based in Heilbronn, has been appointed the sole SSL agent for **Germany**. Audio Export is a joint concern between partners Volker Siegmann and Willy Günther.

Willy Günther has represented Solid State Logic in Switzerland for over seven years. "We are already very familiar with SSL and its products," he explains, "and have had considerable success with them in Switzerland. We now look forward to extending our working relationship with SSL through Audio Export, to provide a high level of support to facilities across Germany."

Volker Siegmann says, "SSL has a reputation for making powerful audio production systems of the highest quality. This is exactly the kind of product which German clients most admire. I look forward to introducing the Axiom and the SL 9000 to facilities in Germany. There is already a high level of interest."

Volker Seigmann and Willi Günther, partners in Audio Export GmbH, the new SSL Distributor for Germany

Digital Media Technology Co. Ltd is the new SSL Distributor for **Hong Kong**, while sister company, **Medialand** assumes responsibility for SSL sales into mainland **China.** Clement Choi is the contact at both companies.

From the Desk Of... Mick Guzauski

"I'm very comfortable when mixing on SSL consoles - few others have all the facilities that I need, such as total number of channels, useful automation, flexibility of EQs, and dynamic section. The company has most definitely increased its commitment to sonic excellence over the years.

"Sonically, the new SL 9000 J Series console is in a class by itself - I've never heard anything that comes close to it. It is the first large format analogue console I've ever heard that has such a low noise floor and such a level of sonic transparency. Its low distortion, wide frequency range, and low phase shift provides amazing sonic integrity.

"One of the nicest operational features about the SL 9000 is the integral hard disk recorders. When I recently used the new SL 9000 J Series console at Record Plant in Hollywood, I dumped the multitrack to the hard disk recorder in the SSL and had instant access to every cue point. I could instantly locate to any part of the song, and there was no waiting for the tape machine.

"I also like the new automation system. It is smooth and accurate, it is there to help you and doesn't confine you to working the way the automation wants you to work. I could turn the automation up at any point and didn't have to worry about it. In addition, I was able to see if all the modules were full and could switch effects without having to go to other modules."

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SA&V Octavia

SADiE is a tough act to follow but SA&V is playing a strong card in its Octavia nonlinear modular multitrack system. BBC Engineer and SADiE user ROB TAYLORSON puts it throught its paces

AS A LONG-TIME SADiE user, news of Studio Audio & Video's Octavia nonlinear, modular, multitrack system prompted me to wonder where the company sees my much loved SADiE fitting into the new order. Having done my homework, I can assure all SADiE users that the next software release (SADiE 3) works impressively across both SADiE and the new Octavia hardware platform.

The input-output facilities and DSP power that Octavia offers show where the system is bound: audio-for-video and film-and-music multitracking. SA&V has obviously designed Octavia with the long term in mind. The DSP power provided (quoted at 133MFlops per unit) together with the ability to link units together (up to ten Octavia units can be chained at 1.3GFlops of processing power), mean that the facilities provided in the software can be increased over time without being limited by the hardware.

Octavia's hardware is contained in a sturdy metal case separate to the PC giving it a more robust feel than add-on cards. The only connection to the PC is a high-speed serial link to an internal card. There are eight analogue I-Os and eight digital I-Os as well as connectors for locking an Octavia to any standard reference signal such as time code, AES clock or MIDI time code.

Easy interface: Octavia screen detail

Some of the hardware features are class-leading. The tentacle bus is Octavia's digital highway and can provide up to 280 channels of audio transfer between Octavia units. Audio is passed through the tentacle in native 32-bit floating-point format. The tentacle can be used as a multi-purpose audio router between Octavia units. In this way, a track recorded on a disk connected to Unit 1 could be processed in Unit 2 and played out of Output 23 (on Unit 3), or tracks from various units can be bounced or effected together before being output. The tentacle also allows larger installations to share processing power between units for most efficient usage of the available DSP resources.

The basis of Octavia is the SADiE 3 software which is used on both hardware platforms; the only difference is in the number of available inputs and outputs and the relative DSP power of the new system. The other important difference between SADiE and Octavia is that Octavia analogue conversion is to 20-bit resolution. You can mix 10-bit, 16-bit and 24-bit digital audio on the SCSI (SCSI2 fast and wide) disks and when a project is finished the final audio can be mastered at any resolution up to 24-bit.

But where SA&V has really scored is in the total compatibility of its two workstations. Take a removable disk from SADiE, plug it into Octavia and then carry on. The systems should work perfectly for digital dubbing. Tracklaying M&E can be done on SADiE and dubbing on Octavia.

SADIE 3 is currently undergoing beta testing and will be released free of charge to all SADiE customers soon. The

HARDWARE CONTROLLERS

THERE ARE TWO new hardware controllers which can be used with both SADiE and Octavia hardware. The main control panel provides a scrub wheel, transport controls and a range of other keys duplicating all the main mouse-accessible features on the screen. One of the few limitations I had found using SADiE was editing classical music; scrubbing a section of audio with very few transients can sometimes prove difficult when using a mouse. Scrubbing with the control panel is a dream and equally as responsive as any of its main competitors.

The second control panel contains eight moving faders and six shaft encoders which can be used to control EQ and other parameters. The fader panels can be chained in a group of four if need be.

HAVING USED SADIE for around three years now, it is remarkable how much the software has developed in this time. The balancing act of adding new features and functionality to a system while still maintaining an uncluttered screen and ease of use has been performed well by Studio Audio. The progression from v.2 to SADiE 3 has taken the software much further down the road of a self-contained 'studio in a box'.

There are also plans for tie-ins with some of the major MIDI-sequencing software programs. I can see the multiple I-O capabilities of Octavia finding a home in postpro studios or other audio situations requiring a large number of individual outputs while the new software also means a host of new features for existing SADiE users.

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software has been completely rewritten in an object-orientated language. To you and me this means that among other features 'drag and drop' has appeared as well as the prospect of easier addition of facilities and software add ons.

For current SADiE users, the look and feel of the program will be familiar, although there is a wealth of new features and developments from v.2. I found that, after about two hours of use, I felt at home with the system.

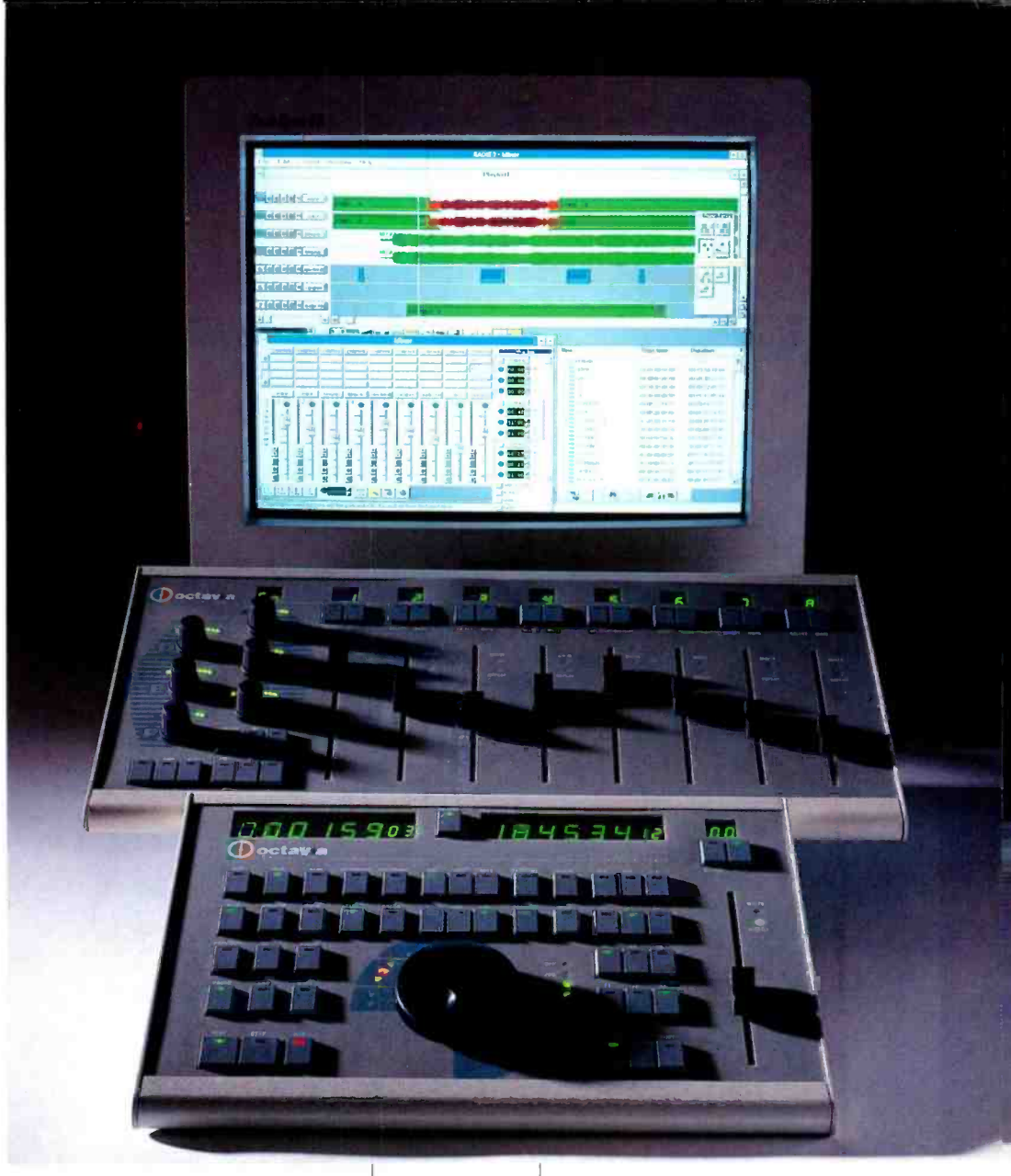
The first obvious enhancement to the software is the new Playlist window which includes the option of viewing the clips in the EDL as waveform profiles. It also includes the facility to edit clips and trim edits without leaving the playlist. Fade lengths are displayed clearly as overlays on the clips and you can choose to scrub as many, or as few, streams as required whilst editing in the playlist. As well as being able to run multiple EDLs simultaneously it is possible to have two playlist windows showing the same EDL. The benefit of this becomes apparent when viewing the same EDL from two different zoom levels—one window showing a close-up view of an EDL and the other showing the entire programme. Clips in the EDL can be grouped together and moved as one block, this grouping remains set until you ungroup them.

A future feature that will cheer me up enormously is that clips can be moved (or gaps in an EDL closed!) while playing. For those of us who have been one minute from the end of a 2-hour playout only to find an unwanted gap before the final clip, the facility to close the gap without stopping will be most welcome.

The Edit window has gone and its useful features have been incorporated into the Trim window, which can now have as many clips loaded as required. When timing complex music fades around speech this proves very useful rather than having to constantly refer to the playlist to audition the result.

I have to admit to being impressed that you can not only scrub audio in the playlist but also scrub all the streams at the same time while reading automation data. Automation is now event based, allowing you to move clips about without ruining a mix. The moving faders on the second, optional, hardware control panel complement the new automation system which is better integrated into the editing process. All mixer elements can be automated such as EQ, panning and aux sends.

There has also been a degree of consolidation in the software. Features such as autoplace and autoshift (for moving and placing groups of clips in the playlist) have been reorganised into one new toolbar. This toolbar is accessed from an icon in the playlist window and provides all the various tools required to move clips around the playlist from one easy menu.



By rewriting the software, SA&V has managed to wring far more DSP power from its cards—both the original XS card and the new Octavia cards. This has brought more playlist streams and more real-time DSP processes, such as EQ and dynamic compression. Other new features in the Playlist include the overlaying of automation data on clips which can be graphically edited. Text comments can also be attached to the clips and then used as search fields when trying to find specific audio material on networked SADiEs. With Octavia you can use almost unlimited streams (virtual tracks) which you then route to the outside world through the Octavia on-screen mixer.

'Automation is now event based, allowing you to move clips about without ruining a mix... all mixer elements can be automated such as EQ, panning and aux sends'

Tough customer: Octavia's hardware is contained in a sturdy metal case separate to the PC giving it a more robust feel than add-on cards

THE MIXER is unquestionably the most impressive aspect of the new software. It is bus structured and extra fader strips can be dragged and dropped onto it allowing users to create and save specific setups for each project. This bus structure enables submixing within the Octavia system. This allows a user to create submixes such as a music and effects mix in a film-dubbing session or two versions of a live concert, one with an announcer and one without.

The drag-and-drop technique continues in the mixer window with a toolbar of available resources such as EQs, compressors and fader strips. These resources, when required, are simply dragged from the toolbar to the appropriate channel and are then ready to be used. I have often found while editing Radio 4 features and documentaries at BBC Pebble Mill that there hasn't always been time to go through the process of bouncing clips through the SADiE DSP processes such as EQ or dynamic compression. The facility to mix these clips onto one stereo fader and drag an EQ module onto that channel of the mixer will be an enormous help. Many users who prefer not to pass their audio signals through an analogue desk will find themselves able to drop a compressor ☞

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Optional internal M-O, 8mm tape backup or additional removable SCSI hard drives
Up to 15 SCSI devices (to SCSI2 spec) may be connected in total including M-O, CD-R, 8mm Exabyte, further hard drives

AUDIO I-O
8 balanced, analogue, line-level inputs (2 XLRs + EDAC)
8 balanced, analogue, line-level outputs (2 XLRs + EDAC)
Optional Breakout box for full set on XLR or EDAC multipole to patchfield
4 stereo AES-EBU inputs
4 stereo AES-EBU outputs
20-bit monolithic A-Ds on all inputs
20-bit monolithic D-As on all outputs
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Optional DC coupled inputs

SAMPLING
At any rate between 28.8kHz and 51kHz
Sample rate can be locked to word clock or any digital input, generated internally (48kHz, 47.952kHz, 44.1kHz, 44.056kHz, 32kHz, (10% analogue Varispeed) or synchronised to time code.

SYNCHRONISATION
VITC and LTC SMPTE-EBU time-code readers
24fps, 25fps, 29.97 drop frame, 29.97 non-drop frame, 30fps supported AES reference input
Inter-unit word clocks for chaining multiple units together
MIDI interface

HOST COMPUTER
486DX266 IBM compatible PC (8Mb RAM) Intel PCI motherboard
17-inch SVGA colour monitor
High speed serial link interface (320Mbit/sec) to multiple Octavia units via twisted pair cabling
Optional RS422 9-pin interface
Optional Hardware controller

module onto their Octavia output fader and play out their finished programme, including level compression, straight into a DAT machine.

Another new option in the mixer window is having aux sends on channels which can be designated pre-post fader and routed to one of the available analogue-digital outputs. A simple drop-down menu appears allowing the user to specify where to send the aux and an extra stereo channel can be dropped into the mixer and set to pick up the effects return from whichever I-O port specified. When using such facilities the benefit of the new Octavia platform becomes apparent with its wealth of inputs and outputs. You are able to mix all the separate outputs of their Octavia (up to 80) on an external mixer having added whatever processing in the digital domain inside Octavia. SA&V is designing a overview page which will clearly display the routeing of all inputs and outputs of the mixer to help users check configurations at a glance.

The Process window, although redesigned, is still available and when selected this displays a pseudo 19-inch FX rack. Units can be dragged and dropped to perform sample-rate conversion and Varispeeding, noise abatement and time scrunching.

SA&V has also introduced project management into the software. The project-management window shows which audio tracks, clips and EDLs are being used for a particular job. You then have the option of password-protecting access to those tracks. In practice, this means that you can limit access to all the audio and EDL information so that while the producer is allowed limited access to listen to the finished work another unrelated user could not load that EDL. With the use of networked Octavia's and SADiEs, the need for management of projects becomes more important and I can see the need for a flexible approach in regulating access to systems. In the future it should be possible to set up a network of Octavia's including a central file server containing a complete FX library all linked by an ATM network. For large broadcast centres or postproduction studios the possibilities of this combination of high-speed networking and project management are very impressive.

SADiE 3 software when working on the original SADiE platform can also use an optional CEDAR-designed, noise-reduction, system called De-Noise (software based). This is not available at present for the Octavia platform but SA&V has already raised the question of porting it across for Octavia users.

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REVIEW

Soundcraft DC2020

Soundcraft's latest DC2020 surround console was derived from the DC2000 after the company discovered most of its sales were going to the post market. ZENON SCHOEPE describes the evolution of the new board on the block

IT IS IMPOSSIBLE to talk about Soundcraft's DC2020 console without mentioning the original DC2000 from which it is derived. The DC2000 stormed the market as the most affordable moving fader automated desk a couple of years ago. This employed Soundcraft's C3 automation technology which has been around since in the K3 live-theatre desk and the Broadway high-end theatre desk.

But it was the DC2000 that started it all. Armed with switch automation, machine control, and a well-planned structure to the menus of its mix-data organisation, all of which is communicated via a small centrally positioned touchscreen.

The association with the 'most affordable' tag continued when the DC2000 was endowed with a multiformat monitoring panel making it the cheapest board on the market with this capability built in. This system was the Interact Magtrax TV routeing-and-monitoring interface offering six independent speaker outputs and automatic Surround encoder-decoder insertion using the desk's groups as inputs to the routeing matrix. The 19-inch rackmount unit could be controlled from a dedicated hardware remote or from Windows software.

It's against this backdrop that the DC2020 arrived: essentially a Mark II version of the original desk but subtly redirected towards postproduction.

DIFFERENCES TO the DC2000 at the desk level concern themselves with minor tweaks but the DC2020 is still an 8-bus in-line board, with 4-band EQ, four assignable floating groups, six aux es, four stereo groups with effects returns and an optional patchbay. The motorised long monitor faders and the master fader are complemented by automated channel and monitor cuts, two automated aux send switches on each channel, and four automated stereo return and group cuts.

On the channel strip the DC2020 gains a phase switch and, most significantly, four fully sweepable +/-15dB bands of EQ with switchable Q/shelf on the HF and LF, and switchable Q in the mids as opposed to the DC2000's fixed HF and LF and swept mids. HF covers 500Hz–17kHz with a shelf, or 1.5 bell, while LF handles 50Hz–1.7kHz with a shelf or 1.3 bell. Q values of 1.2 or 2.0 are available individually on the two mid bands which span 700Hz–17kHz and 50Hz–1kHz.

Other differences are that the DC2020 is available in a 40-channel frame rather than the 24-32 choice on the DC2000 and the processing has been upgraded to cope with this size increase. Other additions include an output on the back for a screen display via PC and Mac, video sync input, and extended machine control with different drivers for variations on the 9-pin theme plus open loop MMC protocols.

The DC2020 is available in a 40-channel version; processing has been upgraded to cope with this increase

The point about the software of this desk is that it can be, and is, continually enhanced, and new additions include LTC master control and the ability to switch machines out of the sync ring selectively. Important features in the automation include the editing of automation data down to 1/4-frame accuracy by effectively scrubbing the automation on the dial which is particularly useful when trying to locate precise positions for cuts.

In order to make room for the Magtrax monitoring panel on the desk, the effects returns lose their 2-band fixed EQs but this is a small price to pay for the convenience of having the control panel to hand. The processing is housed in the TV8 panner rackmount which is controlled from the remote with extra functions controlled by a monitor module positioned down by the master fader.

THE PANNER has ten audio inputs —eight group inputs from the desk's group-insert sends arranged as two sets of LCR with mono surround plus two panner input signals which are mixed into the LCRS according to the position of the joysticks and their associated Group 1-4 and Group 5-8 switches. Stereo surround is mixed to with a flick of a switch on the TV8 which adds another channel as the Right surround and employs the mono surround channel as the Left surround.

Remote operation centres around buttons, with twin LEDs, corresponding to the setup's eight channels. Their precise function depends on the current selected mode. In RTD the channel buttons switch between replay, direct or toggle in which their action is dictated by global direct and replay switches in the monitor module. In cut mode the channels can be assigned to three cut groups activated again from the monitor module while the channels also have a solo mode and mute mode for speakers.

Other features include output-level setting (LED read-out) with two presets, mono mode, desk-metering switching to the TV8 and three matrix encoder-decoder modes. One bypasses the matrix for discrete and stereo mixing, another permits the effects of encoding and decoding only to be monitored, while a third is a full-blown final-mix mode for encoding LCRS to 2-track with decoded monitoring.

A DC2020 Surround and an appropriate monitoring system puts the ability to mix in all popular multichannel formats into the hands of many more people. The tweaks to the desk are small but important ones. The automation system was good to begin with, but is being added to in a manner that now makes it exceptional.

Stand-alone console, multichannel monitoring panels do exist, but none offer the degree of integration and neatness of the DC2020 Surround. As the entry-level console for this type of work there is nothing like this desk.

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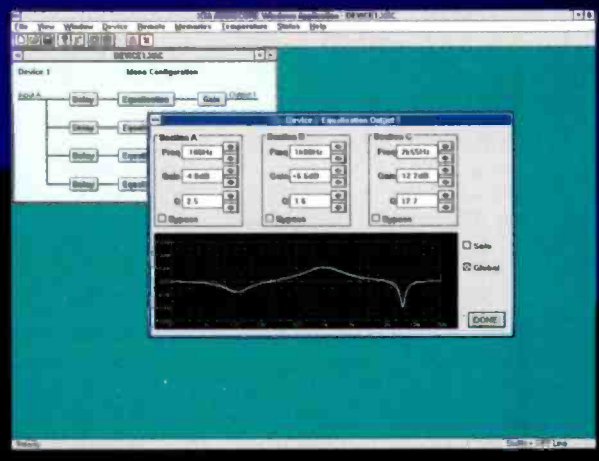

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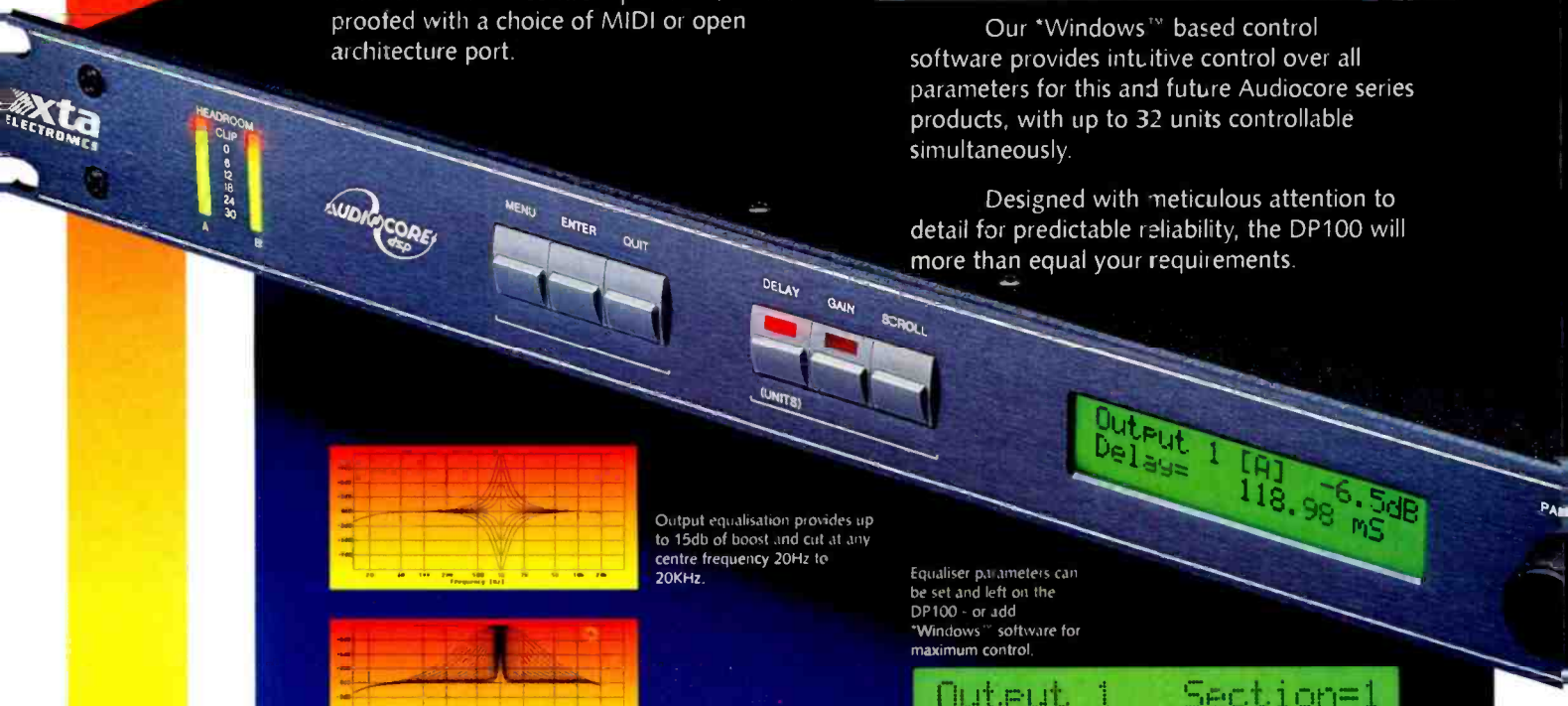

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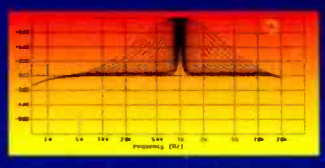

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Rolec-SADiE Mobile

The race is on to build an industry-standard location hard-disk recorder—and Rolec's entry is looking good.

KEITH SPENCER-ALLEN gets an exclusive preview for **Studio Sound**

ONCE, THE CONCEPT of hard-disk-based portable recording would have been a futuristic audio recording nightmare discounted as not only impractical but probably undesirable. But portable recording is undergoing the kind of change that hit studio recording ten years ago, with the same format options appearing. And we've now arrived at the first hard-disk recorder for portable use, the Rolec-SADiE Mobile.

Rolec is a small engineering company based in the UK which has been making niche products for recording, radio and government use for over ten years. Rolec set about designing the Mobile last year and it is now undergoing beta testing before its launch during November.

The Mobile is a compact 'over-the-shoulder'-sized recorder for location recording. It is not intended to mimic studio-based workstations and should be viewed as an alternative to existing portable formats. In operational terms it is no more complex than a DAT machine.

So what are the advantages of portable hard disk? Surprisingly, in terms of basic recording operation it would seem to differ little from other media except for the instant access to already recorded tracks. The essential benefit is that of being able to load hours of recorded audio into a digital editing workstation by physically removing the disk carrier from the Mobile and plugging into a disk bay in the workstation. This just takes seconds but it requires that the recordings on the disk are in the same format as that of the host workstation so that they can be worked on directly with no processing or copying. To this end, Rolec has worked with Studio Audio & Video to licence the disk format used on the SADiE editor. Rolec is also using the same type of disk packs to ensure physical and electrical compatibility between the Mobile and SADiE.

THE MOBILE IS straightforward in operation. The left-hand side has XLR-type I-Os for mic or line input and will supply 12V mic powering. There is also provision for optional AES-EBU and SPDIF connection. The front panel has all the controls and a central LCD that doubles as metering and status readout.

The Setup menu is simple, allowing selection of mono-stereo operation; sampling rates of 32kHz, 44.1kHz or 48kHz; and the level at which the peak indicator will flash. All that then remains is to select record and set record levels. The meters to the right of the LCD show record level while the track indicator displays the incremental number that is automatically allocated to identify that track (recorded item). The counter displays elapsed time although total disk-record time is also available. Pressing STOP terminates the recording and you may then allocate that track a six-letter name. Headphone monitoring is supported although a very small speaker is to be added to the front panel. The other transport controls are standard.

The first hard-disk recorder for portable use: Rolec-SADiE's Mobile

It is not intended to mimic studio-based workstations and should be viewed as an alternative to existing portable formats

Record time depends on the disk size used and the sampling rate. Rolec suggests that most will initially opt for the 1Gb drive which will offer about 90 minutes record time with the option of proportionately greater times with larger disks. The record time ties in conveniently with the charge life of the internal rechargeable battery. The design allows for alternative powering from dry cells, external 12V and an optional mains power supply. Battery status can be shown on the front panel and when it become critical an audible warning is given in the headphones and if no further action is taken, the machine will shut itself down.

Also part of the system is a simple onboard editing facility. As Rolec's Roy Campbell puts it: 'It's for tidy top-and-tailing and not much more'. Actually, the edit capability is quite handy with the ability to assemble edit sections with an rough accuracy of 300ms. With the rough edit completed, the track can be auditioned and then edit adjusted with an accuracy of 10ms. The edit list made on the Mobile can also be read by SADiE.

Part of Rolec's philosophy is to maintain an open architecture and there is provision for a third party to develop ISDN or PCMCIA interfaces. The implemented computing platform is a 486X and by using an industry-accepted architecture the Mobile is open to future development.

Returning to the original perceived problem—vibration and handling. The mobile is supplied with a strong padded case surrounding a robust metal chassis. The drive is cradled in a rubber suspension and is rated to withstand greater than 8G. This gives Rolec the belief that the Mobile may not only equal other media but actually be more reliable. Only practical experience will prove this.

The complete system is priced below £2,000 (UK) with a 1Gb drive.

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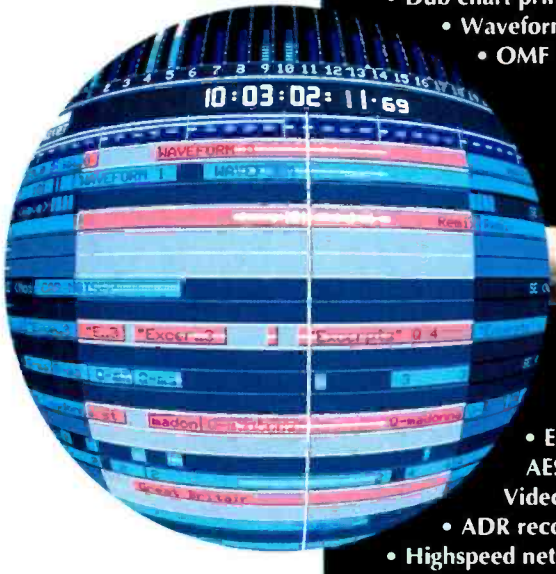

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Crown CM-700

Crown is broadening its scope with a straightforward and traditional microphone which feels and sounds special. DAVE FOISTER finds out if special means good

THE NAME OF Crown has been in the 'household' category for as long as I can remember. When the specialised amplifier manufacturer decided to diversify into microphones, it, paradoxically, ended up becoming even more specialised, as it brought into the world the Pressure Zone Microphone, developments of which have formed virtually the entire Crown microphone catalogue since. True, other manufacturers have tried the idea, but the PZM is indisputably Crown's; even the ubiquitous Tandy-Realistic version is manufactured under licence.

Crown has evidently tired of the limitations of this niche market, however, and is broadening its scope with the launch of a more straightforward traditional microphone, the CM-700. Having said that, it still does things in very much its own way, and despite its small size and conventional shape it manages to retain a style all its own.

THE CM-700 IS short and slender in the manner of most small-diaphragm studio microphones but its gloss black coating stands out visually as much as its extraordinary weight, 113 grams, stands out when you handle it. The combination of weight, finish and the flaring of the body around the capsule assembly makes the microphone look and feel for all the world like one of those Magnalite torches so beloved of stage managers for their indestructibility. It certainly appears that the body case is made of thick solid brass, offering excellent mechanical and electrical protection to the circuitry within.

Crown evidently believes the CM-700 design to be as rugged in terms of SPL handling as it is mechanically, as no pad switch is fitted; the only control available is a recessed slide switch for the low-frequency filter, with three positions offering both steep cutoff and gentle roll off (both coming into play around 150Hz) as well as flat. The fact that close use is envisaged is evidenced by the two different windshields provided with the microphone, one a straightforward all-encapsulating piece of sculpted foam, the other incorporating a plastic stand-off frame which holds two foam screens, one right over the grille and a second a few millimetres away. The only other accessory supplied is a standmount, which is sturdy and sufficiently stiffly pivoted to bear the weight, Sadly, this comes with no thread convertor. The whole kit is packed in a substantial zipped soft pouch.

It seems all too common for mic manufacturers to get too specific about the intended applications of their various models, perhaps deterring the user from a little fruitful experiment. Crown, on the other hand, is supremely vague about what the use of the CM-700, saying only that it is suitable for studio and stage use—what for, exactly, they leave for you to decide.

Which, in my view, is exactly as it should be, especially when the performance of the microphone is as neutral and versatile as that of the CM-700. This is a microphone that delivers everything you could reasonably ask of a small diaphragm, compact design and, perhaps, a good bit more.

Crown's CM-700 is a more straightforward and traditional microphone

In the first place, its frequency response is unusually smooth, even and extended. Crown's published curves show a response within ±3dB from 50Hz to 20kHz, with small upper-mid humps around 6kHz and 12kHz which still manage to remain within a couple of decibels of flat. The lower end is particularly impressive, lending a depth and fullness surprising for the size.

It still does things in very much its own way, and despite its small size and conventional shape it manages to retain a style all its own

The lack of a built-in pad is justified by the published performance figures, claiming that the microphone can handle 151dB SPL for 3% THD; certainly in use it is virtually impossible to make it complain. The figure drops to 142dB with a 12V phantom supply, but for our purposes this should not pose a problem. Its immunity to overload is perhaps reflected in its relatively low sensitivity, but the A-weighted equivalent noise level remains respectable at 21dB SPL.

TO SUM UP the aspect that sets the CM-700 apart I have to return to its sound. The revelation came with vocals: placed in front of a singer, its performance was so startling that I had to go back to the console to check that I was listening to the right channel, as the richness and depth I was hearing could easily have come from one of the large-diaphragm workhorses that I was using as a comparison. This microphone defies the kind of generalisation that says a small microphone equals a small sound, giving an up-front expansive neutrality that belies its proportions.

Crown's microphones are always full of surprises, look at the SASS-P stereo PZM array to see how bizarre they can be, and it was, perhaps, to be expected that an innocuous design like the CM-700 should also have the potential to startle. For once a condenser looks as though it is up to any of the rigours the road can throw at it while still giving remarkable results in the studio.

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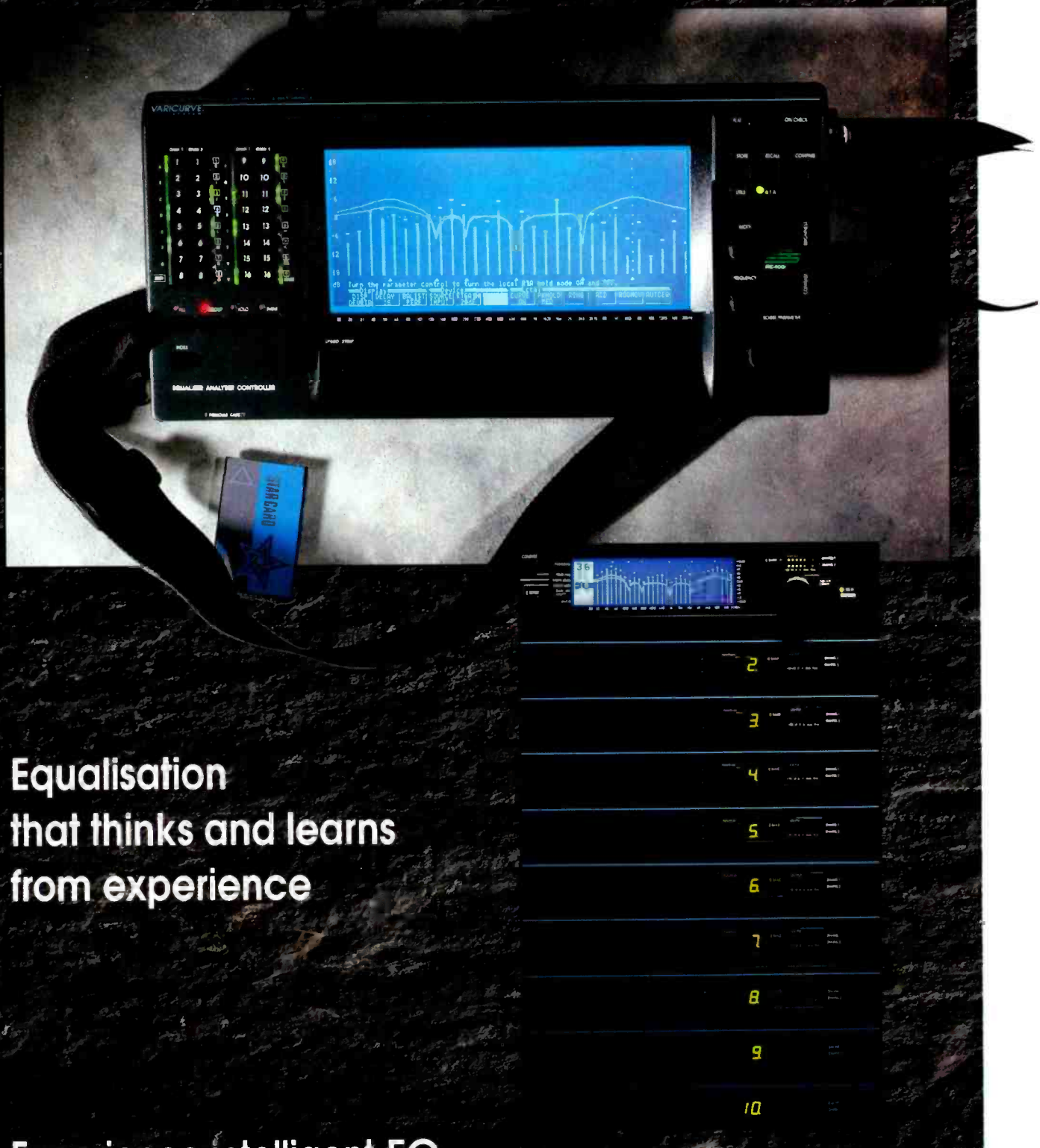

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Waves WaveConvert

Until computer audio systems genuinely approach professional standards, optimising sound in software is going to be a critical multimedia tool. DAVE FOISTER rides the waves and discovers a real breaker

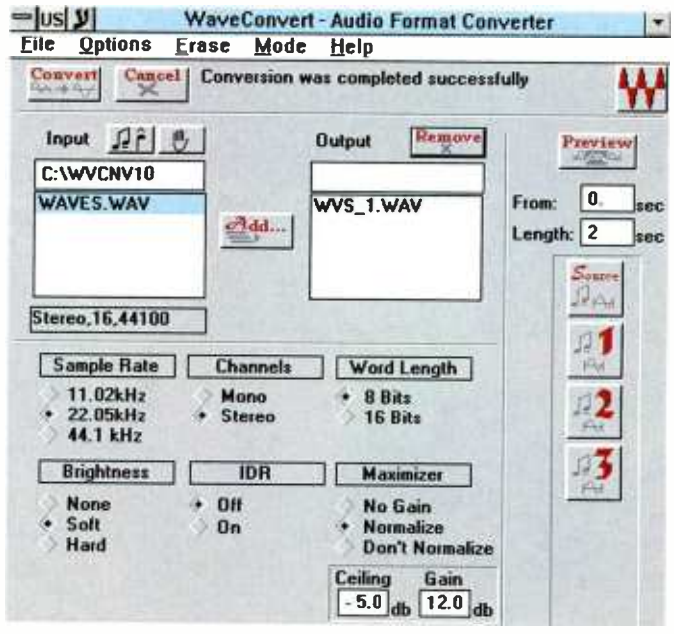
SOUND FOR COMPUTERS is clearly the 'Next Big Thing'. Ben Duncan's test of IC power amps (*Studio Sound*, September 1995) and the Sega studio (*Studio Sound*, October 1995) are both indicative of the growing importance of sound in computing, and timely reminders that the standards we expect to find elsewhere do not yet apply in this field.

Consumer audio has made great progress over recent years, so that although the quality spread remains enormous, the worst is nowhere near as bad as it was, and the average is quite acceptable. Multimedia computers, however, still rely on amplifiers of questionable adequacy and tiny loudspeakers to reproduce the explosions in games, as well as play audio CDs. Having to cater for the lowest common denominator recalls the challenges of mixing a single for a pocket transistor radio.

Which must be frustrating for the growing number of studios specialising in this work. A significant proportion of console sales trumpeted to me in press releases recently have gone to such studios for the preparation of soundtracks for software, including some pretty grown-up systems. Despite the software designers' recognition that sound and music have important parts to play in their products, the poor-relation syndrome still applies and the various contributors to a project end up horse-trading over the finite amount of bytes available—as Gail Cooper's account of the Sega operation illustrates. Audio quality is a prime target for economies, as its parameters can fall to eight bits at 11.025kHz. At the other extreme, standard PC .WAV sound files can manage 44.1kHz 16-bit stereo and while the chance remains of using this specification there is no point committing to something more basic too early.

This leaves the problem of down-converting when the bartering for space is over. All the parameters—channels, word length and sample rate—are up for grabs in the bid to save bytes, and the dangers of doing any of this wrong are familiar from the experiences of transferring 20-bit recordings to a 16-bit medium and the effects of sample-rate conversion.

WaveConvert from Israeli software house Waves aims to carry out this process in the most elegant way possible, while preserving, as far as possible, the quality of the original source. Eventually it is planned to be capable of dealing with a variety of file formats, but at the moment it works with the various configurations contained within the standard .WAV format. It can be presented with such a file in any variant—mono or stereo, 8 or 16 bits, and any of the three sample rates (44.1kHz, 22.05kHz and 11.025kHz) —and convert it to any other combination of parameters, up or down. There are various processing options available on the way to optimise the end result, with varying chances of success depending on how brutal the downgrade is to be —halving sample rates and word lengths at a stroke is never going to be a comfortable experience.



WaveConvert for the PC—Audio format convertor—the interface

THE SIMPLEST PROCESS is Brightness, which adds a touch of HF to compensate for downrating the sample frequency, and has just two settings, Soft and Hard. This gives a distinct improvement on most sources. A Maximizer section offers manual and automatic gain adjustment, allowing signals to be normalised to take advantage of the available dynamic range. Peak Limiting algorithms prevent distortion and the ceiling can be set to anything up to full scale. Trying this with some of the available files showed just how undermodulated some of the originals were, as the extra level almost made up for the loss in dynamic range.

The third option is called IDR, or Increased Digital Resolution, and is a proprietary noise-shaping technology designed to minimise the quantization noise caused by down conversion from 16 to eight bits. Again, the difference was clear and reduced the familiar 8-bit artefacts we all thought we had left behind years ago.

Using the software is simplicity itself, although it has to be said it is time consuming. I was using a less than state-of-the-art 486SX33 and a 2-second file could take over three minutes to convert, so how long a 386 (Waves' minimum specification) would take I shudder to think. Having said that, the flexibility offered by the processing and the ability to create up to five preview versions of the alterations, all available for instant replay and comparison with each other and the original, compensates for a lot. The results of down conversion were never entirely satisfactory, but always better than they would have been without Waves' processing, and a big surprise was the fact that upwards conversion of an 8-bit 11.025kHz file to 16-bit 44.1kHz actually gave a marked improvement in quality, adding whole octaves of missing top.

The conversion creates a separate output file—the original is never interfered with—and a multifile mode allows whole groups of files to be worked on simultaneously and then converted as a batch. This makes the slow processing less of a problem, and adds to the feeling that this is a thorough piece of software which does its very specialised job extremely well.

CONTACTS

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Studio Sound

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ANALOG PERFORMANCE

	Audio Precision System Two	Tektronix AM700	Rohde & Schwarz UPD
Generator Residual Distortion	harmonics -120 dB THD+N -108 dB 20 Hz-20 kHz	harmonics not spec'ed; THD+N -86 dB 20 Hz-7.3 kHz (low distortion mode)	harmonics -115 dB w/low distort option; THD+N not spec'ed
Analyzer Residual THD+N	-103 dB 20 Hz-20 kHz, 0 to +30 dBu	-79 dB 20-100 Hz -86 dB 100-400 Hz -90 dB 400 Hz-6.6 kHz	-110 dB, freq. & amplitude range not specified
Generator Frequency Response Flatness	±0.01 dB 20 Hz-20 kHz	±0.1 dB 20 Hz-10 kHz, +0.1/-0.2 dB 10 kHz-20 kHz	±0.05 dB 20 Hz-22 kHz
Analyzer Frequency Response Flatness	±0.01 dB 20 Hz-20 kHz	±0.1 dB 20 Hz-20 kHz	±0.03 dB 20 Hz-22 kHz

Compare what we bring to the table

Audio Precision introduced the first test set able to generate and measure audio signals in both the analog and digital domains. That unit, the System One Dual Domain, remains a popular Audio Precision product today. As time has passed, in addition to generation and analysis of the embedded digital audio program signals, new needs have surfaced for intensive testing of the AES interface pulse train itself.

Today, audio professionals often find that digital interface problems including jitter, inadequate bandwidth and excessive line noise cause degraded performance or even system operational failures. System Two answers these and other needs by including complete measurement of every parameter specified in AES3, the governing document for the AES digital interface. Trouble-shooting today's problems requires measurement of jitter, eye pattern, pulse amplitude, delay and noise of the interface itself. System Two does all this and adds impairment signal generation capability for simulation of interface problem signals, as well as high level status byte readout and control.

Compare for yourself... we believe System Two brings the most and the best to the table.

AES/EBU & CONSUMER DIGITAL INTERFACE MEASUREMENT CAPABILITY

	Audio Precision System Two	Tektronix AM700	Rohde & Schwarz UPD
Jitter measurement	Yes	Yes	No
Injection of jitter	Yes	Yes	No
Variable rise & fall output	Yes	No	No
Eye patterns	Yes	Yes	No
Injection of noise and interfering signals	Yes, normal mode or common mode	No	No
Channel Status Bytes	Yes	Yes	Yes

Our worldwide force of representatives will be pleased to provide further information and an on site demonstration.

Tek AM700 specifications from brochure 21W-7212-5 dated January 1995. System Two specifications from brochure 52C-0084-01 B-0295m of February 1995.
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New technologies

In this month's Studio Sound DAVE FOISTER rounds up the best of the new releases at October's AES Convention in New York

Studer M-O recorder, valve mic A-D

Studer's latest recorder is the D424-2 stereo magneto-optical machine, combining familiar tape-deck functionality with digital features such as non-destructive editing. It will record up to 24 bits on a standard 5¼-inch high density M-O disc and has a digital scrub capability and serial control option. Studer sees it as a direct replacement for existing quarter-inch analogue recorders and high-end DAT machines, and is aiming it particularly at the broadcast environment as part of the Studer All-digital Broadcast Concept (ABC) which features Studer digital products at every stage of the broadcast audio-chain.

Also new from Studer is an addition to the D19 series of mic preamps with 20-bit digital conversion on-board. The new unit is the D19 Mic Valve, a two-channel mic-line preamp with what Studer calls a Valve Dignifier stage offering full control over the various parameters of the valve sound.

- *Studer Revox, Switzerland. Tel: +41 1 870 75 11.*
- *Studer, UK. Tel: +44 1707 665000.*
- *Studer, US. Tel: +1 615 391 3399.*

Brainstorm Electronics time-code products

Brainstorm Electronics has added two more tools to its range of time-code-related products. The SA-1 incorporates the analyser functions of Brainstorm's established SR-15+ Distripalyzer in a small, portable, unit for studio or location operations, and identifies time-code format, monitors its phase with video and reports any errors. A serial port can provide a comprehensive report to an external computer or printer.

The SR-3 time-code repair kit is a regenerator which identifies and repairs faulty time code, with functions including drop-out repairs, jitter reduction, auto video-phase correction, auto drop-flag correction, on-board generator and large reader display.

- *Audio Intervisual Design, US. Tel: +1 213 845 1155.*

dB Technologies DA122

Following the uptake of its year-old AD122 A–D convertor, dB Technologies has introduced the other end, the DA122 D–A. The DA122 will handle up to 24 bits, claiming a resulting performance of a -120dBFS noise floor and .0001% distortion. dB Technologies points out the advantages of using 20-bit precision when converting 16-bit material: 'because reproducing 20 bits dithered and-or noise-shaped material requires 20 bits of convertor linearity'. The unit uses 'classical' resistor-network architecture and overcomes technology limitations by use of a proprietary process for continuous calibration of circuit components. Further reduction of clock jitter is provided by a proprietary reclocking circuit to retain lock with sub-picosecond frequency adjustments.

- *Audio Intervisual Design, US. Tel: +1 213 845 1155.*

Studer's D424-2 recorder combines familiar tape-deck functionality with digital features such as non-destructive editing

Digidesign family expands

New additions to the Avid-Digidesign range include Pro Tools products from within and outside the organisation. Digidesign has announced ProControl, an affordable, modular, control surface with dedicated editing and mixing controls for complete Pro Tools II systems and plug-ins, offering integrated control of a whole Pro-Tools-based studio. Digidesign's own Intelligent Noise Reduction, DINR, now has TDM compatibility. Plug-ins from third parties include a software-based digital EQ from Focusrite, based on the Red 2 parametric equaliser, and a reverberation and chorus package from tc electronic known as TC Tools.

Other developments include AudioSuite, a platform for DSP Plug-in development that will not require additional dedicated DSP hardware, relying on the power of the Digidesign Audio Engine and the speed of the Macintosh or PC host processors. Digidesign has also announced a NuBus-to-PCI exchange program for all registered Pro Tools III owners.

- *Avid Digidesign, US. Tel: +1 415 688 0600.*
- *Digidesign, UK. Tel: +44 171 494 2949.*
- *tc electronic, Denmark. Tel: +45 86 262800.*

New software from Avid

Avid Technology has upgraded two of its principal packages with the announcement of Release 3.5 of the AudioVision family of DAWs and v.6.0 of Media Composer. AudioVision now incorporates clip-based 4-band parametric real-time EQ, enhancements to the compatibility and connectivity with partner company Digidesign's Pro Tools, and several editing, processing and file management enhancements based on user feedback. The editing features include reverse clip processing and new selection and placement commands.

Media Composer v.6.0 incorporates support for new levels of on-line image-quality with compression levels as low ☞

Avid's Audiovision software updates

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as 3:1, with support for two-field mixable resolutions, component I-O and 720-pixel media. On the audio side, it features a new EQ Tool, offering 3-band EQ with selectable HF and LF turnover frequencies and a semiparametric mid band. The resulting EQ settings are also clip-based. The updated Media Composer will be available for both NuBus and PCI Power Macintosh systems.

- *Avid Technology, US. Tel: +1 508 640 3158.*
- *Avid Technology, Japan. Tel: +81 33 505 7937.*
- *Avid Technology, UK. Tel: +44 1753 655999.*

Dolby and Coastcom multichannel

A new joint product from Dolby and Coastcom offers remote multichannel sound and pictures using a combination of Dolby AC-2 codecs and Coastcom's D/I MUX III T1 multiplexer. The system offers full multichannel theatre sound with picture at remote locations, remote mixing and mix approvals, viewing of daily rushes and links with remote studios for dialogue replacement and musical scoring. The system requires the use of a fibre-optic line such as provided by Pacific Bell, and the multiplexer can use a single T1 circuit to carry video, voice, 1-800, WATS, low-speed data, switched 56, Fractional T1 and frame relay. The Coastcom family supports up to two T1 lines and up to 48 channels.

- *Dolby Labs, US. Tel: +1 415 558 0200.*
- *Dolby Labs, UK. Tel: +44 1793 842100.*
- *Coastcom, US. Tel: +1 510 523 6000.*

Lexicon upgrades

Lexicon's established PCM 80 effects platform now has available a series of new FX cards, plugging into the unit's front-panel PC Card slot to add new algorithms and presets. The four initial cards cover a range of possibilities, including 25 new dual FX algorithms, two cards filled with custom presets from Sound Designer Scott Martin Gershin and Keyboard Player David Rosenthal, and five new pitch-shifting algorithms.

Still on hardware, the Lexicon 300L is a new version of the model 300 which now supports the LARC remote controller, while in the software domain a new daughterboard for the NuVerb 20-bit reverberation system adds support for Digidesign's TDM system.

- *Lexicon, US. Tel: +1 617 736 0300.*
- *Stirling Audio, UK. Tel: +44 171 624 6000.*

Crown Studio Reference amplifier: designed for sonic accuracy

Crown amplifiers and distributed processing

Crown's PIP-compatible amplifiers—the Macro-Tech, Com-Tech and Macro Reference ranges—can now be fitted with a new digital signal processing module allowing a wide range of signal treatments to be carried out locally under remote control. Currently available processes include EQ, crossover, gating, compression, delay, and loudspeaker control and protection. Real-time and preset control of the DP module is provided by a host computer running IQ Turbo v1.3 software, a Windows-based package which allows the operator to design software controls for the installed system.

Also new from Crown are the Studio Reference 1 & 2 power amplifiers, designed to be the most sonically accurate amplifiers available using Crown's 30 years of amplifier design expertise. The high-powered amplifiers offer such specifications as a damping factor in excess of 20,000, signal-to-noise ratios of 116 and 120dB, THD within 0.05% to full-rated power and IMD below 0.025%.

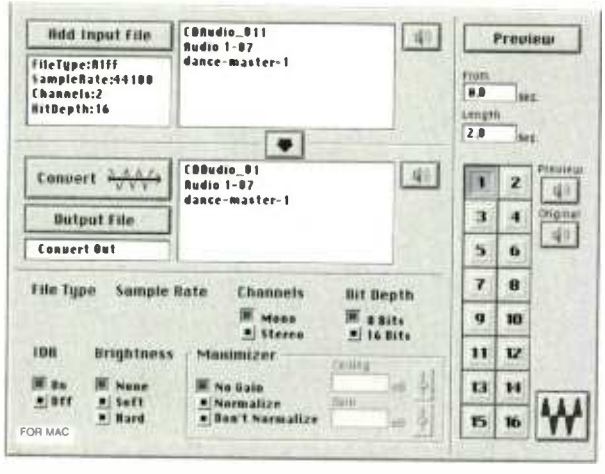
- *Crown International, US. Tel: +1 219 294 8000.*

SSL new features

SSL's AES launches consist of software updates and enhancements to the G Plus consoles and the Scenaria and OmniMix systems. The automation on the G Plus now includes a song map feature, allowing working in beats and bars, and selectable mix data joining, which enables cuts or fades or both to be joined between mixes. Scenaria now incorporates cycle-based automation, fader trim, more EQ curves and new automation and editing features, while OmniMix further adds enhanced Hierarchical Submix

The Audio Converter for Multimedia developers

WaveConvert for windows/Mac



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System 9098 Equalizer
by Rupert Neve the Designer

" The SYSTEM 9098 EQ is a high performance Equalizer and Preamplifier designed to originate microphone signals of the highest quality and to process signals generally in terms of frequency response. The circuitry is based on the research I put into the 9098 console and the approach bears many similarities to that used in the 9098. Paramount importance has been given to the sonic quality of the audio path, taking great care to retain the highly-prized musical character of the famous old designs of this pedigree.

The SYSTEM 9098 EQ embodies the original curve shapes now enhanced by improved circuitry which provides swept frequency bands in place of the discrete switched steps of the past. Thus the EQ has become even more powerful yet remains a subtle and creative tool, using the same basic circuit configurations which have been successful over many years. However, new amplifying devices and better quality components have resulted in lower noise, lower distortion and the ability to handle higher frequencies.

The result is an equalizer which has the solidity and sound of Class A without the cost, heat and weight penalties and thus provides the 'best of both worlds'. We have also left behind cumbersome and expensive hand cabling, noisy connectors, heavy separate power supplies and outdated assembly techniques which contribute nothing but nostalgia. Apart from the robustness, repeatability and reliability, we have now made one of my designs more affordable than ever before."

Rupert

The System 9098 EQ is a Mono 1U 19inch Rackmount unit. Units are shown here.

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The PCM-2600 one of three new DAT machines from Sony

displays, phase reverse on individual HSM elements to create mix-minus feeds, extended surround sound processing and enhanced reverb control parameters.

- *Solid State Logic, UK. Tel: +44 1865 842300.*
- *SSL, US. Tel: +1 212 315 1111; +1 213 463 4444.*
- *SSL, Japan. Tel: +81 1 3 5474 1144.*

Sony DAT machines

Sony has unveiled three new DAT machines, all featuring four-motor direct-drive tape transport mechanisms and switchable Super Bit Mapping on the A–D path. The PCM-2800 and PCM-2600 replace the PCM-2700A and PCM-2300 respectively, the first also providing four heads for confidence monitoring. The third machine, the DTC-A8, is designed to complement the current DTC-A7, and has -10dB unbalanced analogue I-Os and IEC digital in place of the other

NEWS FROM TUBE-TECH EQ 1A

See it at the AES show in New York, stand 430

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AES NEWS

APT remote machine-controller

APT's RMC 240 remote machine-controller uses the auxiliary data facility on all APT codecs to enable a wide range of DAT and ADAT machines to be remotely controlled over digital networks such as ISDN and Switched 56.

- *Audio Processing Technology, UK. Tel: +44 1232 371110.*

Bag End Elf Infra-Sub

Bag End Loudspeaker Systems has added a subwoofer to its range, which for the first time in a Bag End design is self-powered. Incorporating the same Elf dual 8Hz integrator found in the Elf-1 system, along with a 400-Watt power amplifier and a new 18-inch drive unit, its claimed frequency response is 100Hz down to 8Hz from a 3ft³ enclosure, and will accept signal configurations up to full LCR, providing three line-level, high-pass, outputs.

- *Bag End, US. Tel: +1 708 529 6231.*

beyerdynamic

beyerdynamic presents a complete range of headsets based on the DT108-109. This comprises the DT200 which comes with or without a choice of mic capsules and the lighter DT391-DT392. More condenser mics, too, including the small end-fire MCE83 and the MPC65V boundary mic.

- *beyerdynamic, Germany. Tel: +49 7131 6170.*
- *beyerdynamic. UK. Tel: +44 1273 479411.*
- *beyerdynamic, US. Tel: +1 516 293 3200.*

E-mu's Darwin

E-mu's 8-track digital-audio recorder, Darwin, was highlighted at the NY AES. Darwin features tape-style operation with jog-shuttle wheel, 44.1kHz and 48kHz sampling rates, MMC and MTC, SPDIF I-O, 40 locate points, 10-segment LED metering and an optional ADAT I-O card.

- *E-Mu Systems, US. Tel: +1 408 438 1921.*

HHB Portadat upgrade

HHB's Portadat range now has an upgrade option providing a selection of headphone monitoring modes to deal with the varying demands of location formats. The unit replaces the clock backup battery-access panel, and a rotary switch provides a choice between stereo, mono left or mid, mono right or side, mono sum and MS monitoring modes.

- *HHB Communications, UK. Tel: +44 181 962 5000.*

TL Audio Micro Series

TL Audio has broadened its range of valve-based processing still further with the launch of five 1U-high units to be known as the Micro Series. The all-valve range comprises the MPA2 4-channel preamp, the MEQ1 2-channel, 4-band, equaliser, the MEQ2 parametric 2-band equaliser, switchable 4-band mono, the MC1 2-channel compressor, and the MO1 2-channel triode overdrive.

- *Tony Larking Professional Sales, UK. Tel: +44 1462 490600.*

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machines' +4dB XLRs and AES-EBU. It has an optional footswitch for hands-free control of all major transport functions.

Also new from Sony are additions to the wireless microphone range, including the WD-870A multiplier which allows up to 42 simultaneous channels using robust band-pass filtering to pack microphone channels more closely without crosstalk.

- *Sony Electronics, US. Tel: +1 201 930 6981.*
- *Sony Broadcast & Professional, Europe. Tel: +44 1256 55011.*

Aphex—two new compressors

The 12AT7-based Tubessence circuitry featured in Aphex's Model 107 microphone preamp now appears in the new Model 661 tube compressor-limiter. This is a single-channel valve version of the established solid-state Expressor, using the valve in the same low-voltage transformerless robust design as the 107, and provides three knee settings and a choice between manual and Easyrider operation. The Easyrider system also features on the new Model 108 two-channel auto compressor, which also introduces a rotary speed control for precise tailoring of layered time constants and the patented Wave Dependent Compressor circuitry that adjusts attack and release times automatically according to the texture of the input.

- *Aphex Systems, US. Tel: +1 818 767 2929.*

Audix Broadcast MXT 1500

The latest console from Audix Broadcast is the MXT 1500, featuring the company's new D2EQ (digital dynamics and equalisation) in every channel. The EQ is a 3-band parametric design, with a switchable high Q response in each band, which in the cases of HF and LF produces a brickwall response. Dynamics control is selectable between compression and limiting, with fixed attack and variable or automatic release. General specification includes two or four stereo groups and two main outputs, and channels with three mono microphone-stereo line-inputs in a variety of frame sizes and configurations to suit different applications.

- *Audix Broadcast, UK. Tel: +44 1799 542220.*

TimeLine Studioframe

TimeLine showed three new products to augment its Studioframe DAW. Version 6.20 software speeds up waveform redrawing, operating on any individual track or on all tracks simultaneously, and adds an Advanced Custom Interface which allows users to redesign the edit control interface to suit their project needs and styles of working. The new Soundfile Server provides networking capabilities via an industry-standard file server, allowing the creation of a central sound library. It also permits files to be auditioned before loading on to the workstation, and enables the transfer of whole files and groups between workstations. Further integration is provided by the optional OMF Compatibility, offering transfer of work between Studioframe and other systems including Avid.

- *TimeLine Vista, US. Tel: +1 619 727 3300.*

Timeline's Studioframe digital audio workstation with DSC-100 edit controller

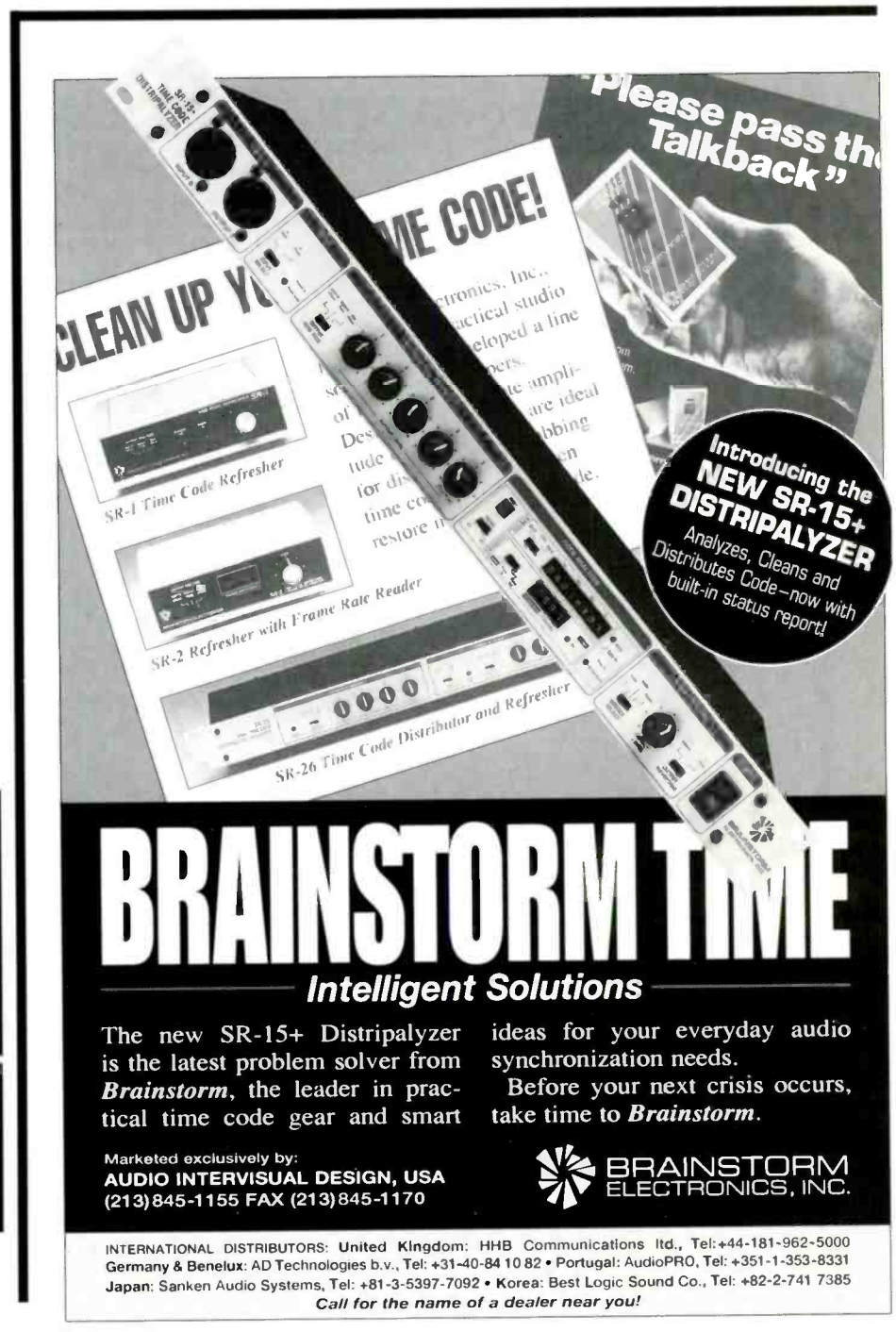
dbx 1066

dbx's latest is the 1066 stereo compressor-limiter-gate. Based round dbx's new v2 VCA, the 1066 offers several proprietary features including PeakStopPlus limiting, claimed to stop transients while minimising sine-wave distortion, and a choice between hard knee and OverEasy compression characteristics. Auto-time parameters are offered, along with side-chain access and monitoring, input and output metering, and dbx's contour switch allowing overall mix compression without the holes caused by low-frequency peaks.

- *dbx, US. Tel: +1 616 695 5948.*

Digital Audio Research OMR 8

DAR has announced the introduction early next year of the OMR 8, a dedicated 8-track open-media disk recorder operating with either removable hard disk (up to 8Gb) or 2.6Gb magneto-optical discs. Built round a simple tape-recorder-style interface, the recorder can handle word lengths up to 24 bits and comes as standard with on-board 18-bit convertors. Scrub and Varispeed functions allow accurate editing ☞



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using cut-and-paste principles, and disk-space usage is maximised by automatic gated recording. The OMR 8 can generate and chase to LTC, and provides variable-speed replay forwards and backwards to code and biphase. Built-in VTR emulation also allows audio to be *autoconformed* either from video EDLs in stand-alone mode or during the video conform.

◆ *DAR, UK. Tel: +44 1372 742848.*

Weiss Engineering Dithering Unit

Daniel Weiss Engineering has addressed the varying dithering demands of different types of audio material with a unit combining three of the best known dithering algorithms in one box. As its name suggests, the new ANR-UV22-SBM incorporates Weiss's own ANR system, Apogee's UV22 and Sony's Super Bit Mapping SBM system. Daniel Weiss comments: 'The mastering community is more and more realising that the optimum dither algorithm to be used for a different piece of music depends on many parameters, such as the equipment used to record and process the music, the recording location, the type of music, etc. Thus it seems a logical step to integrate various types of redithering algorithms in a single unit.'

IN BRIEF

BASF ADAT format tape

BASF has introduced a new S-VHS cassette specifically for the ADAT market, known as Digital Master 938. It comes as standard in a library case with wraparound index card and an APRS label sheet, and features a sliding erase tab in place of the usual breakout lug.

◆ *BASF Magnetics, Germany. Tel: +49 621 438 2406.*

Focusrite Red 8

The Focusrite Red Range has been extended to number 8 with the addition of a dual mono microphone preamplifier. It features control of input sensitivity in 6dB steps, dual vu meters, phantom and phase reverse, and the familiar circular scribble disc for each channel. With a quoted noise of -127dBu and a circuit topology similar to that found in the Focusrite Studio Console, it is intended as a high-end preamp for all applications from multitrack tracklaying to workstation front ends.

◆ *Focusrite Audio Engineering, UK. Tel: +44 1628 819456.*

FutureVideo EditLink AV

EditLink AV is a multimedia synchroniser-controller system comprising a Windows software package and FutureVideo's 2110 controller card. It provides precise time code synchronisation and dubbing between two banks of tape transports and other devices, including a wide range of machines from professional VTRs to MIDI sequencers. Various DAT machines, modular digital multitracks, CD-ROM drives and CD players are supported, and optional MMC and 'prosumer' VTR support widens the possibilities still further.

◆ *FutureVideo Products, US. Tel: +1 714 770 4416.*

Rogers LS1

Rogers International, famous for its association with the BBC in loudspeaker design and manufacture with standards such as the LS3/5a and LS5/9 to its name, has introduced the LS1, aiming to give maximum quality from a minimum-sized low-priced design. The LS1 incorporates a standard 5-element precision crossover and efficient heat-dispersion characteristics usually found only in more expensive designs. Rogers claims the units will produce near-field levels in excess of 100dB without distortion or stereo-phase shifting.

◆ *Rogers International, UK. Tel: +44 181 640 2172.*

SAMM control software

Yamaha's ProMix 01 is the subject of a new package from Innovative Quality Software, known as SAMM (Software Audio Midi Mixer). The Windows system allows global control of up to 16 ProMix 01s, providing a total of 288 input-channels. All the mixers' functions are displayed with fast precise control, programming and recall. Unlimited cue sequences can be built and saved and cross fades between cues can be automated or manual. Unlimited groups (including groups of channels across separate mixers) can be created, and the system supports SMPTE chasing.

◆ *Yamaha-Kemble Music, UK. Tel: +44 1908 366700.*

◆ *Yamaha Corporation, US. Tel: +1 714 522 9011.*

Sennheiser UHF mic systems

Launched at London's PLASA show, Sennheiser's new cost-effective UHF radio microphone range comprises the System 1081 hand-held and System 1083 beltpack systems. Both use the same 1/2U true-diversity receiver with switchable 16-frequency operation within a 24MHz window. The hand-held version incorporates Sennheiser's new dynamic supercardioid capsule, while the beltpack comes with an MKE2 Red Dot miniature omni condenser clip microphone.

◆ *Sennheiser, Germany. Tel: +49 51 30 600 366.*

◆ *Sennheiser, UK. Tel: +44 1628 850811.*

◆ *Sennheiser, US. Tel: +1 203 434 9190.*

SYPHA Nonlinear Video Buyers Guide 2nd Edition

Following the success of the first edition, independent consultant SYPHA has produced an updated version of the Nonlinear Video Buyers Guide. It lists over 250 systems, covering both on-line and off-line; turnkey and hybrid (mixed media) systems; cards; software packages; random-access disk recorders and servers.

◆ *SYPHA, UK. Tel: +44 181 761 1042.*

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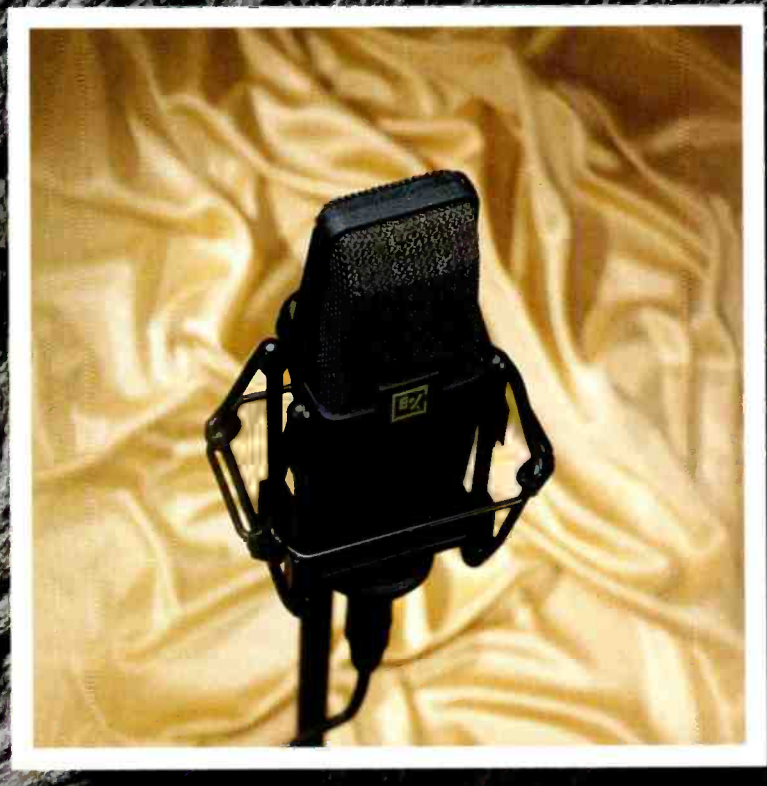

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Motown Historical Museum: Operations Manager Ron Swope presides over the interior—note the classic Scotch tape boxes

DAN DALEY pays a visit to the original Motown recording studio, now lovingly and painstakingly restored, to discover the technical truth behind the musical magic and myth that is Motown

THE MOTOWN NAME has transcended categorisation as simply a record label. The use of many of the company's catalogue artists in the 1983 film *The Big Chill* illustrated the fact that Motown had provided the soundtrack for the lives of an entire generation. Smokey Robinson & The Miracles, the Supremes, the Four Tops, Marvin Gaye, Stevie Wonder, the Temptations, Gladys Knight and The Pips, the Jacksons (with and without Michael); songs like *I Was Made To Love Her, My Guy, Shotgun, I'll Be There, Ain't Too Proud To Beg, I'm Losing You, I Second That Emotion, Tears Of A Clown, Cloud Nine, Ain't No Mountain High Enough.* And just as country music has its Nashville, the blues its Memphis, and jazz its New Orleans, soul had Detroit. Soul's integrity was made more secure in that it walked off the music scene with its head held high. Motown moved to California in 1972 and soul became infused with some of Hollywood's glitz.

If indeed there is a physical memento of the genre, it could only be the house where it was born: 2648 West Grand Boulevard, Detroit, Michigan. The house that a young Berry Gordy Senior bought in the late 1950s and that he would turn into a womb for the music. He lived there, raised his family there, conceived and nurtured Motown Records there, made the records there, mixed and mastered them there, slipped them into sleeves on his dining room table and shipped them to the world from there. In the world of soul music, this is Mecca.

What it is now is the Motown Historical Museum. The interior of the house has been painstakingly restored over the last decade to what it looked and felt like when Gordy was navigating the label through its growing years. Upstairs, his apartment has been recreated right down to the crib his sons played in while he worked the phones. The front office has vintage copies of *Ebony* and *Jet* magazines on the waiting room table. The creaky switchboard nearby with its military-style patchbay and Bakelite headset remind one of a black-and-white movie still. But it is the recording studio that is at the core of the restoration. It is as it was in 1964, recreated from photographs of the era. A blackboard on one wall has two unidentified sessions listed for 10am and 3pm, then 'Supremes' in at 5pm and 'Temps' in at 10.30. There is a photo that shows exactly that.

And perhaps more importantly, in the wake of closings of historical recording facilities around the world in recent years, the original Motown Records Studio A site stands as a remarkable example of what a working, successful recording studio looked like, and how it was equipped in the 1960s, the period during which America's music underwent massive technological and aesthetic changes.

THE FIRST THING that grabs your attention upon entering the studio in the lower rear part of the house are the details.

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Bring back that loving feeling

There is a box of Muriel Corona cigars and a pack of Camel cigarettes, circa 1968, found in a machine walled up in an old bathroom-vocal booth. One of the cigarettes is leaning on the lip of a glass ashtray on the producer's section of the console.

The console–it takes a second to register. It is just barely recognisable as such on first look. Hulking, handmade, steel-plated, purchased in 1962 from a source lost to history, controlled by massive Bakelite knobs and red toggle switches the size of ballpoint pen caps. It is backed by a wall filled in with the technology of the era, including both mono and stereo Ampex tape recorders, a pair of Pultec HLF-3C passive high-pass/low-pass filters, a Gates MO2694 levelling amplifier, a Cinema Engineering Corporation Type 4031B passive EQ, and 11 military-style quarter-inch patch bays. Engraved plaques near several of the console's knobs refer to 'Hybred' (sic), a misspelling of 'hybrid.'

'A hybrid was a coil, a transformer with three windings balanced in such a way that you can feed two 600Ω circuits together into mono for monitoring but without actually combining them on the recording,' explains Dave Clark, who was for 3½ years one of the technical wizards who literally built the Motown sound. 'Hybrids were a telephone company invention, and a lot of those found their way into early recording technology. We used hybrids for feeding signals into an echo chamber, for instance. I guess they were like aux sends now.'

The console began its life as a mono desk, being upgraded as the number of tracks increased and topping out at eight busses and 25 inputs. Nothing in the signal path was normalled; everything, from signal to power, had to be patched.

Clark, now an audio consultant with his DLC Designs company in a suburb of Detroit, was one of a team of three technicians, along with John Windt, assembled by Motown Chief Engineer Mike McLean, who himself was hired when he was 19 years old by Berry Gordy. 'None of us had degrees in electrical engineering,' remembers Clark, who was at Motown Studios from 1965 to 1969. Referring to the fact that as Gordy's empire grew, he kept buying adjacent houses until he had seven on one side of the street and one on the other, forming a sort of Motown campus, Clark adds, 'We got our educations there.'

Clark also designed the studio's specialised cue system. It was designed to allow producers to coach the players and singers along as the tracks were being recorded without the producer going to tape, as well.

'Heavy, personal coaching during the session was an important part of the Motown production style,' says Clark. 'Producers were singing along with the track from the control room even as the musicians were recording it in the studio. So the cue system had to be heard in the headphones but not leak to tape.'

Clark, Windt, McLean and Mastering Engineer Robert Dennis were involved in the design and implementation of almost all the other electronics systems at Motown, including amplifiers, preamps, graphic equalisers and even the studio's 8-track multitrack, which was installed in 1964, three years before The Beatles made *Sgt Pepper* on a 4-track system.

This emphasis on technical quality permeated early Motown, explains Robert Dennis, the studio's mastering engineer and now the President of the Recording Institute of Detroit. 'Throughout my time at Motown, the company always had more technical engineers than recording engineers,' he recalls. 'The creative elements of the company and the recording engineers would want a certain effect of a certain function, Mike McLean would get it designed and built for the company.' This could often be taken a bit too far, Dennis remembers. 'Motown used to mix every multitrack master several times,' he says. There were an average of 20 mixes done for each tune released. In 1964, a cost-cutting Vice President, Ralph Seltzer, noticed that each mixing session used a full reel of tape and usually only three minutes or so was cut out off the reel and kept. The tape librarian used to take the rest of the used tape off the reel and toss it so that the metal flanges could be salvaged. Seltzer asked Mike McLean, why the tape was not spliced together and reused. Mclean's response was, if the splice was made poorly, the level would drop when the engineer tried to record over it. Then he wanted to know if McLean could build a machine that would detect bad splices. McLean, who never backed down from a technical challenge, agreed to do so.

'Mike figured out that the splice would be silent if the dropout was no more than 1dB. He worked on the design for two weeks straight. He designed a tape transport that would record a tone on the tape and then play it back; if there was a drop out of more than 1dB, the machine would automatically stop so that the splice could be redone. After completing the design, he got John Windt to build it. Six months and 1,000 man-hours later it was done. The machine worked exactly as planned, but it wound up that none of the recording engineers, no matter how careful they were, could make a splice that didn't have a drop out of more then 1dB. Mike and Berry Gordy tried, but couldn't. The machine wound up under the work bench, gathering dust. It was still there when I left Motown in 1968.'

The five-foot-tall guitar amp that hulks in the corner of the studio is another example of the highly specific technical innovations at Motown. Despite its large speaker cabinet, 'The idea was that it was a huge direct injection box,' explains Dave Clark. 'The guitar and bass plugged into it and that signal came up on the patchbay and was sent to the console and then the tape machine. The speaker was just for monitoring in the studio.' It might seem that Clark and the other engineers were less than pleased with the store-bought valve equipment of the day, and that *was* the case, to the point of irony. ☞

Motown maestro: Berry Gordy the vision behind the mission

BERRY GORDY PHOTO COURTESY OF POLYGRAM

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'We had RCA 77 and 44, and Neumann U47 and U67 microphones coming out of the woodwork,' he recalls. 'Fairchild compressor-limiters, LA-2A compressors... everything. All this stuff is considered priceless now, but back then all it was to us was a monstrous pain of drifting tubes and thumps in the audio. We couldn't wait to get our hands on the new Neumann solid-state mic.'

ONE OTHER INTERESTING fact about Motown's technical staff. While it has been documented that Berry Gordy and his A&R staff held an aesthetic review of the top five records of the week from the music-trade publication charts, it is less well-known that the engineering staff did a technical analysis of the same five records each week. One such analysis survives, of the Beatles' *Hard Day's Night* from the week of 20th January, 1965. The document, prepared by McLean, lists how the record's bass, midrange, upper midrange and high frequencies compared to each other, as well as average level (+7dB) and maximum peak (+7.6dB), along with the comments, 'Voice very clear, background very compressed and muddy.'

'The producers had no say in how records were mixed or mastered,' says Robert Dennis. 'They handed them off to the technical staff and we checked them for apparent and relative loudness. I even had the power to stop a record from going out. As a result, we had the loudest records ever made, and that's part of what helped them stand out on radio.'

Robert Dennis headed up Motown's mastering, most of which was performed on an old Neumann record lathe, a Telefunken mastering machine with its labelling in German, and McLean's own huge, 'home-brewed' equalisation processor. The lacquer disks were then sent to Motown's in-house quality control group, headed by Gordy apprentice Jeanine Brown, which would review them aesthetically and for the radio. It was an assembly-line-type of operation, with at least 20 mixes per song coming from the control room to the mastering room to the technical analysis group to quality control and finally to Gordy. Everyone along the way listened off a pair of AR bookshelf speakers, which had become the standard reference for Motown.

'The producers were usually not allowed to mix,' says Dennis. 'The engineers did that, and even if a producer did a mix, the engineers would choose which one was sent to us. We or quality control might ask for some changes, so the mix would be sent back with the comments and done again, passing through the same chain. As a result, Motown Studio A was 24-hour-a-day operation—22 hours of recording and two hours for maintenance.'

Dennis remembers that many records that would go on to become monster hits went through the painstaking process with many revisions, including the Supremes' *Love Child* and Marvin Gaye's version of *Heard It Through The Grapevine*. It got to the point that the control room's monitor speakers were catching fire occasionally, Dennis laughs. The pace was so intense that in the early 1960s Motown bought the original Golden World Records studio on Davison Avenue in Detroit and turned it into Motown Studio B.

The refurbishment of the Motown studio and office complex is just as painstaking as the company's record production process was. Ron Swope, Operations Manager at the Museum, says that several professional audio manufacturers have been helpful in this pursuit, notably 3M, which provided hundreds of tape boxes of its classic tape products of the late 1950s and 1960s, including Scotch 111, 206, 202 and 203, to outfit the tape library, where a teenaged Martha Reeves worked as an archivist until one day a singer didn't show up for a session and Gordy asked her if she wanted a shot at it. Martha & The Vandellas' *Heat Wave* went No.1 on the R&B chart the following year.

'It was an amazing place in those days,' says Swope. 'And what we're doing here is trying to keep that magic alive. Because this isn't just history—it's living history.'

Motown Historical Museum, *2648 West Grand Avenue, Detroit, Michigan, US. Tel: +1 313 875 2264. Fax: +1 313 875 2267.*

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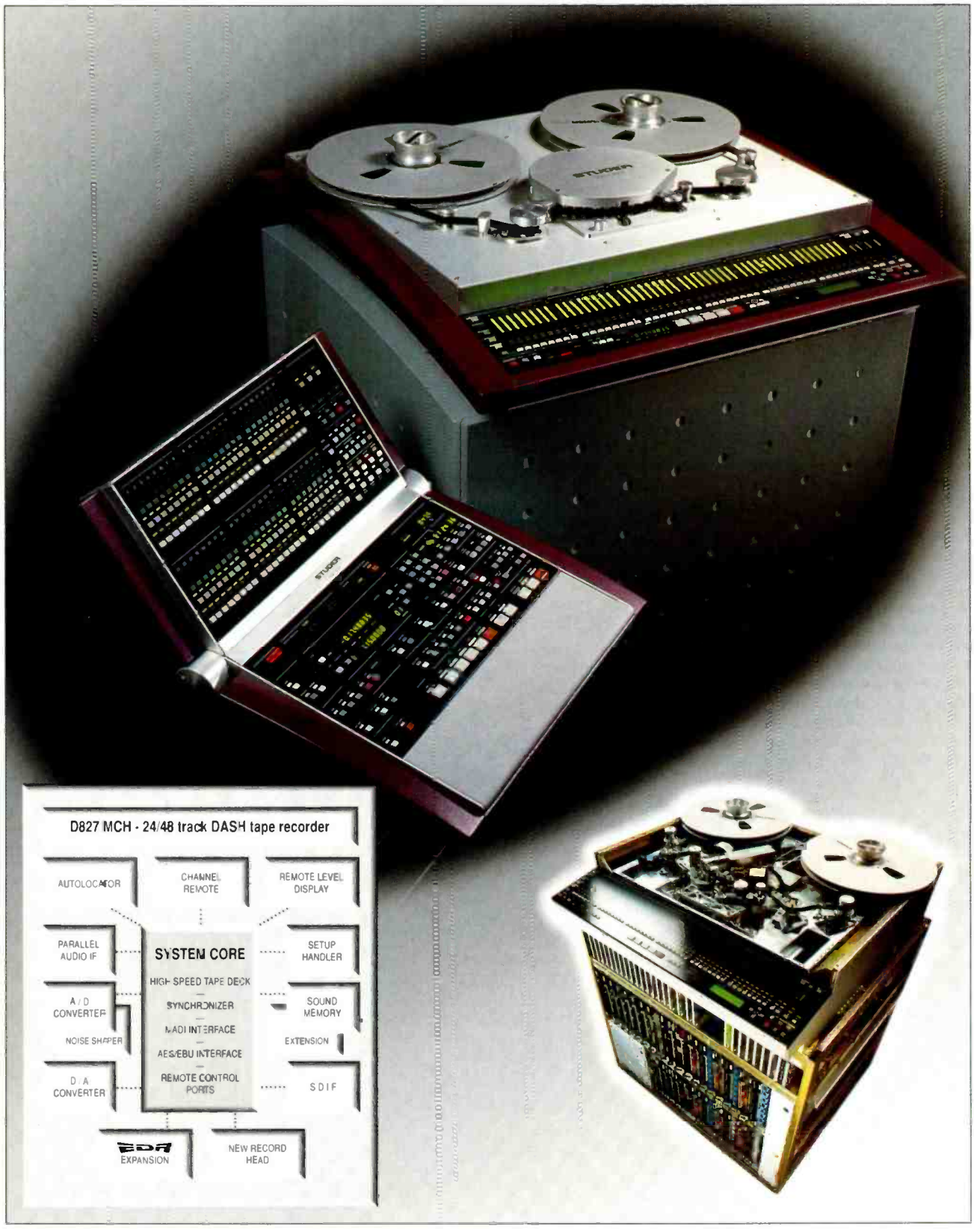

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No hand signals required: the decision was taken early on to leave the voices of the aliens untreated for reasons of intelligibility

Space Precinct

From his string of childrens' sci-fi classics, Gerry Anderson has projected an integrated human and alien society without a puppet in sight.

PATRICK STAPLEY explores the frontiers of society and post

AT AN ESTIMATED $40m, *Space Precinct* is the most expensive American series made in the UK, and one of the most costly shows ever produced for television. Conceived 10 years ago by Gerry Anderson (creator of *Thunderbirds*, *Stingray* and other sci-fi classics) *Space Precinct* has sold to over 50 countries and has recently begun BBC transmission following a 6-month run on Sky.

Representing a departure for Anderson (not a puppet in sight), *Space Precinct* takes two popular formats, US cop shows and space fiction, and combines them in what Anderson and production company Mentorn Films both regard as a recipe for success. 'I was looking for a new commercial format,' stated Anderson, 'so it just seemed like a good idea to launch the NYPD into space.'

The 24-episode series, which boasts more special effects than any previous TV show, has been exclusively produced in the UK at Pinewood and Shepperton with audio postproduction at Air Studios. For Air the contract was something of a coup, and has done a great deal to boost the studio's image as a top, multifaceted facility. The all-digital project involved four Air engineers –Dubbing Mixers Cliff Jones and Paul Langwade, and Editors Beady and Eddie Jones.

Image building: Dubbing Mixer Paul Langwade at Air Studios

'THE WHOLE THING, from the initial sound design through to the final Dolby Surround mix, was treated more like a feature film than a TV series,' observes Paul Langwade who was specially recruited for the project from Thames Television. 'Gerry Anderson got personally involved from the early stages of the audio design and played a significant part in the general outline and the creation of continuity sound effects. It's his baby and he's got very definite ideas of how it should sound.'

Anderson also attended the first mixing sessions and spent a lot of time experimenting with different ideas, before handing over to Supervising Sound Editor, Phil Bothamly, who oversaw the rest of the series. With Anderson's influence so strong, I asked Langwade whether there were similarities between the *Space Precinct* soundtrack and his previous series like *Thunderbirds*?

'As Gerry says, everything he does seems to have a lot of bangs in it and we put a great deal of effort into making the biggest explosions we could as well as creating plenty of variety. For the spaceship sounds, we tried different things, but in the end it was the traditional jet engine sound that provided us with the raw material. But generally speaking the soundtrack was quite different and in many ways unique.'

None of the effects used in the series were taken directly from stock library sounds, all were specially constructed to create what Langwade describes as a dark,

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alien presence.

'It would have been easy to go to a CD and take a laser gun off it,' he says, 'but we wanted an imprint that said "'this is *Space Precinct*" and a whole collection of specific new sounds were needed to do that.

Sound design was begun by Beady, who spent a 3-month preproduction period putting together 500 basic sounds. Beady left the project around halfway through to work in the Far East, and was replaced by Eddie Jones.

'There's a great deal more sound creation involved in a series like this compared to an average TV drama where a dog bark is a dog bark,' remarks Jones. 'Just about everything has been specially constructed from laser guns (electric motors pitched-up with a little added buzz) to alien forest creatures (processed sparrows).'

Jones uses an Akai S3000 sampler with Cubase to sequence sounds which are then mixed to a 16-track AMS Neve AudioFile using a Logic 3 console.

'The main effects processor I tend to use is the Eventide DSP4000 which is digitally interfaced to the desk. It's running the new software and provides an incredible variation of effects, plus it can be used to create individual sounds as well.'

However, the source from which most sounds were built up, was Air's extensive effects library housed in two NSM CD jukeboxes. Each contains 100 CDs providing a combined total of 13,000 sound effects. Sounds are then stored in a separate, fully catalogued Exabyte library which required seven 90-minute DAT tapes. 'There were a lot of atmospheres and effects that were used from episode to episode,' Jones points out, 'but a surprising number had to be designed for each new episode. They regularly introduced new spacecraft for instance, so we had to keep coming up with new engine noises which varied depending on whether they were goodies or baddies. There were also new weapons like the ice gun which deep freezes its victims and was created by using the sound of an iceberg.'

PHOTO: CAROLINE MARDON

'We had to keep coming up with new engine noises which varied depending on whether they were goodies or baddies'

The premix stages were always dealt with in the same order starting with dialogue. This had been edited at Pinewood on an Avid system, and was transferred to Tascam DA-88 for delivery to Air where the eight tracks were autoconformed into a 16-track AudioFile.

'Dialogue was premixed to four mono tracks,' explains Langwade. 'We'd end up with the main dialogue premix on one track; another track containing any dialogue that needed to be effected in some way—coming over the RT of the police cruiser, or turning into a strange alien voice; a third track for sections of dialogue that needed to be kept separate from the premix so they could be treated differently during the final mix for crossovers and so on; and a fourth track for live sync sound that could be useful to mix in with Foley and spot effects.'

While the dialogue was being premixed, Eddie Jones would be busy in one of Air's Preparation rooms laying-up background atmospheres. These were backed-up from AudioFile to Exabyte and brought to Langwade for the next premixing stage, which normally resulted in two checker-boarded stereo pairs per scene. Once this was under way Jones would lay-up the effects tracks which again would be given to Langwade on Exabyte.

'There's was no way I could play off everything from my AudioFile, so we slaved two DA-88s giving us a total of 32 tracks. The first DA-88 included the background premixes across the first four tracks, while the remaining tracks contained premixed spot effects.

'When things got really busy, like in a spaceship chase where there would be loads of effects going on at once, I'd premix to the DA-88, but leave most of it on the AudioFile. The aim was to keep as much separated sound as I could for the final mixdown.'

The second DA-88 was used exclusively for Foley which had also been prepared at Pinewood. Music usually arrived the day before the final mix on a stereo DAT, and this was transferred directly to AudioFile. As everyone was working to the final cut, time codes matched up perfectly and according to Langwade there were never any syncing problems.

A LOT OF THE ADR was done at Pinewood which meant matching ambiences on the replaced dialogue. Some of the larger aliens included motor driven mouths, as the head assembly was too big to be controlled by an actor's jaw movement. In these cases a prerecorded voice sampled into an Akai S1000 was used to provide the live sound. This, rather ingeniously, also simultaneously triggered a preprogrammed computer sequence that controlled mouth movements to produce perfect lip sync.

As far as alien voices were concerned, It was decided quite early on that they should remain untreated for reasons of intelligibility, and there were only a few occasions where Langwade created special voice effects. Other effects such as the RT sound between station and ships, were also played down.

'Gerry Anderson was quite definite that he didn't want the typical distorted squawk box sound. Because the series is set in the 21st Century, he felt that the quality of communications systems would probably have improved by then—the only problem is that if you have a completely clean sound, you don't know who's on the radio and it can get very confusing. In the end though we reached a compromise and produced a semi-distorted sound.'

However, Langwade did get the opportunity to be more adventurous on other occasions as he explains. 'In one episode there is this strange floating orb that has the ability to pass through walls, and we had to create a sound for this. I ended up sending the output from one Lexicon 300 to the input of another and then feeding its output back to the input of the first, creating a feedback loop. I then messed around with the programmes on both units while recording to AudioFile which created some very unpredictable results. We picked out the best sections of this and edited them to picture.

'On another occasion, we had a lot of trouble with the footsteps of a *Robocop*-type alien in an episode called ☞

Space Precinct is the combination of two formats: space fiction, and, of course, the American TV cop show

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Time To Kill. The Foley wasn't quite there—I think they'd used scaffolding poles banged down on to a concrete floor to produce the sound. To make it a bit less 'clangy' and a bit more futuristic, we ended up sampling a fax machine, which was repitched and edited. We then triggered this using the original footsteps, and blended the two sounds together.'

A difficulty Langwade experienced with the soundtrack as a whole was the overall density of sound. This he says was not simply due to the fact there was so much going on, but also because it was being mixed in surround.

'It meant that you had to work much harder to make things really stand out. Gerry Anderson wanted the explosions as loud as possible, so we were continually working to the limits that television dynamic range would allow to make them really impressive.

'We were continually working to the limits that television dynamic range would allow'

'We also had to be very careful that what we did in surround translated back to mono, bearing in mind that most people are going to be listening to it through a 2-inch loudspeaker! It would have been easy to get carried away and have spaceships flying all around the room, but in mono you'd probably find there was very little there.

'Towards the end of the series I had a standard desk layout that I could call up and modify for each particular episode. The general rules were that dialogues went straight down the middle and reverb returns for dialogues didn't go anywhere near the surrounds. As soon as you start hearing dialogue bleeding through on to the rear speakers it can be very distracting.'

The music track largely took care of itself due to the fact that Crispin Merrell, who wrote and produced all the music, had mixed the stereo image to work in surround. Although he hadn't actually mixed in surround.

FOLLOWING THE 'FINAL' mix, a mix review pass was also done, and this usually took place on a different day to aid objectivity. 'Hearing things again fresh, we'd often try out a few different spot effects or whatever was required. It all remained very flexible thanks to the all-digital system, and even at this late stage it was very quick and easy to make changes. Often there would be a number of alternatives to choose from—spots that we'd track laid, spots that Foley had done, and effects that may have existed on the original sync tracks. Sometimes it was a case of mixing together all three, and in this respect it became both a mixing and selection process.'

Once everyone was satisfied, the mix was laid down to two time-coded DATs (one acting as a safety copy), and it was then transferred back to the Digi Beta master. After that, Langwade mixed the M&E.

'Because of the automation, this was very fast to do. It was simply a matter of running the original automation, dumping the dialogue tracks and then mixing in a bit more Foley to make up for any sync sound that is missing from the original dialogue.

'The integration of different systems was very successful and extremely efficient. Also the fact that the whole production remained digital all the way through counted for a lot.

'Transferring sound from Pinewood to Air worked without a hitch, although it would have been an added bonus if OMF had been up and running as we could have just taken the Avid files from the guys at Pinewood and loaded them straight into AudioFile without autoconforming. Perhaps, though, we'll be able to do that next time.'

Each episode was completed at Air in roughly 12 days, slightly longer than had been originally forecast. 'We were actually aiming to turn around each programme on a ten-day schedule,' says Langwade. 'But things got a little more complicated when the BBC decided it wanted to edit out a certain amount of the violence which it felt wasn't appropriate for the 6pm slot. We had the added complication that Sky TV had made its own edits which we weren't particularly pleased with from the sound point of view, so it meant reloading the system and remaking a lot of them.'

Space Precinct is currently being viewed (and listened to) by millions all around the world. At the moment there is no word on whether a second series is to be commissioned. But if not, the highly creative Mr Anderson has some other ideas up his sleeve including a show called *Apeman*. Air is currently stocking up on monkey noises—just in case. 8

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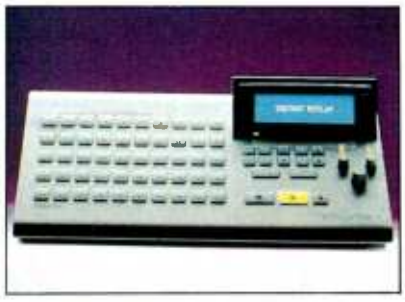

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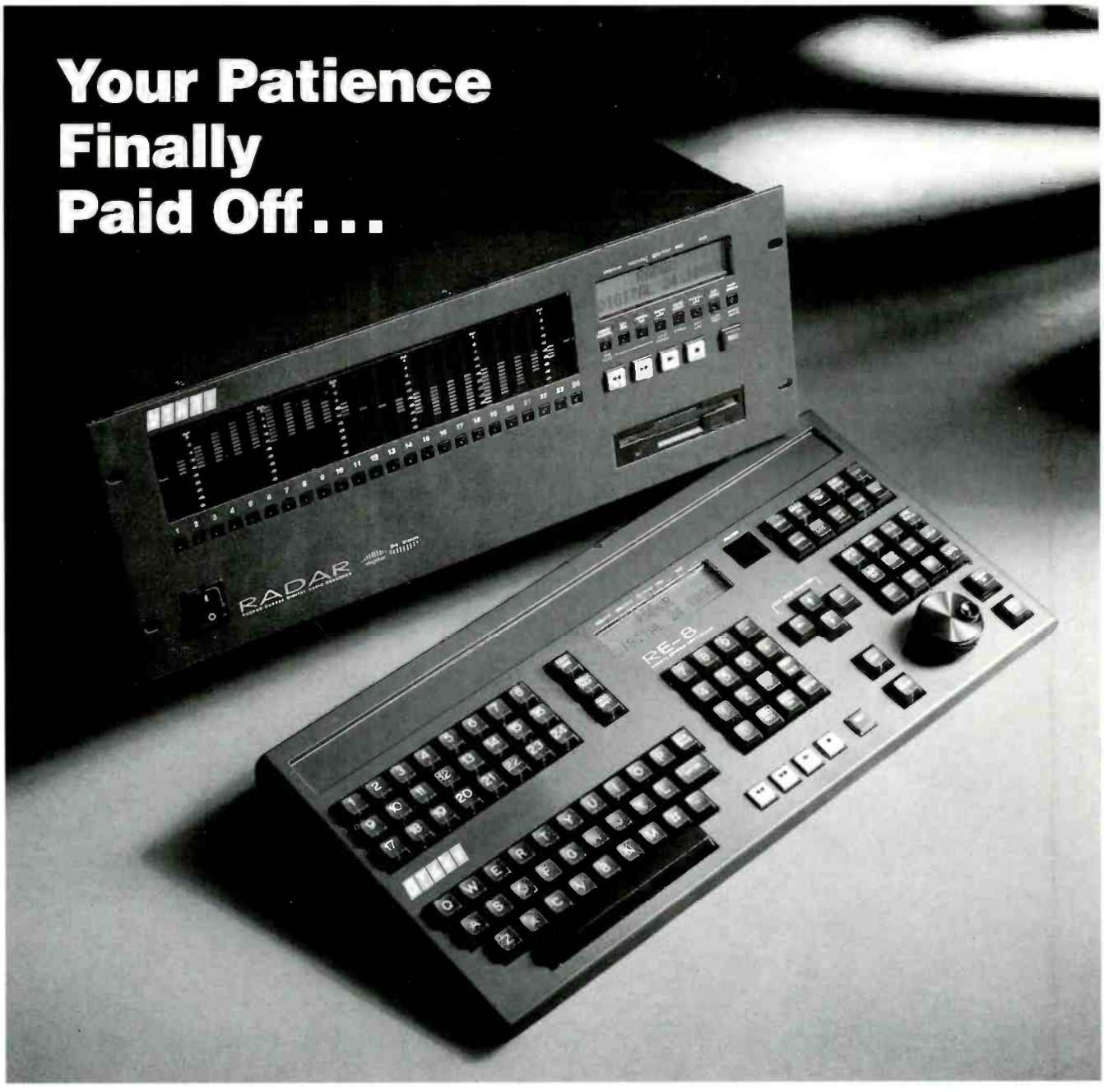

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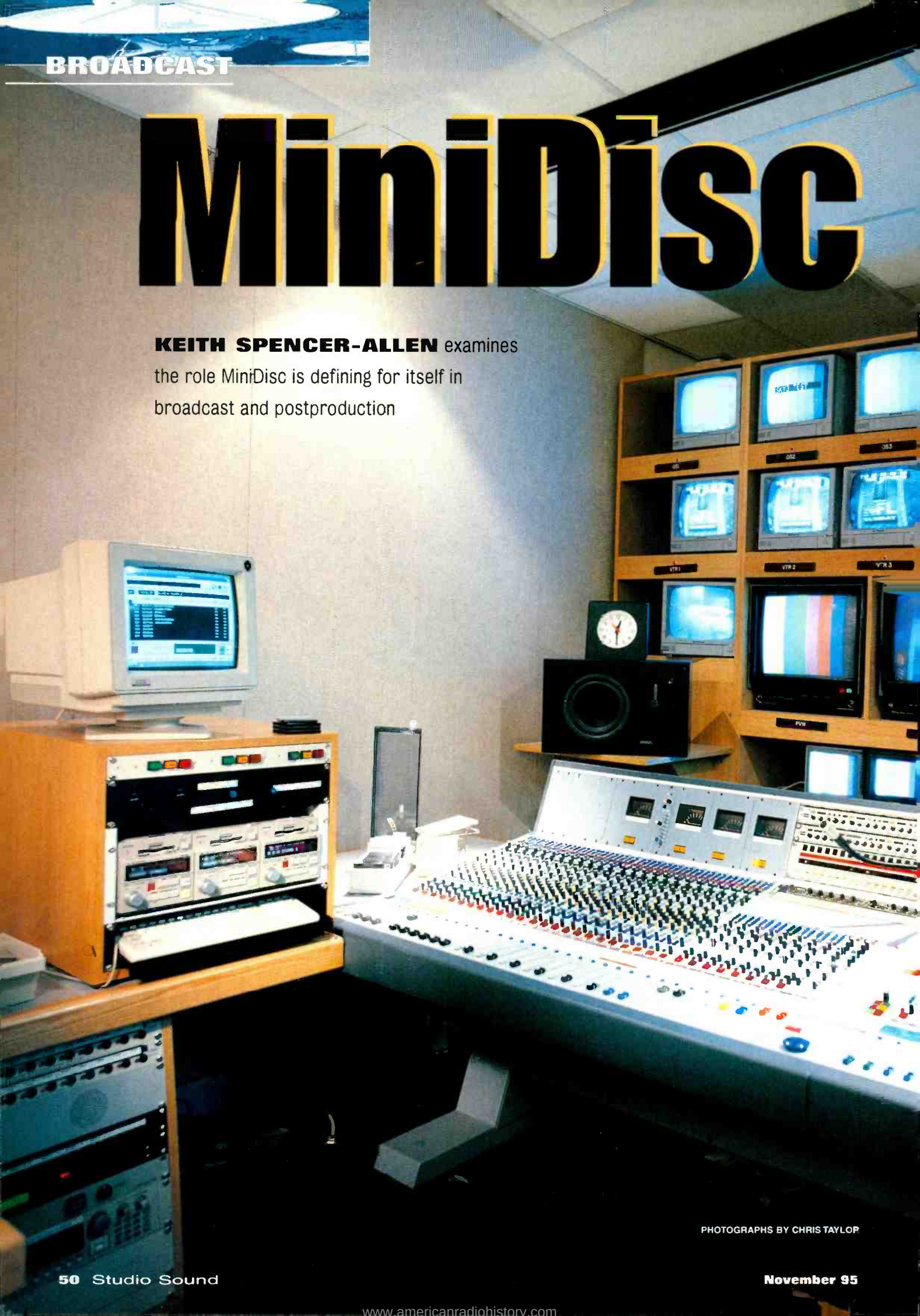
MiniDisc

KEITH SPENCER-ALLEN examines the role MiniDisc is defining for itself in broadcast and postproduction



PHOTOGRAPHS BY CHRIS TAYLOR

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moves

THE PRO-AUDIO INDUSTRY has done well out of consumer products rejected by their primary market. Sony's PCM-F1 gave us low-cost digital recording; DAT added a more practical medium at even lower cost. And while the consumer may not have rejected DCC and MiniDisc outright, neither have made much headway—yet MiniDisc's portable, compact, nonlinear format is finding increasing favour with specific professional applications.

What is the attraction of MD over CD-R? It isn't quality—to achieve the required recording time, MD uses a data-reduction system known as ATRAC which is effective but definitely sub-CD quality. There are, however, features in the original MD format that have professional appeal. Editing tracks, reordering, adding new tracks, and labelling tracks are all very practical facilities to the professional user and explains why MD is finding a home in broadcasting.

The first pro MD systems appeared some three years ago with television people taking a serious interest about 12 months ago. TV trailed radio users who had already begun to use MD widely. For this article three different TV companies who used MD were approached for their experiences. As with any new product, it is sometimes difficult to differentiate between facilities offered by the hardware and limitations inherent in the format as it now stands. Much as with DAT, if the will to develop exists, then products can change.

CHANNEL ONE is a cable TV station, at present only available in the London area, with heavy emphasis on news. Launched a year ago it is based in the old Channel 4 building. The two studios and dubbing suites are all equipped with MD. During setup, Head of Sound Peter Thurlow, was evaluating many possible formats. 'Having grown up with ¼-inch tape and carts I was a little sceptical but it was a possible choice,' he recalls. 'We experimented with a domestic MD and it worked. So we opted for that format.'

All music at Channel One is now handled on MD. 'We tend to use them quite simply—for playing small sections of music under menus or competitions, for stings. We also use it for effects and recording programme telephone calls. A lot of preparation work is handled on Avids and any spot effects used would be on MD. It has become the means of moving sound around the company and playing it.'

BSkyB: Europe's main satellite TV service is growing rapidly with multiple channels of news, sport and entertainment. It is also a heavy MD user

As with most TV production, time pressures dictate a high speed of operation. First generation MD players were very slow to load in tracks on a newly inserted disc for playout; with discs arriving from multiple sources during the programme it was not as practical for use as carts were before. Recent software updates have improved on this considerably but it did highlight a problem of the MD format, that users would prefer to copy tracks to a single disc for playout rather than use separate discs. Copying machine to machine, however, just transfers the audio and the other features of the MD such as track naming does not copy over.

This has been recognised for some time. Denon has a software package that allows complete transfer of all recorded data via a PC and the more recently introduced MD duplicator that allows production of total clone MDs at nearly 3½ times real time.

PETER THURLOW: 'We have now begun to make up compilation MDs that contain all the music for a specific

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MINIDISC MEDIA

At present MiniDisc blanks are available from TDK, Maxell and Sony. Denon has its own brand but these are not widely available. French company MPO has just started manufacture and will be marketing these under its own name and on an OEM basis. Sony has a 74-minute disc PRMD-74 identified as for professional use.

None of the facilities I talked to had any preference for different brands of MiniDisc discs. There was also an awareness of potential problems. Sky has used over 300 discs and found just one instance of dropout. Channel One's Peter Thurlow had a situation where searching through a newly recorded track, the machine threw up an error message and has since refused to play that track.

BBC TV's Jon Sweeney reports two recording-related problems. Problems appear to increase when undertaking greater amounts of editing, writing to and from the disc TOC (table of contents). None of the facilities reported any compatibility problems between machines and were generally happy with everyday MD use.

All the users were aware of the quality question but as Jon Sweeney put it: 'If you've got a show that is hitting PPM 6 a lot of the time and with a live audience and the associated PA coloration, the quality deficiencies of MD are not going to show through.' The general feeling, however, was that it is so far superior to the carts that proceeded it that such complaints are irrelevant.

programme and this is more efficient. The small size of the box to identify contents is something that you need to find a way around.'

Uniquely, Channel One uses the 'nonstandardness' of MD as part of its music administration. The only way of playing music is on MD and the only CD player for transfer to MD is monitored closely so that any music intended for broadcast can be fully cleared and administered before use.

While the styling of MD machines is based around the appearance of NAB cart machines, it is not always cart machines that they are replacing.

BRITISH BBC TV Saturday morning children's programming centres around *Live & Kicking*, a 3-hour live show with music, guests, games and sound effects and originates from BBC TV Centre in London.

'In the old days, we would prepare four different 1/4-inch tape machines,' comments Jon Sweeney, a Sound Assistant who acts as Deputy Sound Supervisor on *Live & Kicking*. 'It took a long time, most of which was basically rerecording the same things and putting them in a new programme order. It didn't give us the flexibility we needed to respond to the needs of production.'

Because the show is so busy there is a sound crew of up to ten, two of whom are operating, in BBC parlance, Grams—or all the recorded material, music and sound effects. Two systems are used: an Akai S1000 sampler with a 16-way trigger system and a bank of three MD machines, one of which has a prototype Denon trigger box to allow instant triggering of up to 10 tracks. In use, the spot effects come from the sampler while all the short music beds, background atmospheres, the sea and creaks of the boat in the 'video galleon' set are from MD.

The MD machines were used for some of the last series and all of this—about 12 shows so far. Aside from the 1/4-inch tape machine for playing out the artists music tracks, there are now no tape machines used. The current arrangement is not necessarily the way that the operation will remain; they want more instant triggers for the MD players but it is a learning curve for everyone.

The track-naming facility is used to identify the tracks on MD but these are changed if the same effect is referred to in a different way in that week's production script. It is that kind of flexibility that appeals to the production crew.

Sweeney operates with a bank of three MD machines. Normal practice so far is to ensure that consecutively required tracks come from different machines. This provides cover should there be the need to change discs in one machine and the variable amount of time that it can sometimes take a disc to fully load and be ready to play out. We are still only talking in terms of seconds but in live TV that can be too long.

'When using 1/4-inch tape, while one was playing out you would be hoping that the next track was the one you wanted It was play it, cue it and rewind. With MiniDisc it is possible to watch the monitor a lot more.'

Several other BBC shows have been using MD—the last series of *Noel Edmonds' House Party* used it extensively as does the *National Lottery* show, but the latter only in a backup mode to 1/4-inch tape and an Akai sampler system.

BSKYB IS EUROPE'S principal satellite TV service. Based in West London, its facilities are growing rapidly as they service multiple channels of news, sport and general entertainment. Currently, there are five studios, nine transmission suites and numerous dubbing suites. At certain times all five studios can be live on air. Sky is also a heavy MD user.

'It all started about a year ago when we were beginning to do more stereo programmes. We were using NAB carts everywhere but azimuth errors and reliability was just not good enough. We started looking for a cart replacement system and looked at everything,' said Vaughan Rogers, Sky's Head of Sound.

'We thought MD looked interesting but there was no immediate feeling that it was suitable for us. But it did meet a requirement within a sports programme where match reports are phoned into the show, some going out live—others recorded. Normally these were done on 1/4-inch tape but there were problems if the running order was changed, finding the right take and filling in. MD looked like it could handle that at the flick of a switch. We bought one and realised that it did most of what we wanted from a "cart system".'

Sky also uses a hard-disk PCX system for some audio sources and consequently made numerous tests on copying between MD and PCX to check the cumulative effect of using different reduction systems. These, according to Sky, proved quite acceptable. The decision was then made to move to MD which took a period of five months. This entailed compiling MDs containing all the sound stings, cues and

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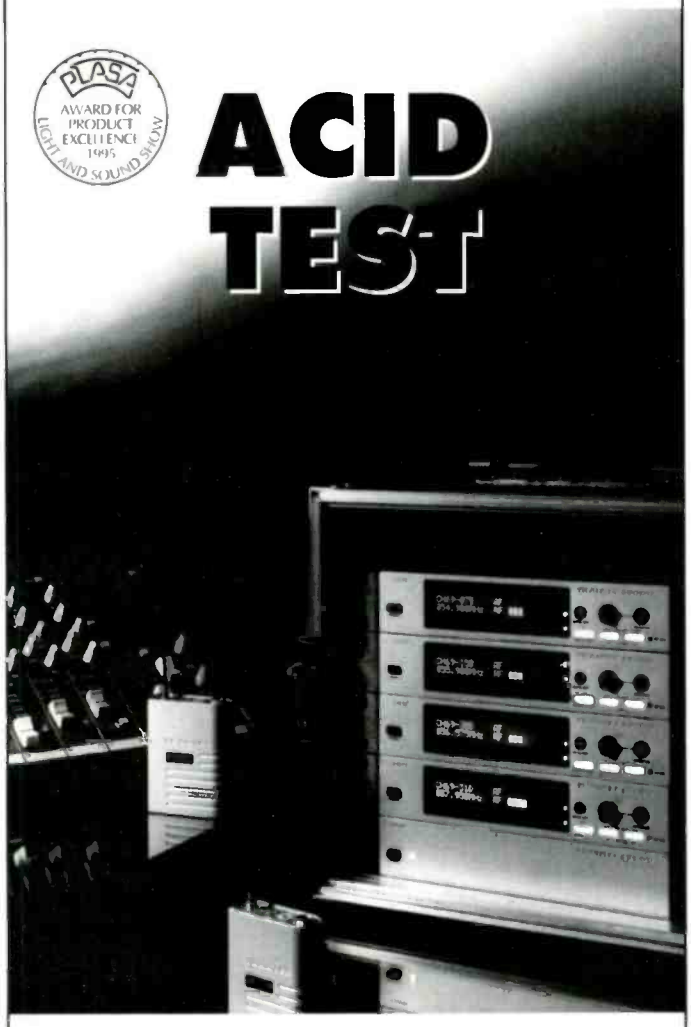

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bubbles for each programme.

'What became clear very quickly was that a cart has one sound on it and enough space to write what it is. A MD may have 200 tracks on it but no room to write. So we had to divise a catalogue system; now each disc has a number and a programme name. There is a paper catalogue of the tracks and also a database on the studios BASYS news computer that has terminals in most studios. We make a master for each compilation which is held centrally. Each studio then has two copies of each disc. If material is added to one disc all the others with the same number are also updated so every same-numbered disc in the studios should be identical.'

Rogers added that the housekeeping was probably the most difficult part of running the system. Sky now has 14 MD units and they have proven reliable. The only problem time is when they are working in a very hot environment they become more prone to errors. Although there are still a few cart machine around the studios they are now used just for material from outside, and, as it was put to me: 'no one has looked a cart in the face for over nine months'.

MINIDISC IS NOW quite integrated into Sky's audio-production techniques. Each studio has a block of three machines –a recorder and two players. The operators are quite to happy fire-off tracks from the front panel and according to Sound Engineer Martin Black: 'There isn't another replay system that is faster to play from the cue than MiniDisc–it's virtually instant. You are always aware that there is a loading time with a new disc, unlike with carts, but with two copies of each disc in each studio there is no need to do that.

'Also you can make loops on MD–it's tricky trimming the ends but it means that we can run loops of 30 seconds of music as long as needed under football results. It is not as sophisticated as the 3-point looping on the PCX but it works fine and saves disc space.'

> 'There isn't another replay system that is faster to play from the cue than MiniDisc–its virtually instant' Martin Black

Vaughan Rogers: 'Although we still have some ¼-inch machines, I can't remember the last time we used them. The combination of MiniDisc and the PCX computer works very well for the moment. MiniDisc is generally more resistant to operational accident erasure than tape.'

Sky has also brought gentle pressure to bear on the mobile facilities it uses–such as 021 and VMTV to add MD facilities in their trucks for Sky OBs. Sky then let them have a copy of the relevant MD so that the show can retain the same form for when the production is done on site. The compact size of the MD player is also beneficial in the remote OB truck as is the ease of transporting the music tracks with no need to transport large numbers of carts.

Sky has two PCs loaded with the Denon ACD-19 MD copying-control software but control of the MD is still preferred to be local on the machine. Sky has also found that the MD copy made via the PC is a few frames longer and as such requires slight adjustment if the copy is of a loop from the master MD if it is to work. Sky has expressed interest in the DN-045 MD duplicating system which will apparently produce an exact bit for bit digital copy.

At present most spot effects are played out from the PCX computer but Sky is looking at the Denon 10-way remote to use with its MD machines and then it may be that MD will also be used for that type of work. Due to MD's lack of time-code capability, Sky's only use in postproduction of MD is to download sound effects for its DAR SoundStations.

DEVELOPING TECHNOLOGY invariably has shortcomings. Common criticisms from most commentators include two points that could present viable directions for research. The first is the ability to locate to a particular location in a track more quickly that holding down the fast wind button would be useful. The second is the wish to see a system working without the ATRAC compression. It would dramatically reduce the record time but several users had ideas as to how they could use such a product.

Possibly most telling about the acceptance of MiniDisc in the TV environment is that almost everyone turned to MiniDisc as a replacement for NAB cart machines but after experience with it all used the comparison of a ¼-inch tape machine with MiniDisc by implying that they would not have the room to install enough tape machines to duplicate the MiniDisc facilities at their disposal. MiniDisc has arrived in TV.

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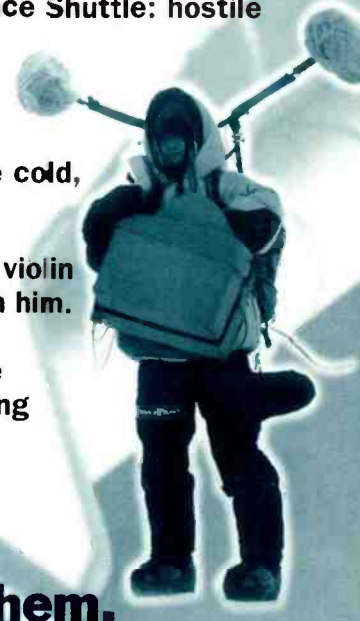

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The BBC's DAB hand

Looking forwards, but facing backwards, the move towards DAB sees the BBC in further difficulties writes **KEVIN HILTON**

Unlike the bowl of petunias in *The Hitchhiker's Guide To The Galaxy*, there is a ready explanation as to why BBC publicity 'minders' would have thought 'Oh no, not again' in recent weeks.

As the BBC has rushed to be seen as pioneers of the broadcasting frontier, enthusiasm for digital has undermined any good work that has gone on behind the scenes. The first digital debacle came on 27th September, which was hailed as the start of the third age of radio.

Even before this, the word 'launch' was dropped in favour of 'a switch-on', emphasising that these early days were merely a pilot scheme before the full introduction in two to three years time.

Matters weren't helped by some newspapers splashing stories about the start of Radio 6, due to the extra capacity of the multiplexes. A publicity person commented to me that, at present, the proposed new services didn't even add up to Radio 5 and two-fifths.

DAB Managing Editor Glyn Jones said that it would also have been difficult to establish a new technology with unfamiliar programmes, but added, 'The five core networks are not the whole story—instead we will use the flexibility of DAB to give extra value.'

This includes additional sports coverage on Radio 5 Live Sport+, live relays of the House of Commons, World Service broadcasts in Urdu, Hindi and Bengali, mini-dramas and speech pieces, known as digital miniatures.

There's also BBC Now, an embryonic audio-on-demand service, giving access to news, travel information, weather reports and radio shows when the listeners want them, not when programme planners decide to put them out.

Given the Beeb's public service brief and publicly funded status, there were concerns over whether this meant pay-per-listen. 'Would there be public demand for radio that you have to pay for?' was the reply to such queries. Well, that's what we were asking you, everyone mentally retorted.

Earlier, BBC Network Radio Managing Director Liz Forgan had proudly proclaimed that, as a public service broadcasting enterprise, DAB was providing better value for the licence fee, inadvertently reminding us that, strictly speaking, UK listeners already pay for BBC radio.

Things were not going terribly well, and deteriorated when someone rashly said that the DAB system being used, Eureka 147, was a world standard. There was a stunned silence. Such a comment is like saying that Shaquille O'Neal is merely one of the tallest people on a basketball team.

After that it was a bit like shooting fish in a barrel: the lack of large numbers of suitable receivers, confusion over when or whether analogue would be shut off in favour of digital (which ignores the fact that DAB is seen by others as a way to free up the present crowded spectrum), and the revelation that DAB's current home was only a parking band, which could mean the building of yet another new transmitter network in the future (the incoming DAB transmission system will cost £10m over three years).

Members of the BBC's Engineering Policy Unit ran around putting out the fires, but the lessons learned on that occasion were not heeded less than two weeks later when the Corporation gave its response to the Government's White Paper on digital terrestrial television (DTT).

Lined up this time was the Director-General John Birt, who emphasised that the Corporation's TV operations also wanted 'to pioneer and develop its full potential in the digital age'.

The catch is that the BBC is now demanding a multiplex to itself, something precluded in the White Paper, which clearly states that the ITC should reserve a 6Mbits/sec place on a single multiplex for BBC 1 and 2, ITV, Channel 4/S4C and the proposed C5.

With a multiplex all to itself, Birt sees the Corporation offering its two networks in widescreen, plus Ceefax and a free-to-air DTT programme guide. Rather like DAB, the BBC is also considering a rolling news service, live broadcasts of Parliament, uninterrupted sports coverage and relay of such arts events as the Proms.

'Oh no, not again', the minders must have been brooding as the press corps turned on the suits, especially when Birt announced that the Beeb would also need space on a second multiplex to work with its commercial partners. 'We do not see ourselves as some conquering army,' countered Birt. 'We wish to have the same role in digital as we have in analogue.'

As well as the bullish ambition, pushed by Birt's free-market philosophies, it is the bandying of technical buzzwords which has got the BBC's top executives into difficulties. Just like the DAB presentation, there were awkward questions over the availability of suitable equipment, suggestions that all digital services could be integrated into one box, and the analogue switch-off (which was spuriously compared to the implementation of both colour and VHF broadcasts).

The only conclusion to be drawn from these frustrating, unintentionally funny confrontations is that many broadcast executives are only now catching on to the emergent technologies. Armed with bullet points supplied by their minders, they blithely announce how it will change the face of broadcasting, without really knowing how it will all happen.

Many broadcast executives are only now catching on to the emergent technologies

If you think this is unnecessarily cruel, then boggle at John Birt's advice to a largely technically aware group of journalists to get a demonstration of widescreen digital television, which would prove how good it can look and sound.

Protestations that this was really nothing new to us were cut short by the Director-General and his entourage getting up and leaving the room. I rest my case.

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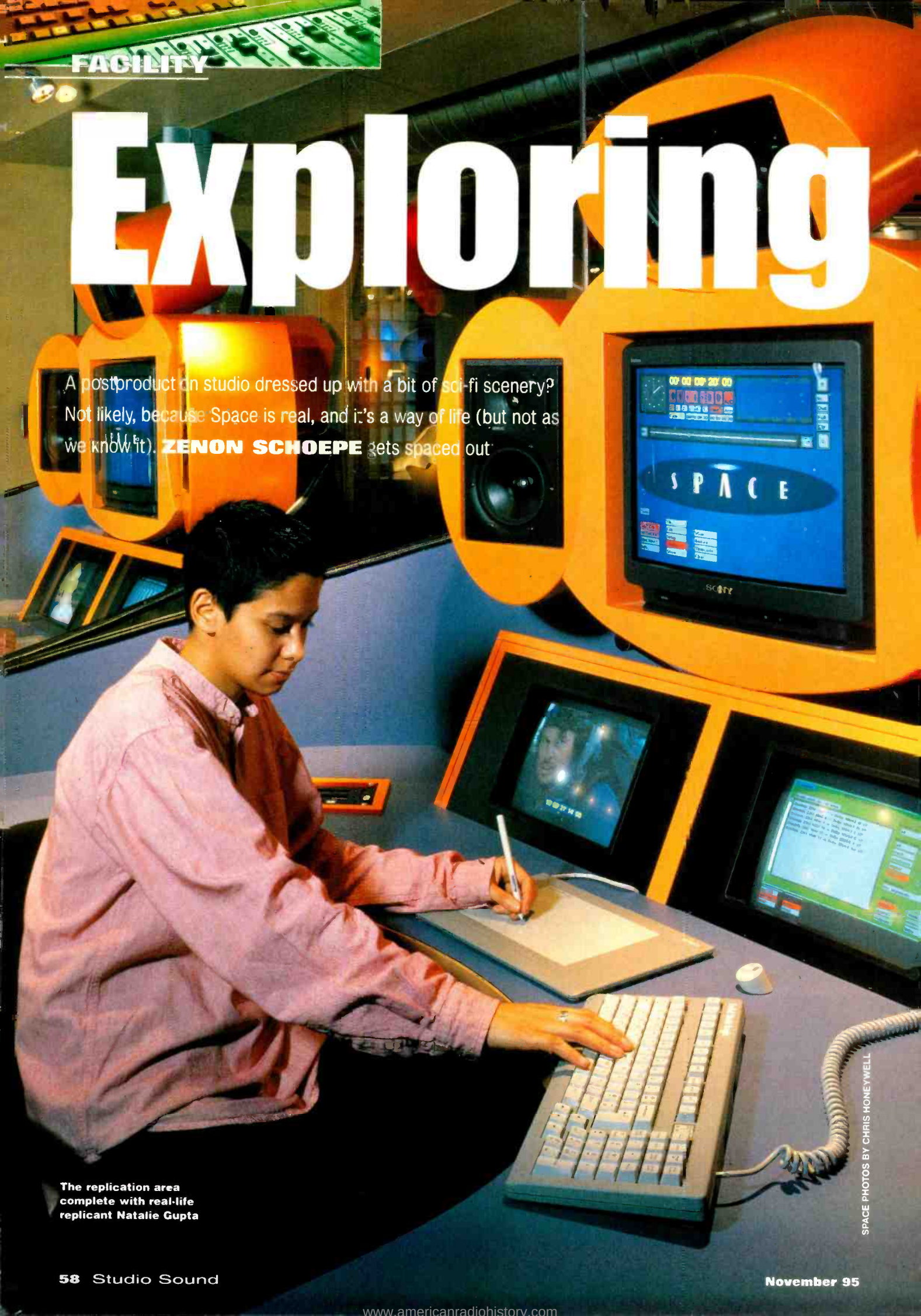
Exploring

A postproduction studio dressed up with a bit of sci-fi scenery? Not likely, because Space is real, and it's a way of life (but not as we know it). **ZENON SCHOEPE** gets spaced out



The replication area complete with real-life replicant Natalie Gupta

SPACE PHOTOS BY CHRIS HONEYWELL

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Space

YOU HAVE to see London's Space Postproduction for yourself. It defies description. While some studios impress with their vibe, architectural design, scale or application of technology, Space combines all of these properties in a truly unique way. You leave with the feeling that you've never seen anything like it before –and you haven't.

The visual impact of Space is matched by that of its technology; the place is loaded with four SSL OmniMixes, one Scenaria and two ScreenSounds with VisionTrack, housed in five rooms and one double-decker transfer and control bay.

Pitched at the overcrowded, although extremely busy, London Soho post scene, Space was announced to the industry at the Paris AES Convention–to a sceptical audience. The information that followed the announcement was draped in mystery and good-natured hype. MD Robbie Weston and Technical Director Rick Dzendzera played up the Space name with a line, which they still adhere to now, that they had stumbled unwittingly on a buried space ship in Soho, had made contact with aliens, and proceeded under orders to adapt it for audio post.

There were pieces in tabloid newspapers with headlines proclaiming that they had been kidnapped and interfered with by extraterrestials–'Aliens sucked our blood', read one headline, 'Studio chiefs tell of aliens' bloody nerve'. Weston has also pointed consistently to the deep significance of the letters UFO in Space's Dufour's Place address *(editor's note: as far as we can tell this is the only address in London where the letters U, F and O appear consecutively and uninterruptedly.)*

Asked why nobody else had discovered the spaceship that has allegedly been lying dormant for 400 years in Soho, Weston replies: 'It's because the aliens have been waiting for people sympathetic to their cause who aren't just scared and run away but are prepared to go along with it.'

Similarly he can explain the reason for the surround capability of every single room including the transfers bays. 'The original aliens had four ears and four fingers, their entire culture was built on a four. The whole business about "May the force be with you" is a complete misunderstanding–it's "May the fours be with you". Lucas missed that which is why he's been left out of this entire secret.'

The spaceship theme is carried throughout the design and decor of the complex with sheet metal surfaces, futuristic shapes protruding from flat surfaces, landing lights either side of a ramp that leads to the first floor, and large custom-built IAC isolating doors (to an original alien design), windows and interestingly lit passages that would not be out of place on an Alien set.

The four OmniMix rooms are referred to as Cabins, the Scenaria room the Explorer Module (it was originally a detachable pod from the main ship which is now used for sound design and autoconforming), while the glass-lined transfer bay adjacent to the reception area is referred to as Replication and is entered via a sideways sliding glass door a la Star Trek. It is weird to behold.

Space cost £2m and is being readied for a Halloween launch. It is the latest facility to be owned by Robbie Weston and partners who already own The Bridge and Silk Sound post facilities in London. The effect of the single biggest SSL digital facility on earth being opened in Soho will be profound as it adds to the increasing SSL user-base in the UK capital and becomes SSL's flagship installation. A spate of upgrades followed its announcement with competing facilities keen to see through any changes 'before Robbie's place is up and running'.

'The scene is hugely buoyant,

...they had stumbled unwittingly on a buried spaceship in Soho, had made contact with aliens, and proceeded under orders to adapt it for audio post ...

THE ROOMS

REPLICATION The reception area adjoins Replication with its two stations also with Genelec surround monitoring and multiple screens for conducting pre-session and post-session work, copying, transfers, and administering and supervising the whole network system. This area houses all the machines and transports. Rick Dzendzera proudly proclaims that there is no moving tape in any of the cabins, and that everything from audio sources and destinations, machine control and ISDN links via APT DSM 100 codec and CCS Prima 220 codec passes through, and are accessed from, the Hub.

Sound effects are stored on a central CD Jukebox and there are also stereo links to The Bridge and Silk Sound.

A matrix is also located here for video distribution through Pro-Bel HD analogue video routers, a System 2 controller and a variety of panels. 'We must be the only sound facility to have spent this sort of money on a Pro-Bel video router,' comments Robbie Weston.

The machine room represents the largest congregation of SSL digital racks ever assembled. Dzendzera draws attention to the fact that a track-working week of digital audio is available on line which translates to a track-working day per system.

CABINS Dotted around the 6,500ft² of floor space on two floors are the four OmniMix Cabins each with its own associated voice-over studio. The rooms are deliberately designed to be as near identical in proportions and contents as possible. It is easy to believe that Space has, in fact, only one Cabin but with multiple doors leading in to it, so similar are the layouts of these rooms.

Central to each Cabin is a triumvirate of elliptical LCR speaker clusters with the video monitor mounted atop a large rock-type structure set off by strangely drilled and shaped metal panels and beams that combine to give a futuristic look. Marvellously winged tables house the OmniMixes and open up the traditional sweet spot to give an expansive feel.

'The advantage of surround sound is that it does away with the configuration of the engineer at the front and the clients behind,' says Weston. 'This arrangement allows for lots of eye contact and lots of space.'

It's glaringly apparent that they have had an incredibly amount of fun designing this complex.

EXPLORER MODULE The Scenaria is positioned into what is probably the prettiest room at Space. Dedicated to sound design, autoconforming, synthesiser and music programming, equipment racks are mounted in the sloping surfaces above the SSL with the large Sony video monitor giving the impression of being a porthole out into deepest space.

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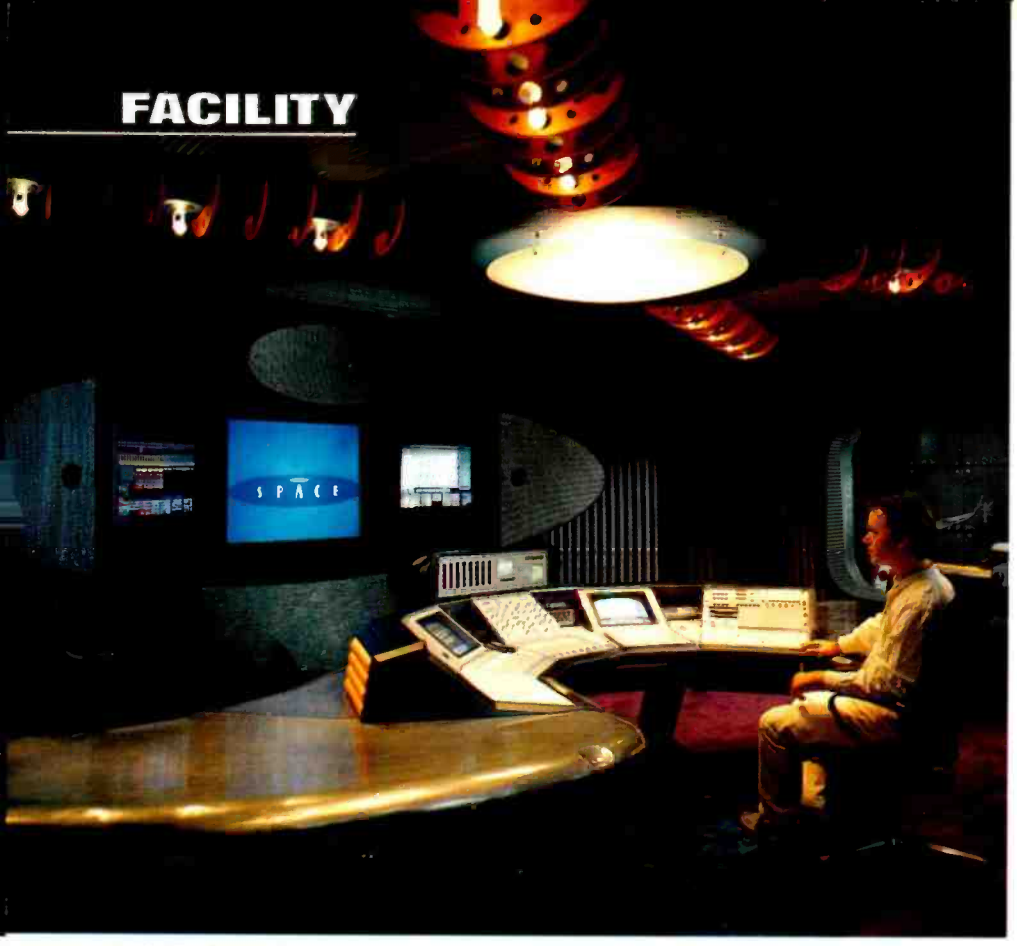

Cabin Engineer (Operator) Killian Fitzgerald caught staring into space

phenomenally busy, outrageously overcrowded in terms of people chasing sessions—we're building it because the demand's there. We wouldn't be doing it otherwise,' comments Weston.

'I prefer not to listen to what some people say. I like it when they say nice things like we're completely barmy, we've chosen the wrong equipment and it will never work because I feel reassured that we're on the right lines,' he continues. 'When we bought the Opuses everybody said we were completely mad and it would never ever work. I was quite sad when we bought the OmniMixes because only half the people said we were absolutely mad and it wouldn't work. I wavered for a moment.

'To me it's the contrary theory of investing—when everybody else is buying, you sell, and when everybody else is selling you buy—you go against the flow,' he says.

It begs the question of whether opting for SSL is part of this contrary theory of investing. 'We don't believe in a mix-and-match philosophy,' he replies. 'We went totally Lexicon at Silk, totally Lexicon at The Bridge and we would have gone totally Lexicon again if they had a product that matched what we needed. But they didn't.'

Dzendzera agrees: 'We don't believe in confusing people,' he says. 'If each room has different types of kit and is not compatible, when you have to restore a job on one system and copy it onto a Tascam DA-88 to get it into another, then it's crazy. It's difficult for the people making the bookings and it's difficult to administer such a nightmare.'

Thus 'brand buying' was a precondition of the Space installation—the short list of suitable systems came down to just three manufacturers: Lexicon (Weston: 'They couldn't deliver because they've been "Harmanised" and they don't see the focus of their business being in high-end audio workstations'); AMS Neve (Dzendzera: 'They couldn't integrate in the way that this does, not in a way that every audio source and every destination is all part of the same system on the same matrix'); and SSL. SSL got the contract but the system is not SoundNet which takes care of the facility's interconnection of storage for the various systems, but a new SSL system derived from its Axiom technology called the DiskTrack Hub which has been applied to its digital post products as a crosspoint matrix, A–D/D–A and sample-rate convertor. It was developed specifically for Space and is now available to anyone.

'The Hub is central to the entire installation and was the biggest plus point in SSL's favour,' explains Dzendzera. 'We were starting to plan the wiring and what the sources and destinations would be for jackfield layouts when Robbie asked "What do you need jackfields for?" I replied that while you can normal most things, for the testing and the unusual you need to be able to plug one thing into another. He asked what it would take to do all this electronically and I replied a huge

'You have to accept that if somebody starts hammer drilling in the building you can either have spent a million pounds keeping that sort of noise out or give the man a bottle of Scotch and ask the man to go away. I prefer the £12 approach' Robbie Weston

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Rick Dzendzera drifting around in space: and he's buying a £2m stairway to heaven

matrix and an awful lot of money.

'A day or so later, SSL was revealing bits and pieces to me and said they had an electronic matrix but wouldn't tell me how big it was. I started putting things on it and rang them up and asked if that was alright and then kept adding more ins and outs until eventually at a meeting in Oxford they told me—its 2,280 squared.' Located in Replication and controlled and accessed by all the systems, sources and destinations are named and grouped for convenience.

'The great thing about it is that it lets you forget about whether something is analogue or digital,' Dzendzera adds.

Weston has no problem with the Scenaria and OmniMix desk sections' lack of expanse or traditional layout. As he points out, they are used to working with the Opus. He is similarly unruffled by SSL's present lack of activity in OMF circles.

'Everybody talks about OMF but when it really comes down to it the requirement isn't as great as it would seem.

'I'm dubious about the whole thing of rival manufacturers' systems being compatible. I'm a great believer in incompatibility because it encourages development. It's still too early, everything is too new to set on a standard.'

Buying OmniMixes does not, the duo claim, render their Opuses obsolete. 'One of the advantages of the Opus is that once something's done it's undo-able,' explains Weston, 'but one of the strengths of the OmniMix-ScreenSound system is that you can undo it, peel it, move it and everything else. They're completely different qualities but they're both great.'

DESIGN OF the rooms is by New Zealand acoustician Steve Kennedy who was also responsible for The Bridge. Neither Weston or Dzendzera will concede that the highly conceptual appearance of the rooms with their spaceship themes made the areas less than ideal acoustically'.

'If you want to get acoustically idealistic then you don't have windows at all,' says Dzendzera, 'but we spotted early on that having windows would be a good idea because people can see each other through them. We thought if we were going to have windows then we might as well have big ones.' Weston adds a practical pointer on ultimate isolation: 'You have to accept that if somebody starts hammer drilling in the building you can either have spent a million pounds keeping that sort of noise out or give the man a bottle of Scotch and ask him to go away. Personally I prefer the £12 approach.'

SURROUND CAPABILITY in all the rooms is intrinsic to the complex through Dolby SDU4 and SEU4 surround sound decoders and encoders. While the fitting of extra channels of Genelec monitoring for 5.1 was a 'drop in the ocean' compared to total spend, the need to go for OmniMixes rather than Scenarias to take best advantage of the format was more serious but nevertheless essential according to Weston.

'Nothing will be in stereo anymore, everything will be in surround,' he opines. 'To me it's comparable to the old days when people used to ask whether they should make something in colour or black and white. As soon as a switch has been thrown to a new technology it sticks.'

Monitoring is via combinations of Genelec 1030As, 1031As, 1032As and 1094A subwoofers with Weston claiming that part of the attraction of the Genelecs was the fact that they are active and matched by the manufacturer.

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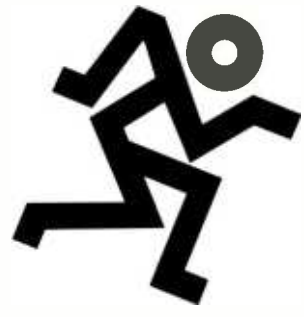

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THE ORIGINAL MS1202 TOOK SMALL MIXERS IN A NEW DIRECTION. JUST THINK OF WHERE YOU CAN GO NOW THAT WE'VE ADDED A DOZEN NEW FEATURES.

- 4 mono mic/line chs.
- Studio-grade mic preamps
- 4 stereo line chs.
- 2 aux sends per ch.
- 2 stereo aux returns
- Efx return to monitor
- Aux 1 Pre/Post switch
- 3-band EQ w/Lo Cut filter
- Mutes on every channel
- 4 buses via Mute/ALT 3-4
- Easy metering via PFL Solo
- Control Room monitoring
- Headphone output
- 4 channel inserts
- XLR & 1/4" outputs
- Multi-way metering
- Sealed rotary controls
- Built-in power supply

For 5 years, our Micro Series 1202 12-ch. mixer has toured with superstars, gathered network news, pinch hit next to mega-consoles...and has been the main mixer in a lot of home studios.

All that time, we've been reading warranty cards for suggestions on how we could improve the MS1202.

This is the result. Same great value. Same built-like a tank construction. But with some exquisitely handy new goodies that make it an even more effective tool for recording and live performance. Including 3-band EQ, balanced XLR outputs, PFL Solo, channel mutes (with Alt 3-4 bus) and multi-source Control Room monitoring.

Visit your Mackie dealer (the MS1202 VLZ's in stock right now) or call your Mackie distributor for detailed information.

1 3-BAND EQ *on all channels, PLUS...*

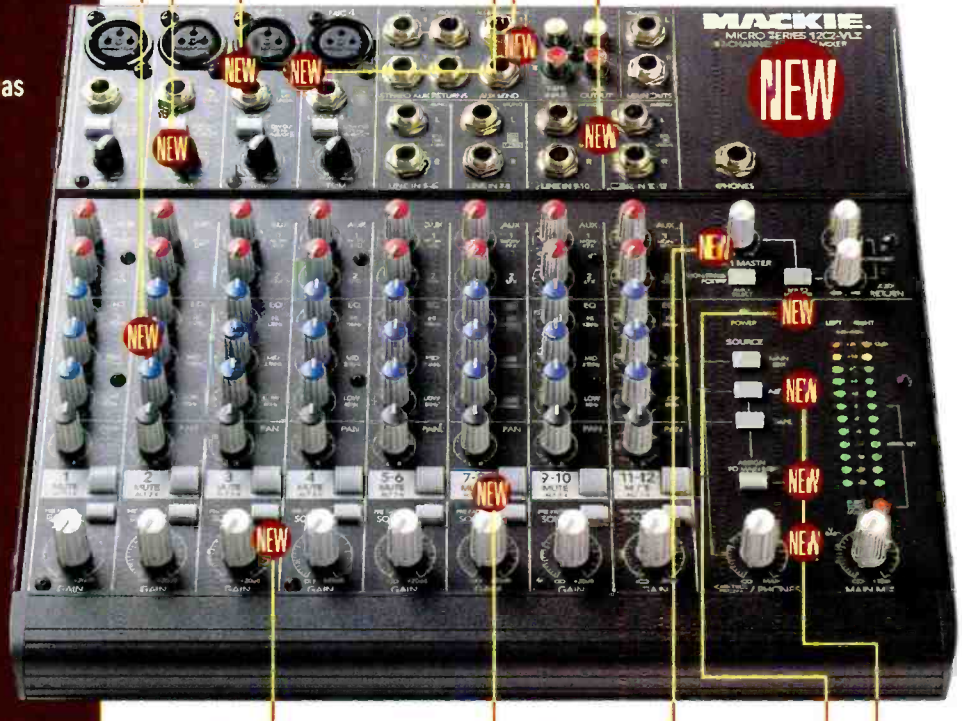
2 LO CUT FILTER *(Chs. 1-4). dramatically extends useable bass EQ by cutting stage rumble, mic thumps, etc. just like on our 8•Bus and SR Series. VERY IMPORTANT!*

3 60dB GAIN on *on first 4 channels via balanced mic inputs.*

4 VIRTUAL PAD *or first 4 channels (line inputs only). 10dB attenuation with trim all the way down; Unity at 9:00 so you can add even more EQ to already-hot signals.*

5 –10dBV RCA TAPE OUT INTERFACE

6 ALL INPUTS & OUTPUTS BALANCED *(except RCA-type tape inputs)*



7 PFL SOLO *on all channels makes level-setting via meters easy, Interrupts Control Room/Phones selection & ignites Rude Solo LED.*

8 VLZ *(Very Low Impedance) circuitry for pristine sound.*

9 BALANCED XLR MAIN OUTPUTS *with switchable 30dB pad for connecting to Mic Level inputs.*

10 AUX 1 PRE/POST *global switch.*

11 EFFECTS TO MONITOR *lets you add reverb to your stage monitor mix just like with our SR Series*

12 CONTROL ROOM/PHONES MONITORING *w/level control lets you select any combination of Main Mix, Tape In and Alt 3-4 signals for Phones, Control Room & meters. Plus you can re-route it back to the main mix!*

13 MUTE/ALT 3-4 *routes main mix to separate stereo bus.*

MACKIE™

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our perception of reference monitoring,' says Dzendzera. 'They sound stunning. We've been particularly impressed by the fully integrated sound between tweeters, mid range and sub bass.'

DISKTRACK HUB MATRIX

THE HUB MATRIX for all intents and purposes is a SSL DiskTrack without any disks in it, it is, in fact, Axiom technology that has been applied to OmniMix and Scenaria-style installations. Previous to its availability such systems had their own discrete I-Os whereas the Hub connects via a single Highway port from the system and is itself connected to 'bucket-loads' of resources which can then be shared and allocated between any number of systems. Hard disk management remains the preserve of SoundNet.

The Hub was intended to become a feature of multisystem configurations but the Space project brought its development forward. As well as being a crosspoint matrix the Hub is a D-A, A-D, distribution amp and sample-rate convertor. It is available as a standalone product although users will need an OmniMix, Scenaria, Axiom, ScreenSound or VisionTrack control surface to configure and control it.

As long-time KEF users at The Bridge and Silk Sound, KEF's move into domestic loudspeakers necessitated a search for new monitors. A search for something new was also attempted for microphones but without much success.

'We went through all sorts of things but we've ended up with U87s again throughout,' explains Dzendzera with the U87Ai being the chosen model with 6dB more output than its predecessor and capable of handling Tommy Vance at 1mm as well as room pickups for voice-overs.

The mics are processed through SSL remote, digital, mic preamps with two Cabins sharing one mic-amp box capable of running 12 mics. However, the feeds are also available at the Hub so can be shared through the complex if required. This sharing principle was also applied to Space's choice of tc electronic M5000X effects processors with one mainframe loaded with two DSPs controlled by an ATAC remote for each room with the view to networking them in the future.

'One of the areas we'd like to see developed on the M5000 is the sampling,' he adds. 'Bearing quality, price and facilities in mind, the M5000 seemed to be the best route to go.'

Weston claims they developed a taste for complete systems when building the two studios at The Bridge and says that designing from scratch rather than adding rooms one at a time through a process of expansion gives enormous freedom. Dzendzera agrees: 'It means much more work at the beginning when you're planning and getting to the point where you've defined enough to see how it will all work together. You also build in redundancy and expansion—we're prewired with DVCRs and video discs plus D2 and D3 should we ever go that route,' he says.

SIGNIFICANTLY, DZENDZERA and Weston will not entertain the thought that their clients should have any say in the type of equipment they choose. 'We anticipate that our clients won't have the slightest bit of interest in the equipment we use, they want to come in and get an end result,' says Weston. 'When I check into a hotel I don't ask about the type and make of air conditioning or the type of ovens they use. When you go into restaurant you're interested in the food being good and not how it's been prepared—so it's a service.

'We've chosen the equipment that we think will do the job configured in the way that it is. If clients phone up asking about Gigabytes they'll be put through to Head of Anoraks who will attempt to deprogram them and ask them what they are trying to achieve and what they want to go away with. It's not how we do the job, it's simply a matter of whether it is what they want. 'This notion of asking your customer what he wants in a really high technology business relies on them knowing what research and development is doing and it can't be done.'

However, he acknowledges that there are risks involved. 'That's the fun,' he states. 'A lot of people go scuba diving to get their kicks. We build studios and run them and that's even more fun.'

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Record of the year *All I Wanna Do* by Sheryl Crow edited and mastered by Dave Collins, A&M Mastering

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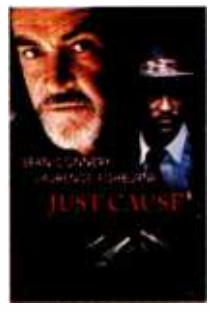

Just Cause Sonic System dialog and background editing supervised by Michael Kirchberger, 20-bit music editing by Tom Drescher, Wonder Dog Music

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Bullets Over Broadway, Hoop Dreams, Just Cause, Pret-a-Porter, The Jungle Book, Apollo 13—what do they have in common? The Sonic System—of course!—because it delivers power and speed for dialog, music, and effects editing for film and video. Our new UltraSonic Processor provides up to 16 channels with full DSP on a single board making multitrack work streamlined and affordable.

Beatles Live at the BBC editing, NoNOISE, and premastering by Peter Mew, Abbey Road

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NoNOISE® is used around the world to tackle the problems of tape hiss and ambient noise, clicks and pops, and distortion and crackle. Engineers, artists, and producers wouldn't trust their masters with anything less.

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"I haven't touched a reel to reel in months," says Bob Carlson from KCRW in L.A. That's because building radio programs with his Sonic System is fast, easy, and affordable. Stay tuned around the globe for promos and features prepared on the Sonic.

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Star Trek CD-ROM editing by Mark Waldrep, Pacific Coast Sound Works

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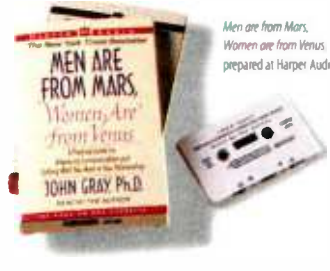
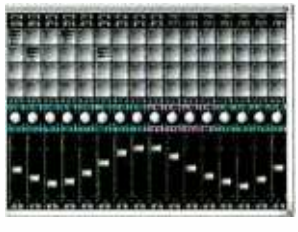
It was a dark and stormy night…the project deadline was approaching…the talent was restless. With my Sonic, I recorded readings directly to hard disk, edited alternate takes, layed up effects, and slapped down a multi-track music bed. "No sweat," I said handing over the finished tape. "My Sonic always delivers a happy ending."



Men are from Mars, Women are from Venus prepared at Harper Audio



The Ultimate in Power: USP
The USP (UltraSonic Processor) delivers more digital signal processing power than any other workstation – a single USP card includes up to 16 channels of digital I/O, 32 channels of playback, 32 EQ sections. No kludgy expansion chassis or multi-board cabling required.

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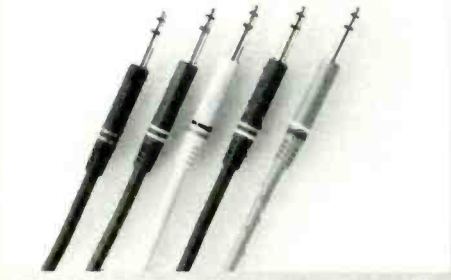
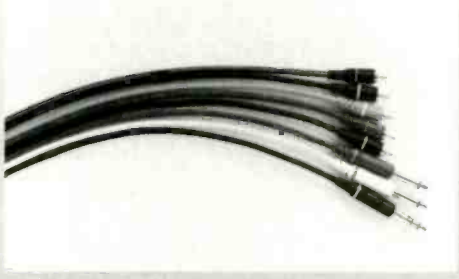


BANTAM PATCH CORDS



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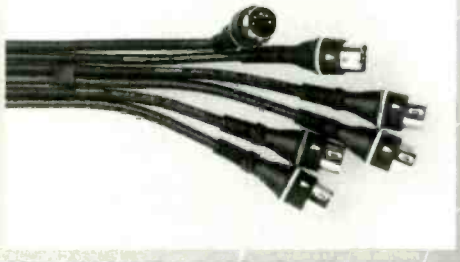

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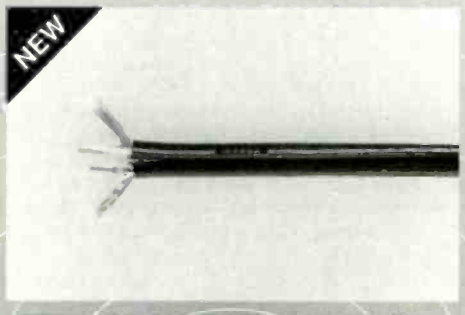

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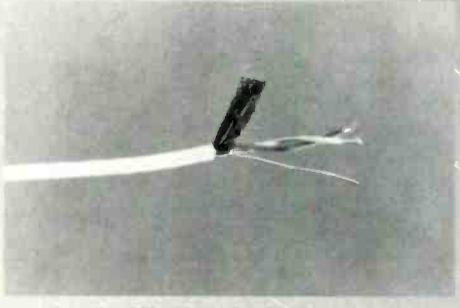

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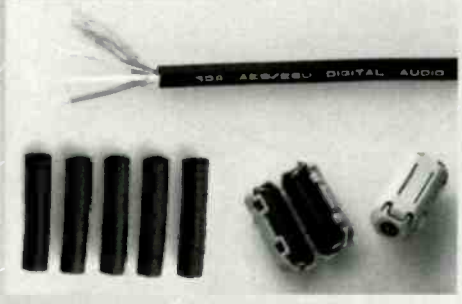

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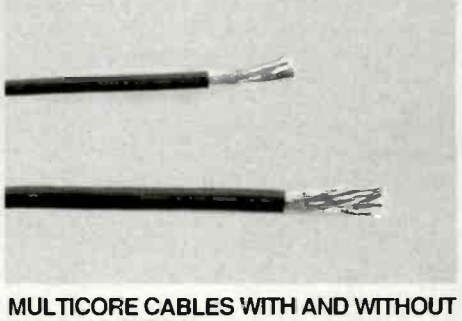

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