

JULY 1994

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# STUDIO SOUND

AND BROADCAST ENGINEERING

INTERNATIONAL PRO AUDIO AND POSTPRODUCTION MAGAZINE

*YAMAHA ProMix 01*

MEMORY UTILITY LIBRARY  
STORE RECALL GROUP COMP  
METER P-11/2  
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1 2 3 4  
SEL ON ON ON ON  
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16  
SEL ON ON ON ON ON ON ON ON ON ON ON ON ON ON ON ON



## Compromise or control?

Serial port synchronisation

# MIXING CONSOLES

## Focusrite Red 5

Amplifier bench test

## Yamaha ProMix 01

Mackie 8-Bus, TLA Valve Mixer, Soundcraft Series 10



# *"The Sound Quality is Marvellous"*

George Martin, Air Studios



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Photo: Paul Burgess

*"I have always admired the ergonomics and automation of SSL consoles. Now, having compared the sound quality of our new SL 8000 console at Air Lyndhurst with the older SSLs that were in use at our former studio at Oxford Circus, I find that the sound*

*quality of the new console is marvellous.*

*"With the latest consoles, both their clarity and definition are noticeably better. Ultimation moving faders are also a great idea, providing precise control, without any of the sonic disadvantages of VCAs."*

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AND BROADCAST ENGINEERING

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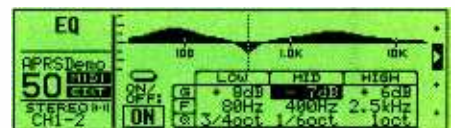
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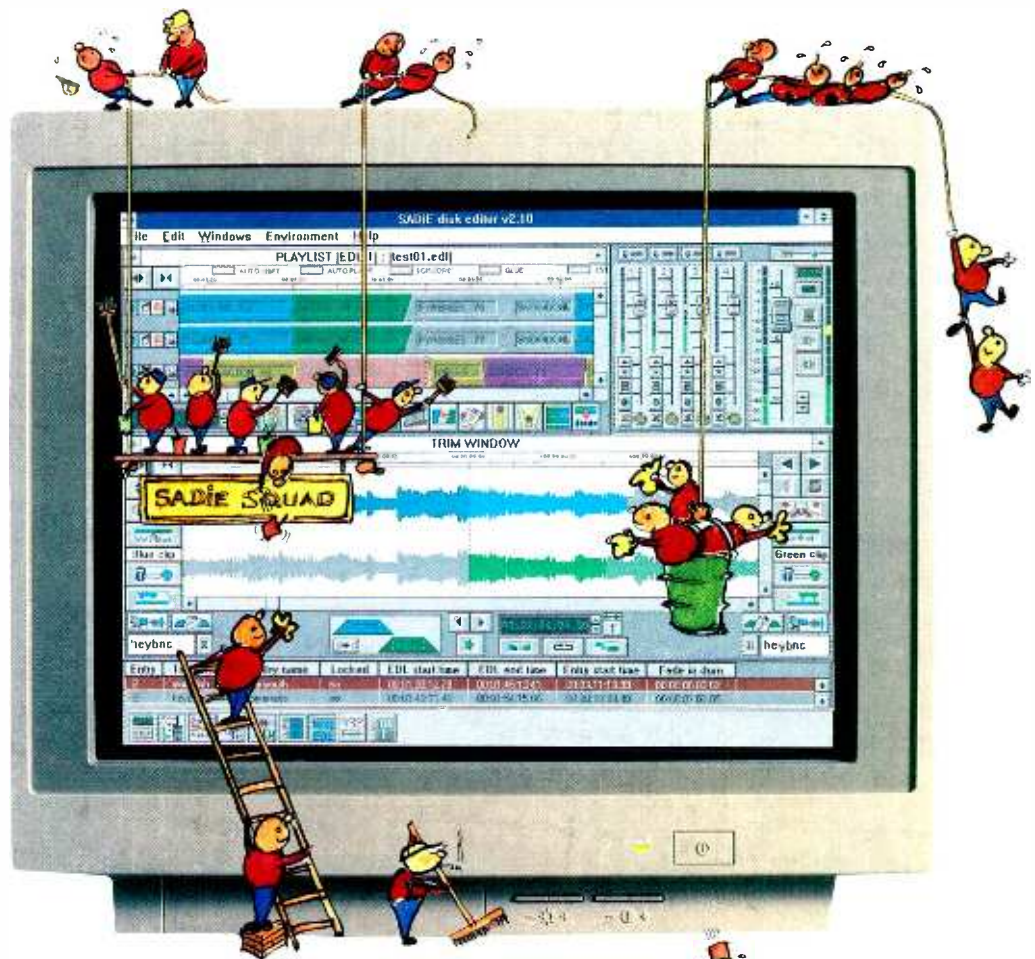
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AND BROADCAST ENGINEERING

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## EDITORIAL

**Editor:** Tim Goodyer  
**Production Editor:** Peter Stanbury  
**Editorial Secretary:** Mary Walsh  
**Consultants:** John Watkinson, Sam Wise  
**Columnists:** Barry Fox, Kevin Hilton,  
Martin Polon

**Regular Contributors:** James Betteridge;  
Simon Croft; James Douglas; Ben Duncan;  
Tim Frost; Philip Newell; Terry Nelson;  
Dave Foister; Francis Rumsey; Yasmin Hashmi;  
Zenon Schoepe; Patrick Stapley

## ADVERTISEMENTS

**Executive Ad Manager:** Steve Grice  
**Deputy Ad Manager:** Phil Bourne  
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**PA to the Publisher:** Lianne Davey

## CIRCULATION

**Assistant Circulation Manager:** Diana Rabôt

**Managing Director:** Doug Shuard  
**Publisher:** Steve Haysom

## EDITORIAL AND ADVERTISEMENT OFFICES

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## Passing notes

In 1973, Argent told us it was a gift from God, but just two years later, Todd Rundgren sang of its death. Curiously, Richie Blackmore's Rainbow were still wishing it long life some eight years on...

Of course, some have been forecasting the death of rock 'n' roll in earnest. And there are those who are more pessimistic when it comes to the future of recorded music in general. So what is the score (sic)? Is the music business actually facing extinction or are the rumours of its impending death greatly exaggerated? Perhaps it would help to put things in perspective.

Music is older than the spoken word. Something in the nature of mankind demanded expression—first through rhythms and then also through pitched tones, melody and harmony. This form of expression facilitated some aspect of early communication and could have expected to be replaced by the greater power of language. That it appeared independently in every known culture, and that the advent of language did not signal the death of music are our first clues to its significance. Any remaining doubt about the depth of this relationship is readily dismissed through the place of music in almost every aspect of every society on the face of the earth. And yet we are being encouraged to consider its demise.

The only way the prophets of music's death can retain any credibility is to qualify the prophesy—music will survive but the current methods of dissemination will not. Could the records and CDs we know and have loved be replaced not just by a new format (such as MD), but by something which casts music in an entirely different role—multimedia, for instance?

Certainly there is an important place in the emergent 'multimedia', but is this enough to completely displace music-only activities? Are we to believe that future generations will perceive no significant value in music unless it is associated with images and interactivity? I suspect that certain of music's critics are confusing the development of media and entertainment with the kind of evolution that involves extinction. I cannot imagine a future in which the relationship mankind has enjoyed with music for tens of thousands of years has vanished. Neither, it seems, can any of our sci-fi visionaries.

Music certainly has a place in William Gibson's recent novel, *Virtual Light*, even if the method of its reproduction is deliberately ill-defined. Kubrick set a precedent with the classic *2001: A Space Odyssey* in employing music that had already established its place in our history. The lesson had obviously been keenly learned by Oliver Stone when he set *Wild Palms* against a 'classic pop' revival. In both cases, the 'future' was not about to become dated by a poor anticipation of musical trends.

An alternative strategy involves sidestepping the musical mainstream—and so avoiding any association with musical fashion. The 1956 sci-fi milestone *Forbidden Planet* was the first film to employ an electronic soundtrack. Apart from making the film musically unique, this evaded contemporary associations. Twenty-six years later, Vangelis' accompaniment to *Blade Runner* was to achieve the same end.

Admittedly, not everyone appears to have got it 'right'. Take Steven Spielberg's blockbusting Star Wars series—that sad vision of entertainment in a bar on a space outpost (*Star Wars*) that involved a collection of aliens playing a comic variant of jazz on outlandish instruments is little short of insulting. And the musical accompaniment to the party thrown to celebrate the overthrow of the Empire (*Return of the Jedi*) is simply insufferable.

We have come to terms with anticipating technological advances in acceptable ways, but we have consistently failed to accurately predict the development of an art form.

Perhaps rock music is soon to yield its position as the current role as modern folk music—advocates of dance music would certainly argue that it has. Certainly, the methods by which music is distributed are set to change, but we can expect recorded music to die only along with humanity.

● On an entirely different note, certain of you will have received the third edition of our mastering, duplication and replication supplement, *MDR*, with this issue of *Studio Sound*. If you are among those who have not, but are involved in some aspect of this side of the music business, please contact the editorial offices (preferably by fax) to be included in the circulation.

To those of you who have made *MDR* the success story it has so far been, a heartfelt 'thank you' from those of us who have invested the considerable effort in producing it. While you want it, we will continue to provide it. ■

Tim Goodyer

Cover: Yamaha ProMix 1

Photography: PSC Photography



Walter Afanasieff's personal-use studio

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# International News

## In-brief

### ● Ampex ADAT

Sales of ADAT units (both Alesis and Fostex) have reached 1,000 in the UK alone, prompting Ampex to step up production of their 489 DM S-VHS format tapes. Alesis have specified Ampex as the recommended tape since ADAT's introduction two years ago, following rigorous tests of both magnetic and mechanical characteristics, and, of course, Alesis' own ADAT blanks come from Ampex.

**Ampex Recording Media Corporation.** Tel: +1 415 367 3888.

### ● Nagra-D for Denon

Denon have ordered a Nagra-D 20-bit recorder for use on their high-bit classical recording programme. The decision was made after a test run at Air Lyndhurst with the London Philharmonic Orchestra, which was so successful that Denon's music production group have made it a permanent addition to their location recording system, teamed with a Yamaha DMC1000 digital console.

**Nagra Kudelski (GB) Ltd.**  
Tel: +1 727 810002.

### ● Shuttlesound split with Behringer

Shuttlesound have announced that they will no longer be responsible for the UK marketing, distribution and after-sales service of the Behringer line, having handled it since February 1992. Behringer will run the UK operation themselves, setting up a small sales office with third-party support, with Graham Allen, the Behringer Product Manager at Shuttlesound, appointed to man the office.

**Shuttlesound.** Tel: +44 81 610 9600.

### ● Studio Sound Interactive

Following on from last year's *Studio Sound Product Directory Interactive* will be released to accompany the October issue of *Studio Sound*. Winner of the 1993 United Newspapers Enterprise Scheme Award, *Studio Sound Interactive* represents the first 'interactive' pro-audio publishing venture. *The Product Directory Interactive* is set to build on this by providing not only a comprehensive new product listing for 1994 (to date) but also an interactive show guide for the San Francisco AES Show.

**Studio Sound.** Tel: +44 71 620 3636.

Fax: +44 71 401 8036.

### ● Second Scenaria to Saunders & Gordon

London postproduction studio Saunders & Gordon became the first SSL Scenaria-equipped studio in London when they installed a system last year. Following the success of that installation, they have just opened a second Scenaria suite at their West End premises.

**SSL.** Tel: +44 865 842300.

## BBC buys Ascotel for ISDN

The BBC is using an Ascom Ascotel ISDN PBX to switch news, sport and outside broadcast reports around its central London radio studios. This is the first time that BBC Network Radio has been able to route their ISDN 2 traffic directly to editing workshops and studios. Although the BBC have been using ISDN 2 lines for some time, lines were predominantly terminated at a central point and therefore did not provide the flexibility of a switched ISDN 2 service.

As well as providing cost savings by the use of shared resources, the Ascotel gives BBC staff greater control from the studio. Studios now have their own numbers, which can allow direct dialling in by journalists and reporters in the field.

**Ascom Telecommunications Ltd.**  
Tel: +44 252 834833.

## BDS and CRL break the ICE

Broadcast Data Systems LP, a leading TV and radio monitoring company, and Thorn EMI's Central Research Laboratory have announced a worldwide licensing arrangement that will allow both companies to jointly exploit CRL's newly developed ICE (Identification Code Embedded) technology. BDS will deploy ICE in conjunction with its existing core pattern recognition system and plans to immediately utilise the new technology for specific applications, such as radio network verification and TV syndication tracking.

'We developed ICE to enable security data to be inaudibly embedded within the audio portion of any media: CD, DCC, audio cassette or videotape,' says Dr Nigel Johnson, Manager of CRL's Audio Technology Group, and adds: 'With their enormous monitoring network and vast experience, BDS is the ideal partner to exploit the potential for this technology as a monitoring system.'

Marty Feely, President of BDS, says: 'For our main music and advertising monitoring business we developed a unique pattern recognition system which requires no codes to be added to the media.

However, we have always realised the potential value of an 'active' coding system for certain applications; the problem has been finding one that really works, is not strippable, and most importantly will now survive new digital compression standards. The CRL ICE technology exceeds all our requirements and, what is more, functions very efficiently as an augmentation to our current system.'

BDS and CRL expect that in due course ICE will become a worldwide standard for the entertainment and music industries, with all companies embedding information in their media to prevent piracy and to ensure accurate distribution of royalty payments.

**CRL Ltd.** Tel: +44 81 848 6444.

## IRN back to the regions with ISDN

Independent Radio News are completing the second phase of their plans to see all of the major UK commercial radio stations equipped

with ISDN facilities. A further 11 stations are receiving the technology, partly paid for by IRN to provide high quality return feeds to IRN from the regions. Many years ago the old Independent Broadcasting Authority (IBA) had paid for fixed music lines to all stations, but when the Radio Authority took over the regulatory role the costs fell on IRN.

Says John Perkins, Managing Director of IRN: 'As the recession started to bite something had to give, and we trimmed back to a dozen or so of the major market companies.

Today, with revenue vastly improved, we have made the offer to pay half of the costs to a further 11 stations.

'The hope is that we can extend the offer next year.'

The ISDN lines are now enabling IRN to rebuild their contribution network, with 33 units already operational including links with ITN and New York. Perkins adds: 'The aim is to see ISDN at every station in the network. In contributing half the costs both parties accept that the benefits are both to IRN and to the stations individually. A particular benefit for stations is in having facilities to link to outside broadcast and roadshow activities. An ISDN kit represents a very good and cheap



**HNB Portadats for the BBC.** Following the unveiling at the New York AES, HNB communications are now making early deliveries of the Portadat PDR1000 location DAT recorder. Among the first customers was the BBC's Outside Broadcasts Radio Unit, which recently took delivery of a quantity of units for use on a busy summer sporting schedule that includes the World Cup and the Commonwealth Games. Handing over the Portadats to Gerry Clancy, the BBC's Head of Operations (right), Outside Broadcast (Radio), HNB's Broadcast Sales Manager Brian Binding (left) commented: 'It is particularly fitting that the very first production units are going to the BBC as Gerry Clancy's input, along with that of a number of other engineers and producers at the BBC, has been invaluable at all stages of the Portadat's development.' HNB Communications Ltd. Tel: +44 81 960 2144.





Shure microphones, primarily long associated with live use, are making a concerted effort to penetrate the recording studio market, with claims of major successes already. London enthusiasts include The Church Studios, established by Dave Stewart, and Zeus B. Held of Eastcote Studios, while Shure cite Peter Gabriel's Real World studios near Bath as regular users. Peppermint Park Productions have added Shure microphones to the armoury. The same models appear in most of the equipment lists, typically SM81, 98, 91, 57 and 58 and the M-S stereo VP88. Shure GmbH. Tel: +49 7131 83221.

alternative to having an OB unit.  
**Independent Radio News.**  
 Tel: +44 71 388 4558.

## Clyde and Classic FM go Dutch

Clyde Electronics, the audio broadcast equipment specialists, are currently working for leading UK national commercial radio station Classic FM on the launch of its new Dutch station. Classic FM began broadcasting in the Netherlands on 30th April.

Due to the limited time available between the licence award and the on-air date, demonstration equipment was shipped to the UK from Malaysia. The Clyde *Prima Series* mixing console is now situated at the temporary studio in London, with the new station's classical and jazz mix being transmitted via Intelsat satellite to the Netherlands.

A number of commercial stations now operate successfully in the Netherlands through a system of satellite and cable delivery, and Classic FM is hoping for a 2-3% share of the nationwide market. Having held the Classic FM studio equipment contract since their launch in 1992, Clyde are currently constructing the equipment for the permanent new Dutch studios in London.  
**Clyde Electronics Ltd.**  
 Tel: +44 41 952 7950.

## Digital Betacam at Lynx

Lynx Video, one of the top ten facilities companies in the UK, have installed a fully digital editing suite from Sony Broadcast and Professional, based on Digital Betacam technology. Sony worked closely with Lynx to develop a suite capable of meeting their requirements for high operational flexibility and fast, multilayer editing without sacrificing quality. Neville Young, Lynx MD, said: 'We already had one analogue on-line editing suite, but wanted to expand our facility. It made sense to choose equipment that would take us forward without abandoning the past. The beauty of Digital Betacam VTRs is compatibility with analogue Betacam SP.'

**Sony UK Ltd. Tel: +44 784 467000.**

## Nomis-Sensible tie-up

In an unusual move, Nomis Studios and Sensible Music have joined forces to combine Sensible's hire catalogue and Nomis' studio activities under one roof. A retail outlet, The Show Room, will take advantage of Nomis' facilities to demo equipment to

customers in 'real' live or studio environments, while on the hire side Nomis have reached an exclusive agreement to store and rent out an extensive range of backline and studio equipment within their West London studio complex. This will allow Nomis clients to hire equipment quickly and without incurring any of the overhead charges which usually arise from transport and handling costs.

**Nomis Studios.**

Tel: +44 71 602 6351.

**Sensible Music Ltd.**

Tel: +44 71 700 6655.

## Restructure for Neutrik UK

As part of a major rationalisation programme to integrate all Neutrik operations in the UK, Neutrik Marketing Ltd, the London-based sales and distribution company for Neutrik connectors and test instruments, is to relocate on 1st January 1995 to the Isle of Wight premises of Neutrik (UK) Ltd, a wholly owned manufacturing subsidiary of Neutrik AG. Peter Eardley, Managing Director of Neutrik Marketing Ltd, a partner in the jointly owned company with Neutrik AG, will sell his shareholding to Neutrik AG. Eardley will, however, continue his 18-year association with Neutrik and join the board of Neutrik (UK) Ltd as a Nonexecutive Director.

Neutrik Marketing Ltd took over from former agent Eardley Electronics Ltd in 1990, enjoying a 30% annual growth rate and establishing the current position of Neutrik XLR connectors and test equipment. Paul Smith will remain Managing Director of Neutrik (UK) Ltd and Pat Walsh will be appointed as Sales and Marketing Manager. Although all order administration, distribution and accounts will be carried out from Neutrik Isle of Wight, the company will retain a London sales office and showroom in Eardley House where Pat Walsh will be based, with a computer link to all Neutrik factories.

**Neutrik Marketing Ltd.**

Tel: +44 71 792 8188.

### Corrected Telephone Numbers

**Amplex Media Europe.**

Fax: +44 734 302235.

**Le Studio Mobile.**

Paris. Tel: +42 72 2493.

London. Tel: +44 81 875 9712.

### Contracts

#### ● Amek for Canadian broadcast

Amek have announced sales of two Rupert-Neve-designed 9098 consoles to the Canadian Broadcast Corporation for radio production studios in Montreal and Vancouver. Both feature Supermove, Virtual Dynamics and Recall.

**Amek Technology Group plc.**

Tel: +44 61 834 6747.

#### ● EV for A-V In Singapore

More than 500 Electro-Voice loudspeakers and 200 EV amplifiers form part of the largest turnkey audio-visual contract ever awarded in Singapore. The contract is for a 12,000-seat convention hall, a 2,000-capacity ballroom, a large-scale exhibition hall, a 600-seat auditorium, 26 meeting rooms and two restaurants in the new Suntec City International Convention Centre. The installation is expected to take nearly a year to complete.

**Electro-Voice, Inc.**

Tel: +1 616 695 6831.

#### ● Calrec broadcast sales

Recent Calrec console sales include the second *Compact Series* to Irish broadcaster Radio Telefis Eireann, for Studio 3 at RTE's TV centre in Dublin, and a 16-channel Compact Series to Samsung Broadcast Centre in Korea.  
**Calrec Audio Ltd. Tel: +44 422 842159.**

#### ● Lightworks movements

The Surrey-based broadcast equipment hire company Hyperactive Broadcasting have taken delivery of their eighth *Lightworks* editing system. Hyperactive specialise in dry hire, and concentrate exclusively on *Lightworks* for nonlinear work, offering free site installation and training for first-time users. Four more systems have gone to Hong Kong postproduction company Touches, one of which is in operation at the company's Bangkok facility.

**Lightworks Editing Systems Ltd.**

Tel: +44 71 494 3084.

#### ● Far East AMS Neve sales

Recent major sales of AMS Neve equipment to Pacific Asia include a 48-fader *Capricorn* to Taiwan facility A-String, a *Logic 1* with integral AudioFile *Spectra* to Touches in Hong Kong, two *VR Legend* consoles with *Flying Faders* to NHK in Japan, and two *Logic 3* mixers with AudioFile *Spectras* to Cine Sound Co Ltd in Thailand.

**AMS Neve plc. Tel: +44 282 457011**

#### ● Molinare takes Pro-Bel

West End facilities house Molinare have ordered a Pro-Bel MADI AES matrix and other audio equipment, with a total value of £100,000, to provide a unified system for their large existing audio routing requirements and to accommodate planned expansion over the next two years. The MADI system will be used for tie-lines as well as for routing.

**Pro-Bel Ltd. Tel: +44 734 866123.**

# INSTANT PICTURE FOR INSTANT AUDIO



The **Virtual Recorder® (VR™)** is a random-access, digital video recorder that can record and playback timecoded video, plus 2 channels of audio. It also costs significantly less than you may have thought.

VR works with any device (via Sony 9-pin), and for any application where you would normally have used a video tape recorder. And, with VR you get the added advantage of instant access to any point on your video, which can be seamlessly recorded across up to seven 9GB drives. That's around eight hours of video!

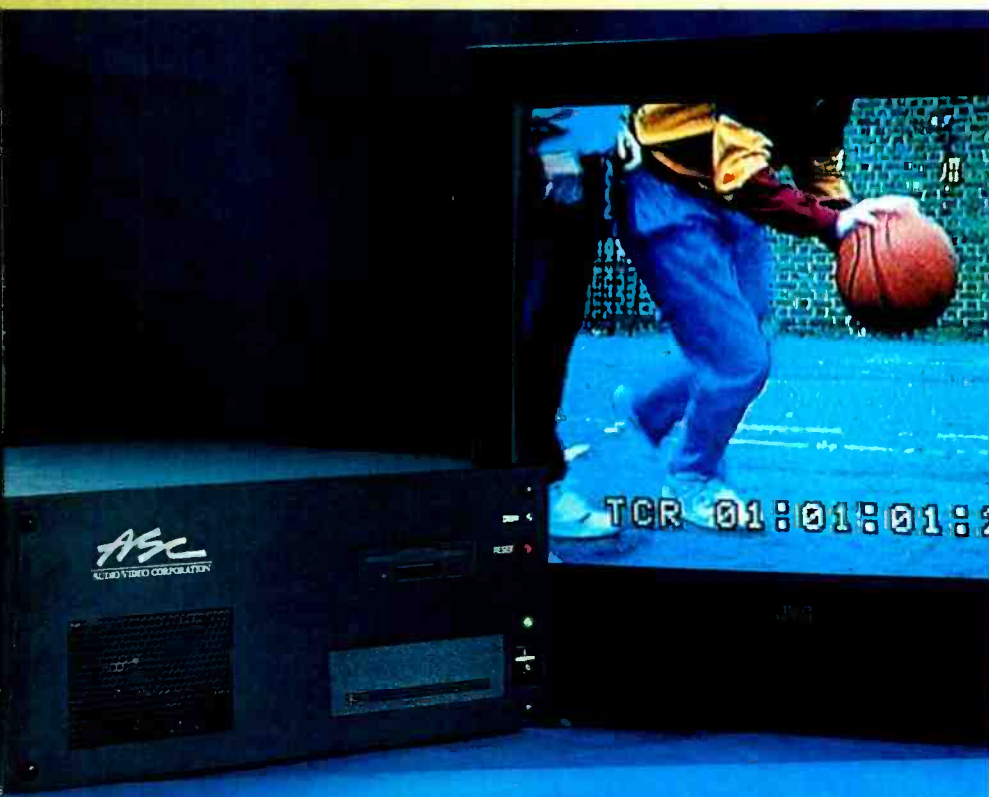
Now, with a video recorder that responds as quickly as a digital audio workstation, you'll be amazed at the increase in your production and operational speed.

The time-saving benefits of VR are obvious for a variety of applications:

**Post-Production** – Now you can do ADR and Foley to video. While laybacks, sound effects, mixing and scoring are all significantly faster.

**Broadcast and Cable** – Instant search and retrieval makes automated spot insertion extremely economic, with one VR instead of a whole bank of VTRs.

**Interactive Video** – VR's re-usable data storage, instant retrieval and digital reliability makes it ideal for use in video kiosks etc.

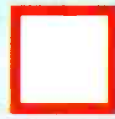


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Now in full production, Otari's RADAR recorder

## Otari release RADAR

Following the announcement at NAB of Otari's acquisition of exclusive rights to market and distribute Creation Technologies' RADAR (Random Access Digital Audio Recorder), the first production run has been released. The full RADAR system provides 24 separate balanced inputs and outputs, random access hard-disk recording, Exabyte backup and a fully functional remote for a claimed \$1,000 per track.

RADAR is available in 8, 16 and 24-track configurations, upgradable in 8-track units to 24. The optional remote provides 99 cue points, shuttle-jog wheel, Qwerty keyboard, track keys for arming and soloing, and dedicated function keys; the system comes with a chase synchroniser and supports all common sampling rates including 44.056kHz and 47.952kHz. Standard hard disk provision is 1.2Gb per 8 tracks, and external SCSI support allows for removable hard drives.

**Otari Corporation.**  
Tel: +1 415 341 5900.

## Alesis, Emagic, MotU, and Symetrix

Shown at APRS and on view again at Sound Technology's stand at the forthcoming British Music Fair is the Alesis X2 mixing console. Designed to interface directly with up to 24 tracks of ADAT via 56-pin multiway connectors, the modular in-line console has 24 input channels, 8 group outputs and a master module

giving control over the MIDI muting system which is fitted as standard. Each channel has 4-band EQ with two fully parametric mid bands, while each monitor section carries a 45mm fader for level and can be assigned 4 of the 8 auxiliary sends and the shelving EQ in addition to its own MIDI muting, giving a total of 64 inputs on mixdown.

Emagic will be launching *Logic* and *Logic Audio v2.0* at the BMF. New features include Quick Time Movie support, OMS compatibility and full colour support, while *Logic Audio* will now include time compression and expansion, pitch shifting and even audio regroove, giving the ability to apply a swing feel to a section of digital audio. The package is even claimed to be able to turn audio into a score.

Mark of the Unicorn augment their hardware catalogue with the addition of the *Digital Time Piece*. This 19-inch rackmount box allows sample accurate synchronisation of multiple digital audio devices and includes a Sony 9-pin connector allowing control over a wide range of VTRs. The *Digital Time Piece* allows the user to select MTC, SMPTE, Video, SPDIF, Word ADAT, DA-88 or DTP as the timing master and is claimed to be the only device that will simultaneously lock all of these different sources.

Also debuting at the BMF will be Symetrix' new 602 stereo digital processor. This is a full-function dynamic processor, featuring digital compression, de-essing, noise reduction, gain control, parametric EQ, expander gating and first reflection stereo delay. AES-EBU and SPDIF are provided alongside balanced analogue I-Os.

**Alesis.** Tel: +1 310 558 4350.  
**Emagic.** Tel: +1 916 477 1051.  
**MotU.** Tel: +1 617 576 2760.  
**Symetrix.** Tel: +1 206 282 2555.  
**UK:** Sound Technology plc.  
Tel: +44 462 480000.

## ES.Lock for DA-88s

Independent machine control and synchronisation specialists Audio Kinetics have completed the development of new *ES.Lock* software, designed to enable comprehensive external control of the Tascam DA-88 system. The software enables users to achieve genuine multimachine audio editing and tape synchronisation, effecting full integration of DA-88s and avoiding the problems associated with time-code chasing.

The new software allows rapid locating and accurate synchronisation, with fully adjustable time-code offsets. Remote record track selection is possible across all eight tracks, subject to the installed controller software levels of each unit. Full control is achieved via the 9-pin RS422 control port, fitted to the optional SY-88 interface card. This accepts Sony P2 protocol commands, allowing the DA-88 to emulate a typical VCR.

**Audio Kinetics UK Ltd.**  
Tel: +44 81 953 8118.

## Sony SBM v2.2

The Sony K-1203 SBM processor uses powerful signal processing LSIs to process 20-bit master recordings into 16-bit form ready for CD production, and now incorporates an enhanced processing architecture, Super Bit Mapping v2.2, which adds a small amount of dither at the input of the digital noise-shaping filter section. According to Sony, the resulting SBM-processed 16-bit signal is judged by many users to be more 'musical', with a pronounced improvement in spatial positioning and overall transparency. Sony claim the new ▶

### In brief

#### ● New 3M digital media

New 3M digital recording media were featured at APRS, with several products making their UK debut. Newcomers included 275LE open reel Digital Mastering Tape and 3M's ASD S-VHS cassettes, designed specifically for ADAT use. Also on show was the new range of CD-Recordable blanks.

**3M United Kingdom plc.**  
Tel: +44 344 858614.

#### ● Slimline P&G

Making its first UK appearance at APRS was Penny & Giles' 3000 Series Slimline Motorised Fader, a space-saving design for console automation systems and now available in a 128mm long-stroke version. The new fader is already available as an option for the *Uptown* fader automation system.

**Penny & Giles Studio Equipment Ltd.** Tel: +44 495 228000.

#### ● Upgrade time for Fostex D10

The new optional 8333 Interface Card for the Fostex D10 DAT recorder will enable recording of IEC-format time code on a machine that was previously only capable of playing back time code. It also adds a 9-pin RS422 control port, switchable between Sony protocol and ESbus.

**Fostex US.** Tel: +1 310 921 1112.  
**Fostex UK Ltd.** Tel: +44 81 893 5111.

#### ● Sony Pro MD

To meet growing demand for professional-quality media for use with recording MD hardware, Sony have introduced the new PRMD-74 Professional Recordable MD, providing 74 minutes of storage on the standard 64mm disc. Sony guarantee a block error rate of 10<sup>-6</sup>, representing an order of magnitude improvement over 'standard' MDs. The PRMD-74 offers an undergraded audio performance typically extending to 1 million read-write cycles.

**Sony Broadcast and Professional Europe.** Tel: +44 256 483366.

#### ● Cubase Audio for the Mac

The APRS saw the first demonstration of Steinberg's *Cubase Audio v2.0* for the Mac. *Cubase Audio* was the first integrated MIDI, music scoring and Digital Audio system for the Mac, and v2.0 includes support for 4-16 channels of audio, real-time EQ, multichannel record, audio track delay, scrubbing, and enhanced resolution for audio waveform displays.

**Steinberg.** Tel: +49 40 211598.

**Harman Audio.** Tel: +44 81 207 5050.

#### ● Trantec S5000

Trantec Systems have launched ▶

their new UHF microphone system, the *S5000*, the first of what is to be a series of UHF products. The system features the *S5000RX* true diversity receiver, whose half-rack design incorporates a multi-use LCD display showing all its parameters and those of the *S5000TX* transmitter, indicating the channel and operating frequency selected, RF and audio output, mute level and low transmitter battery.

**Trantec Systems.**  
Tel: +44 81 640 1225.

● **Orban Optimod-TV Digital 8282**

The *8282* is Orban's first digital audio processor designed specifically for the demands of both analogue and digital television audio, at the same time meeting the special requirements of the various stereo and dual-language systems around the world. The *8282* controls dynamic range to keep it within a comfortable setting for the domestic viewer, controls subjective loudness to prevent highly-processed commercials from becoming intrusive, and controls peak modulation and bandwidth to prevent overmodulation of the transmitter.

**Harman Audio.** Tel: +44 81 207 5050

● **SADiE v2.2**

Previewed at APRS was v2.2 of *SADiE*. Free to all existing customers, the upgrade adds alternative backup on the fast Exabyte 8mm system, a hardware controller interface, improved time scrunch, pitch shift, direct SCSI CD-R creation to *Red Book* standard and DDP CD mastering format on Exabyte tape. *SADiE* now supports 20-bit recording and editing on M-O disk to provide both portability and immediate archiving.

**UK: Studio Audio and Video Ltd.**  
Tel: +44 353 648888.

**US: Studio Audio and Video Ltd.**  
Tel: +1 615 327 1140.

● **GRM Tools**

*GRM Tools*, now available in the UK through Digital Music Archives, is a *Macintosh*-based DSP software package which works with all of the Digidesign audio cards and provides 14 different algorithms for the processing of audio files in *Sound Designer II* format, including additive synthesis, very sharp band-pass/reject filters with 560dB/octave slopes and 60dB attenuation, comb filters, delay accumulator, Doppler, 23-band equaliser, sample-rate conversion, and various pitch and time domain effects. It operates in real time both on disk files and on signals from the analogue inputs.

**Digital Music Archives.**  
Tel: +44 71 624 8774.



**CS2000M with Digital Studio Control Module**

version may yield an audible dynamic range comparable with the theoretical 120dB maximum attainable with 20-bit recordings; this improvement is particularly noticeable in the sub-4kHz range.

**Sony Broadcast & Professional Europe.** Tel: +44 256 55011.

## Digidesign

The Digidesign ADAT interface is now available for the *Session 8* PC. This provides eight channels of simultaneous digital audio transfer between an ADAT machine and a Digidesign workstation by using the ADAT's on-board optical interface. As well as allowing ADAT users to edit tape-based sessions using *Session 8*'s facilities, it offers a cost-effective archiving option for large *Session 8* files.

Also new for the *Session 8* is the *882* I-O Audio Interface for the PC and *Mac* versions. This provides 8 channels of A-D and D-A conversion at a lower price than the previous full-blown system. The *Session 8* system has effectively been unbundled; a purchaser now selects a Core System comprising the software, manuals, cables and audio processing card, plus a choice of interfaces depending on the desired price point and functionality. The new interface is a 1U box carrying 8 ins and outs on 3-pole 1/4-inch jacks, SPDIF I-O and Slave Clock.

Finally, from Digidesign comes v2.5 of the *Pro Tools* software, featuring such enhancements as a new Edit window showing more information simultaneously, 100 autolocation points, scroll during playback and improved take numbering conventions.

**Digidesign.** Tel: +1 415 688 0600.

## Apex CDR 2000

APRS saw the launch of the Apex *CDR 2000* 'The Master' CD Recorder, a modular machine which has the

facility for expansion through free slots. Standard features include: on-board sample-rate conversion from 32 or 48kHz; copying of

start-IDs from DAT, with delay available to compensate for late IDs; MIDI control; user-definable autotrack threshold; wordsync I-O; editable user bits for emphasis and copy prohibit; ISRC data recording; error flag counting; serial control; and double-speed copying via the standard optical I-O. Two expansions are possible, one transforming the *CDR 2000* into a fully featured SCSI writer, recording from hard disk at double speed. It can also support CD-ROM (XA) and CD-I. The other option is a SMPTE expansion board allowing for exact PQ encoding.

**Apex NV.** Tel: +32 89 306313.

## Euphonix CS2000M

Introduced at APRS was the *CS2000M* from Euphonix, a range of packaged mixing systems designed specifically for high-end commercial music facilities. Based around the *CS2000* console, these systems are fitted with (per channel) six inputs (two mic and four line), two EQs, a pair of digitally-controlled filters, and one dynamics module (expandable to two dynamics modules and four filters). Twenty aux sends can be expanded to a maximum of 56 buses per channel. The system features SnapShot Recall and Total Automation and is available for use with 24, 32 or 48-track machines with up to 104 automated mono-stereo faders.

Like all Euphonix consoles the *CS2000M* is a digitally-controlled analogue system, and is fully expandable in terms of both features and size. All Euphonix options can be fitted to any system, which means that the *CS2000M* system can be upgraded to accept the new TV and Film mix bus hardware and software due out later in 1994.

The first of the new systems has already been installed at the Record Plant studios in Los Angeles, while

another sale has just been announced at Mickey Most's RAK Studios.

**Euphonix US.** Tel: +1 415 855 0400.  
**Euphonix UK.** Tel: +44 71 724 8773.

## Studer D731 QC

Based on Studer's *D731* broadcast CD player, the *D731 QC* offers additional interfacing for the external quality control electronics. The machine can check all currently used CD formats including CD-I, Photo-CD, Video-CD and part-recorded CD-R, and has two decoder circuits allowing concurrent measurement of Sony and Philips-type error flags. Given suitable external equipment, many parameters of the CD can be checked, including several digital error flags, several analogue error signals, all eight subcode channels and the table of contents. The *D731 QC* replaces the *A725 QC*, allowing the use of the same external evaluation electronics but adding additional capabilities; for instance, the focus position and radial error servo signals are now available.

**Studer Professional Audio AG.**  
Tel: +41 1 870 75 11.

## Tascam-Prism Sound high-bit recording

A new Prism Sound interface for Tascam's *DA-88* allows 20 and 24-bit multitrack recordings to be made on a standard *DA-88*. Connecting directly to the *DA-88*'s proprietary digital interface via a single cable, the *MR-2024T* 20-bit/24-bit interface adaptor offers a straightforward and cost-effective route to high-resolution recording in professional audio, audio-for-video and film sound applications.

Recording time is unaffected—up to 113 minutes with '90' Hi-8 tapes—and both 20-bit and 24-bit recordings can be replayed on standard *DA-88s* without an *MR2024T*.

The interface also features four pairs of AES-EBU inputs and outputs, and two TDIF connectors to allow double-running with two *DA-88s*. Prism claim that the *MR-2024T* retains the full functionality of an unmodified *DA-88*, allowing punch in and out as normal, and several units can be slaved to add more tracks. Other features include error indication and word sync out.

**Prism Sound.** Tel: +44 223 42988.

# Step into the Future: Go Optical with AUGAN



Do you need a transportable digital recorder/player/editor using an instantly removable medium to replace tape or harddiscs?

Do you need a comprehensive remote control with dedicated keys and a full colour display using a flatpanel TFT or a SVGA monitor?

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Then your choice should be the AUGAN OMX

If in addition you need to be fully synchronised to Digital Betacam or to a random access video disc recorder, or a film machine, and be able to hear audio from all tracks while shuttling picture,

Then your choice must be the AUGAN OMX

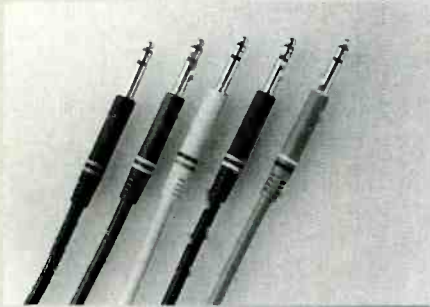
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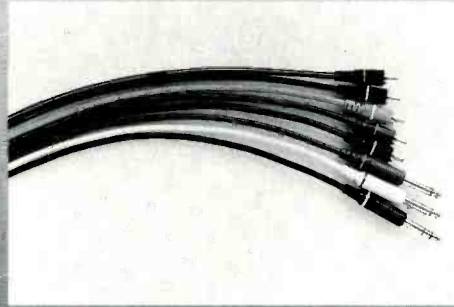
# MOGAMI



Any cable failure often results in problems where the original cause is extremely difficult to detect. The reliability and quality of Mogami cable ensures those problems do not arise. Long-life, safety, efficiency and economy make Mogami the No. 1 choice for cable.



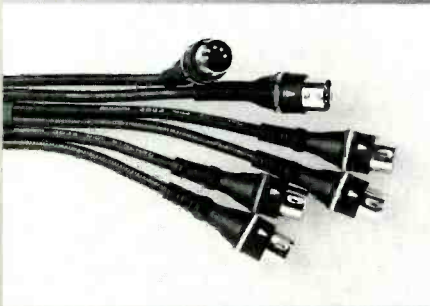
**BANTAM PATCH CORDS**



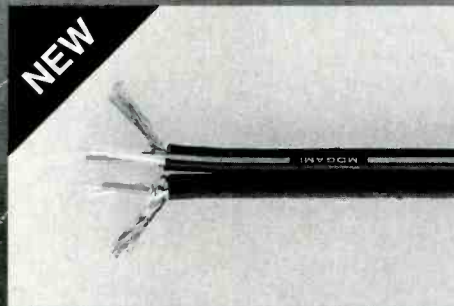
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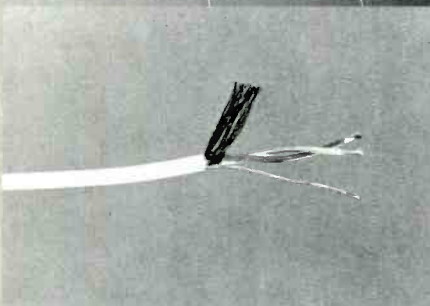
**MIDI SYNCHRO CABLES**



**CL2 RATED SUPER-FLEXIBLE STUDIO SPEAKER CABLES**



**CL2 RATED SNAKE CABLES**



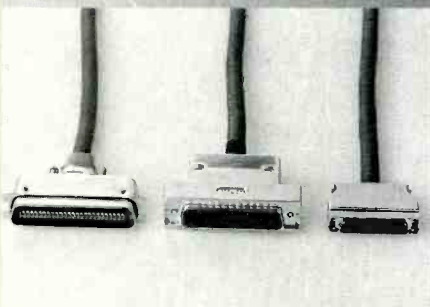
**CONSOLE WIRING CABLES**



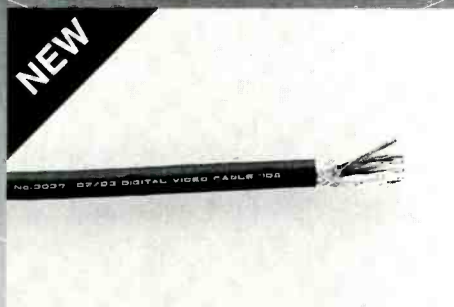
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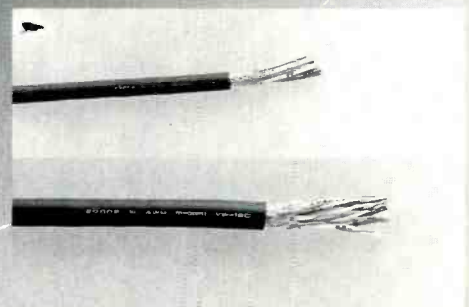
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# TYRESTOR REMOVABLE SERVICES

With the rapid proliferation of digital workstations, and in particular with the use of multiple systems within single facilities, there is an increasing demand to transfer data from system to system, area to area as quickly and efficiently as possible. Networking, of course, offers an effective solution, but apart from being an expensive option, is not always possible or practical. Optical discs also provide a solution but have limitations in terms of their storage capacity and transfer rates.

Over the last couple of years, UK-based distributor The Tyrell Corporation (Sonic Solutions, Dawn, Sony and so on) have become particularly aware that an alternative is required which will help avoid the 'significant production bottlenecks' that can occur as data is moved from A to B. Tyrell have responded by releasing a proprietary, removable, hard-disk system called the *TyreStor Removable Series*.

'We got a growing number of requests from people who wanted to move data between workstations without using networking or removable M-O media,' says Tyrell's Stephen Paine. 'A typical example would be from a track-laying room to a dubbing room in the same facility. We also had customers like the BBC who wanted to move data from one building to another and were looking for a suitable method of interchange. Additionally, there were the small, busy facilities with just one workstation that needed to be able to switch between jobs very rapidly; they often didn't have time to archive and were cramming everything onto one disk with the obvious risks that entails. A better solution was to have separate disks for separate projects, so it struck us that a good all round answer for all these clients lay in a well-designed, sensibly-priced, removable hard-disk system.'

*TyreStor Removable* provides a simple and effective means of transferring large amounts of data between digital audio workstations. The system consists of four components—media bay, media canister, SCSI cable, and SCSI terminator—and is available in various configurations.

Firstly, there are two types of bay—rackmounting and desktop. Secondly, there are two different sizes of push in/pull out media canister

—3½-inch and 5¼-inch—each having their own type of bay. Thus the various 3½-inch bays can hold from one to seven canisters (1Gb, 1.7Gb, 2Gb and 4Gb hard disks, plus a 4Gb–16Gb DAT archiving device), while the 5¼-inch bays are supplied in single or dual configurations accepting 4Gb and 9Gb hard disk canisters.

Paine believes that workstation users are now beginning to view storage in a different light, seeing it as separate, detachable media rather than an integral system component.

'In the past I don't think people have really understood the difference between the processing element of the workstation and the storage element; and actually there's no reason why they should, because the two have always been marketed as a whole so the manufacturer can also sell the storage peripheral. Hence workstations have been referred to as 8-hour systems or 4-hour systems, implying that in some way the storage capacity is inherently related to the system itself, which, of course, is not the case as they're just SCSI devices.'

'What is starting to happen now, is that people are thinking of this as recording media, and viewing it like a new form of tape or film stock—its a different shape, it weighs a bit more, its a lot more expensive than a roll of tape but then its reusable as many times as you like.'

But what of compatibility, and manufacturers that claim their drives have been modified to optimise product performance?

'Basically manufacturers want to hang onto the drive sales themselves and they will claim that special things have been done to the drives to make them work properly with their particular product,' states Paine. 'Sure, there are certain cases where that's true, but on the whole it's garbage, and so far we haven't come across a single system that *TyreStor* won't work with. There is, of course, an emotional decision that some customers will have to make as to whether they want to risk alienating their original supplier, but as time goes on I think more and more people will appreciate that this is only generic hardware and because of that there's a free market value for it.'

'We use Micropolis AV drives which have been optimised for continuous, uninterrupted data throughput, which



Getting hard on data storage—the *TyreStor*

is what you need for video so you don't get grain dropout, and for audio to avoid glitches occurring because the buffer is temporarily empty. It's interesting that top workstation manufacturers such as AMS Neve, Avid, Sonic Solutions, Lightworks and so on, all use these same Micropolis mechanisms. It's also interesting that the price of our removable system is considerably lower than most manufacturers' standard fixed drive systems.'

Apart from the hard disk canisters, Tyrell also supply *TyreStor* 4–16Gb DAT archive canisters (with DDS2 compression). Again the removable aspect offers certain advantages as Stephen Paine explains.

'With most systems it's not possible to archive data without tying up the workstation in the process, and thus losing valuable production time. Now if one adds an additional computer and media bay, it becomes possible to build a dedicated archive station allowing jobs to be archived or restored, while the workstation is kept on line and productive. For a busy facility, the cost of the extra equipment will quickly be absorbed by the extra production time gained.'

Another advantage of the

removable system according to Paine is that it makes more efficient use of storage resources within a facility. Rather than having fixed storage capacities for each device, *TyreStor* provides a bank of removable storage that can be shared between rooms as necessary. But couldn't this equally be achieved by having a collection of fixed drives that are moved from system to system as and when they're needed?

'Yes, but it would be very messy—you have to go to the back of the system unplug the SCSI, replug the SCSI, make sure you haven't got any ID conflicts, make sure your termination isn't screwed up because you've added something in the chain that may be internally terminated and so on. *TyreStor* removes all these headaches, because it's been designed with simplicity in mind and to avoid any interfacing problems.'

As suggested, difficulties can occur when moving fixed drives between systems if SCSI IDs are not properly set. A typical SCSI bus allows up to eight devices to be attached to it and each of these carries an individual ID number: 0–7, or in the case of *TyreStor* 1–8. Problems can arise if one is unaware of which ID relates ▶

# DIGITALLY YOURS

The new D940 Digital Mixing Console from STUDER offers you *more...*

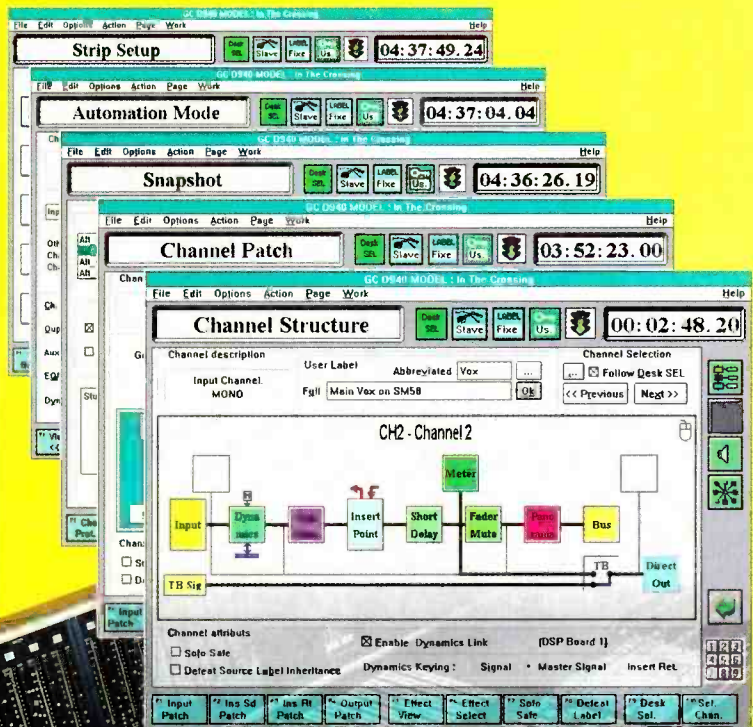
*...more sonic transparency* owing to Studer A/D technology

*...more value* for less money by tailoring the console exactly to your needs

*...more flexibility* because of modular interfacing and on-line channel structure configuration

*...more operational safety* by providing direct access to all important functions on the channel strip

*...more user-friendliness* introducing WYSIWYG for mixing consoles...



## Need to know more?

Contact us to find out how the new D940 Digital Mixing Console from STUDER can become «digitally» yours...

# D940

**STUDER**  
PROFESSIONAL AUDIO EQUIPMENT

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Japan: +81 3 34 65 22 11 Singapore: +65 481 56 88

**H** A Harman International Company



to which device and set two peripherals to the same ID. This, of course, will result in a SCSI conflict which will prevent the system from booting up correctly. To avoid such conflicts, *TyreStor* rather cleverly assigns IDs to the actual bay rather than to the storage devices themselves which all remain neutral. Thus any canister can be inserted into any slot where it will adopt an ID number without any danger of duplication.

ID numbers are displayed directly to the right of each slot in an alphanumeric display window. Just below this is a key-operated lock which apart from its obvious security function, also ensures proper seating of the canister within the bay and switches its power on and off. If a canister is inserted but unlocked the display will show a 'U'.

Also included with each bay is a Diagnostic SCSI cable and an Active Diagnostic Terminator.

'The Achilles heel of SCSI systems is the cabling,' explains Paine. 'It has nothing to do with the esoteric,

golden-eared thing of cables having to run from north to south and so on, but is based on some very genuine issues. SCSI cables and connectors have fixed bandwidths and if they're not shielded correctly they can pick up all kinds of interference. In the past, people have experienced major problems which they think are the disk drives themselves, but very often it's the cabling that's at fault—either because it's not capable of passing data fast enough or because it's not sufficiently well shielded.

'We've chosen cables, again from an American company, that display the highest spec that you can find anywhere, and because they're so good we've guaranteed them for life. We also use active termination, which means that all the data lines on the SCSI bus are supplied with constant voltage—this results in a much stabler, safer signal with high immunity to noise. The terminator also acts as a diagnostic analyser and it includes LEDs that permanently tell you what's happening on the bus.'

There are four of these LEDs. The

green TeRMinator LED lights to indicate that the termination power is at the correct voltage on the line; the yellow SElect line LED shows that there is activity between the host and the peripheral; and the red ACKnowledge line and REQuest line LEDs are used in the event of a system crash due to a SCSI error, to show whether the storage device or the host computer is at fault.

Each media canister is supplied with a shock and water resistant carrying case manufactured by Tyrell by an underwater equipment company, and although Stephen Paine does not recommend customers take their disks scuba diving or bungee jumping, he remains confident that they will survive the stresses of the average motorbikes courier and the worst of the British weather.

*TyreStor* removable drives are guaranteed for five years, and if any problems occur during the first year, Tyrell will supply immediate replacements.

'The beauty of this,' says Paine, 'is that rather than us going out into the

field, all we do is send out a replacement by courier; the client then inserts the new drive in a matter of seconds and sends us the old one back in the carrying case. From the servicing point of view, one of the reasons we originally got involved in removable media was to make our lives a lot easier!'

The prices of *TyreStor* removable systems begin at around £1,400 (UK price) for a single desktop bay and a 1Gb 3 1/2-inch canister; a dual rackmount bay with two 1.7Gb 3 1/2-inch canisters is priced at £2,725; and a quad rackmount bay complete with four 1.7Gb 3 1/2-inch canisters will cost in the region of £5,000. The 5 1/4-inch series is proportionately more expensive. *TyreStor* also offer a selection of fixed storage systems which includes 8mm Exabyte archiving. ■

Patrick Stapley

**The Tyrell Corporation,  
49-50 Great Marlborough Street,  
London W1V 1DG, UK.**

**Tel: +44 71 287 1515.**

**Fax: +44 71 287 1464.**

# HASSLE-FREE CD-R COURTESY OF HHB

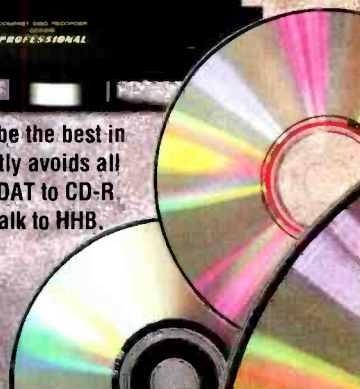


It's simple really. First, HHB evaluates all the available CD-R technology finding the Marantz CDR610 to be the best in terms of both the performance and value. Then we develop the Bit Box, an ingenious interface which neatly avoids all the track indexing and sample rate conversion problems previously associated with digital transfer from DAT to CD-R making it a simple, real-time operation. So if you're interested in CD-R, talk to HHB.



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## Kenton MIDI-to-CV Converter

Analogue monosynth users need look no further than the Kenton *Pro-4* MIDI-to-CV converter as a means of integrating those old beasts into their MIDI setups. Essentially distilling the features available in other Kenton converter boxes, the *Pro-4* offers four independent monophonic sections. Each can be assigned to a separate MIDI channel and output 1V-per-octave CV and +15V gate to control pitch and note duration and thus accommodate the majority of old synths although an optional 4-channel Hz-to-V unit is available for those who need it (Korg *MS-series* and Yamaha *CS-series* users).

Each section boasts built-in portamento-glide, modulation amount controllable by MIDI continuous controller, assignable note priority and V-Trigger or S-Trigger outputs. If this is not enough, there are also eight auxiliary outputs for the control of things like VCF and VCA—four of these can be further influenced by the four built-in LFOs with amount of modulation again tweaked on continuous controller.

Transpose and pitchbend ranges can be adjusted from the front panel and the *Pro-4* can be tuned to match your synth with the programming of values conducted from an LCD with data dial.

However, there is more in the form of standard Roland DIN Sync 24, 9-pin WASP output, filtered MIDI output to channelise a virtually useless Omni On keyboard, DCB port for polyphonic control of Roland

*Jupiter 8* and *Juno 6-60*, and a 15-pin connector for getting at Roland *TR606/808s*. Needless to say you can get even more value out of an old synth by combining the *Pro-4* with other Kenton mods such as adding filter and modulation sockets to the *SH101*, for example.

All in all, this is a wonderful concoction of analogue integration which starts to look irresistible if you have more than a couple of synths that are currently excluded from your MIDI rig.

**Kenton Electronics, rear of 137-165 Hook Road, Surbiton, Surrey KT6 5AR.**  
Tel: +44 81 974 2475.  
Fax: +44 81 974 2485.

## Mesa Boogie V-Twin

With a name and chromium demeanour that conjure up images of North American personal 2-wheel transport with an attitude, Mesa Boogie's *V-Twin* valve preamp guitar pedal is not your average floor box. Instead, it is a mini amp with three modes, two of which can be footswitch selectable, and with outputs that connect to phones-mixer, power amp or a guitar amp.

Two 12AX7A/ECC83s glow away, aided by a craftily positioned red LED, under a crush-proof grill driven by Gain, Bass, Middle, Treble, Presence and Master pots. A footswitch activates a Solo channel or an alternative channel, the latter possessing a Clean or Blues tone selected on a push button with green and blue LEDs lighting accordingly. A separate Bypass footswitch

switches out the *V-Twin* permitting the host amp's sound to be accessed in isolation. Channels and bypass can also be activated remotely on standard jacks. Power comes up on a disappointingly insubstantial external power supply which ought to have a locking connector for the sort of money the *V-Twin* commands.

The EQ and gain behave remarkably like that of an amp (surprise) although the position markers on the chrome pots could have been a tad more strident. The middle and presence control is superb, there is plenty of leeway on the all-important gain but the bass can overpower so it is certainly not an everything-on-full type of affair.

Of the three basic modes or Tones, Clean cannot be provoked into giving any type of meaningful crunch no matter what you wave at it. It is not what I would describe as a particularly crystalline or modern timbre, that after all is the domain of rackmounts, just a fairly good crack with a damn good amp.

The Blues channel is really quite special and can be wound up enough to lead with. It also retains guitar character well and can be worked on the guitar volume pot. This cannot be said of all preamps some of which bottle-out once the driving level is backed off. However, what you really want to know is what the Solo channel does for you.

There is a stupendous amount of gain available, so much, in fact, that you get an impression of guitar-amp-speaker sympathetic resonances even with cans on. Play it out into a room and it verges on the obscene. Instant guitar legend—just add facial expressions. Guitar differences tend to drop away at the more extreme settings and everything starts to sounds extremely hot which, let's face it, is what you want. Variability is best applied through the tone pots which by now are in Turbo mode. It's confidence inspiring because it sounds so expensive and while I wouldn't dare to suggest that this is a Boogie-in-a-box I would say that it's a relatively inexpensive way of injection a bit of Boogie into an existing rig that maybe is not at its strongest in this department.

It's no a cure-all box either—you'd have to be a real minimalist to be content with just a *V-Twin*, power amp and cabs—especially as the dryness of the signal cries out for a dose of reverb to give it some perspective. But as far getting things sorted at the business end of things,

then it really takes some beating. Classic Americana.

**Mesa Boogie, 1317 Ross Street, Petaluma CA 94954.**

Tel: +1 707 778 6565.

UK: Rocky Road, 1 Horseshoe Close, Oxgate Lane, London NW2 7JJ.  
Tel: 081 450 6666.

## Fairlight samples

Never mind your latest compilation sample CD of last week's loops and bleeps, Digital Domain have released a library that is likely to be of sustaining interest. The Fairlight IIx sample library is approved by Fairlight and contains the complete set of sounds that access to in the 1980s, lest we forget, would have cost you a handsome deposit on the pad of your choice.

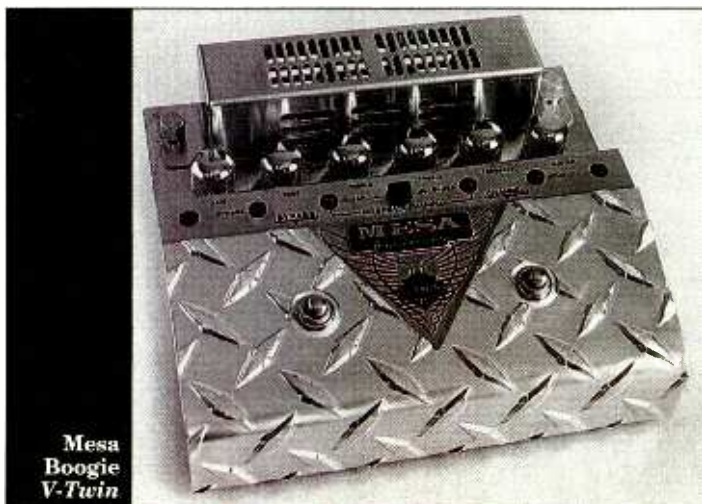
Sure they were 8-bit, but sound quality was rarely criticised particularly when held up against the low-end wallop that the thing had. Indeed it was a sampler with a sound and character of its own which you can't exactly claim nor indeed would want to admit with the machines of today that now do much the same for considerably less cash and without taking over your life.

But here they are, those blasts from the past, faithfully reproduced and dry as a bone. Keyboards, pianos, guitars, basses, drums, cymbals, percussion, mallets, strings, brass, reeds, wind, humans, bells, analogue, animals, and effects corresponding to Fairlight disks 1 to 30 and A to C and track indexed on the CD as Fairlight disks. An accompanying booklet names and describes the sounds but does not give timing locations within tracks. Loop points are blatantly obvious on many of the sounds but merely add to the earthiness and general graunch that you can create. Indeed in retrospect this is the 'analogue' face of sampling—dirty, powerful and very easy to use.

The CD will soon be joined by an Akai-Roland format CD-ROM at which point the CD price can be refunded but that, however, is taking some of the fun out of it. An absolute must for the seriously jaded sampler. **Digital Domain, Churchill House, 12 Moseley Street, Newcastle-upon-Tyne NE1 1DE, UK.**  
Tel: +44 91 230 0000.



Kenton's *Pro 4* converter—MIDI to CV... CV to MIDI...



# HHB DAT TAPE

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## Escaping the Gulf War Moheb Milad made a pact: to build the first world-class recording studio in the United Arab Emirates when he, and peace, was restored. Caroline Moss reports

---

**W**hen the Gulf War broke out in Kuwait, Egyptian Sound Engineer Moheb Milad fled the country like countless others. Before leaving he made a pact with a Kuwaiti musician-friend; if they survived the exodus they would build the first 24-track studio in the United Arab Emirates. Fortunately, both men were successful in their escape and several years later realised the pact in the shape of Funoon al Emarat, which opened mid-1993.

To grasp the significance of building a well-designed studio in this part of the world, it helps to understand Middle Eastern recording protocol. Cairo is the centre of the industry and most large orchestral productions are recorded in studios there. Prestigious projects are sent to Europe for tracking and mixing, Athens being a popular and convenient choice. Studios throughout the Middle East send their master tapes to Cairo for the instrumental tracks to be laid down, then the tapes are returned to the studios and the vocals, percussion and string instruments (such as lute) are overdubbed. Although Eastlake had built an 80-person-capacity orchestral



The reception area

studio in Libya in 1989, Eastlake Director David Hawkins says that it, 'seems to be off the region's musical map for political reasons'.

With its long history of musical tradition, Cairo remains the seat of the area's musical culture. The UAE in particular is so new that it has no deep rooted culture of its own, and Milad knew there would be no point in building the studio in a vacuum. In the light of a copyright protection act about to be passed in the UAE, however, the studio's investors were keen to develop a cassette duplicating plant, record label and sales room in tandem with the studio itself.

Milad, now Technical Manager at Funoon, supervised the technicalities of the entire project. A Sound Engineer since 1980, when he trained in his native Cairo, he had become familiar with Eastlake studios during stints spent working in Europe and this was his first choice once backing had been secured for the studio.

'I've always felt very comfortable in an Eastlake studio, and I knew I could rely on Dave Hawkins as he's designed almost 100 studios around the world,' the Engineer states. So high was the emphasis placed on the fundamental design of studio that the major part of the budget was allocated to this rather than to the equipment that would inhabit it. 'If you want to create something different in this part of the world you have to invest in something that nobody else has,' explains Milad.

The first priority was to find a suitable building. One was quickly located: a disused storeroom measuring 20m x 20m x 9m high with no interior walls—consequently Milad refers to it in its original state as 'the cube'. This empty shell proved ideal for his plans. Hawkins approved the space and began work on the complex in 1992.

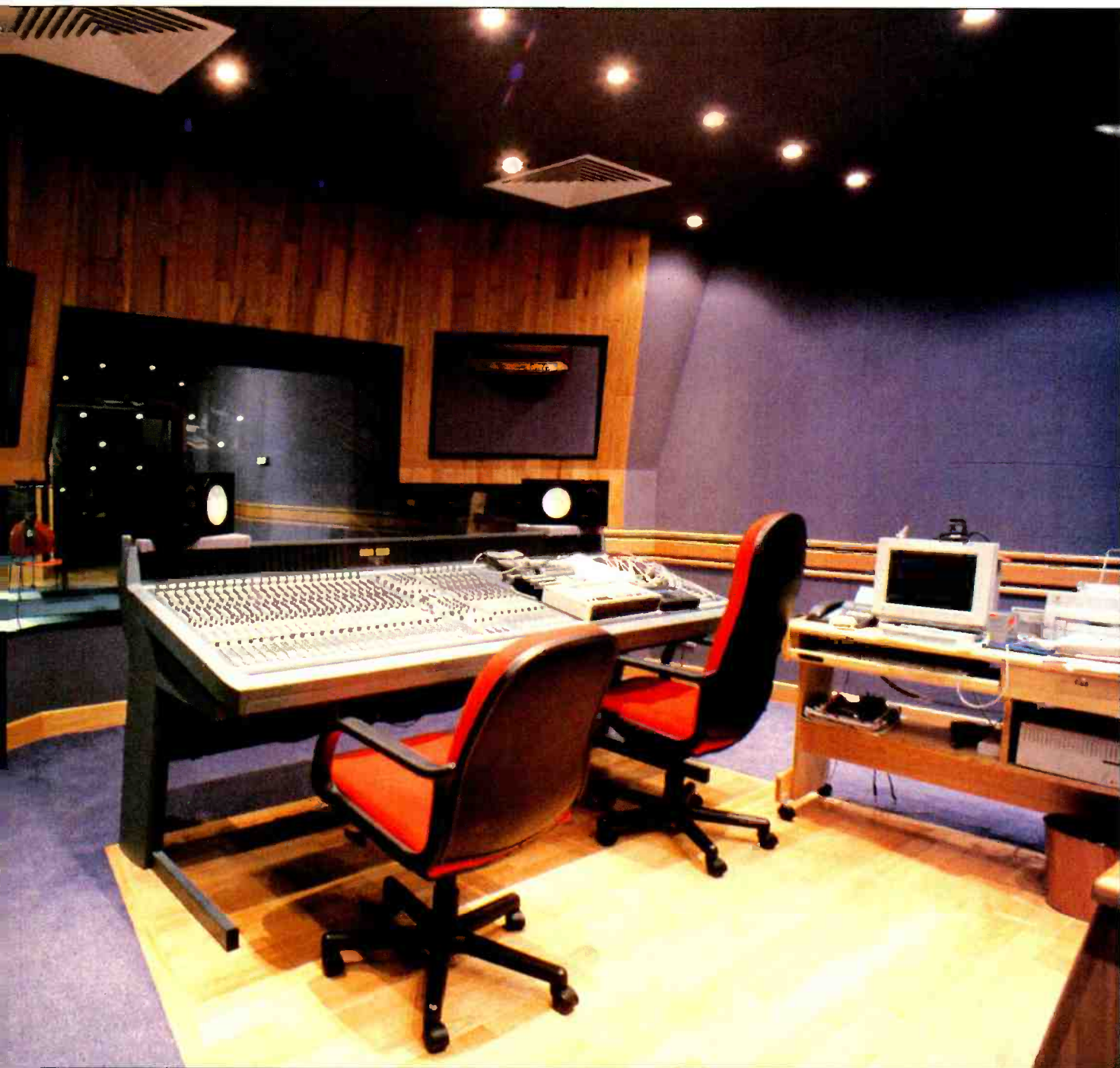
Initially, a mezzanine floor was built to accommodate the cassette duplicating plant which was up and running within months while the recording studio was constructed. Hawkins located and supplied everything from

materials such as wood, fabric and carpeting through to the wiring crew and a foreman to supervise a team of local builders.

'We have lots of good building contractors in Dubai, but building a studio was such a specialised thing and so completely unheard of here that we didn't want to leave anything to chance,' Milad comments. Every single component of the studio was built locally to Hawkins' specifications under careful supervision.

'Studio owners in this region always talk about sound isolation and not acoustic treatment, so it was a dream come true to build a studio like this one where the amount of carpet, cloth, wood and so on, is so precisely calculated,' says Milad.





Listening in the East—the control room complete with Soundcraft *Sapphyre* console at Funoon al Emarat

# FUNOON AL EMARAT

## Tuning in, turning on

Once the control room was built and wired, Hawkins started to fine-tune the studio. He installed a custom-built Eastlake monitoring system using White equalisers and JBL drivers. Milad is more than pleased with the results.

'What really matters to me is that the

room is completely homogeneous and mixing has never been easier. I've suffered in control rooms for years with things sounding different at every spot you position yourself in.' And after years spent dealing with the shortcomings of typical Middle Eastern studios, Milad is equally enthusiastic about spacious live and dead areas.

During the building period Milad started to order equipment. This

involved a trip to London's APRS exhibition where he watched the Soundcraft *Sapphyre* in action and decided it was the console for him.

'The commercial standard for a desk in the Middle East is certainly not SSL or Neve, so what I wanted was a good, mid-price range console that was versatile and upgradeable. Some of studios have already jumped to 48-track, and at some point we will have to do this.' ►



Moheb Milad in the control room

An old hand at working on Soundcraft consoles, Milad was particularly impressed the new *Sapphyre's* low noise levels and the features it offers. The gate integral to each of the desk's channels was a particularly welcome inclusion.

'Some of the tapes we receive from Cairo have no noise reduction at all and are very hissy,' Milad explains, 'so during mixing we can gate the hiss. It's not the ultimate noise-reduction system but it's a big improvement on what went before it.'

Milad purchased a 52-channel frame fitted with 32 channels with a future upgrade in mind, and to this end the studio is prewired for 52-channel, 48-track recording. Currently he is satisfied with the 32 channels which give a comprehensive 64 channels during mixdown.

'You don't need more than eight buses at the same time,' Milad asserts, 'and I find that four buses are sufficient.'

The studio's multitrack tape machine is an Otari *MX-80* and as compatibility with Cairo is vital, noise reduction is a dbx *911* which Milad describes as, 'set in stone by the first guy who upgraded to 24-track in Cairo'. A TimeLine *MicroLynx* synchroniser provides the necessary for future 48-track work and audio-for-video projects. The 2-track machine is also an Otari, an *MX-55*, and is supplemented by several Panasonic *SV3700* DAT machines.

When it came to choosing a hard disk recorder, Milad opted for the Digidesign system as he had worked with the system in Jeddah at what is Saudi Arabia's first hard disk facility.

Nearfield monitors are Yamaha *NS10Ms* and effects units include two Lexicon *LXP1s*, two *LXP5s*, two Alesis *Microverb IIIs*, two dbx *160Xs* and two Urei *1176LNs*.

'I'm glad I bought the Lexicons when I did,' Milad reflects, 'because not long afterwards they introduced MIDI remote control which gives you a screen so you can really get into the parameters.'

## Duplication

Upstairs from the studio is the cassette duplication plant. This is equipped with a Lyrec loop bin and two slaves, Apex equipment for on-body printing, folding and boxing and a Capex wrapper. In the

mastering room is a Soundcraft *Delta* console, two Otari *MX-55s*, two Panasonic *SV3700* DAT machines and Genelec monitoring. Around 60%–70% of the factory's cassette duplication is for the studio's sister production company and the remaining work is largely promotional cassettes for advertising agencies and radio stations such as Dubai Radio and Abu Dabi Radio. The factory's annual capacity is 1.5 million cassettes to which it is building up, hoping to reach 1.2 million this year. Like the studio it has been designed with expansion in mind, and there is physically the room to add several more slaves.

'As the Lyrec is a modular system it's readily expandable, and we're only limited by the last operation—the printing,' says Milad. 'Our printer is capable of 3,500 cassettes an hour, so we can expand our slaves and loaders in line with this and go all the way to its capacity.'

Five technicians work in the factory and Milad handles the mastering duties as well as all the mixing in the studio.

In-house productions are of Arabic music and many of the resulting cassettes are exported throughout the Middle East, the resourceful company having set up a distribution arm for this purpose. As much as 60% of any cassette run will go to Saudi which, at 12 million, has six times the population of the Emirates. Sound quality requirements in this part of the world seem to be centred on high volume levels and a great deal of compression.

'It's incredible how pushing the level at high speed affects the quality. I can push it all the way to saturation without reaching distortion and they like that around here because it sounds very aggressive—very loud and very compressed. If a client buys something of ours to play in the car, and it sounds



The live area

louder than the cassettes, he bought last week, then for him it's a better quality. That's how it's judged in this part of the world.'

Looking to the future, Milad is hopeful that Dubai will establish its own musical culture including a musical institute, of which the only one in the Middle East is presently in Kuwait. Currently 80%–90% of the work done in the studio has begun life by being sent



The cassette and CD showroom

to Cairo for the instrumental tracks to be laid down.

'For a very traditional, simply-constructed percussion and lute arrangement it is completely recorded here, but when it comes to a more complex type of production then it is recorded in Cairo and the multitrack master is brought all the way back here for the traditional percussion and the main and backing vocals to be overdubbed, and for the final mixing. We hope that the day will come when there will be musicians here and we can handle complete productions.'

With Dubai going through a boom period—the city resembles a vast, quickly-spreading building site and it is on the way to becoming an important international trading centre—Milad will doubtless be remembered as the man who opened the first world-class studio in the city. ■

**Funoon al Emarat, PO Box 2788, Dubai, United Arab Emirates.**  
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The 'rhythm' area



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-20dB activity LED's "stacatto" effect is so distinct that you can tell vocals from instruments. +20dB OLLED.

Triple bussing! All 8•Bus consoles have 24 Tape Outputs (3 sets per bus) so you can "send" an output to your choice of tape tracks without re-patching. For example, Sub 1's output appears at Outputs #1, #9 and #17. All outputs are switchable between "pro" +4dBu & "semi-pro" -10dBV in banks of 8.

Sealed rotary controls resist contamination.

Optional MB•32 meter bridge.

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Exceptional specifications including 0.0014% THD (1kHz @+4dBu, main outputs), -95dBu output noise (master fader up), 10Hz-120kHz (+0dB/-3dB) frequency response, -129.5dBm mic E.I.N. (20Hz-20kHz, 150Ω), -83dBu mic C.M.R.R. and 91dBu crosstalk (line in to adjacent ch.).

Optional stands available for all models & 24•E Expander.

Constant loudness pan controls' active buffered circuitry & special pot design provide up to 74% more attenuation than comparably-priced consoles.

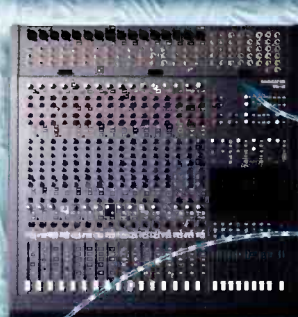
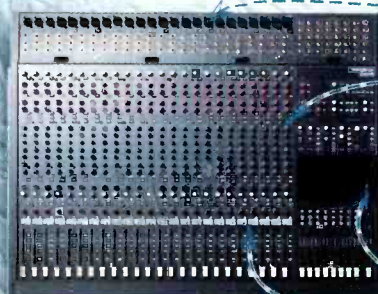
MIX-B bus is a "channel strip within a channel strip," with its own Level, Pan, Source and EQ options. During mixdown, Mix-B doubles your inputs (for example, 64 on our 32x8, 2 32•8 shown above).

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

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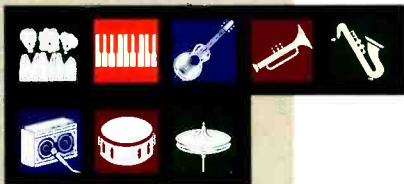
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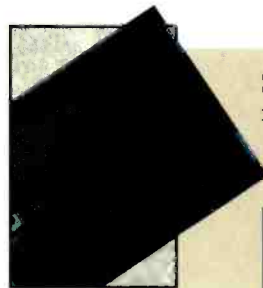
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# SOUNDCRAFT SERIES 10



10 for Europe, 10S for the US—Soundcraft on the air

Soundcraft have been manufacturing their range of radio broadcast consoles for just over three years now. Out of the four consoles—from the baby *Series 5* to the comprehensive *Series 30*—it is the *Series 10* that has proved most popular. However, until now, all these consoles have been designed for the British style of operation, and consequently sales to America—and other territories that adopt or partly adopt the US style, such as Australia, Japan and Germany—have been poor to nonexistent.

Soundcraft have now produced the *Series 10S*, which takes the basic console and adds a new set of modules specifically designed for American users.

To give a clear picture of how the two consoles differ, this article will first look at the *Series 10* and then outline the changes that have been made to produce the *Series 10S*. Readers that are already familiar with the *Series 10* should move straight onto the next section.

## *Series 10*

The *Series 10* has been designed for local radio and smaller studios in national broadcast operations. It is equally suited to self-operation or engineer-presenter operation and is available in two variants—the On Air console and the Production console. Both versions are supplied in three frame sizes—12-input (609mm x 637mm), 20-input (889mm x 637mm) and 28-input (1169mm x 637mm).

There are five types of module available for the console—Mono Input module, Stereo Input module, Telco (Telephone Communications) Input Module, Stereo Source Select module, and Master module. These modules can be fitted in combinations and positions within the frame to suit the customer's preferred way of working—the only exception being that the Master module is always sited at the extreme right of the desk.

The 3 input-modules all share the same basic facilities, each having a  $\pm 15\text{dB}$  gain control, recessed coarse level preset pots overload LED, single auxiliary send (selectable pre-post on internal links), optional 3-band fixed EQ (130Hz shelf, 3kHz peak, 8.5kHz shelf all  $\pm 10\text{dB}$ ) plus separately switched 80Hz high-pass filter, PFL switch, pan-balance control, and long-throw ▶

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Soundcraft's *Series 10* broadcast console now comes optimised for use both sides of the Atlantic Ocean. Patrick Stapley goes on the air to explain the desk and its variants

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ALPs fader fitted with a microswitch.

The Mono module has switchable Mic and Line inputs, and can be used for presenter's and guests' microphones, or for journalist's cassette machines, mono cart machines and other mono line sources. Similarly, the Stereo module can be switched between two stereo inputs, controlling stereo cart machines, CD players, records decks and so on. The Telco module has one input and one output connecting it to an external telephone hybrid system—the output being a clean feed containing the programme minus the telephone signal. This module also contains a DIVERT switch for routing the hybrid output to a standard telephone handset, and a COMM switch to allow off-air communication between the presenter and the caller. The COMM switch (like the channel PFL switches) will be deactivated once the fader is moved from the closed position.

All connectors appear on the facing side of the modules, where they take up approximately the top quarter of the channel strip—this area is neatly concealed below the hinged meter-bridge assembly. Two types of connector are used on the input modules—XLR for I-Os, and 25-pin D-type for remote functions.

The Stereo Source Select module accepts eight stereo inputs on a 38-way EDAC connector, which are routed to two stereo outputs via a matrix. These outputs are designed to connect to the Stereo Input modules, thus doing away with constant replugging or the need for additional input modules.

The console provides a range of remote functions and this is where things start to become more intricate. Both the Mono and Stereo modules include a cueing switch that works in conjunction with the fader microswitch to enable-disable various relay-controlled remote functions. This interaction means that remote switching can be controlled either from the fader or from the mounted switch. Thus, in the case of the Mono module, if the REMOTE switch is on and the channel is switched to Mic, opening and closing the fader will automatically switch a cue-lamp circuit on and off and mute either the studio or control room speakers. Alternatively, if the REMOTE switch is off and the fader is up, the Cue light can be switched from the REMOTE button—the fader, however, still controls speaker muting.

To clarify status, a LED within the REMOTE button operates at two brightness levels: with the switch on and the fader down the button will be dim (armed mode), but as the fader is moved away from its bottom stop, thereby activating the relays, it will switch to full brightness (active mode).

When the Mono Input is selected to Line rather than Mic, the Start-Stop remote function becomes available. This operates in the same kind of way allowing a mono cart machine, for example, to be fired-off and stopped-recued, either from the fader or the REMOTE switch. Alternatively, if the fader is down and the REMOTE switch is on, the PFL button will activate the start relay providing a third method of control—the assumption here being that if a machine has been PFL'd it also needs to be started so the operator can hear it.

The same remote start-stop facilities are provided for the Stereo module for controlling carts, CD players, turntables, tape decks and so on.

Both momentary and latching closures are available, and each stereo input has a separate set of remotes associated with it, although only the selected input will be operative.

Another remote facility is Cough-Reverse Talkback. This requires an external button to be connected via the remote socket which allows the presenter to temporarily mute his or her microphone, or if the channel is switched off, to talk back to the control room by switching the studio mic into the FFL circuit. An additional talkback switch can be added that connects the mic channel's prefade input to the Talkback Mix bus, thus allowing off-air conversations, for example a guest and a telephone caller.

Apart from their switching functions, the remote sockets also provide power rails for driving ancillary equipment such as RIAA to line level preamps for turntables, limiter-compressors and effects units. The remote sockets also carry some audio including one of the stereo inputs for the Stereo module, and an insertion point for the Mono module.

The 4-module-wide Master module contains the monitoring, auxiliary master, and

The Series 10S is  
not a replacement  
or an updated  
model, but is an  
alternative version  
aimed at American  
and related  
markets

communications controls, and like the input modules has face-mounted connectors which are concealed beneath the meter hood. It is available either with two effects returns, plus stereo and mono output faders (Production Console), or without (On-Air Console).

The monitoring section has four stereo outputs—Presenter's Headphones, Control Room Monitor, Studio Headphones, and Studio Monitor. Each of these stereo outputs has a rotary level control and source selector buttons allowing them to monitor either the programme output, the auxiliary send, or one of four external sources selected from a common, intercanceling matrix.

Apart from the Presenter's Headphones circuit, the other three monitor outputs include an AUTO FFL switch that when selected will cause any PFL selection to replace the existing signal. The Presenter's Headphones are automatically overridden by PFL, but can alternatively be switched to PFL SPLIT which will put the sum of the PFL to the right channel and the sum of the existing source to the left. Irrespective of which mode the Presenter's Headphones are selected ▶



to, the reverse talkback facility will take precedence and override all other signals.

A built-in electret microphone is included in the Master module with an associated button allowing talkback to both studio circuits. However, this switch does not turn the mic itself on and off, and consequently the TB microphone is always present on the Talkback Output bus which can be accessed from the Continuous Talkback Output jack socket along with any reverse talkback signals.

There are two other talkback inputs provided on jack sockets which can be fed from other areas such as another studio within the same station. These mix directly into the presenter's headphones and studio monitors.

The *Series 10* is available with a choice of output metering: the standard are mechanical PPM or VU, but high-resolution bargraphs from NTP or RTW can be optionally fitted. These meters will normally read the desk output, although they will be overridden by PFL selection. However, they can also be switched from the Master Module to follow the Presenter's Headphone source minus any talkback.

Other metering standards are available for the console, and additional meters can be fitted to permanently read the PFL bus—in this case the main meters should only monitor the desk output ignoring any PFL switching. A meter-bridge distribution board allows for easy connection of meters and other optional meter-bridge modules such as a small PFL speakers, a dual digital timer which may be controlled by the console's remote switching, and a talkback remote.

The desk can be supplied with two types of script tray—flat plate or recessed—and the stand-alone power supply is available in floor-standing or optional rackmount versions.

## Series 10S

It is worth clarifying at this point that the *Series 10S* is not a replacement or an updated model, but is simply an alternative version aimed at American and related markets; both consoles will be manufactured side by side.

Like the *Series 10*, the *Series 10S* has been

designed for local and community radio applications. Frame sizes remain the same, and once again there are five types of module available. The most obvious, visible change has been in the simplification of the input modules, apart from the Stereo Source Select module and meter-bridge modules.

Input modules no longer include a mono auxiliary send. Instead the channel has two output bus selectors—PGM and AUD—which allow the operator to set up two separate stereo mixes providing a main programme output along with audition or off-line tape sends.

Also removed from the inputs is the  $\pm 15\text{dB}$  gain control. This trim adjustment is now controlled directly from the fader which has been rescaled to accommodate the extra gain. The net result of this is that the unity gain point of the fader is no longer set at the end stop, instead the operator's 'O' point is positioned (and marked) a little above the fader's mid point.

As before EQ is an option, but has been reduced from 3-band to 2-band (180Hz and 7kHz shelving  $\pm 10\text{dB}$ ) and does not include a high-pass filter. EQ is only available for mic channels, and these modules have also been changed from Mic-Line to Dual Mic Input Modules with switchable selection between Mic A and B.

The Stereo Input modules have been equipped with a 4-position MODE selector which allows the channel to be switched from its normal stereo operation. The alternative modes are: 1) a mono sum of left and right inputs goes to the left and right signal paths; 2) the left input is combined to both signal paths; and 3) the right input is combined to both paths.

To fit in with American terminology, the PFL button has been renamed CUE. This function in the same way except it does not have a start function. The REMOTE switch that originally appeared above it, has been replaced with two large buttons which have been positioned below the fader at the nearest point to the operator. These switches have the same function as the single REMOTE button, one acting as an ON button the other as an OFF.

The *Series 10S* includes the same remote facilities offered by the *Series 10*, but adds a number of additional features. Instead of one cue-lamp circuit, there are now dedicated Studio and Control-Room circuits. This means that mic channels will selectively switch cue lamps depending on where the mics are sited, thus a module connected to a control-room guest mic, will switch the control-room cue lamp on either as the fader is lifted (providing that the ON switch is active), or as the ON switch is activated (providing the fader is up). Links within the module assign this area switching.

The ON and OFF switches have been designed to combine with external switches to allow for remote operation: thus a guest in the studio, for example using remotely sited ON and OFF switches will be able to turn his or her mic on or off. Additionally, the external ON switch can be used as a 'cough' button when the mic is on (muting the circuit as long as the button is pressed), and the external OFF switch can act as reverse talkback when the mic is off. Remote switching is independently available

for both mic inputs on the mono channel.

The Stereo Input module also has provision for external remote switching for the ON and OFF switches as well as the CUE switch. Making this facility available for Cue switching is very useful in situations where a tape machine is positioned away from the console: by placing a switch adjacent to the machine, its Cue circuit can be locally activated allowing the machine to be cued up.

As with the *Series 10* Stereo Input module, machine start-stop functions are controlled either by the fader microswitch or the remote switches. The *Series 10S*, however, also includes a tally-back system from the connected machine that has two main functions. If connected to a cart machine, the respective channel will mute as the cart machine recues, and once reset will automatically switch back on. If connected to a recorder, the channel will mute as the machine switches to record to avoid any danger of feedback loops, and again will switch the channel back on once the machine has stopped.

Due to the extra remote facilities provided on the Stereo Input module, there is no space available for XLR connectors, thus all connections are via a 25-way and 15-way D-type connector.

The Telco module no longer has a COMX button for off-air talkback to the caller, instead the CUE switch performs a double function, providing prefade monitoring while connecting the talkback bus to the caller. Either the PGM or the AVD bus can be used as the clean feed back to the telephone hybrid, and as with the *Series 10*, the caller can be DIVERTED to a conventional phone. The ON and OFF switches have no remote function, but simply act as channel ON-OFF buttons.

The monitoring section of the console remains identical to the *Series 10* apart from having an additional output labelled Guest Headphones. This shares source selection with the Studio Headphones circuit, but does not include any talkback. The only other difference to this section is that the previous auxiliary-send source selector buttons now access the Audition bus.

As before On Air and Production versions of the console are available. The Production Console includes two main output faders for the Programme and Audition outputs, but unlike the *Series 10* Production Console has no effects returns. The On Air desk simply comes without main faders. Both versions have switching to enable the PGM and AUD outputs to feed a mono output.

In terms of cost, the *Series 10S* is slightly more expensive than the *Series 10*, which at first may appear surprising considering the simplification to the audio path. However, if one takes into account its extended remote capability and the use of more expensive components, such as P&G faders rather than ALPs, the price differential becomes more understandable. ■

**Soundcraft, Harman Industries Ltd,  
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Estate, Potters Bar, Herts EN6 3JN, UK.  
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# COMPROMISE OR CONTROL?

**F**or every studio or facilities manager—irrespective of whether in a recording studio, postproduction facility, broadcast or most recently, project studio—the introduction of new equipment implies the need for effective integration into an existing configuration. No matter how sophisticated a new digital console, audio workstation or video-editing system, they all have to work with other equipment rather than in splendid isolation. So why is it that the integration question is so often overlooked until very late in the decision chain, often leading to a severe compromise in the whole issue of machine control?

The need for and benefits of effective multimachine control have been demonstrated time and again over the past decade. One would, therefore, expect users and manufacturers to be finely tuned to the relevance of designing and installing equipment which maintains such an easily attainable level of sophistication. The fact remains, however, that the question is often overlooked. This article aims to ask why this should be and try to address some of the key criteria from the different perspectives involved—those of the users, manufacturers, and independent system integrators.

What exactly constitutes state-of-the-art machine control? Multiroom studios with central machine control rooms are not uncommon, using a permanently wired distributed configuration to achieve maximum flexibility and reliability. By hooking all machines to be used on a specific job onto the common master speed and position references, routed via the machine control system, fast lock times and consistent operation can be achieved. Equally, remote equipment can be easily accessed from area to area, without having to move transports on a regular basis. In both audio and video environments, the central machine-control routing should provide a minimal number of wires—hence the use of serial comms across hundreds of metres, carrying control commands, machine status, plus master speed and position data for each system configuration.

## Standards

At the heart of the matter is the problem associated with the lack of a common machine-control standard. Admittedly, there is the matter of vested interests—so often a block to achieving a common and universally applied control standard. Manufacturers inevitably provide for functionality to suit the particular attributes of their own

machines, at the same time minimising any inherent shortcomings. Part of this same scenario involves deliberately encouraging the use of their own complementary devices, such as controllers and editors. Although some common elements have been adopted by various manufacturers—for example, serial control using the RS422A command at 38.4kbaud, developed by Sony in Japan and Ampex in the US for their own VTR control and editing requirements—the only real commonality is the interconnection principle itself.

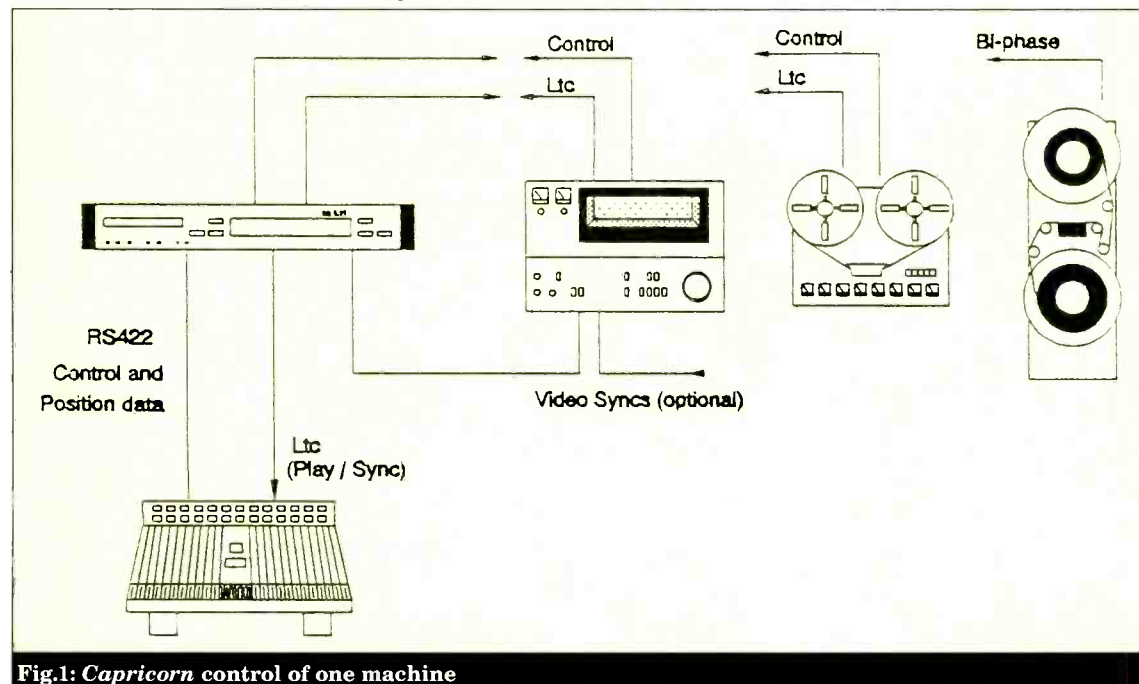
Recognition of this lack of a common standard was the principal impetus behind the development of ESBUS (EBU-SMPTE remote control bus running at 38.4kbaud), designed to give the industry a secure, dependable framework for machine control. Based on the serial 9-pin RS422 interface, ESBUS has been established for a number of years and yet, as a universal machine control mechanism, remains little used.

The principle behind ESBUS is in essence very simple, although it is arguably its esoteric nature which has precluded its widespread use (see Francis Rumsey's detailed overview of the ESBUS concept in 'Audio Remote Control—Where to Next?' *Studio Sound*, March 1994). ▶

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**David Godsmark of Audio Kinetics hosts the great Serial Port Debate**

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**Fig.1: Capricorn control of one machine**

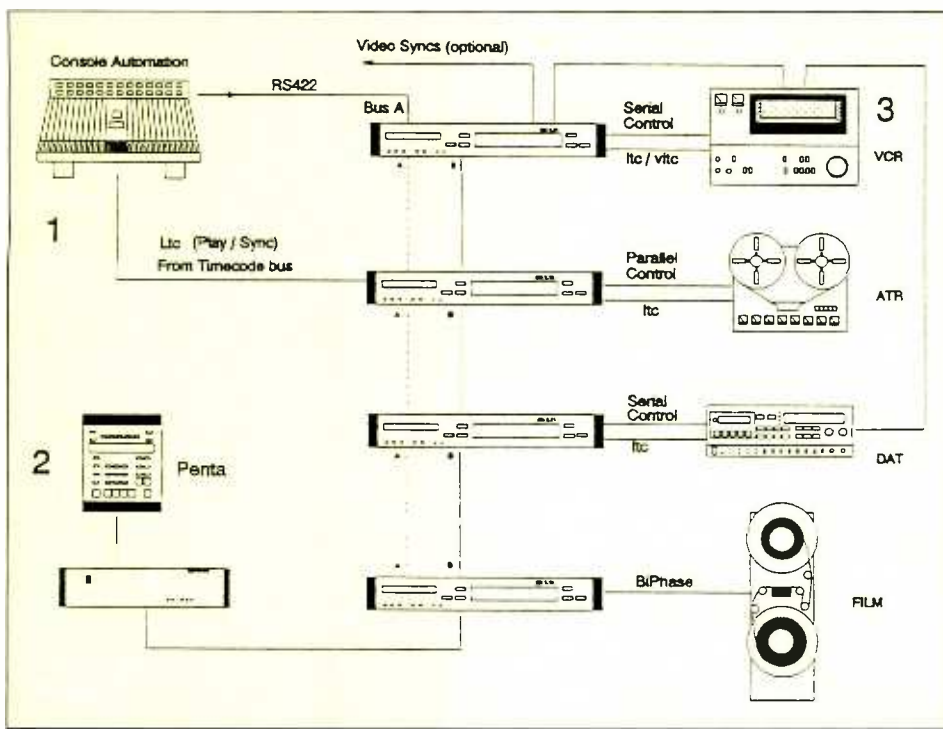


Fig.2: Serial Share dual control

A growing volume of equipment with 9-pin control capability is now being introduced for specific applications, which are outside of the original VTR remote control and editing environment. The problem is that 9-pin control has inherent limitations when the specific requirements of audio machine control and editing are considered in detail.

Such controlling and controlled devices in the audio domain using this principle include such examples as the SADiE controller and SSL's *ScreenSound* at extremes of the digital audio workstation genre. Transport types include the Tascam *DA88* and most of the time-code DAT recorders—now so popular in the mainstream professional audio domain—a fact which dictates the need for a genuine control solution to be found, which can encompass the basic single machine and the increasingly inevitable multimachine control environments. It is interesting to note that the very high-end multitrack DASH machines generally still use a parallel remote control interface, possibly because of shortcomings in the 9-pin approach.

Overall, the most widely used remote control solution is an RS422 point-to-point, conforming to the Sony P2 protocol. Unfortunately, not all controllers or controlled devices exhibit exactly the same characteristics—for example, commands used may be the same for two transports, but machine ballistics may be totally different. Alternatively, a customer may have transports without 9-pin control ports at all, or a control device may use a proprietary serial protocol of some other kind. This situation has given rise to the development of the 'Emulator', a device which acts as a 'control translator'. This emulation concept enables machine differences to be overcome by adapting what a machine can do to what a controller wants to do.

Taking a more specific look, the recent introduction of the AMS Neve *Capricorn* console is a good example of the machine control debate. As supplied, *Capricorn* is capable of machine control via the proprietary Adams Smith Zeta Three protocol (driving either RS232 or RS422 at 9600baud), through which it can recognise only a single controllable transport. In a real world situation, this is a severely limiting factor and one

which has needed a prompt solution as the number of *Capricorn* installations has grown.

One can fairly argue that manufacturers have far greater priorities during research and development than addressing the machine control question. However, once the product is in the marketplace and gaining wider acceptance, it is a problem which rears its head time and again. There is also the factor of being totally reliant on a single manufacturer for the deliverability of a flagship product. Irrespective of how effective the device may be, the financial stability of a company can be at issue—as has indeed been the case with Adams Smith, involving the parent company going into liquidation during 1992.

Machine control is fundamental to *Capricorn*, as part of its integrated automation functions. See Fig.1. Controlling a transport to locate to named sections of material from the mix EDL or to setup loops and automate punch in-outs simply cannot be achieved if the controller can only chase time code, or follow a transport autolocator.

When working with digital audio workstations, there is a need to control source machines containing original location material or archive material, whether editing audio in isolation or to picture. An ability to combine tape (linear) sources of audio with material from the digital audio workstation during editing avoids the need to transfer everything to disk.

The manufacturer of the automation or digital audio workstation system faces a dilemma, in that every step on the path to integration of complex machine control becomes a distraction from the primary function of designing more editing functions into its products. Once you offer some degree of machine control, the customer—like Charles Dickens's *Oliver Twist*—may ask for more. Equally, by not directing attention to machine control needs, you may find the customer will not consider these matters until after the sale has been concluded. Manufacturers may also be so concerned about what they can do inside their boxes, that they do not sufficiently consider the wider application environment at all. It therefore falls to the purchaser to be mindful of his own needs—a question of *caveat emptor*.

## ES.Lock

Overcoming restrictions in the interconnection of 'island' products represents an opportunity for specialist companies such as Audio Kinetics, who in the case of *Capricorn* were able to carry out extensive software development to its established *ES.Lock* system and the principles behind ESBUS. It was a solution that was largely driven by user demand, with Abbey Road being a prime member of the lobby (see sidebar). The resulting software, *Serial Share*, was developed after considerable co-operation between Audio Kinetics and AMS Neve, who provided assistance in verifying the functionality, recognising at an early stage that the solution would be of considerable interest to both existing and future *Capricorn* users.

*Serial Share* is a good example of how manufacturers and independent specialists can work to achieve an effective result—a type of partnership which has decreased over the years as the number of independents has declined! Used in conjunction with the *ES.Lock* synchroniser, the software enables up to five machines to be controlled over the ESBUS from a *Capricorn*, digital audio workstations or editor.

The *ES.Lock* system was originally designed with its unique dual bus feature as a means of providing internal machine-to-controller routing, enabling independent A Bus-B Bus operation, whilst being able to combine them to work in concert. The *ES.Lock* also uses dual processors with shared memory, making it possible to do the extensive work necessary on the communications software without having detrimental effects on the machine control functions—again, a strength of the original design.

The *Capricorn* situation highlighted the need for combined operation as the most practical solution. Audio Kinetics therefore chose to build on both facets of *ES.Lock* with *Serial Share*. Full dual control can therefore be achieved, using the *ES.Lock*'s two control buses in the following way. The *Capricorn*'s automation switches the *ES.Lock* to Emulation mode, using the A Bus port for this function, and leaving the B Bus available for system extension over the ESBUS protocol. By connecting the A Bus across all modules, it is then possible to assign any module as the Emulator to be controlled by the system automation. The A (and B) bus also includes a time-code bus, which can be automatically switched to be fed from the Emulating mode, thereby enabling complete patch-free reassignment of the Master.

By incorporating the Penta controller as an option, users can attain the full range of primary controls for multiple machine setups, without demanding further control within the digital audio workstation or automation product. The full range of controls span: individual on-line and off-line, with access to each machine for search and cue, including Bump and Crawl; manual or automatic Offset entry for each slave; Record Enablement and Serial Track Record Selection (when available) for each machine; full Looping Control with Auto Record in-out.

Fig.2 shows the Adams Smith 2600 serial protocol is also from the AMS Neve stable—the ►

# Dual Domain Audio Testing

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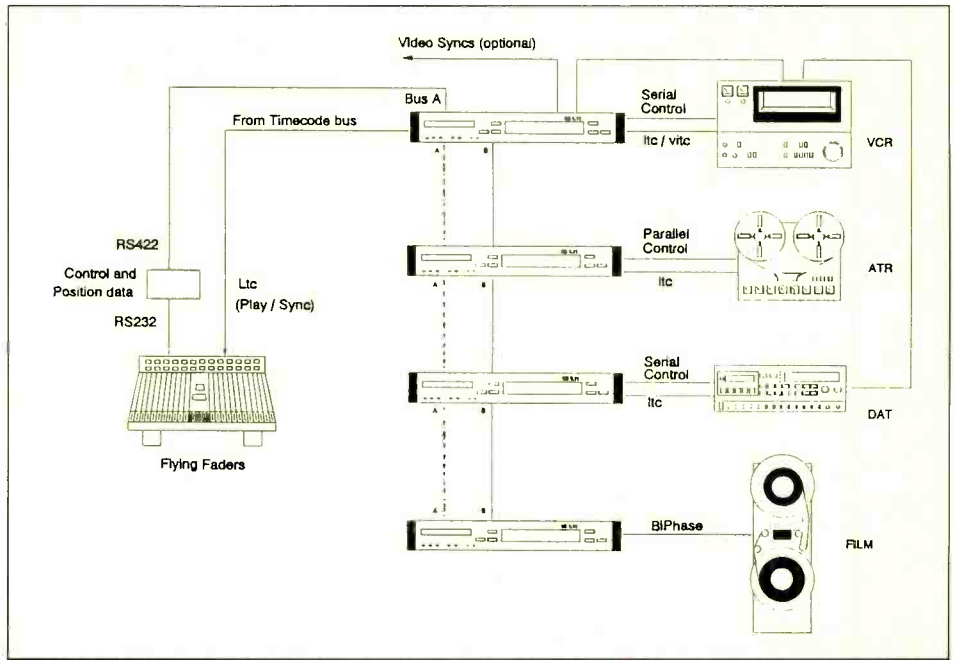
**Alan Parsons and  
the new AT4050/CM5**



*Alan Parsons will be using Audio-Technica microphones exclusively on his upcoming world tour to promote his latest Arista Records release "Try Anything Once." (CD 07822-18741-2)*

*Flying Faders* automation system. In this instance, multimachine control can be effected through the use of the Adams Smith System 2600 protocol Emulation on the *ES.Lock*, capitalising once again on the dual bussing facility. One of the key benefits of this approach is that it allows the *Flying Faders* to resolve to video extremely simply, by referencing the *ES.Lock* modules to video syncs. The solution also ensures accurate parking, as well as achieving rapid lock times from Stop to Play mode, as well as from Wind to Play—all significant improvements over time-code-only chase synchronisation techniques. In addition, the *ES.Lock* modules can be referenced to time code or biphase, allowing *Flying Faders* +10% to -20% varispeed operation or control from a film chain.

As before with *Capricorn*, the *Flying Faders* system controls the appropriate master module via the A bus, utilising that module in the Emulation mode. See Fig.3. All other modules are then operated in Chase Slave mode on the B bus, communicating via the ESBUS protocol. By interconnecting all of the modules via the A and B buses, any module can be quickly and easily assigned as the master for control by the *Flying Faders*' computer. The full range of standard *Flying Faders* transport commands are available, including cue. In addition, automatic subframe accurate record in and record out time-code values



**Fig.3: Flying Faders machine control**

are programmable and can be executed via the Cycle command.

To date, over 200 different device types are supported within the machine control software developed by Audio Kinetics for the *ES.Lock* system, highlighting the extent of the overall machine control saga. Slight differences between one transport and another, ranging from the choice of serial or parallel interfaces to varying types of connectors, all dictate the need for individual solutions. The development of these interfaces has

generally come about due to end-user requirements for multimachine control facilities on installation of relatively standard new equipment.

Surely the onus is now on the pro-audio industry as a whole to recognise that diverse machine control requirements will continue to exist for both single and multiple machines, and therefore to grasp this nettle and take coordinated action. The advent of ISDN is yet another rationale for taking effective action sooner rather than later, as evidenced by the increasing use of the EDNet ▶

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## THE ABBEY ROAD PERSPECTIVE

The recent commissioning of their new AMS Neve *Capricorn* console in the Penthouse led Abbey Road to canvass Audio Kinetics for a multimachine control 'fix'. Colin Johnson, Senior Engineer of Technical Operations, assesses *Serial Share*: 'With a concept as complex as *Capricorn*, the issue of integration with the studio environment tends to be secondary to familiarisation with its operation and facilities. Hence, on commissioning our Penthouse studio with *Capricorn*, we realised the need to supplement *Capricorn's* current ability for single machine control with an effective solution. Our long relationship and knowledge of *ES.Lock* suggested that the question of machine control could best be dealt with via an external interface. AK's answer to this was to develop a highly sophisticated emulation facility on *ES.Lock*, running on one of the two busses and thereby allowing full machine control on the other.

'The comms aspect of *Serial Share* is incredibly complex, but works extremely well—giving us genuine multimachine control and the flexibility to hook up just about anything to the *Capricorn*. We have configured the control room with four 1.11 modules, controlled from the Penta head from which we can handle everything. We have already done a substantial volume of multitrack editing, across the full range of our 48, 32 and 24-track machines. We are getting very fast lock-up times and good results. With *Serial Share*, AK have really stepped into the breach, solving something that would otherwise have left us with very limited control facilities. In an ideal world, the manufacturers would make a priority of machine control more than they do—so we are fortunate that in the real world, independents still operate who are prepared to take on aspects such as this.' ■

for long distance recordings and the resultant emphasis on fast machine lock-ups which are maintained consistently.

Audio Kinetics have been at the heart of the machine control debate for the past 20 years. This has spanned their first time-code-based audio synchronising systems (*Q.Lock*), designed to enable the potential of multitrack tape to be realised for video and film post applications, to the current *ES.Lock* solution. The nature of the industry has changed considerably, but there is still a common factor—tape and magnetic film still remains at the core of the technology. Digital audio and video still depends on tape, and will continue to do so for

some time to come. Although tapeless solutions will be of increasing significance, they still have to interact with linear systems, and for that matter, with traditional operators.

The experience of the last decade shows that trends towards standardisation of control communications formats have been unable to provide the universal panacea—despite the availability of something intrinsically as sound as the ESbus concept. It is also true to say that the changing nature of the requirement has in itself demonstrated the impossibility of having a fixed standard—compare the differences between the Sony P2 protocol commands required for

controlling a *BVU*, or a *DVR2800* or a *PCM3324S*, or for controlling an *AudioFile* or a *ScreenSound* as a tapeless device using serial control.

This means that manufacturers of new products cannot afford to ignore the interaction between their devices and those of others. Rather than committing themselves to full in-house expertise at this level, it is therefore possible to see a role, albeit a changing one, for the independent specialist. If everyone was to adopt Sony protocols, they would still encounter the limitations implicit in the protocol structure itself—unless, of course, we eventually reach a situation where one manufacturer truly dominates the market and therefore dictates the pace!

Without doubt, far more attention needs to be given to the ability to communicate properly between devices, and unfortunately it is down to the purchaser to look to safeguarding his own interests on this issue. Machine control is a secondary issue for the manufacturers themselves, who after all, will naturally prefer to focus on developing the product rather than the peripherals. We are a very long way off the ideal world situation where the 'island' approach is extinct—but perhaps if we open our eyes to the problem and start working more proactively together, the compromise can be reduced and genuine control regained. ■

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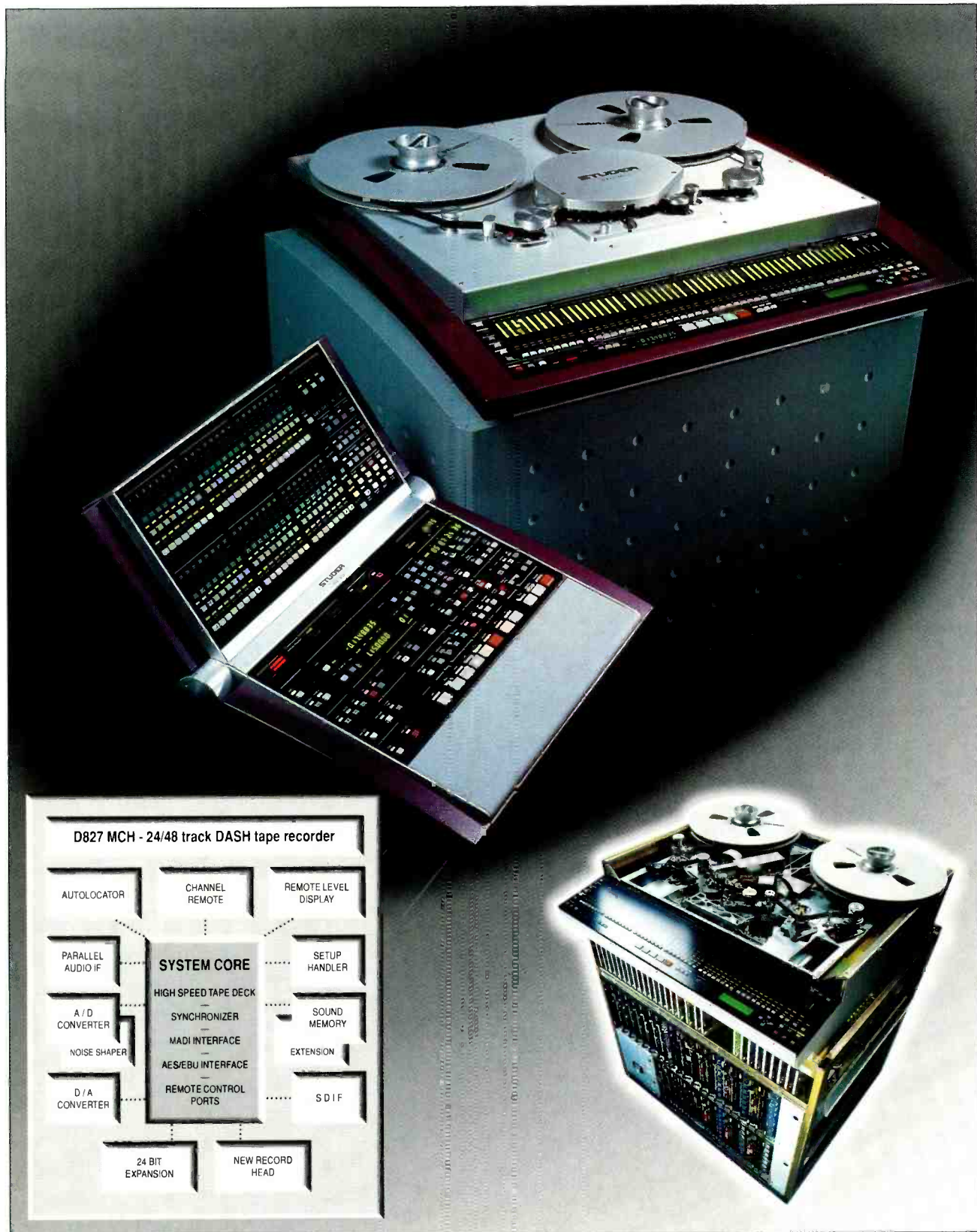
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# MACKIE 8-BUS CONSOLE

A lot of people laughed, initially, because they didn't think an American-built mixer would actually sell in the UK, says Tony Williams, recalling the introduction of Mackie into Britain three years ago.

Williams, who's company Key Audio Systems is the sole UK distributor of Mackie products, is not a man to get easily discouraged, particularly when he believes strongly in a piece of equipment. Three years on and he has proved the sceptics wrong, having established the Mackie name in the UK and built up a wide and enthusiastic user base.

'The consoles have been extremely well received, and up to now have sold well with very little need for advertising. I believe if you have a good product and enough satisfied customers, the product virtually sells itself. We have started advertising the new Mackie 8-Bus console in the last couple of months, but so far all the sales have come through personal recommendation from existing Mackie users.'

The Mackie success story is by no means confined to just the US and UK markets; worldwide the Washington-based company have gained, or is in the process of gaining, a reputation for high standards and low prices.

'The thing that really impresses people about Mackie is the price-quality ratio,' says Williams, 'and it comes as something of a revelation to a lot of my customers, who have become used over the years to mixers in this price range sounding squashed, noisy and lacking in definition, to find a budget price console that sounds every bit as good as a big studio desk.'

Mackie's top of the range 8-Bus console was launched about eight months ago, and so far Williams' main market has been to professional musicians with home studios—band members from Level 42, Simply Red, INXS, and Marillion being just a few of his recent customers. However, the console is by no means restricted to the project studio, and has wider applications including MIDI programming, postproduction and live work. Another of Williams' clients, Le Studio Mobile (see *Studio Sound*, May 1994), use the console for location recording.

The 8-Bus is available in three compact frame sizes: 16-channel (29.2-inch x 28.8-inch), 24-channel (37.0-inch x 28.2-inch), and 32-channel



Mackie 32-channel 8-bus console

(45.8-inch x 28.8-inch). Also available is a 24-channel expansion console—the 24E (29.2-inch x 28.8-inch).

The current UK price for a standard 24-channel 8-Bus is just over £3,000 excluding VAT. Add to this the optional meter bridge and stand, and the price increases by approximately £800.

## Nonmodularity

One of the aspects of the console that has helped keep costs down, is its nonmodular design, and the entire control surface is a single panel below which run horizontally-mounted circuit boards—eight channel strips per board. Apart from cost benefits, this method of construction also increases the strength and rigidity of the desk, which, of course, is important if it is to be used on the road. In fact, generally, the desk has a robust build-quality incorporating a solid steel chassis, braced shock-absorbent circuit boards, and impact resistant pots.

A criticism that can be levelled at nonmodular consoles, is that maintenance and repair work is more difficult—faulty channels, for example, cannot simply be exchanged. However, Mackie argue that modular channels with vertically-mounted circuit boards are more prone to failure than their horizontally-mounted boards. Also the company claim that having chosen components and connectors 'with infinitesimal failure rates,' the result is a very reliable console that should need

little in the way of maintenance. In fact, Tony Williams has only had one desk returned to him, and that, quite understandably, was because someone had poured a bottle of Coke into it!

## I-O channel

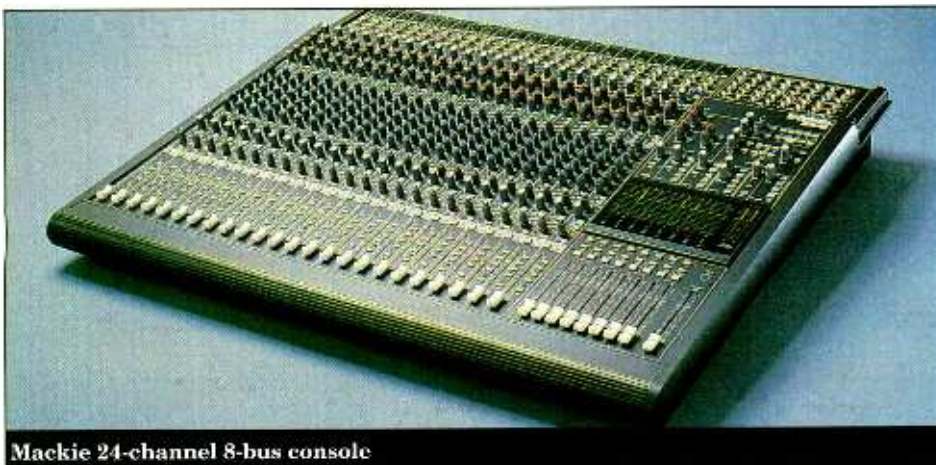
The desk is an in-line design and uses duplicated bussing (that is Group 1 sends to tracks 1, 9 and 17). All I-O channels are identical, and although they manage to cram a lot into a small space, the controls do not suffer from over-miniaturisation or insufficient spacing—even the fattest fingers should feel at home here. The inputs to the channel can be selected from three sources—Mic, Line and Tape—and by using combinations of three buttons, inputs can be configured in a variety of ways without the need for patching.

The first of these buttons selects a ▶

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The Mackie 8-bus console demonstrates that it does size and cost are not the primary factors in a professional console. Patrick Stapley talks signal quality and flexibility and American expertise

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**Mackie 24-channel 8-bus console**

Mic or Line input to the channel preamp (0–40dB line gain, 10dB–50dB mic gain). This input will normally appear on the channel path unless the FLIP button has been pressed, in which case the channel will receive the Tape input while the monitor path sources the Mic-Line input. A further SOURCE switch situated in the monitor section (or MIX B as it is referred to on the console) replaces the selected monitor source with the same signal as the channel fader. This facility allows functions such as ‘mix-minus’, broadcast feeds, stereo recorder feeds during live mixing, or a stereo aux send (a channel mod can be performed to source a postfade output, but this has to be done on all I-O channels).

These monitor features are all made possible by the switchable nature of Mix B. Rather than acting simply as a monitor bus feeding directly to the main stereo outputs, Mix B can be globally switched in-out of the stereo mix bus, thus leaving it free to be used for the kind of functions mentioned above usually associated with much more expensive consoles. Mix B’s output level is controlled from the master section of the console by a rotary control which has a centre detent to mark unity gain.

The console has six auxiliary buses accessed from four auxiliary sends per channel. The sends have been arranged into two sections—Sends 1 and 2 are permanently routed to their respective aux buses with separate level control but shared pre-post switching. They are normally sourced from the channel path although a modification will allow them to follow source switching for Aux 3–6. The other two sends can either be assigned to Aux buses 3 and 4, or 5 and 6 depending on SHIFT switching, and are sourced either from the channel or Mix B paths—once again, pre-post switching is a shared facility. Gain controls feature a centre detent marking a unity gain position, after which a further 15dB of gain is available.

Positioned below the auxiliaries is the 4-band equaliser and separately switched 75Hz high-pass filter (18dB/octave). The equaliser contains high and low fixed-frequency shelving filters (operating at 12kHz and 80Hz  $\pm$ 15dB), and swept High-Mid and Low-Mid peaking filters (500Hz to 18kHz and 45Hz to 3kHz  $\pm$ 15dB). Normally the EQ resides in the channel path, but the two types of filter can be locally split between the two signal paths: thus the peak filters remain in the channel while the shelves move into Mix B. In this Split configuration the EQ IN-OUT button only affects the channel path.

Because of the Split facility, the frequency range of the two mid-frequency controls has been made very broad providing coverage of the full spectrum and offering a generous interband overlap. Additionally, the High-Mid includes a Q control with bandwidth adjustment from  $\frac{1}{12}$ th to 3 octaves.

The sound of the EQ as with the rest of the

console is excellent, and one feels in no great hurry to plug in an outboard equaliser. The frequency range and curves offer versatility, and the EQ is responsive without being coarse.

The 100mm channel fader is a proprietary Mackie design which uses a logarithmic scaling mimicking the designs used in top-end studio consoles. Beside the fader are the routing switches, accessing the eight group buses and stereo bus in pairs. Two signal indicators are included—a green ‘signal present’ LED and a red ‘overload’ LED—which measure the signal at three points in the channel: after the Mic-Line amp; after the EQ; and after the fader. The only other LEDs included on the channel strip are for the channel solo and mute. The solo is a nondestructive, stereo-in-place AFL, but can be changed to PFL through a channel modification.

No Solo or Mute facility is provided for the Mix B path, which some users may find frustrating. However, yet another internal mod will change the function of the MIX B SOURCE switch to a mute—this does, of course, sacrifice the original function of the switch and means that Mix B will no longer have access to the channel signal.

## Master output

The master section is positioned at the right-hand side of the console and contains the master faders and metering, Mix B master switching and level, auxiliary masters, effects returns, cue controls, monitoring, communications and solo master level.

The eight group master-faders and main stereo output fader are again all 100mm proprietary Mackie designs. Each group master also includes a solo, and can be switched into the mix bus providing a useful subgrouping facility. This is achieved either by assigning odd and even groups to left and right buses, or by sending each group to both channels of the mix bus.

Above the faders is a meter panel containing peak-reading bargraphs for each of the outputs—12-segment for the groups buses, and 13-segment for the main mix bus. The main meters have been designed to follow the control-room monitor source, thereby always reading the currently monitored signal including solo selection.

The console has six dedicated stereo-effects returns arranged in pairs, each pair offering a different level of facilities. Common to all six are jack inputs that can accommodate either a stereo or mono source; a rotary level control providing a wide range of gain with a centre-detented unity position; and a solo. Working in reverse order, stereo returns 5 and 6 are the simplest being assigned directly to the mix bus; stereo returns 3 and 4 each have a set of routing buttons allowing assignment to the mix bus and each of the two headphones circuits, while

Returns 5 and 6 are equipped with balance controls and routing switches to each of the eight group buses and mix bus.

Two stereo headphones circuits are provided each with level, solo and five additive source selectors for: Monitor, Mix B, Aux 3 and 4, Aux 5 and 6, and an External stereo input.

The Monitor section contains separate level controls for the Control Room monitor and the Studio Playback circuit, and these share stereo source selection from the Mix Bus, Mix B, 2-Track Return, and External input. There is also a MONO button that only affects the Control-Room speakers. No alternative-small speaker circuit is included.

Talkback is provided from an electret built into the console just above the main stereo fader, and four momentary push buttons allow talkback to: Aux 1, Aux 2, the Group and Mix buses, and the Phones and Studio circuits. A common talkback level control is also provided.

The Solo section contains a master level control that again incorporates a centre detent marking the point at which soloed and unsoloed levels will match. Also in this section is the ‘Rude Solo’ light—a persistent flashing LED which Mackie describe as ‘a reminder with attitude’. In fact, the console is well equipped with indicators for tracking down hidden solos, and both the Aux Masters and Effects Returns have LEDs showing that an associated solo has been activated.

## Connectors

Connectors are positioned in two areas of the console—on the rear panel and below the optional meter bridge on the top panel. At the end of each channel strip can be found the Mic and Line inputs, a Direct channel output feed, and a pre EQ Channel Insertion point. Mic Inputs are via XLR, the rest are on  $\frac{1}{4}$ -inch jacks. Phantom power is also switched from this part of the desk and is assigned in groups of eight channels. BNC sockets are included for connecting 12V goose-neck lamps, such as *LittleLites*, for live applications.

All the connectors directly above the Master Section of the console are  $\frac{1}{4}$ -inch jacks, and include inputs and outputs for associated functions. Additionally, there are insert points for the eight group buses and mix bus. The main mix output is available either as an unbalanced output from here, or can be accessed from a balanced XLR at the back of the console.

Also at the rear are the 24 group outputs (arranged in three rows of eight buses), and the tape returns (16, 24, or 32 depending on console size). Both are on  $\frac{1}{4}$ -inch jack and have sectional switching to accommodate +4dBu or -10dBV operating levels.

The remaining rear-panel connectors are to the rackmountable power supply, and a multiway connector for interfacing the 24E expansion console.

## Sound

There are two very noticeable things about the sound of the 8-Bus: firstly, it is very quiet; and secondly, it is very clean. It is interesting looking through the technical spec to see figures more ►

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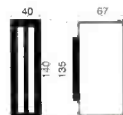
## MASTER MONITOR



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akin to a console worth tens of thousands of pounds rather than just a few thousands.

Throughout the desk efforts have been made to keep the signal quiet, for example very low impedance circuitry has been employed wherever possible to reduce thermal noise and improve crosstalk. Also RF rejection has been incorporated into all the inputs, keeping interference well away from internal circuitry. The general clarity and definition are impressive for a mixer in this price range, and good headroom (particularly on the main outputs) has resulted in a very open, dynamic sound free from distortion. All these factors make the console a very suitable partner for digital formats such as ADAT.

## Options

Current options for the console include a meter bridge, steel stand (26.8-inch high), sidecar, and 24E expansion console.

The pivoting meter bridge runs the length of the desk and includes 12-segment bargraphs for each channel as well as lit VU meters for the

main left-right outputs. The bargraphs can be globally switched to monitor either tape return or channel output.

The sidecar (23.4-inch wide) has been designed primarily to accommodate an optional patchbay. The matching console comes with pretapped rails providing 16 standard rack spaces and can also be used to house outboard equipment. A lead tray has been built into the back.

As mentioned earlier, the expansion console provides an extra 24 channels. The 24E is not available for the 16-channel console, but up to three can be added to the larger consoles. A separate power supply will be needed for each.

A future option available this autumn, is a fully retrofittable automation system. Based on Mackie's previous *Otto* automation, the system controls levels and mutes and can either be operated via MIDI, or an external controller (*Otto-Pilot*).

## Conclusion

The Mackie 8-Bus is a compact budget console built to professional specifications. Its sonic quality,

build quality and overall performance are all very impressive for a mixer in this price range.

Operationally, the console has been logically laid out making it easy and quick to use. Although the console does not contain every facility in the book—and one would hardly expect this considering its size and price—it is generally well equipped, and includes some facilities normally reserved for high-end consoles.

The desk can be used for a wide range of applications, but due to its low noise figures and clean signal paths, is particularly well suited for small studios employing the new breed of 8-track digital recorders.

The Mackie 8-Bus offers excellent value for money and should appeal strongly to the increasingly quality-conscious budget market. ■

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**Tel: +1 206 4873 4333. Fax: +1 206 487 4337.**

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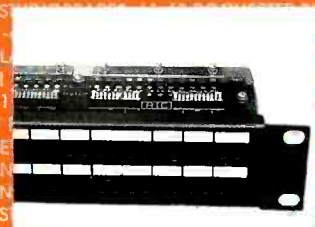
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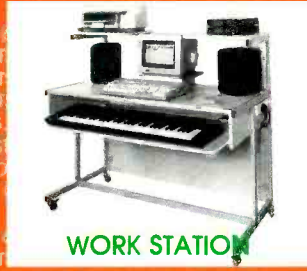
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# TLA 8.2 VALVE MIXER

As one of the UK's longest-standing and most respected dealers in used pro-audio equipment, Tony Larking's company, Larking Professional Sales, are in a particularly good position to monitor trends and preferences as reflected in buyers' enthusiasm for 'classic' items of equipment. Rather than remain simply dealers, shuffling piles of gear in one door and out of another, Larking have responded to demand in certain areas by producing their own rather unusual range of equipment. One of the first TLA products consisted of a rackmount pair of refurbished Neve EQ modules, and this was followed by a growing collection of valve-based equipment, initially comprising an equaliser and a compressor.

The latest step has been the introduction of two mixers with the distinctive and surprising characteristic of being built around valve circuitry. The smaller of these is the 8:2 covered here. Its design was prompted in part by frequent customer interest in small classic mixers (the AMS Neve *BCM10* is a good example) for use as distinctive-sounding sidecars on big modern consoles or as main mixers in their own right—perhaps for purist classical work. The result is a straightforward 8-channel stereo mixer which is about as simple as it is possible to be, with the emphasis on sound quality (both objective and subjective) rather than facilities.

Although valves are obviously an important feature, this is not an exclusively valve design but a hybrid, using solid-state circuitry where it is more appropriate. For instance, the microphone input amplifier has a solid-state transformerless front end and a valve second stage, providing the valve sound without the trade-off of valve noise levels which an all-valve mic amp would have produced. Valves are also used in the channel EQ circuits and the mix amps, but the electronically-balanced output drivers are solid state.

The publicity shots might leave one wondering where on earth the mixer finds room for all these bottles, so slim and compact does it appear; the answer is that the photos show only the top surface, not the full depth of the unit, whose slim-looking control panel sits on a sizeable steel case containing the electronics. This is not to say that the end result is cumbersome (although it is obviously not light); in fact the box underneath acts as a substantial stand,



A box of tubes—the TLA valve mixer

raising the console and angling it for easier use. It also allows all the connectors to be mounted underneath the rear overhang, making installation very neat if a little inaccessible. There is still not room inside for the power supply, which is almost half the size of the mixer itself, built like a tank, and connected to the mixer by a chunky multicore umbilical—carrying rather more than the usual number of supply voltages—which on production models will be 3m long. The construction appears to be of a high standard, although it is worth noting that, perhaps not surprisingly, the channels are not modular but all built on to the single front panel. I was slightly concerned to note that although the valves are mounted upside down, hanging from their sockets on the board, they do not appear to be held in with any kind of retaining clips, which I can see leading to trouble in a mobile situation.

Cosmetically the mixer is as much of a hybrid as it is electronically. The pale green panel-colour and the chosen style of control knobs are reminiscent of the 1960s and contrast strikingly with the

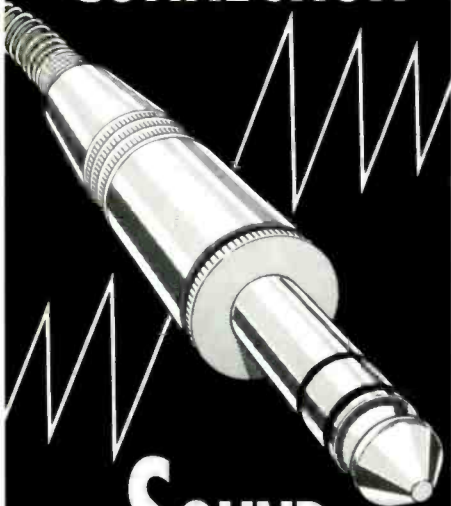
sprinkling of LEDs, particularly the output meters, which are 6-LED columns calibrated from -30dB to +6dB, turning yellow at 0dB and red at +6dB. On the review specimen the period feel was made stronger still by the dark wood (eco-friendly, I trust) trim, which is an optional extra—the standard version is supplied with rack ears. It will not have escaped notice that channel levels are controlled by rotary knobs rather than faders, which some ►

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The requirement for auxiliary and location mixers is growing, and the specifications for these units are becoming more demanding. Dave Foister examines one of the new breed of 'old' mixers.

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might feel to be taking traditionalism a little too far; the main outputs are, of course, on a pair of decent 100mm faders.

## Facilities

Though hardly extravagant, the channel facilities are well implemented and meet most basic needs. Phantom power is switchable on each channel, and line inputs are balanced on 3-pole jacks; the two sources share a single, largely uncalibrated, input gain control. Phase reverse is provided, as is a 12dB/octave high-pass filter, which with specs of -3dB at 90Hz is subtle but effective.

The 4-band EQ has two switched frequencies each for HF and LF (8kHz-12kHz and 80Hz-120Hz), and four on each Mid section—1.5kHz-5kHz for the upper and 250Hz-2200Hz for the lower. This may sound limited, but the frequencies are well chosen, with a sensible overlap between the Mid sections; the low Q, fixed at 0.5, makes the EQ so broad-band that further precision in centre-frequency selection would have little practical use. Each band gives 12dB of boost and cut, and the whole EQ has an IN-OUT switch.

Pan and level controls complete the channel strip, together with IN-OUT and PFL switches. Be warned, the PFL clicks slightly on the main outputs—it is not uncommon, but this is no excuse. Monitoring facilities include a single stereo tape return, a PFL level control and a switch for allowing PFL to show on the meters. I should be interested to know how the gain structure works, since the PFL level always seemed to be much higher than the channel output however I tried to work it, and therefore fairly meaningless. The main monitor output and the headphones socket share the same volume control, and even with this at maximum the headphone output level is quite low—I would not like to have to depend on it on location in a church vestry with live sound leaking through the door. Channel insert points are jumper-selectable between pre and post EQ and can be used as direct outputs, while a pair of balanced Link inputs allow multiple mixers to be cascaded. The mic inputs and main outputs are on XLRs, but everything else is jack sockets, mostly 3-pole A-types either for unbalanced inserts or balanced line level ins and outs.

Not surprisingly, with 18 valves glowing happily beneath it, the control panel gets warm to the touch—warmer even than the top of a digital signal processor. At least it would keep the aforementioned vestry more comfortable on a long winter session.

There are, of course, facilities which it would be useful to have but which have been omitted in the interests, presumably, of compactness—chiefly channel faders and some sort of auxiliary send and return arrangement. Without these, its use as a stand-alone console must surely be restricted to acoustic work in a suitably ambient venue. The good news is that there are already plans for a larger, better-equipped version, which will have not only channel faders, two aux sends and two stereo aux returns, but a peak LED and a balanced dedicated direct output on each channel, all for an extra 50% on the price.

In the right application, the TLA valve console as it stands is a joy to use. The thoughtfully worked out combination of solid state and valve circuitry means that the signal path is as quiet as one would expect a modern design to be, while giving that indefinable musical valve warmth. The EQ in particular is quite special: bright and clean but never harsh at the top, warm and round at the bottom, and gentle but flexible in the middle. It is hard to produce unpleasant sounds with it, and easy to get musical, effective results which never seem to sound EQ'd. I used it on a piano recording where the pianist wanted the biggest, richest bottom end I could get, without sacrificing clarity—effectively asking me to add three feet to the length of the piano with the EQ. To my surprise and his, the TLA EQ managed it, giving us exactly what he wanted to hear without any undesirable side effects whatever.

The fact that the TLA valve mixer can appear on the market within weeks of the launch of Yamaha's latest digital *wunderkind* is, on the face of it, quite extraordinary—and yet in another way it is not surprising. The vogue for valve equipment has grown out of being just a fad; major players are in the field now with some pretty heavy-duty, serious (and expensive) products, and the bandwagon-jumping *arrivistes* are falling by the wayside. Despite this, opinions are still sharply divided and heated debate between those who regard anything with a 'character' as being a deviation from the straight-wire-with-gain ideal and those who maintain that a valve is telling a musical truth which a semiconductor cannot understand. It is remarkable in a way that everyone understands what is meant by 'the valve sound' even though many in the industry are too young to have had any experience of the original equipment which produced it. I myself am of an age where the valve equipment I have used was already old, even vintage, so any liking I may have for valves is based not on nostalgic sentiment but on practical experience of what they sound like and what—in appropriate circumstances—they can do to help achieve the desired result.

## Conclusion

This is a mixer with which I should love to record an orchestra on location; I would also expect it to work well as a submixer for backing vocals, horns, guitars or even keyboards. It seems to enhance everything that passes through it—musical sounds seem to fall effortlessly out of it. Its character is too subtle to get in the way—one is hard pressed to call it significantly coloured or inaccurate—but it does have one, and I have yet to hear anything which did not benefit from it. As it stands the mixer has obvious operational limitations in certain situations; I await the forthcoming bigger version, which appears to address all of them, with considerable interest. ■

**Tony Larking Audio, Letchworth SG6 1UJ,**  
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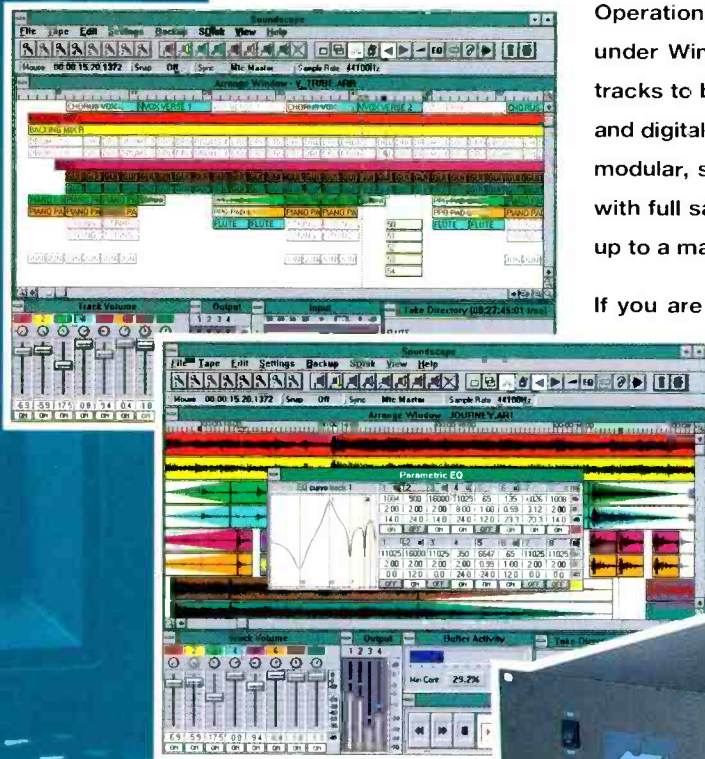
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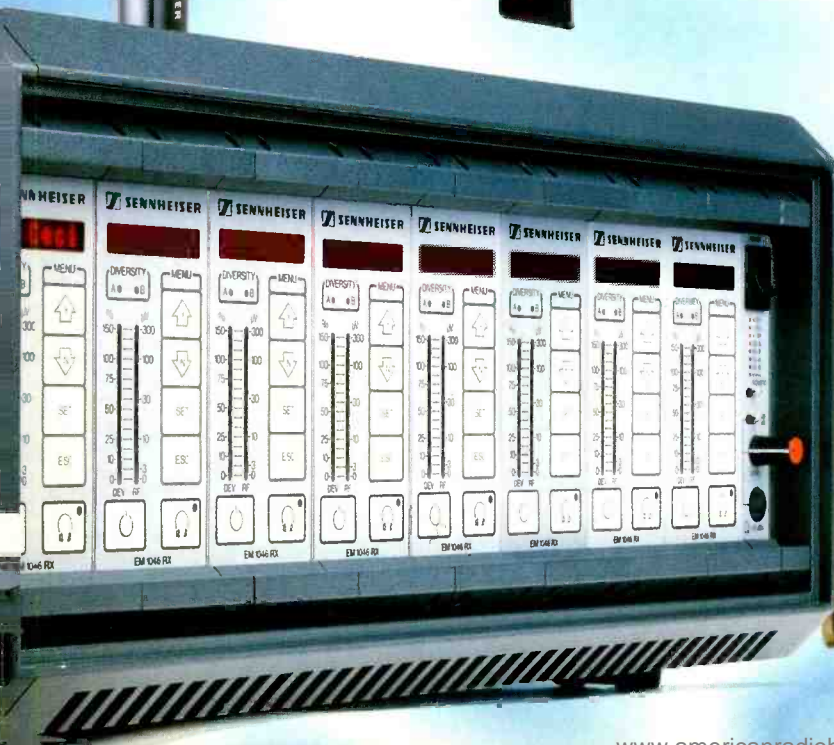
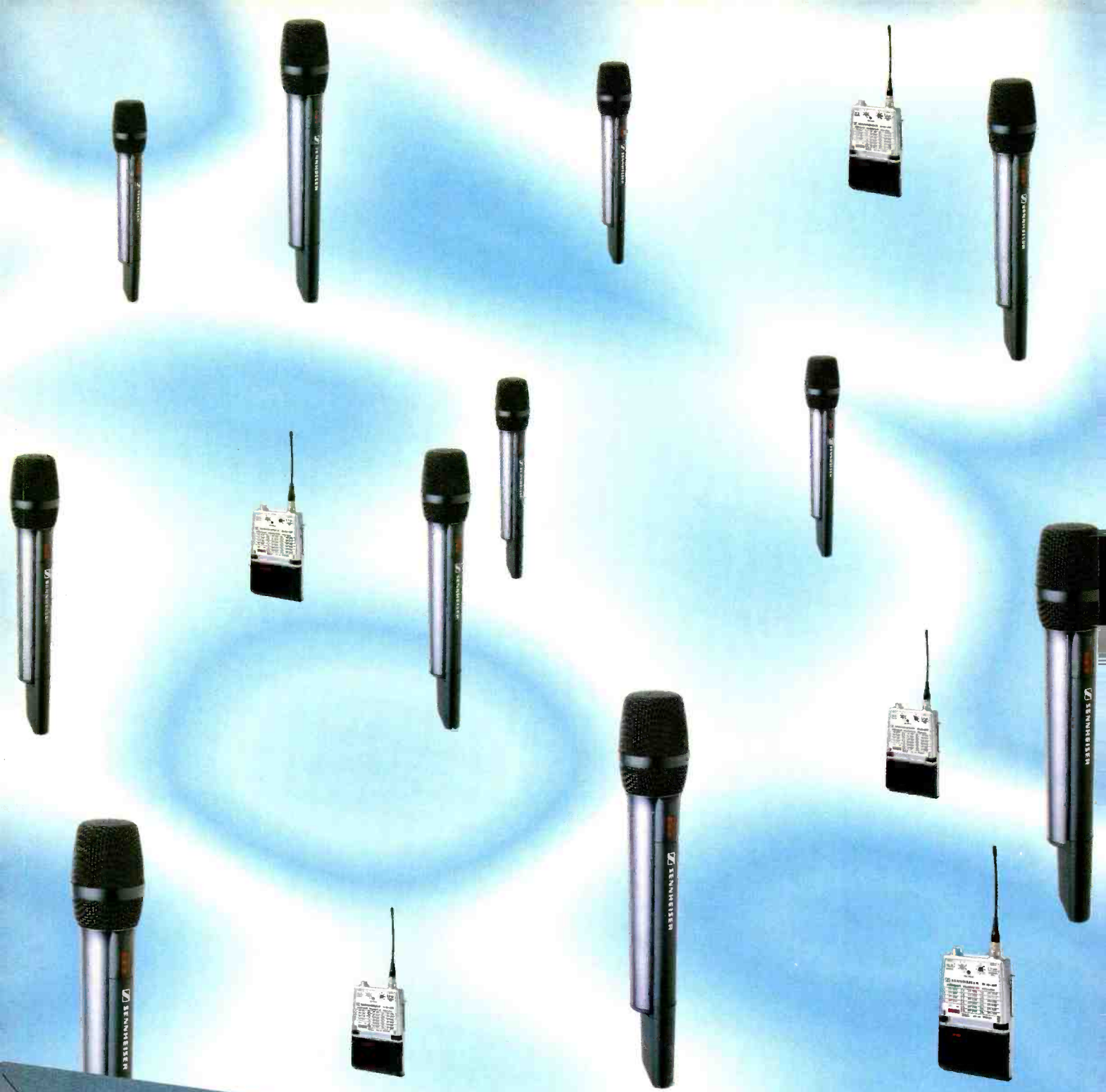


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# KRAMER vs KRAMER 2

**E**ddie Kramer recalls the end of his relationship with the famous Record Plant studio—and the beginning of his involvement with Hendrix' legendary Electric Ladyland.

'At the Record Plant, I felt that I was being taken for a ride, so I split and for a year I was independent. During that year I built Electric Lady. John Storyk was the architect, and I put the board together in terms of what I wanted and laid out the control rooms, John and I and a guy called Bob Hanson. We were lucky in that it was a good room to start with. We'd had a few problems, but we managed to solve them with some unusual sorts of techniques.'

Like what?

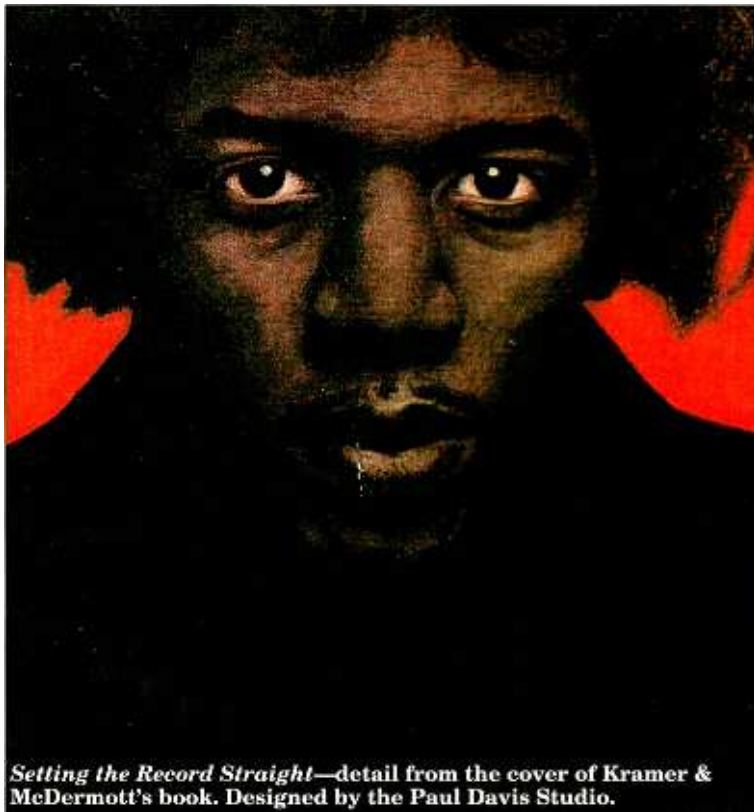
'The fact that the studio was... below grade, and that when we knocked out all the walls to get the complete square space, once we'd removed all the rubble and levelled the floor, we discovered that a tributary of the Manhasset River decided to come up. The whole studio actually floats on water. And there's two sump pumps up in the ladies' room and two down in the workshop. And they're on two different levels, of course—if one kicks in, then the other one will kick in, depending on how much rainfall is happening.'

'In terms of separation between two studios, there was a problem because we had Studio A backing onto Studio B, with no control room between it. So we had to have a special wall designed and built that would not touch any of the other walls, that was about 3-foot 6-inches thick, floating on cork and rubber, each brick was hollow and sand-filled. It was an amazing piece of construction.'

'When Electric Lady was finished, there was no studio like it in the world. Period. For the first three years of its existence, it influenced many major studios, in terms of construction, design, lighting, environmental control—all that kind of thing. But after its initial burst and staying in there with the best and beating them... When Michael Jeffery died, I left the studio—I just didn't want to become involved anymore. I was too busy doing production and my own engineering.'

With what sorts of ideas in mind was Electric Lady built?

'The story goes that Jimi said he wanted a nightclub, so Michael Jeffery and me bought a place called the Generation, which was a nightclub, and



*Setting the Record Straight—detail from the cover of Kramer & McDermott's book. Designed by the Paul Davis Studio.*

they did nothing with it for the first six months they owned it. One day Jimi said, "What's happening with the club?" so they called in some people to help them put it together, one of whom was a guy called Jim Marron. He used to run the Scene in New York, where Jimi used to jam a lot. And they liked Jimi because he was like a maitre d'-type character.'

'Jimi and Michael wanted to put this studio in this nightclub down here. And I contacted John Storyk, who came up with a beautiful set of drawings. Jimi said, "Just put a small control room in there somewhere so I can make recordings from the stage and all." And I walked down there one day, I took one look at the place, and I said, "You guys have gotta be out of your minds—I want to make this the best studio in America. This would be a tremendous waste of money if you made just a nightclub." Thirteen months later and \$1,000,000 later—Electric Lady.'

What were some of its initial specifications?

'Studio A console was 36 in/36 out, Studio B console was 30 in/30 out. It was the first new 24-channel board, with switching for 24 tracks. Bus ins were

equipped for 24—if there was such an animal—but there was no demand for it at that time.'

Did Hendrix influence the choice of equipment at all?

'The only way was on some of the aesthetics. He wanted a nice, close, warm environment in which to create, with coloured lights, and with the ability to change the atmosphere for the artist. In other words, what we created for him was a cocoon. He was never happier than when he was working down there. He loved that studio very much—couldn't stay away. He was early for every session practically. He would sneak in and watch somebody else's session.' ▶

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**Paul Lawrence presents the concluding second part of his exclusive and previously unpublished 1976 interview with Eddie Kramer—Jimi Hendrix' Producer**

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# Jimi Hendrix, The Beatles and The Stones

Do you remember your first meeting with Jimi?  
'Vaguely. I remember him coming into the studio...'

Had you heard his music before that?

'No I hadn't. I just remember seeing these huge amps being rolled in. He came down with Chas [Chandler, Hendrix' Manager] one day to have a look at the studio, just after they had done 'Hey Joe' 'cause they were looking for a better studio to record in.'

Did you see excellence in his music right away?

'It was apparent to me from the first few chords that he played. He was very, very, very sensitive; very, very, well-spoken; very funny. A gentleman, a true, true gentleman. There was such an aura about him—a tremendous presence. There's a—the current terminology is a vibe—that is very strong, a presence that is strongly felt even to this day at Electric Lady. After he died, it took me about three months before I could get back in the studio. It took a lot of courage to start working on his tapes, because you hear the guy's voice and...

'We were putting the *Cry of Love* album together and one of the guitar tracks—of which he did many overdubs, each one of them beautiful and perfect within its own right—he'd keep saying, "How's that one?" I'd say, "Fantastic! Incredible!" "Well, I'll do another one...", and he'd do one better. We'd often have six tracks of guitar solos in there, seven tracks, eight tracks of guitar solos, and upwards!

There was this one in particular where we'd lost the amped track. For some reason, it had gotten erased or something had happened to it, but I had the direct. So we fed the direct through a transformer out to the studio through a Marshall amp. And all the lights were out in the studio, and somebody walked in the back and I thought it was Jimi playing. It was very scary, very spooky, when you hear his sound coming out and you know that the man's not around. And to this day, quite often I'm mixing and I'll turn around and think there's somebody there and there isn't. Just a feeling, just a presence, just like the guy's sort of tapping you on the shoulder.'

How technically orientated was Hendrix?

'He knew what sound he wanted and he described it in his own way, and then I usually got it for him. He wasn't terribly technical. He enjoyed getting involved with the mix—and I would give him about three or four faders.'

Was it usually the two of you mixing together?

'The first album was Chas sitting at the board with Jimi's ideas thrown in from behind. The second album, though—*Axis*—Jimi was sitting there for most of it, and from then on we worked as a team. Certainly *Electric Ladyland*.'

You had such complicated mixes.

'We spent a few hours with them. Usually Jimi grabbed the voices, and I had the rhythm section and the main guitar tracks. Usually I gave Jimi a couple of vocal tracks and maybe one guitar track



that was going to be a problem, where he knew he wanted to pull it in and out. There were certain passages where my hands were full—I was doing five or six different things—and he would grab a chunk of the board. I'd preset certain things, and then he would ride 'em up and down, and pull a guitar in and out, or pull a voice track in and out, or hit an echo button or something like that. But the panning he left entirely to me—we used to get off on panning—we used to fall on our faces laughing at the panning.'

You used to do a 'circle'.

'It's a technique of pulling down the fader as you're pulling the pan pot up, and pulling it back up again. Yeah, he's grabbed a few pan pots in his day.'

I read that Jimi used to come in at night to do a mix and still be there mixing when the janitor would arrive in the morning.

'Jimi wanted to mix a lot of things, but he didn't have the technique for it, and that was the only time we ever fell out. In fact, from the time just before I left the Record Plant to become independent to the time that I saw him again about six months later—when I started to build the studio for him—we did have a falling out, because he wanted to take over everything. He wanted to have control of every single area—the music, the creation, the mixing, and all the rest—and I wasn't about to allow him to do that! I mean, the way we had worked in the past, which was very successful, was that each person did his particular function well, but that we still worked very closely together on the mixing. Within the confines of mixing an album of the complexity of Jimi's, I would suggest things to him and show him some wild ideas, and he'd say, "I love that, but I don't like this" or "Can you get me a sound which sounds something like somebody swimming underwater?". It was a team—the same way I worked with Jimmy Miller, and that's to me the way a mix should go.

Whatever means you utilise to achieve that end is valid. If I have to stand on my head and mix with my toes, that's valid if it produces a sound. But to go into the fine details is nonsense, it doesn't really

mean anything.'

Was Jimi's first album the first time you'd ever done backwards recording?

'I can't remember. Jimi was into that—turn the tape over, do a backward solo. He knew his stuff backwards anyway. It was innovative only in the sense that he was doing it.'

So it had been done before?

'I imagine it had been done before. Yeah, I can't really claim any credit for it. The only thing I can really claim is the use of phasing in a way other than it had been normally used. We used it to much more dynamic effect—you know, phasing the drums as they come in on *Axis: Bold as Love*.'

'There's a story Jimi told us one day: "I had a dream, man, and in this dream I heard a sound. I can't really describe it to you, but it's like swimming underwater. I wish I could create that sound". About a week later, we came up with this phasing thing and he totally freaked. He said, "My God, it's like I've relived my dream! It's exactly the sound I was looking for."

Were you doing it with two tape machines?

'Yeah, real flanging. All that other electronic stuff is rubbish! Listen to electronic flanging and then listen to real flanging—you tell me if there isn't a difference. It has none of the dynamics, it has none of the depth.'

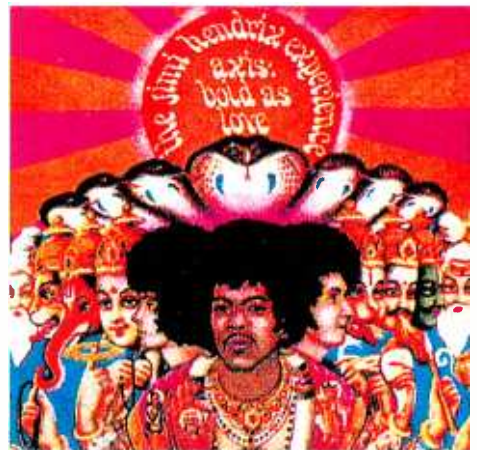
'It was George Martin that turned us on to phasing. I did some work with the Beatles at Olympic—'All You Need Is Love' and 'Baby, You're a Rich Man'. 'Baby, You're a Rich Man' was done all in one session, Keith Grant and myself engineering, all in one go—mixed and everything.'

Just how did he turn you on to it?

'When we were doing those sessions, we asked him—we were very curious about the phasing on the Beatles records—and he told us how they did it. In fact, it's a very old technique which dates back to 1949. It's even listed in the *BBC Radio Handbook*, as a certain technique to be used for special effects.'

On 'And the Gods Made Love', did you do some recording at 7½ ips?

'It was definitely not recorded at 7½—at anything else but. There was every speed from 0–100, if you want to know. Figure it out from there. That whole side is one 14-hour mix. Apart from the stops and starts for editing, that was pretty much one thing straight through.' ▶



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**'There was a lot of pain and a lot of frustration in finishing it up after he was dead'**

Where was 'Voodoo Chile' recorded?

'That was the Record Plant. Live. Straight live. Jimi was jamming at Steve Paul's Scene with Stevie and Jack Casady, and he brought them back to the Record Plant. It's not a great recording, in fact. Stevie Winwood was a perfect keyboard artist for Jimi. He should have joined them, should have gone on the road with them.'

Did Jimi play any of the keyboards on the *Electric Ladyland* album?

'I showed him the chords for 'Spanish Castle Magic' on *Axis*. I showed him one chord that he really flipped over—on 'Crosstown Traffic' the piano chords are my chords. He was good on drums too. Loose, but really nice.'

What are your memories of *The Cry of Love*?

'There was a lot of pain and a lot of frustration in finishing it up after he was dead. How do you finish up somebody else's work? Two or three of the mixes were actually completed with Jimi there, supervising. And he was very, very happy with the album at that stage. He went to England and he got very depressed, and he wanted me to come over and bring the tapes to England. I said, "Jimi, we just opened your studio for you, why do you want to do that?" And he said, "you're right. Can't do that." I said, "I'll see you in a week or so," and the next week he was dead.'

Because *The Cry of Love* is somewhat of a departure from *Electric Ladyland*, I was wondering, did he say, "Now for this album, I want to do so-and-so"?

'It would flow like water. It would just be a sound that he was working on. He had fantastic ears, and he knew exactly what he wanted to hear. I just got used to the way he would describe sounds—he would have a very weird way of describing what he wanted. He would often use colours.'

Did you find that your idea of a 'red' guitar sound was close to his?

'Pretty much. Certain chords, certain keys have a different mental image of colour. I'm sure Jimi had his version of what they sound like, but by working with him, I knew what he was talking about.'

Do you think that part of your appeal to Jimmy Page was the fact that you had worked with Hendrix? Did he ever ask you to do what you did with Jimi, say?

'Never, of course, he was influenced by Jimi—I think he'd be the first person to admit it—as is every guitar player. And it's perfectly legitimate.'

Houses of the Holy perfectly exemplifies your kinds of tones and your ideas about space.

'That's back to the house technique. It was recorded in the Stones' house at Stargroves, with the Stones' truck, and the sound reflects the liveness of the rooms.'

At the beginning of 'The Rover', there's a curious

movement of what seems to be another image of the main guitar. Do you remember what you were doing there?

'You want me to give all my secrets away?'

Not all. Just some.

'They're not really secrets. It's just a question of applying common sense to what's going on in the studio. I react to how the thing sounds; if a thing sounds a certain way, I'll apply a certain technique to it. It's just how it sounds to me in the room.'

You were just manipulating a leakage image?

'You're close to it.'

## Today's studios

You mentioned that you've cooled on recording studios in general.

'In the last couple of years I have, yes.'

Because of a less live sound?

'Precisely. Studios are all very well, if you want to control the situation to such a fine point, but I don't think rock 'n' roll deserves to be shut up in a studio. Look at a lot of the albums that have been released in the last two years and show me, out of the Top 10, how many were actually recorded in the studio. A good portion were either recorded in houses, on location, live, in theatres, in mansions... The reason being rock 'n' roll doesn't sound good in the studio. I feel that those days are over. I feel that there's a new era about to dawn on us, and I certainly intend to be in the vanguard of that.'

Do you think the era of 'great studio recording' is over?

'No, I think studios 'll always be there, studios 'll always produce good sounds. The "old days" of getting it all on 4-track once are over. Last time I saw Olympic, it was looking a bit worse for wear. And it's the same with *Electric Lady*. It goes in fashionable waves, and depending on how efficient the management is in keeping up with the times.' ■

### Further reading

1. David Fricke. 'Jimi: The Man and the Music' *Rolling Stone*, February 6th 1992, page 42. Straight Arrow Publishers Inc, 1290 Avenue of the Americas, New York, NY 10104 USA.
2. Author unknown. 'The Major Works: CDs, LPs, Books, and Videos', *Guitar Heroes*, Spring 1992, Page 37. Miller Freeman Inc, 600 Harrison St, San Francisco, CA 94107, USA.
3. John McDermott and Eddie Kramer. *Hendrix: Setting the Record Straight*. 1992. Warner Books Inc, 1271 Avenue of the Americas, New York, NY 10020, USA.





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# YAMAHA PROMIX 01

## New, hot and exclusive to *Studio Sound*. Patrick Stapley looks at the *ProMix 01* console

**W**ithout doubt, the star of last month's APRS Show was Yamaha's new digital low-cost mixer, the

*ProMix 01*. In fact, from the breakfast press-launch right through to the closing moments of the show, visitors to the Yamaha stand buzzed like bees around a honey pot. The 'buzz', however, was not limited to 'equipment spotters', and Yamaha were able to report spectacular business, with over 300 orders being taken.

*ProMix* is Yamaha's third-generation digital mixer, and although there are some similarities between the previous *DMP* and *DMC* ranges, the new mixer is very much 'its own product' not just in terms of facilities and appearance, but also in concept.

'We took a very different attitude compared with the *DMP9*', says Yamaha's Professional Audio Manager of the R&D centre London, Terry Holton. 'We decided that we really wanted to break digital mixing into the mass market, and to be able to do that we really had to reach the right price point. Consequently, we've taken a much more aggressive attitude with *ProMix 01* in the way it is being marketed and the quantities that we're aiming to sell.'

Priced at just under £1,600 (UK excluding tax), *ProMix 01* sets a staggeringly low entry-level for technology that was previously the reserve of high-end users. Just as companies like Alesis and Digidesign have brought the digital multitrack and digital audio workstation within reach of the budget market, so now have Yamaha 'budgetised' the assignable digital console.

Bulk selling and aggressive marketing aside, another reason why Yamaha have been able to produce a digital console at such a competitive price is through the development of a new LSIC.

The new Yamaha CDSP chip lies at the heart of the system and for the first time combines mix and equalisation functions along with dynamics processing on a single device. The CDSP not only allows greater DSP functionality to be achieved using fewer components, but can perform functions at four times the speed of previous chips by using parallel microcode techniques. This proprietary chip gives the desk the unique advantage of using technology unavailable to other manufacturers.

*ProMix 01* is quite compact

measuring just 435mm x 125mm x 485mm (17 inches x 5 inches x 19 inches) and is completely self-contained—it is so compact and portable that Yamaha supply a shoulder bag. The control surface is deceptively sparse, being divided into three main areas. At the bottom are 19 motorised, 60mm, Alps faders (16 mono inputs, 1 stereo input, 1 stereo return-send, and 1 stereo main output) with their respective ON and SELECT buttons. In the middle is a backlit, contrast-adjustable LCD (240 x 60 dot), which is flanked on one side by a bank of function buttons, and on the other by four cursor keys, an ENTER key, a Parameter Wheel and stereo LED meters. At the top are gain controls and 20dB pads for each of the 16 mono inputs, and level controls for the Monitor and Phones outputs. At ▶



**ProMix 01 will appeal to both professional and semiprofessional user**

the top of the mixer is a selector switch for monitoring an external stereo source.

## Audio I-O

The mixer has not been designed as a conventional music recording console, and does not include traditional group outputs or monitor returns.

*ProMix 01* is an 18:2 mixer providing 16 mono inputs and a dedicated stereo line input, mixing to a stereo main output. All inputs are analogue, but the main output appears in both analogue (-4dB balanced and -10dB unbalanced) and digital (SPDIF). All A-D and D-A conversion is linear 20-bit (64-times and 8-times oversampled respectively), while internal processing is 24-bit except for EQ which is 36-bit. The sampling rate is fixed at 48kHz.

The only difference between the mono and stereo inputs is that the stereo input is derived from an unbalanced jack input, and does not include a mic preamp. All mono inputs are balanced, the first eight are on XLRs and can be collectively switched to receive phantom power; the last eight are on 1/4-inch jacks. This mix of input connectors has been adopted due to space restrictions at the rear of the unit, and also to keep costs down.

Additionally, the mixer has 18-bit (8-times oversampled) outputs for two auxiliary sends and the monitor outputs, all on jacks.

## Control and EQ

The select keys above each fader assign the corresponding channel to the LCD where parameters are displayed and edited. The current LCD function is determined by the dedicated function keys (EQ, Aux Sends, Pan and so on). Adjustments are made by editing the parameters

displayed in the LCD, and this is achieved by using a mixture of the cursor keys, parameter wheel and ENTER key. The interaction between these controls and the LCD is intuitive, and most displays are pretty well self-explanatory.

EQ is available for all 18-input channels, the two internal effect returns, and the main stereo outputs.

The 3-band equaliser has a function button for each band—LOW (32Hz–1kHz), MID (32kHz–16kHz), and HIGH (1kHz–16kHz). When any of these Band buttons is accessed the EQ display will appear for the currently selected channel. This display shows a graphical representation of the EQ curve along with a tabulated numerical display showing values for gain, frequency and Q for the three bands.

To adjust parameters, each Band function button will cycle control through its gain, frequency and Q (alternatively the cursor keys can be used). Changes are then made by using the Parameter Wheel. Although changes are implemented instantly, the EQ curve display takes a little time to redraw. Frequency selection is in 1/6th-octave steps, and the Q can be adjusted in nine steps between 1/6th to 3-octave bandwidths. The Q control also switches the Low and High bands to a shelving response, and the ENTER key acts as the EQ IN-OUT switch. Gain is  $\pm 15$ dB steps.

There is a fourth EQ function button marked LIBRARY that accesses a dedicated EQ store containing 30 factory presets with room for a further 20 nameable user-presets. The concept of factory-set EQs may not appeal to everyone, but for the novice or the engineer in a rush, the facility does have its advantages. It is also useful for more utilitarian purposes such as setting up hiss filters, hum filters, telephone voices, or simply to 'zero' a channels EQ controls.

Because presets can be instantly recalled from

the memory, other functions such as A-Bing different EQ settings can easily be achieved; or during a mix, EQ snapshots can be 'buttoned-in' at exact points, and if used in conjunction with a MIDI sequencer, become automated.

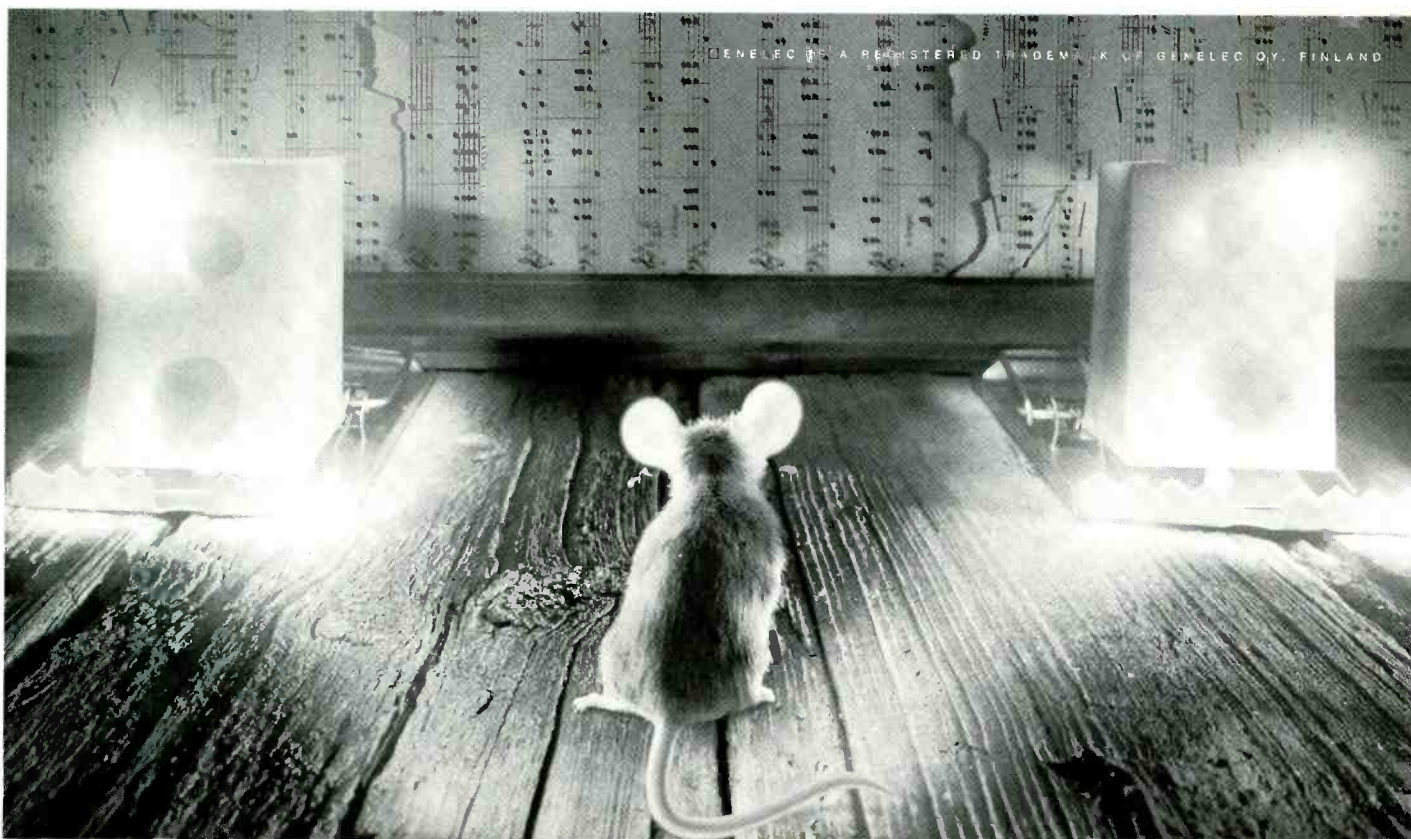
## Auxes and effects

Four auxiliary sends are provided each with its own function button. Sends 1 and 2 are dedicated feeds to the two internal effects processors, while 3 and 4 are designed to interface to the outside world for driving effects units, to provide track sends to a tape or hard-disk recorder, to feed stage monitors in live applications and so on. Sends 3 and 4 can either be configured as two mono sends or as a stereo send with individual pans.

Like the *DMP7*, aux send levels are controlled by the faders—thus, if Send 1 is accessed, all the motorised faders will immediately assume positions relating to the output levels for Aux Send 1 for each channel. Each Send can be configured pre-fader or post-fader, but this is a global function and channels cannot be switched locally.

The Send-Return fader serves four functions, depending on which aux send function button is active it will either act as a master level control for Aux 3 and 4 (either individually or together if configured as a stereo send), or act as a stereo return for each internal processor. Aux Sends 1 and 2 have no master level control, and external effects fed from aux 3 and 4 can be returned either to the stereo input channel or the mono channels.

Like Yamaha's *DMC1000* console, which integrated two *SPX1000* processors, *ProMix* includes two specially designed on-board effects processors that have evolved from the *SPX* series. Each processor contains 30 factory presets



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providing reverb, delay, chorus, pitch change, flange, phasing, tremolo and autopan effects—there is also room for ten user-effects. Parameters have been kept reasonably simple—reverbs, for example, have just six controllable parameters.

## Pan and phase

Pan-Balance and Phase Reversal are all accessed from one function button which will toggle between the operating displays. There are two main pan displays: one showing the 16 input-channels, and another for the stereo input-channel, the send-return channel, and the stereo output (balance only). Each display shows a series of rotary pan controls (single or dual concentric depending on whether the channel is mono or stereo) with the pan position marked on the knob heads. There is also a horizontal bar display that shows the pan position for the currently selected channel in more accurate detail—pans and balance controls have 33 positions.

The ENTER keys toggles between Individuals and Gang modes for stereo channels. In Individual mode both the left and right channels can be panned separately, and in Gang mode the two channels, will become linked this providing a balance function.

Individual channel panning-controls for stereo Aux Send 3-4 are accessed from the Send LCD, whereas Send 3-4s master balance control appears in the Pan LCD.

Phase reversal operates for the 18 input-channels, with the ENTER button switching phase for selected channels. At present Stereo channels, have both logs reversed rather than reversing just one side which would seem a more useful function—this, however, may be changed in future software.

## Stereo and groups

Any adjacent odd-even channel can be made into a stereo pair, and up to eight pairs are available. Each pair has its functions linked so that control can be made from either channel.

Channels can be setup as pairs in three ways. Firstly, the settings on Channel 1 can be copied over to Channel 2; secondly, the settings from Channel 2 can be copied to Channel 1; and thirdly, the settings on both channels are reset to zero.

Four moving fader groups are available for the 18 input-channels, and any fader within a group can act as a master. The ENTER button switches the groups into Balance Adjust mode allowing relative fader positions to be adjusted. Channel mutes are not included as part of the group, and faders cannot be nested. When faders are functioning as channel aux send levels controls, the grouping function is disabled.

## Dynamics

*ProMix 01* offers three on-board stereo dynamics processors, which can each be assigned to provide compression, limiting, gating, or ducking functions for the input channels, Sends 1 and 2, and the stereo outputs. Each processor will work either as a mono or a stereo device, but can not be split to operate as two separate mono devices. Also processors cannot be patched in series, so for example it is not possible to gate a channel and then compress it. There is also no provision for inserting external equipment into a channel path. Key inputs can be sourced either internally, or externally from another input channel, Sends 3 or 4, or either the left or right stereo output. Apart from ducking, the external key allows other

functions to be set up such as frequency-conscious compression for de-essing or depopping.

As with EQ and effects, there are factory and user presets available for dynamics—ten of each. These serve a dual purpose in that they provide access to useful settings, but also select the type of processing required and in this respect provide a starting platform from which parameters can be further modified.

The editing display lists the adjustable parameters and their respective values—Threshold, Attack, Release, and Output Gain for the compressor-limiter; and Threshold, Attack, Hold, Decay, and Range for the gate-ducker. The display also includes an input level against output level graph, and two meters showing gain reduction and output level side by side.

## Monitoring

Three monitoring modes are set from the Cue display. Firstly, there is a Stereo Fix mode that permanently connects the Monitor Output and Phones to the main stereo outputs; secondly, there is Last Cue mode that causes the channel SELECT button to also act as a solo; and thirdly, there is a Mix mode that provides an additive solo function this is only available while the Cue function is selected.

This arrangement means that soloing channels is not the simple procedure it is on other consoles, and unless one leaves the desk set to Last Cue, which will result in a permanently active solo condition, soloing a channel involves four actions: press the Cue function button to access the Cue Display; change mode from Stereo Fix to Last Cue using the Parameter Wheel; activate mode with ENTER key; select channel to be soloed. The procedure seems very clumsy for what really ►

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should be a very straightforward function, and hopefully improvements will be made here. A solution could be to make the SELECT key only operate as a solo when given a prolonged press.

Solos are available to all channels and function as PFLs. However, if the group function is selected, a group solo will cause the entire group to become AFL, soloed, thus making it easy to balance faders within the group.

One of the good points about the Cue function is the display which gives an overall view of the selected channel, showing at a glance how it has been set up this includes a graphic display of the EQ, and meters.

## Utilities

Both soft and hard meters are provided. The LCD has two displays: the first shows levels for the 16 mono channels (post again and ADC, prephase and EQ) in 5-segment bargraph form; the second displays levels for the Stereo Input, Return 1, Return 2, and Aux Send 3 and 4. A peak hold facility is available for both display and is switched on-off by the ENTER key.

Additionally, metering is included in some of the other function displays. For example in the Cue overview display just mentioned, and the four aux send displays.

The 12-segment LED meters to the right of the LCD, will permanently display the stereo output level, and will also respond to peak hold switching.

The Utilities area includes access to a sine wave (100Hz, 1kHz, 10kHz)/pink noise oscillator which can be selectively routed to the stereo output, Aux Send 3, and Aux Send 4.

Another utility checks the level of the internal RAM backup battery and warns if it is getting low. Expected life is five years.

Also included is an initialisation function that resets the entire desk to the original factory default condition, thus clearing all user RAM areas. An additional method of clearing just mix parameters is available by recalling Scene Memory 00.

## Scenes and MIDI

The console can store up to 50 Scene Memories that contain all console settings with the exception of Monitor and Phones output levels, external 2-track selector switch, channel gain controls and pad switches, and the phantom power switch. Scene Memories can be reset to the console either manually using the RECALL button or automatically via MIDI. Memories can also be write protected.

The MIDI capability of *ProMix 01* offers huge potential, and used in conjunction with a controlling computer or MIDI sequencer, the system can provide snapshot and dynamic automation for all mixer parameters. Additionally, the desk can be used to control external equipment such as effects units, synthesisers, workstations, other *ProMix 01s* or even MIDI-controlled lighting systems via Program and Control Change messages.

The MIDI menu (accessed by the MIDI function key) lists five functions: MIDI Setup, Program Change Assign, Control Change Assign, Bulk Dump-Request, Local On-Off, and Memory Control Change Out.

The MIDI Setup page determines which MIDI channels, the system uses to transmit and receive Program, Control and Bulk Dump messages. It also has an Fiche function, which when selected will duplicate MIDI input data to the MIDI output part, thus making up for the absence of a MIDI Thru connector.

The Program Change and Control Change

Assign pages provide tables for remapping—thus the 50 internal Scene Memories (normally assigned in order to Program Change 1 to 50) can be remapped. Similarly the 519 controllable mix parameters can be reassigned to the 1,536 Control Changes (arranged in 16 banks of 96).

Bulk Dump allows the entire contents of *ProMix 01* to be dumped to a suitable MIDI device for archiving. Alternatively, specific items can be transferred such as Scene Changes and user presets.

The Local On-Off function when switched On disconnects the faders from controlling mixer parameters and instead allows them to output Control Change data to an external MIDI device.

Memory Control Change Out allows Scene Memory data to be selectively output as Control Change messages thus updating another *ProMix 01* or controlling computer. This will become particularly useful when working with computers showing an on-screen representation of the console to reset parameters between scene changes.

Earlier this year Yamaha began talks with most of the major MIDI software companies—E-Magic, Steinberg, Mark of the Unicorn, Opcode and so on—to include support of *ProMix 01* in their programs. E Magic were the first to oblige and have incorporated an 'environment' in their *Notator Logic* software that allows on-screen control of the mixer.

Yamaha are also collaborating with these third-party companies, to enhance the operation of the console's MIDI automation, improving efficiency and adding familiar features. A number of other companies have also expressed strong interest in developing software packages for the console.

## Conclusion

*ProMix 01* has well and truly broken barriers bringing for the first time an assignable, fully digital mixer to the budget market. It stands every chance of becoming a landmark product, changing the way a lot of people currently work, particularly when combined with other competitively priced digital equipment.

Facilities-wise the desk is well featured, although cost has dictated some omissions such as digital inputs, group outputs, and disk storage. That said, how many consoles offer total reset of all parameters, moving faders two effects processors and three built-in dynamics processors for the price of a good quality reverb unit.

Operationally, the desk is easy to understand, and avoids complex setup pages and so on that would more likely confuse than aid the user. As would be expected, though, with a new product of this type, certain software improvements can be made, and I am sure will be made, once more user feedback is gathered.

*ProMix 01* will appeal to both the professional and semiprofessional user whether in the studio or on the road. The console is particularly suited to operating with MIDI-based equipment and with the ongoing cooperation of third-party companies, the desk opens itself to some exciting possibilities.

*ProMix 01*, as its name suggests, is the first product of a new range; having made this initial bold statement, it will be fascinating to see which direction Yamaha take next. One thing is for sure it will be at the expense of analogue. ■

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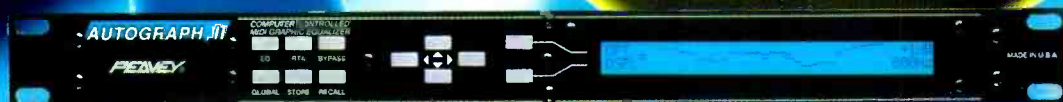
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What many in the professional audio industry are presently wondering is whether or not today's recordings—transformed from their humble analogue origins by digital signal analysis, processing, coding, companding, compressing, equalising and editing—bear a lasting resemblance to their source.

One of the real advances offered by digital technology, computer storage and manipulation of audio is the ability to go back to archive material and extract and essence of earlier recordings which are marred by noise, hum or distortions, and restore priceless performances. Studio sessions circa 1958 done with RCA 77DX and 44BX microphones feeding an 8-input Collins 212S1 broadcast mixing console with a Cinema Products graphic equaliser ending up on an Ampex 350 or 300 tape recorder have latterly yielded extraordinarily listenable recordings of artists such as Elvis Presley and 'Fats' Domino. But will future generations will have that option of returning to the music—just the music—when it has been recorded using early digitised, 'computerised' and storage-space-reduced recordings, no matter how superior the initial recording environment.

Clearly, making an argument against computer-based studio technology is not a simple matter, but nor is the above a blanket condemnation. Rather, it is an plea to studio operators to examine each element of the studio process and adopt new technology as needed to improve audio quality rather than to be solely a technological 'camp follower'.

In order to be objective about our use of technology, first we must embrace current technology as having some merit. It must be used judiciously to improve recorded quality of our recorded music, voice and-or effects for release as records, TV, films, commercials, multimedia and so on.

Secondly, we must ask the question: Are we replacing the skills of musicianship, recording and music producing acumen, with computer-based tools?

Thirdly, we must accept that nobody has ever concluded the arguments against digital audio raised by the staunchly pro-analogue musician and recording camp from the beginning of the CD era of the early 1980s. The arguments are still being waged, and the quantity of record projects produced over the past five years in analogue formats (using Dolby SR for example) still outnumber the digital productions of the same period.

Fourthly, if digital systems are to be used, shouldn't we be using the most sophisticated tools at our disposal with the highest sampling rates, the highest storage capacity-to-recording speed ratios on the digitally recorded medium, the highest-quality D-A convertor chips, the widest data buses and so on? In reality, we find our industry considering taking one step forwards with certain of these, and one step backwards with others such as the use of space-limited recording storage and transmission systems, signal companding and low bit-rate psychoacoustic encoding.

Let us briefly consider the paradigm of companding and low-bit-rate coding to accomplish physical data reduction of the recorded or transmitted digital audio signal.

Here are some of the tools in the 'tool kit' of the

Martin Polon

## Chinese whispers in the digital signal chain

digital audio reductionists:

**Masking**—removal of unneeded audio information bits in a single channel that will be surplus due to the masking effect of other audio information at a higher level. In other words, you are not going to hear sounds that are at a significantly lower level than other elements of the audio programme information.

**Signal redundancy removal**—removal of unneeded audio information bits that will be surplus due to the redundancy effects of other audio information present in the data flow. In other words, if there is any redundancy of information in the audio programme material, as there frequently is in speech or music, then the unneeded bits are identified through signal analysis and removed.

**Threshold effect**—removal of unneeded (due to the human hearing threshold minima for recognition of sounds) audio information bits in single channels. If the human ear and the human brain cannot detect the presence of audio information below the level of recognition, the information corresponding to these low level sounds is removed below this threshold.

**Use of a single, common bit pool for all channels**—the use of a common bit pool minimises the amount of extraneous information necessary to the 'maintenance' of or the declaration of the existence of each channel—in a multichannel system. In plain text, it is not necessary to have the complete bit rate of 'x' number of a single-channel systems. It is only necessary to support those bits necessary for a complex matrix of the recorded multichannel signal in playback.

**Interchannel masking**—if audio information in one channel of a multichannel system is competing for the listener's attention with one or more other channels, and the difference in listener perceived level between channels is greater than the threshold of recognition; then the greater the level difference between channels, the greater the potential for bit

reduction in the lowest level channel. Simply, the listener is distracted from the signal purity of the lowest level system channel by the programme material present in the higher level channel(s).

**Redundancy coding**—if audio information is common to and present in more than one channel of a multichannel system, the redundant data bits can be removed from all but the one 'priority channel'. In other words, if programme material with exactly the same content is present in more than one channel in a multichannel system, the redundant bits can be discarded.

There is no question that the above 'tools' of audio data reduction in the digital domain represent real technological progress. It is not the remit of this column to question the effort in research and development or the technology that has been developed—to reduce recorded or transmitted digital signal density without 'materially' or 'audibly' changing the programme material.

This technology for digital storage and transmission exists and some of the implementations are certainly acceptable when used for a single 'pass', when the quality of the entire digital electronics chain is the highest, and no other similar or dissimilar implementation of coding-companding is used on the signal in question.

But what is somewhat beyond comprehension is the need by some to make the use of 'reduction' technology part and parcel of the future of audio in the digital-computer domain. This is especially difficult to comprehend with the gains made in recordable media and in release media. Consider that memory systems of all kinds are dropping in price-performance ratios at the rate of 25% per year. Hard disk systems equipped for SCSI with 2Gb of capacity are selling in the US for as little as \$1500 in the Spring of 1994.

Using the 10Mb/min rule of storage for two tracks of stereo recorded digitally at the 44.1kHz or 48kHz sampling rate, a 2Gb drive could hold 200 minutes of 2-track recording, 100 minutes of 4-track recording, 50 minutes of 8-track recording, 25 minutes of 16-track recording... You can extrapolate any configuration appropriate to any application. And still larger drives at lower prices are in the offing.

The new generation of 32-bit/64-bit internal pathway RISC (Reduced Instruction Set Computing) computers as typified by the Pentium and the Power PC, promise to further enhance and extend full digital recording capability without the need for data reduction—as new software appropriate to their power is written. Further, we still have digital and noise-reduced analogue tape systems that have recorded literally hundreds of thousands, if not millions, of studio sessions without failure.

The bottom line here is that we do not have to proceed with extreme haste in adopting technology that may not be appropriate for every application. There is no question that long distance digital transmission has opened new vistas. There is also no question that multiple passes through digital coding and companding systems have a questionable influence on the finished audio product. Let us just take our time and not prejudice the future of audio recording based on digital technologies. ■

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Everyone has seen the future of entertainment in the home, they just cannot decide what to call it. Interactive television, multimedia, the information superhighway, convergence technology—all these buzz words have been trotted out in a flurry of techno-publicity, even though full services have not yet begun and those tests that are under way are still limited. The applications are interesting—from interactive medical consultation over many miles to a videophone for the most immobile couch potato—but the hardware appears to be a little unwieldy.

The problem is the whole business of convergence itself, bringing together the once-disparate disciplines of broadcast, computing, telecommunications and consumer electronics—which is probably the most crucial element as it is where all the fun will happen. Some in the industry are worried that everything is moving ahead too quickly and certain elements will move ahead of others. One such are Thomson Consumer Electronics (TCE), who have formed a new division within Thomson Broadcast to bring together the consumer and professional sides of its business to ultimately develop digital and encrypted broadcasting operations.

NESSO (New Systems and Services Operations) has been created to define technical specifications for professional systems and products and supply technical support and customer backup.

Thomson are not the only manufacturer to have both professional and consumer departments but they are one of the first to actively bring the two together. This convergence attitude has been recognised by involvement in the US Grand Alliance to develop digital HDTV, one of only two European companies to be involved in the project; and in their role as sole supplier of digital video compression equipment to Hughes Communications' DirecTV venture.

The executive heading up NESSO is keen to build upon the work currently under way in the US, the most important element of which, as he sees it, is digital pay TV.

'It is not yet the main business,' says Robert Boyer, 'but we need to organise the new systems, the switchers and services. This, of course, comes from the consumer angle, but there is also the professional input because it needs new coders and decoders. You need the systems, because you cannot do anything in this field without the professional path. We must take advantage of developments in both the consumer and professional domains, which we are doing with the systems aspects of a project.'

Boyer emphasises two points: that the professional signal chain must be coupled with current consumer options and that the whole thing must be carried out as a steady progression.

'It must be done very, very carefully, step by step,' he cautions. 'In Europe it will be a combination of communications, computing and television. We already know perfectly well what TV and communications are about—we now need to look at the interconnection of the present network, adding the image and services from the computing sector. From the subscriber's point of view, we must think about the programmes and services—

Kevin Hilton

## Convergent technologies on a collision course while the Eurovision Song Contest charts a course of its own

we need to know what to launch.'

NESSO are currently talking to service providers to discuss programming, and computer companies to develop the domestic terminal interface. Unusually for someone involved with this almost evangelical area of technology, he advocates one side acting as a brake for the other.

'We must try to be practical,' Boyer says. 'The development must benefit the professional domain but in coupling both, it reduces the scope of what could be done by multimedia, especially for the pro side. This will reduce the whole area down to something that will work. It is not sufficient to only talk about the technology.'

As cautious as it sounds, this approach could be the only way of preventing multimedia ending up in the 'interesting but failed' section of a technological history book. There is too much riding on this for that.

Commercialisation in the more institutionalised sectors of broadcasting continues to progress. After the BBC fell, opening up both their technical resources and the Wood Norton training department, which they are now, with an undoubted nod to the marketing people, calling The Centre for Broadcast Skills Training, the question had to be: what was next?

Much to everyone's surprise, the European Broadcasting Union (EBU). But perhaps we should not have been that amazed at the move. Granted, the Union is a professional association of state broadcasters and is often regarded as a 'club', but it has an enviable resource in the Eurovision network, which takes in 64 stations in 48 countries and carries 45,000 transmissions every year.

Spanning East to West across the Continent, the network also reaches North Africa and the Middle East, with a Transatlantic link via Intelsat. Its main infrastructure, however, is a combination of six channels on Eutelsat II F-4 and terrestrial lines totalling 8,870km, providing a powerful programme exchange mechanism.

This is now available to private, nonmember broadcasters, who can transmit from major sporting and news events alongside programmes by EBU members.

'Before, it was not in the role of the EBU to sell the network to nonmembers,' explains Claude

Stoffel, the Marketing Manager of the network. 'But the EBU wanted to make it a business and advertise that the system is available.'

Like most things of this nature, the opening up of Eurovision is not that new: private broadcasters have used it in the past and the Union already sublicenses news and sports programming on request. But advertising the fact will change the way the EBU is perceived.

'It will change its foundation,' Stoffel agrees, 'but it was a political decision on the part of the members to sell the network to private companies. They wanted to reduce their costs.'

Previously, annual subscriptions from the larger EBU organisations, like the BBC and RAI, would pay for the smaller members. By including private broadcasters, the total costs can be reduced all round. It also makes the Union into a commercial player, going up against such operations as Reuters on equal terms.

This new pricing structure will be based around the duration of the connection, with tariffs reflecting the growing reliance on satellite links. Stoffel intends to have full details of pricing on the EBU stand at this year's International Broadcasting Convention, another signal that the organisation is serious about entering the commercial sectors. 'It is certainly the way the EBU will go,' Stoffel affirms.

It is to be seen whether the EBU's new awareness of Mammon will extend to their annual bun fight, the Eurovision Song Contest. Founded as an altruistic competition to forge cultural ties between the member nations, the event has long been the butt of jokes, generally concerning the standard of lyrics, the failure of juries to hear what is going on and the fact that the UK always comes second.

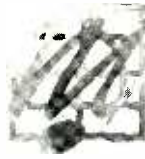
There was more tension than usual in the lead up to this year's Contest. The Republic of Ireland was once again the host nation, having won an unprecedented two years in a row. Those in the know confidently predicted that the 1994 Irish entry had a good chance of achieving the triple, which was the last thing that the state broadcaster, RTE (Radio Telefís Éireann), wanted.

In the build-up to the Contest, equipment suppliers had been approached by RTE to 'lend' gear for the live show. It's not difficult to see why: estimates put RTE's total bill for its previous wins at IR£3.5 million, with the less than attractive prospect of doing the whole thing again next year.

Although RTE earn revenue from a mixture of a licence fee and advertising sales, the EBU forbid commercials to be screened during the event. With the cost of providing broadcast facilities for all its partners, it is little wonder that the company were calling in favours.

After a mind-boggling third victory, any hope of the Contest going elsewhere was dashed by Prime Minister Albert Reynolds, who said, 'This is wonderful and it will definitely go ahead here, there is no question.'

The UK proved that it was no longer taking the event seriously by coming in tenth, while Lithuania probably counted itself very lucky by notching up the now-coveted *nil point*. ■



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# RED FIVE

Surprisingly few power amplifiers are made expressly and solely for studio use. Most of the amps in studios have 'rig driving' origins and, as such, their design has been prioritised to the high degree of ruggedness, power density and efficiency demanded for multi-kW touring and installed PA systems. In spite of such compromises, recent critical listening indicates that the sonic quality of a number of today's PA amplifiers is outstanding.<sup>1</sup> Still, even finer results should be achievable when tour managers are not looking over the designer's shoulder. Focusrite's own amplifier is one of this alternative category, having its roots in domestic 'audiophile' equipment—where sonic quality positively heads the priority list. Focusrite have repackaged and re-engineered one such design that was already configured to high engineering standards by a seasoned electronic designer—unlike so much specialist hi-fi.

## Technology

*Red 5* sets out where most PA amps should be, but are not: it has a switching power supply, which can make an amplifier far smaller and lightweight. Both are hardly relevant in the studio and neither is very noticeable in *Red 5*—with it being 3U in size and made from a solid aluminium plate-and-bar construction. Of course, the switching power supply's higher efficiency (compared for 50-60Hz conversion) could lower the annual electricity bill. But, I would wager the original power supply's biggest benefit for studios is elsewhere—see sidebar.

In their brochure, Focusrite make no direct mention of the supply, but focus instead on two other areas which have been addressed with some originality. First, the power supply has very close magnetic coupling between the final (audio) DC rails—something that's only practical when these are supplied at high frequencies. With these in place, high transient currents can be sourced and-or returned without 'wiggling' the hot end of the supply's 0v system. Instead, current is fed or returned across from the opposite rail—as if cross-coupled by a transformer. The target is a cleaner grounding system inside the amplifier. To listeners, enhanced clarity seems likely. However,



Stylish, rugged and 'sonically excellent'—Focusrite's *Red 5*

as there is no opportunity to A-B against a *Red 5* without this stratagem, users and even reviewers have (as ever) to take the manufacturer's word for it.

The subtler requirements of driving loudspeakers have resulted in a duo of output refinements: (i) output wiring is dead short; (ii) output networks (such as isolative inductors) are absent. This should mean that output impedance, alias damping factor, does not rise too wildly with frequency or above a set frequency—as it does with many power amplifiers. If so, *Red 5*'s consistency in the realms of tonality, damping and detail should be sturdier in the face of diverse speakers and cabling.

## Features

Justifiably in a studio amplifier, controls are almost nonexistent. As there are no gain controls or sensitivity presets, the optimum operating level may need setting from inside the console, and likewise any preset balance of the playback system's stereo balance. The one control is the POWER button. Powering up has two stages: first, a brief interval after depressing it, the POWER button's integral LED illuminates. Then, after about 20s, and if all is well, the 'Operation' LED lights, and the music plays. If the POWER button is subsequently depressed to turn off, the adjacent Standby LED lights. This will also occur if the amplifier shuts down for

any reason.

Inputs are XLRs, naturally balanced and wired to the UK and IEC standard. Outputs are 4mm binding posts of the high quality, chunky Cliff kind that (unlike the delinquent 'plastic hex nut' kind on almost every US, Canadian or Japanese professional power amplifier) accept professional banana jacks, conductor tails or ferrules up to 4mm diameter, and can be end-on tightened with a large screwdriver or coin. Outlets are in pairs, simplifying the biwiring of individual drivers or allowing over fat conductors to be 'bitailed'.

The *Red 5*'s appearance is a development of the *Red* family, from sculpted fronts to full blown 'room sculpture'—one example of the little pro rackmount gear that has naked beauty. Passively cooled, the heat sink fins are ▶

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*Red 5* is Focusrite's first power amplifier, launched at the Amsterdam AES Show earlier this year. The first units were shipped in February—one of these to Ben Duncan

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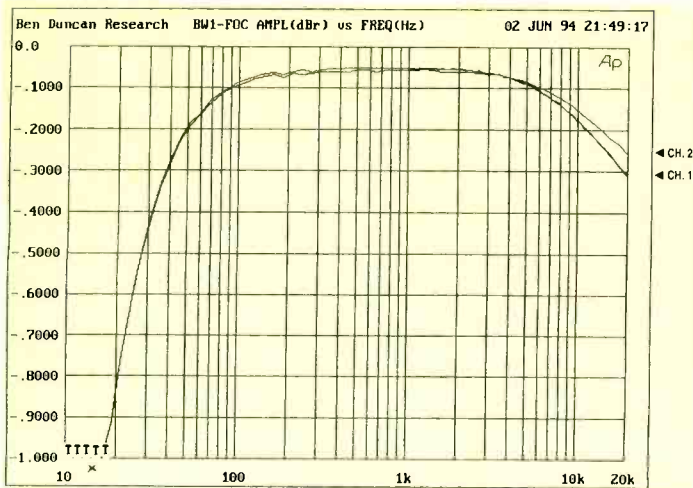


Fig.1: Audio-band frequency response, magnified

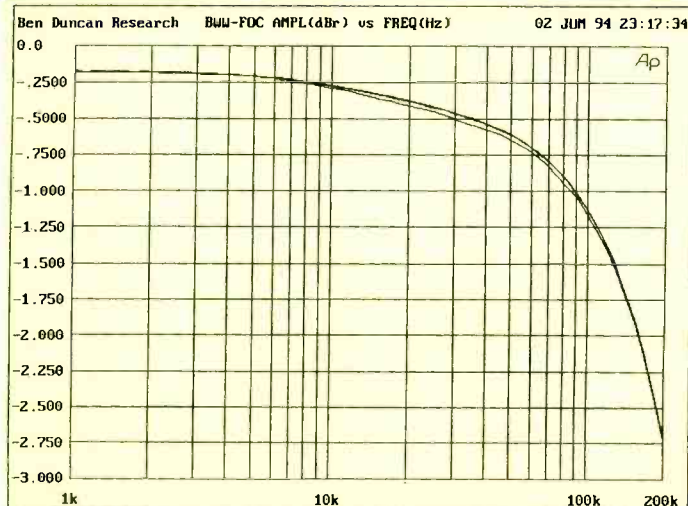


Fig.2: Ultrasonic-RF frequency response. Note scale is 3 times smaller than in Fig.1 and that channels 1 and 2 are identical

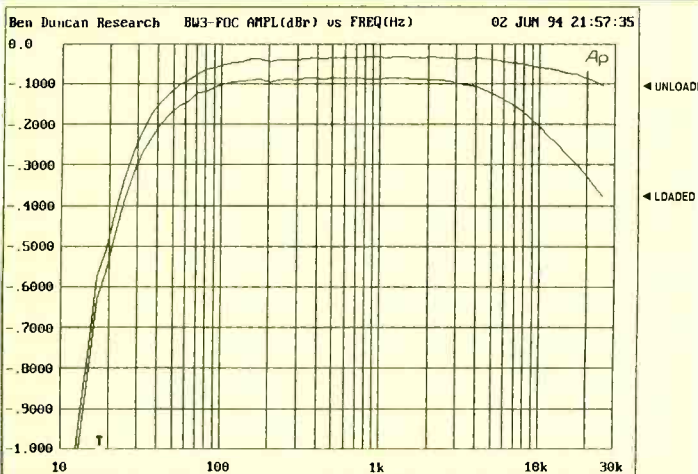


Fig.3: Using magnified, very high accuracy frequency response to display output impedance and its variation with frequency. Lower plot is loaded with 5.1Ω, upper with >10kΩ. The divergence indicates increasing impedance with frequency, indicating some inductance

KEY SPECIFICATIONS

Power into 8Ω, both channels driven	≥250W
SNF, unweighted 20Hz-20kHz average	-102dBr
Weight	12.5kgs. 27lbs.
Operable voltage range	200V-260V AC rms
North American 115V; Oriental 100V. Ranges supplied as applicable.	

POWER INNOVATION

Focusrite appear to be the sixth internationally established pro-audio maker (after Lab Gruppen, Rauch Precision, BSS Audio, Chevin and Soundtech) and of these, the forth in the UK, to employ a switching or 'electronic' power supply. This promises isolation from bad mains supplies and with less 'haze' and 'glaze', consequent improvements in sonic detail. Cleansing occurs because the incoming AC power has to be turned to DC, then re-pulsed, then made into DC again, and should be strongly RF filtered at both input and output. Of course, as a breed, switching supplies can have bad habits. Sick ones are capable of radiating RF into your control room, and a weak design can expire in a millionth of the time it takes to burn out a 50Hz transformer. *Red 5's* RF emissions at its outputs comprised a train of 80mV spikes (at least -58dBr below full output, peak referred) of alternating polarity, with an approximate 160kHz repetition frequency. The only instrument that any of the above listed amplifiers has interfered with in my own experience is an (AM) cordless phone. But even with a speaker lead from *Red 5* wrapped around its aerial, the same rogue phone worked perfectly cleanly. ■

both external and largely exposed as the rear panel. This means that fan-aided cooling can be performed externally where necessary, and without too brutish a fan. As for the decorative side-grab handles, they turn out to be the most relaxed way of carrying any rackable amplifier. This is not a daily task, but the unusually comfortable and secured grippage should make *Red 5* unlikely to be dropped when handled. It is one of few 500w, 4Ω/ch amplifiers one could happily haul up a high ladder...

maximum as the sweep progresses. The counter-argument is that ultrasonic signals of the size being applied should never occur in the calibre of studio that *Red 5* aspires to.

Overall then, *Red 5* is expected to be connected to equipment (notably mixers) which do not burst into oscillation (that is, output 'RF'), which is properly wired and grounded, and used by engineers who power up in correct sequence (power amplifiers are turned on last, and off first). With this regime in mind, I replotted frequency response at -1dB below clip—this time stopping dead at 20kHz. On the magnified scale in Fig.1, we have a response that is reasonably flat, just -0.8dB at 20Hz and barely -0.25dB at 20kHz. Notice the channel gains spread slightly above 4kHz. But with just 0.02dB divergence at 10kHz this is not likely to be a very audible tonal or imaging problem, and otherwise gain matching is extremely good. While sweeping upwards, foolproof subsonic protection was noted. This occurs at about 20Hz; detection takes about 1s and the amplifier mutes until the excess subsonic signal abates. While protecting from subsonic feedback or 'bass boost at all frequencies'-style bass-heavy reggae programme, this would not protect drivers from such woofer-wrenching transients as a purist, 20-bit recording of a dropped mic.

Fig.2 concludes the frequency response picture, at the upper end. This time the drive level is 10dB below clip, or 12V rms, about the average level of programme peaks in many cases. At this level, there is no ruggedness issue, with *Red 5* sustaining repeated sweeps. Now we can see one reason why a high-level sweep proved overly stressful: ►

Frequency response

To understand how the first pair of measurements (Fig.1, Fig.2) developed, it is worth recounting that I had just tested 18 PA amplifiers, many of them bombproof behemoths. My first test on *Red 5* was a frequency response sweep at 1dB below clip, a routine test that I have subjected many pro power amps to and that I expect my own designs to sustain. As the sweep passed 20kHz on its way up to 200kHz, *Red 5's* zobel networks did not smoke—the most usual cause in the 10% or so of pro amp models that are injured by such a test. But *Red 5* expired nonetheless; apparently a few tens of microseconds duration of level sine wave above 70kHz is enough to have the power supply burst its gut trying to deliver the increasing current needed to maintain fidelity. It is my contention that damage should not happen with a pro amplifier, considering the short duration (about 3s) of the 'RF' above 20kHz, and that input RF filtering should anyway reduce the output level from



response at 200kHz is less than -3dB down. At least this bodes well for sonics in studios with equipment which follows the 'big window' philosophy—that equipment bandwidth should extend up to a decade above humans' explicit hearing limits. Again, even considering the scale is a third of Fig.1, the channel matching is excellent at each end, such that it is hard to see the individual channels' curves.

The third bandwidth plot (Fig.3) is plotted with very high accuracy and magnification with and without output loading. The differences in level allows output impedance ( $Z_o$ ) to be calculated and also visually signifies it proportionately. When  $Z_o$  is increasing, the gap grows. Fig.3 shows this clearly above 3kHz. Conversely, the gap closes below 100Hz, signifying a decreasing output impedance, alias higher damping factor. This means that the Focusrite's output impedance is still somewhat inductive. The 1kHz variation of 0.06dB implies an impedance of 35m $\Omega$ . The inductance shows up by the decrease (narrowing in Fig.3) to half this at 20Hz; and to four times or about 140m $\Omega$ , at 20kHz. The other channel behaved very similarly except with slightly less of an impedance increase at 20kHz.

## Noise and harmonics

Fig.4 plots Common Mode Rejection + Noise (CMR+N) with 0.5dBu input that would be (if a differential signal) just below clip. A higher common mode test level would enhance resolution, but as the figure shows, CMR is not high enough to require this. The identical, dismal decay below 300Hz suggests undersized input capacitors which the maker should be able to rectify at a stroke. At HF, CMR is commendably maintained as high as the plot goes (50kHz). Overall, the -38/-35dB achieved, while quite closely matched, is hardly fanfare material in a full-specification system. However, if driven with a balanced feed that is properly plumbed and grounded, there should not be that much noise to reject.

Moving to noise of the self-generated variety, Fig.5 (S-N) shows both channels' noise spectra overlaid. Incidentally, when on the PC, the plots can be freely rerun in historic order and are differently coloured, so untangling the threads is

not the problem it seems on paper. The 32kHz spikelets are probably the PC's monitor, despite it being about three feet away. The larger spikes at 80kHz look like the power supply, repeated at 160kHz. From the graph it can be seen that one channel has slightly but consistently higher noise at each spike frequency including 50Hz, and also includes strong magnetic harmonics of the latter between 150Hz and 450Hz. If I were the maker, it would feel better if such a difference between the L-R channels could be reduced. Averaged, unweighted noise was -102dBr, or 107dB when 'A' weighted. These are averagely good figures, while the 50Hz and 150Hz emissions look rather high at about -97dBr. Nonetheless, nothing in the way of annoying hum was noticed while monitoring at 8 feet with 15-inch *DMT-11s*. No signal residue was rechecked in the nearfield with Tannoy *PBM 6.5s*; on both channels there was just a slight hiss. As to RF instability or emissions above the 200kHz limit of the AP test set, outputs was monitored while listening to programme with a 150MHz 'scope, and nothing gross (above 0.5v) was noted.

Crosstalk, L-R and vice versa is plotted in Fig.6. With -45dB of 'separation' at 10kHz, the results are passable if not exceptional. The differences between the channels are of less concern, as they mostly occur at low frequencies and at levels where (considering Robinson and Dadson's loudness contours) they are unlikely to be audible. Subsequent discussion with Focusrite suggests that the measured crosstalk and CMR limitations may be side effects of the power rail intercoupling—which may be judged sonically a good thing, yet no measurements have been devised or established yet to give this the requisite higher (or lower) number.

Fig.7 shows percentage THD+N vs frequency plotted at just 1dB below clip, with two bandwidths and two loadings. With no load (other than the test set and cabling), an RF bubble was observed on the output waveform, which accounts for the high, about 0.45% THD+N in curve A. With a 5 $\Omega$  load, the bubble vanished. That mostly audio band distortion (cf. RF) is being registered in curve B, is confirmed, since the distortion remains much the same when the bandwidth is shut down to 22kHz (curve C). This is one way to prove that with loading, there is no sustained RF above microvolts being

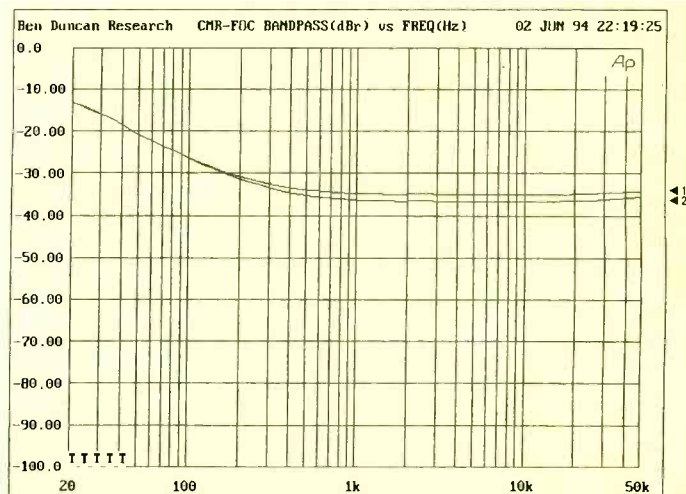


Fig.4: Common Mode Rejection, wide but not high and with notable degradation below 1kHz.

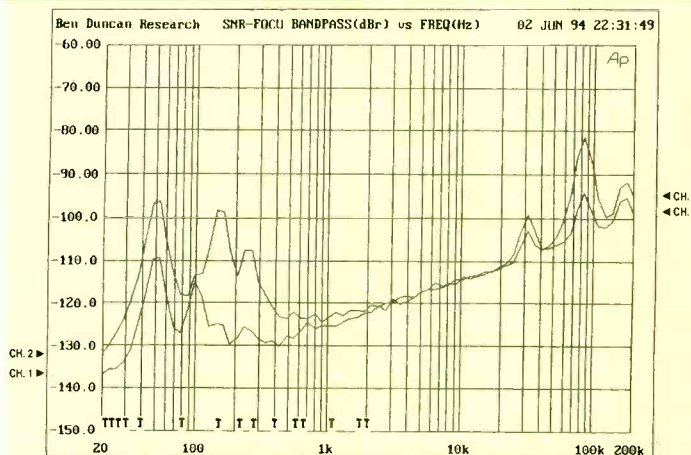


Fig.5: Noise spectra to 200kHz show that switching supply primary artefacts at 80-160kHz are only a few dB higher than 50-60Hz power line noise

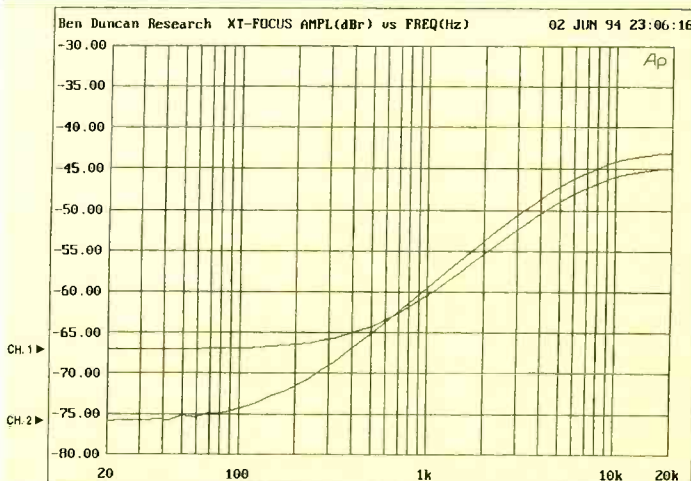


Fig.6: Crosstalk in both directions is modest above 1kHz, at less than -60dBr. Low end differences are of less concern

produced in the 20kHz-1MHz region. As studio amps are most useful with a speaker connected (sarcasm intended) and as they are usually connected to one when powered up, the RF bubble is mostly a nonproblem, however naughty. In Fig.8, percentage THD was plotted into different impedances at -10dB below clip, which is closer to the more usual peak operating levels, into

different impedances. Red 5 clearly has no problem driving 1.7 $\Omega$  at this level, and distortion (%THD+N) is hardly rising in the top end of the audio band into any of the three loads (8 $\Omega$ , 4 $\Omega$ , 1.7 $\Omega$ ) tested. Finally, Fig.9 shows how mid-frequency (600Hz) percentage THD into a 5 $\Omega$  load changes as drive level sweeps upwards into and past clip. A narrow bandwidth (400Hz-20kHz) ►



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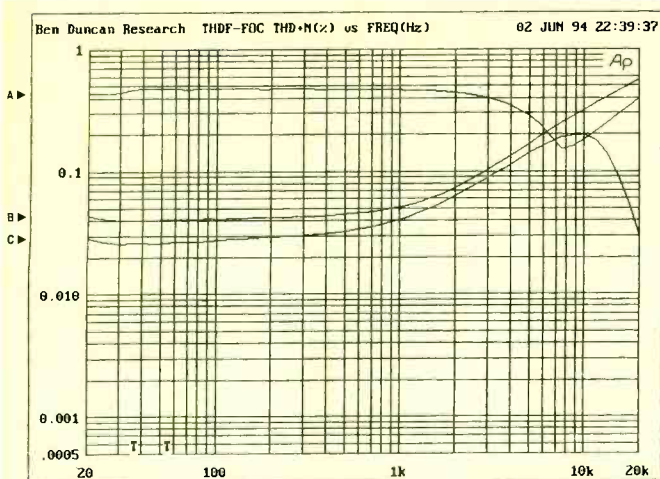
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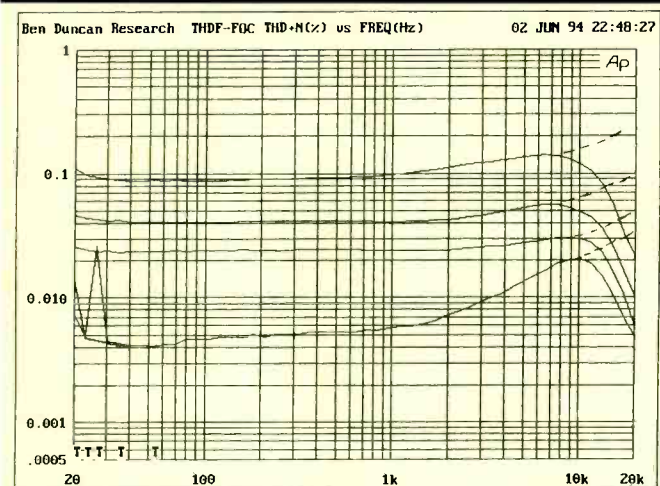
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**Fig. 7: Distortion (%THD+N) vs frequency with different loads and bandwidths: (A): 500kHz test bandwidth, no load (B): 500kHz test bandwidth, 5.1Ω load (C) 22kHz bandwidth, 5.1Ω load**

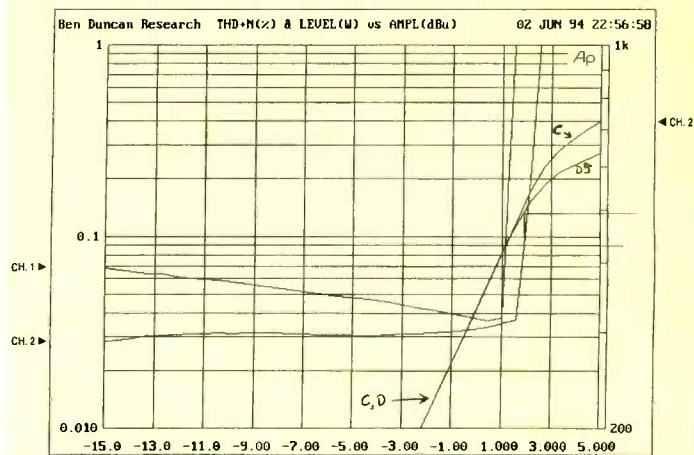


**Fig. 8: Distortion as in fig. 7, but with 22kHz bandwidth into four loading conditions: (A) 1.7Ω (B) 4Ω (C) 8Ω (D) >10kΩ, 'open circuit'**

ensures that we are here seeing mainly real harmonic residues, not hum, RF or wide-band noise. The overall behaviour is normal for a clean, high global feedback design. But differences in the distortion mainly in the down-slope (on the left) are above average. However, no particular listening malady can be ascribed to this slight mismatch. If maximum power output is referred to 0.1% THD, then it's about 415W in Channel 1 but 490W in Channel 2. While apparently large in watts and 1dB in voltage, the practical watts/SPL difference would actually be nil—instead, one channel will

by turning off then on. It also appeared to pass a more realistic and gruelling short test then performed with AES pink noise (APN)—which is band limited and preclipped—with a relay shorting the far end of a 88-foot length 2.5mm<sup>2</sup> speaker cable having about 0.36Ω resistance.

To test the thermal protection, the amp's two channels were driven with the same APN signal just below clip, into 5Ω. After a few minutes, *Red 5* shut down. Subsequently, it was discovered that Channel 1 was damaged; this same channel had undergone the second short circuit test.



**Fig. 9: Distortion viewed 'dynamically' against input drive, with power output (in watts) into 5Ω portrayed on the left scale. The steep curves C, D plot the transfer function (Vin/Po)**

deliver higher distortion than the other on the edge of clipping.

## Abuse testing

Protection against shorts, excess output current, DC at the output or over temperature, are specified. If these occur, the *Red 5* should revert to Standby mode. Short-circuit protection was accidentally proven when swapping load connections mid test; the amplifier immediately powered-down to Standby mode and was quickly reset

The thermal test was continued on Channel 2 at a lower level of 24V peak (about 8V rms) and later at 54V peak. It was discontinued when the fins reached 92°C, at which point the amplifier had survived but not shut down. Subsequent discussion with Focusrite revealed that the thermal sensing relies on both channels being driven, and this would have normally happened by the time the external fin temperature had exceeded 70°C, but with one channel, shut down occurs at about 103°C.

## Sonics and summing up

The manual is a joint affair, common to the *Red* and *Blue* range. Both utilitarian and dryly humorous, it contains solid technical advice. It recommends a one hour 'of operation for the best possible performance'. In practice, listening took place after dozens of hours of 'burn in' and on each occasion after at least two hours warm up. Tannoy 15-inch *DMT-II* monitors were used for assessment. Factors such as image depth, focus, etching and stability; then texture, bass depth, dynamics and tonal accuracy, all across a wide range of listening levels, were all considered well above average, certainly better in some places—and in others on a par with—the best pro 'PA oriented' power amplifiers.

All round, *Red 5* is quite original, beautifully made, some of the more useful measurements a little compromised, easily blown up by certain lab tests, yet promises to be rugged enough in everyday use, and above all sonically excellent. ■

**Focusrite Audio Engineering Ltd, Unit 2, Bourne End Business Centre, Cores End Road, Bourne End, Bucks SL8 5AS.**

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### References

1. Ben Duncan, 'Power Factors' (Group PA amp review), *Live!* magazine, June-July 1994.

**Ben Duncan is an international consultant in analogue audio, including power amplification. He has been involved in the design of over 70 products for PA, studio and high-end domestic use. Since his first article in 1976 he has published over 1 million words on electronics, and audio quality.**

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The majors are looking at CD-ROM, and wondering if they are missing the boat. They see computer superstores packed with multimedia PCs, CD-ROM drives, soundboards, video decoder boards and sexily packaged ROM software. People seem to be buying it. The retail trade is happy and so are the people making money out of conferences. New magazines are starting up. The firms in the multimedia business talk about a revolution in home entertainment.

But how many people who buy this hardware and software are actually getting any enjoyment out of it? That is the market research the majors need to do before falling for the hype that multimedia is big business.

Just as no-one should say that it is easy to install a satellite aerial, without going up a ladder, or retune VCRs to avoid the interference a fifth TV channel would cause, without trying to daisy-chain RF connections, so no-one should say it is fun to use an IBM-compatible PC ROM system, without first setting one up from scratch, working out the bizarre and unwritten rules of IRQ, DMA and I-O Address conflicts, and then trying to install a wide selection of discs. They might also like to ask the magazines which enthuse over multimedia, how many reviewers and writers have actually rolled up their sleeves and done it themselves, as opposed to rolling up to a smooth demonstration staged by the vendors on their own equipment.

Yes, it is all easier with an Apple Mac, but Apple's marketing policy over the years handed 90% of the market to Microsoft and the Windows world. It will never now be a Mac world, however hard Mac-users talk.

Yes, PC ROM works wonderfully for 'vertical' applications, that is to say when a PC is set up to use one particular ROM disc (a database of books in print or music copyright, say). Things fall apart when a PC is used with Windows to run a wide variety of ROM discs, such as games, encyclopedias, and music titles, along with a word processor, database and spreadsheet.

The rich, colourful world of almost-but-not-quite IBM clone compatibility makes use across a wide range of applications rather like eating a Cadbury's Milk Flake or repairing a rusty car—touch one bit and another falls off. Get one routine working and something else falls over next time it is loaded. Autoexec.BAT or Config.SYS has been changed. Or Win.ini has a bad line in it. The Path



Barry Fox

## The trouble with multimedia

is now too long for the Environment space. There is not enough base memory left. Two blocks of code are fighting for the same block of high memory. Drivers are clashing, but only when a particular pair are loaded. Windows reports a General Protection Fault, without any explanation of what it means. The mouse doesn't like the new screen display setup. One or other of Server and Share are loaded but shouldn't be, or aren't loaded, but should be. The variables become infinite.

Companies (like Virgin) that care, spend a fortune on bringing out new versions (like *Seventh Guest*) to fix the latest batch of problems reported by customers. They build in test programs which analyse a user's hardware while the ROM disc is installing itself by copying files onto the PC's hard disk. Often these tests will warn the user that the screen is not displaying enough colours, or the ROM drive not handling data fast enough, to display continuous sound and realistic pictures.

The MPC Wizard (multimedia test disc) has just checked my MPEG video decoder board, demonstrated that it works with Full Motion Video and sound, but told me that my MIDI drivers are wrongly set. And other MPEG Video CDs display only jerky pictures with jumping sound. Too bad I have not found a way of printing out the pages of on-screen troubleshooting text that might help me reset the drivers.

Mindscape's *Beethoven 5th* ROM

comes with a Read Me file which is typical of the attempts which the 'good guy' companies make to help users with late-breaking news of bugs and fixes. This prints out five pages of 'what to do if it doesn't work properly.' I learned from *Beethoven* that I was missing the software needed to get CD audio off a ROM disc.

The most challenging part of many ROM games is making them play at all. The new version of Microsoft's DOS operating system, Ver 6.2, has a feature which is designed to stop people overwriting files by accident. This is a great idea which commonsense tells should have been in Dos Ver 1, a decade ago. Because it has taken Microsoft so long to add the safety feature, it now blocks the installation of software which tries to copy files which already exist on the PC.

Because the blocked software does not recognise the problem it can only display an unhelpful error message, and no help for the user.

The trick is to rename the existing files, but only computer literates will know how to do this until they have wasted half a day hanging on for a Help Line to answer.

IBM, Nimbus and a computer magazine that gave away a ROM disc on the cover have all recently fallen foul of this 'gotcha'.

Before jumping on the multimedia bandwagon, the marketing people from the majors need only stand in a computer superstore or multimedia specialist shop, and listen to what the sales staff are telling customers. The

blind are lying to the blind. 'Yours is the first problem we've heard of.' 'You will have to contact the manufacturer.' 'It sounds as if your hardware is faulty or just not up to the job, you need a 486 or Pentium, and we have a special offer this month...'

The staff are telling exactly the same lies to people who have bought modems and fax cards to use with a PC. Small wonder that electronic mail, the great hope for the music industry ten years ago, is now a dream, used only by a dedicated few who cracked the problems and know the benefits E-mail offers. The rest send faxes, often from £200 stand-alone machines, not PCs which would otherwise have to be left on all night.

Expect more multimedia PCs that come with all the necessary hardware, already installed, and a bundled selection of software that is guaranteed to play. If future PC ROM software is tailored to this common, low denominator, customers might start to feel confident. But this tailored approach simply takes the PC down to the level of the stand-alone, plug-and-go interactive CD-based systems.

The majors should also then ask whether people really want to watch movies from close range on a small PC screen and listen to music through its lo-fi speakers. More likely they will migrate to a stand-alone interactive CD player, plugged into a large-screen TV, and hi-fi sound system.

CD-i is up and running, selling slowly, but looking hopeful, now that MPEG video decoders are available. US company 3DO dismiss CD-i as outdated technology, but has yet to deliver 3DO players and software that prove its higher tech, double speed drive, system to be inherently superior. Sega's Mega CD does little or nothing to exploit the storage capacity of a CD. Nintendo stick with solid-state cartridges which store less but deliver it at blinding speed. Commodore's CD-32 is having a honeymoon, picking up the sales lost by Sega and Nintendo. Sony promise their own system. And Atari are pitching too. We are still at the stage of VHS, Beta and V2000 video, BSB and Sky satellite, or SQ, QS, CD-4 and UD-4 quadraphonics.

The big shakedown now looks likely to begin this winter, when 3DO launches in Europe and either lives up to its hype or loses the market to CD-i. That is when the PC ROM hobbyist bubble will burst, the serious players will channel software into the winning system(s) and there will be real money to be made from multimedia. ■

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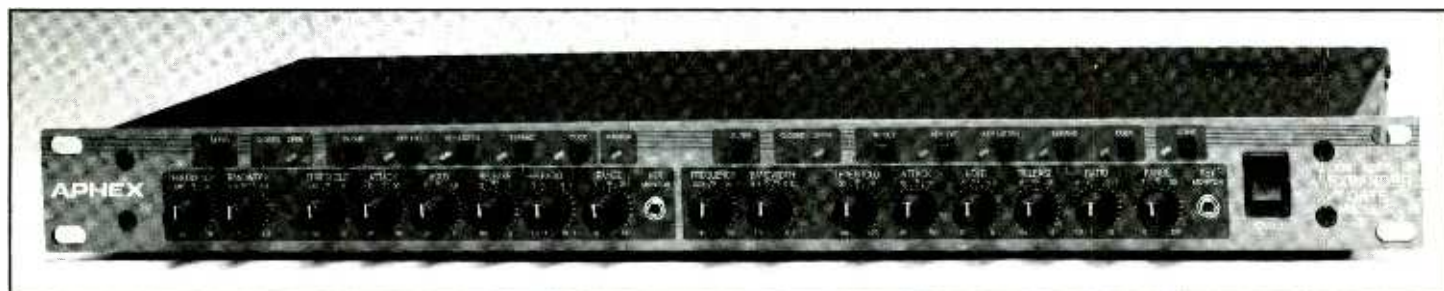
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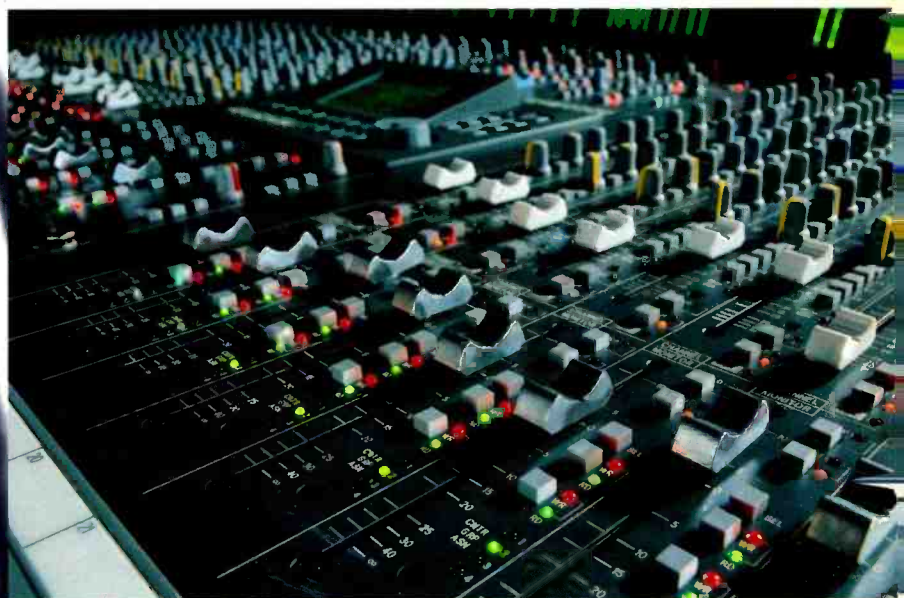
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