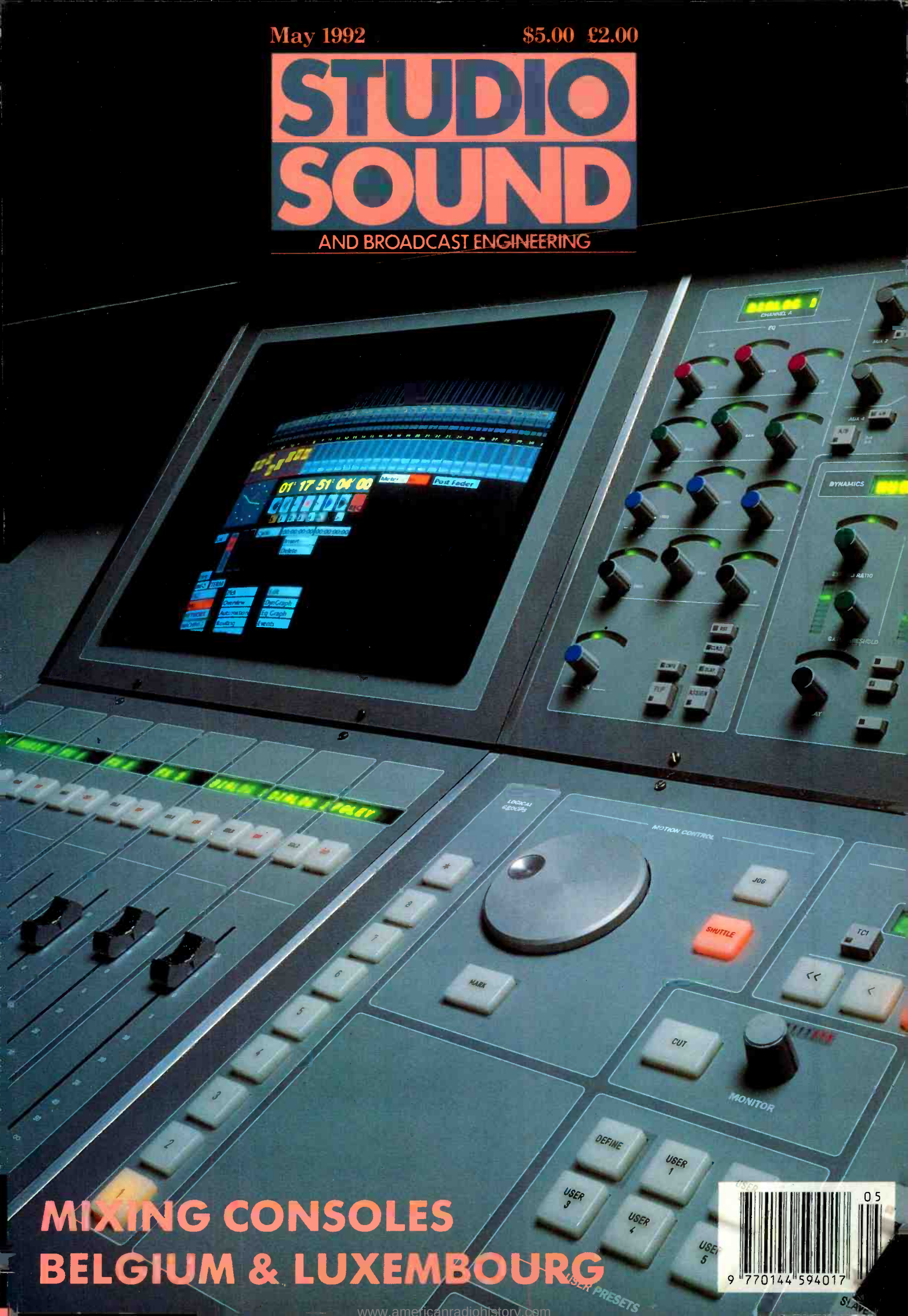
May 1992 $5.00 £2.00

STUDIO SOUND

AND BROADCAST ENGINEERING



MIXING CONSOLES

BELGIUM & LUXEMBOURG

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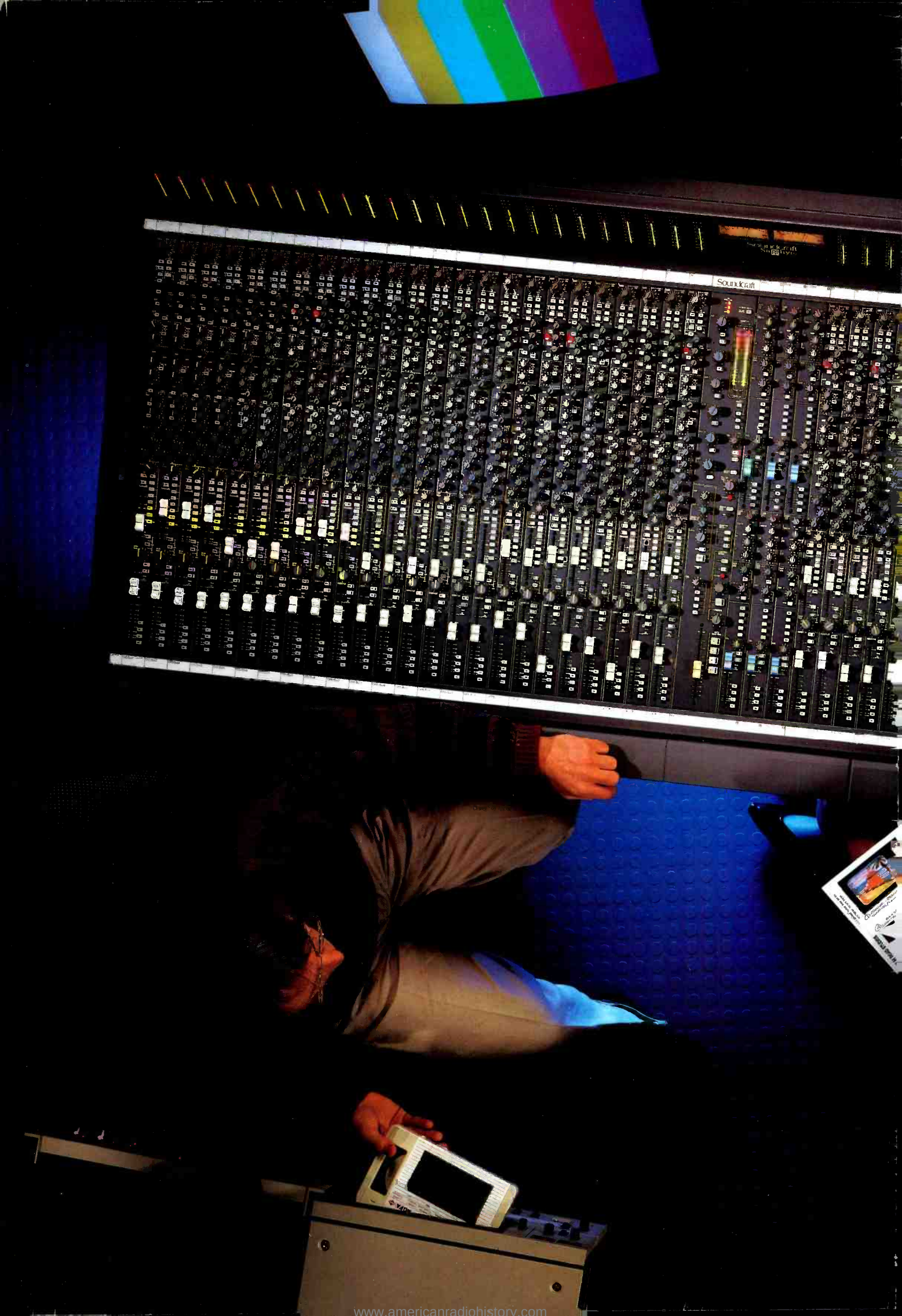

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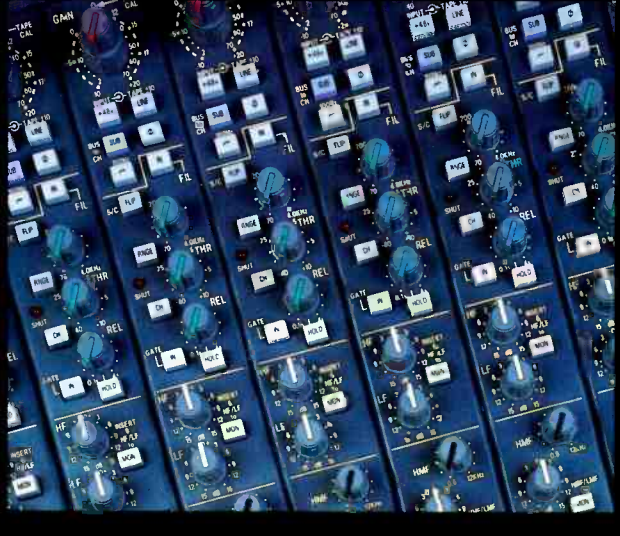

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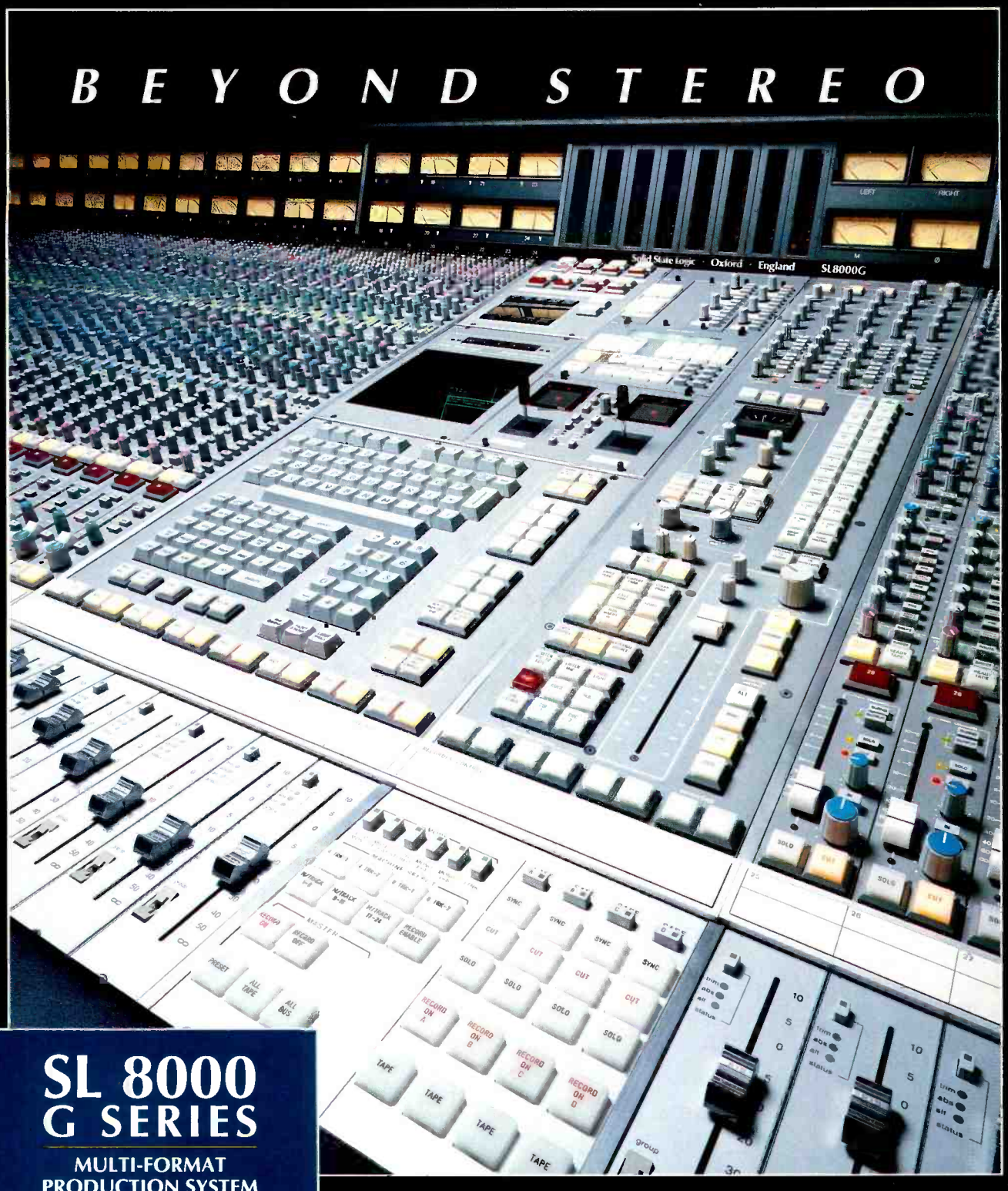

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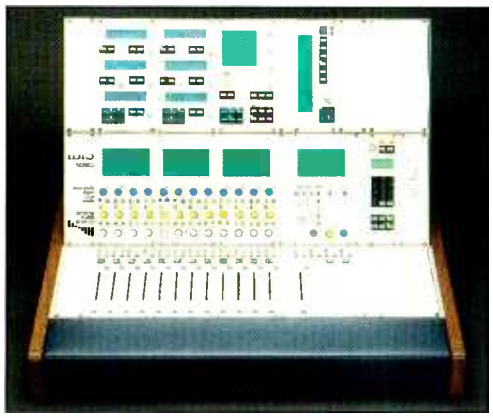
STUDIO SOUND
AND BROADCAST ENGINEERING



Harmonia Mundi Acustica *IBIS* console — see page 22

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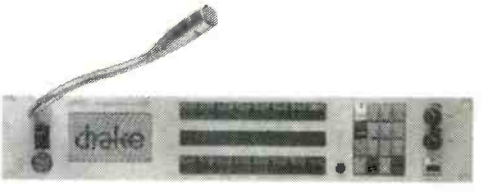
For off the shelf solutions to audio monitoring, signal error and interfacing problems, the 5000 series now includes the Automatic Stereo Corrector and the latest 20 bit A to D and D to A Converters.



Then there's our 6000 series. Its highly developed software and flexibility of expansion add up to the most powerful communications system available.

The 2000 series Broadcast Consoles combine technical excellence with simple operation to suit the most demanding productions.

To complete the picture, Drake Broadcast Systems will manage the design and implementation of an entire facility – professionally.

So for a single module, or the whole installation, Drake provide solutions to meet your needs.

drake

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Telephone: (0707) 333866.
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STUDIO SOUND
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The magazine is available on a rigidly controlled requested basis, only to qualified personnel (see classified advertisement for terms)

ABC

Total average net circulation of 19,166 per issue during 1991.
UK: 6,655. Overseas: 12,511.
(ABC audited)

un A United Newspapers publication

Design for sale

Just over a year ago we ran an article called 'Consultants — who needs them?' about how people who wanted to build a studio might also want to bypass design consultants to get the job done quicker and cheaper. We concluded that even if you asked consultants to do the minimum for you, it was worth asking. I've recently heard of studio owners who wanted consultants involved for very different reasons. One was a UK studio owned by a very successful group with millions of record sales across the world. They had reluctantly approached a designer to build them a new studio. Reluctantly because they didn't see the need to move from their original very small premises from where hit records tumbled. The designer drew up plans for what he thought would work. The plans were changed not for acoustic reasons but because the band thought there wasn't enough room for their families to attend the sessions. How was the designer to react when the band already makes millions from a less than acoustically helpful studio? Quite a dilemna. A second European studio asked us to recommend some studio designers. They wanted 'the best in the business', they said. It depends what you want was the reply, 'the best' they repeated. It was evident that they wanted a 'name' to draw in the business and goes to show that nurturing a magical reputation is indeed a career decision.

The future shows

The world's first public demonstration of Philips new digital consumer technology, DCC, took place last month in a very warm tent in the middle of Battersea Park, London. You would be forgiven for missing it in London as the only promotion was short local radio commercials and small local newspaper ads. Philips bravely called it 'Into The Future', part of a nationwide publicity drive.

DCC was in fact only a part of the show, other debuts were CD-I and Philip's new widescreen TVs. The DCC demo room was off the main tent arena in a long thin cabin with a low ceiling. We were given a short and non-technical description of DCC and its advantages and then challenged to hear the difference between prerecorded DCC and CD. We were confidently told that we wouldn't be able to. The fact that a number of us could can't be seen as being conclusive in the light of the environment and the single obligatory Dire Straits track played. The comparison is moot, however, as Philips seem to be heading for price parity with prerecorded CDs.

Sony, on the other hand, recently announced that they will be releasing an 'enhanced' improvement for the compact disc. They see this enhancement as important in order to dispel any confusion the public may have when Sony's Mini Disc is released. The public, Sony say, may see MD as a replacement for CD. We're not sure of the nature of this improvement yet, but educated guesses include text information in the subcode area; improved materials for disc manufacture; or even a super version of a player, like S-VHS video machines, with some kind of internal processing improvement. The last idea would be preferable to the first.

The power of advertising

At the recent AES show in Vienna it was good to hear of some very high profile bookings a Viennese studio had received after being covered in a *Studio Sound* 'Studiofile' feature. The management of Jose Carreras and Placido Domingo happened to read the article on MG Sound just when they were concluding that Vienna was a recording studio wasteland. They have since booked with the studio for some major recordings for this summer's Olympics. ■

Julian Mitchell

Cover: Solid State Logic's *Scenaria* post-production mixing system

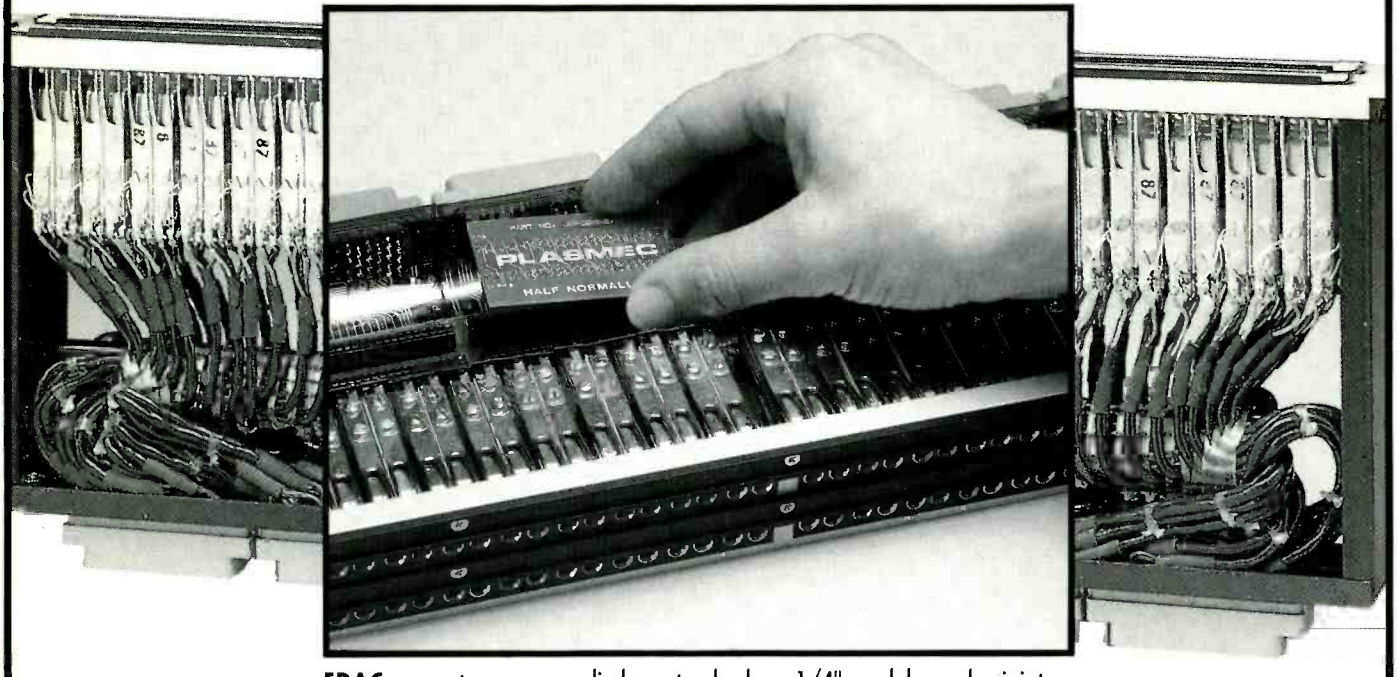
FLEXI PATCH

Takes all the hard work out of hard wiring

If you need quality, ready to use jackfields, and you need them today, there's only one manufacturer you should turn to — Mosses and Mitchell.

The new and totally unique **Flexi Patch** range of jackfields from Mosses and Mitchell can be configured to meet customer requirements in just 15 minutes.

Flexi Patch jackfields don't require hard wiring. Instead, they feature special pop-on pods which allow the jackfield to be 'wired' in any standard configuration, including normalled, half-normalled or paralleled. Should your requirements change in the future, **Flexi Patch** jackfields can be reconfigured to meet them, simply by switching over pods.



EDAC connectors are supplied as standard on 1/4" models, and miniature versions can be supplied with connections to any standard ribbon connector, including Cannon D and DIN 41612.

Flexi Patch jackfields are manufactured with all the precision you'd expect from Mosses and Mitchell, Europe's leading manufacturers of quality jackfield products.

Mosses and Mitchell are part of Plasmec Systems, one of the U.K.'s foremost suppliers of equipment for broadcast and studio applications.

For more information, please contact

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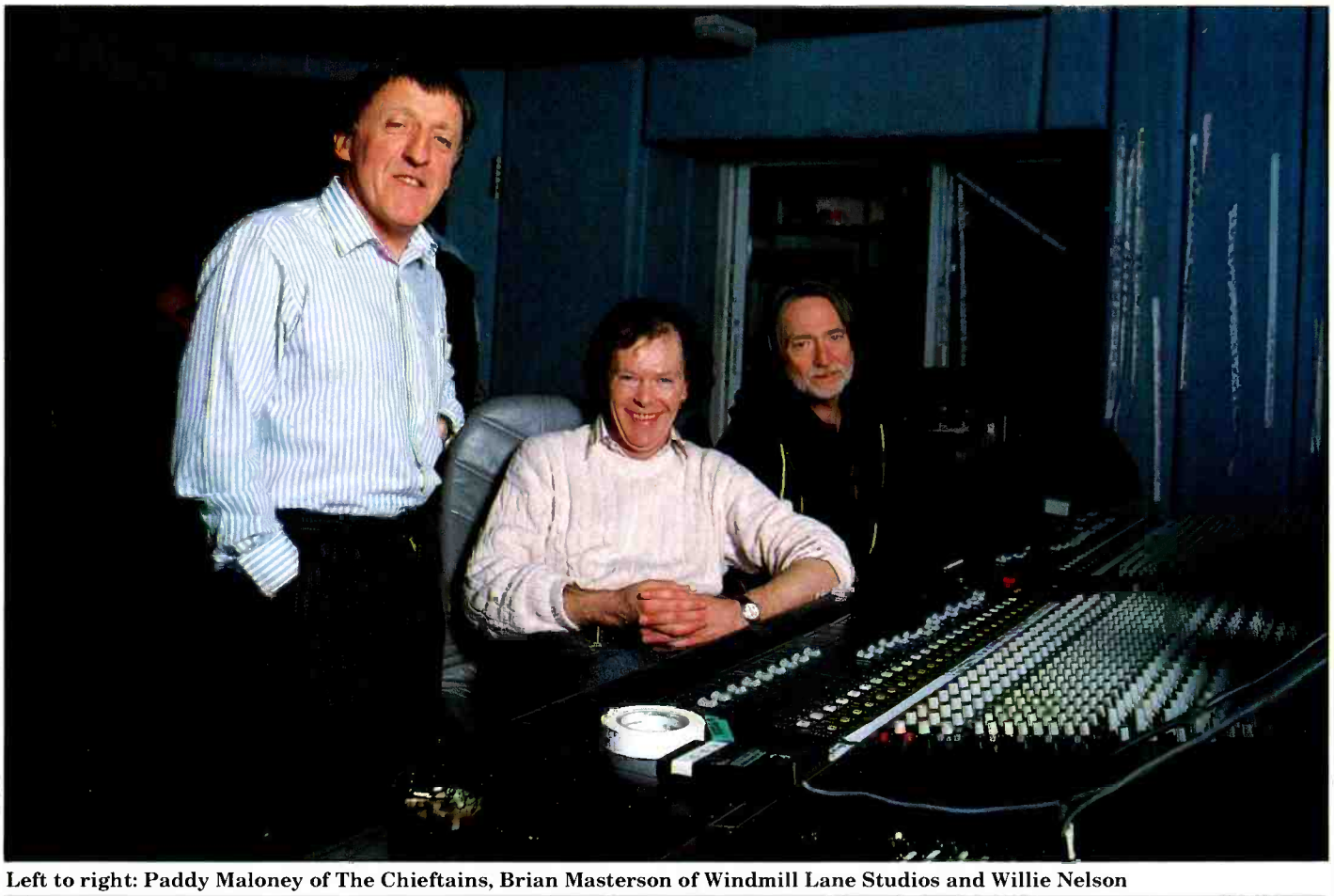

Left to right: Paddy Maloney of The Chieftains, Brian Masterson of Windmill Lane Studios and Willie Nelson

Windmill Lane

June sees the opening of Windmill Lane's Studio 2 — completing its new complex in Ringsend Road, Dublin. Since its takeover by Brian Masterson and Andrew Boland last year, Dublin based PA company owner Mick O'Gorman hs been appointed manager of the new facility while Masterson and Boland are listed as house engineers.

The listed Art Deco building, a former electricity generating station, already had the necessary massive construction to provide isolation. Studio 1, at 2,500 ft² with a 700 ft² control room, has a 48-channel Amek *2520* with *Mastermix II* and Studer *A827*/Dolby *SR* with Urei monitoring. The 800 ft² Studio 2 is equipped with a 48-channel SSL *G Series* with *Total Recall*, Studer/*SR* and Westlake monitoring, while Studio 3, the programming suite, has Soundcraft *TS24*/*Mastermix II*, Studer A820/SR, AMS *AudioFile*, Fairlight and Meyer Monitors.

Masterson commented, 'The new setup means bringing together the reputations of myself and the Old Windmill Lane, Andrew's considerable strengths and the excellent new facilities. It's wonderful to work in.' Mick O'Gorman, head of Dublin PA company Mikam Sound, was appointed. said Masterson, 'because I've known him personally for years, he has incredible energy and he's absolutely the right person for the job.'

Mike Lethby

TIC Studios, Vienna

With the dearth of live venues in Vienna, two musicians, Clemens Kloss and Rupert Weber, were forced to open a recording studio to earn a living. TIC Studio (The Innovation Corporation) is the result. Recently Soundtracs' Austrian distributor Audiosales installed two *Quartz* consoles there.

TIC's two studios were once a printing works which after an explosion brought the attic portion of the building onto the studio market at a very low rent.

The two musicians, Kloss and Weber, have set themselves up as producers and most of TIC's work is audio for video. They compose and perform most of the music for commercials themselves and use a separate video post-production studio on a lower floor as a one-stop-shop facility for their clients.

In fact pure music recording and production is what they want to do long term, but post-production pays the bills at the moment.

Two control rooms and two live rooms are available. Studio design is in-house with the minimum of acoustic treatment, however the rooms actually sound quite good. Equipment includes Sony *APR-24* tape recorder, Apple *Mac IIfx* and Atari *Mega 4* computers and Sony U-matic VTR.

Tic Music, Schottenfeldgasse 60/2/4, A-1070 Vienna, Austria. Tel: +1 431 933 115.

Desktop studio

Matrox Video Products of Canada have released a new desktop video system with an in-built 6-channel audio mixer and 32-bit DSP-based digital audio enviroment integrated with Personal Producer Multimedia Windows software, for under $15,000. (approx £9000).

The Matrox *Studio* was seen at NAB last month and claims to provide all of the capabilities of traditional video production studios costing 10-15 times more with its five board set designed for the EISA PC.

Matrox Electronic Systems, 1055 St.Regis Blvd, Dorval, Canada. Tel: +1 514 685 2630.

Matrox *Studio*

Kunstkamera, now at the International Electronic Centre, in Moscow

Russia's audio capitalism

'Kunstkamera's philosophy is simple — to bypass the immense bureaucratic machine established by the Soviet organisations, and through private means provide to Russia professional service of the highest western standards at 60% to 70% of the price.'

This is part of Kunstkamera's official press statement and moves are well on their way to achieving it.

Kunstkamera was formed in 1991 as one of the first privately owned companies in Russia devoted solely to quality productions in audio, video and film. The company has since moved to a floor of the Moscow International Electronic Centre to form what they call Russia's first all digital audio/video complex.

Planned are a video production and edit suite with satellite links and a 'tapeless' audio studio.

Kunstkamera Ltd. Sretensky Bld 11, Moscow 101000, Russia.
Tel: +70 95 927 42 11
Fax : +70 95 975 23 88.

New venue studio for London

A $1m studio facility is to be built at Brixton Academy in South London making it easier for bands to record live material at the venue.

The project is being funded by private investment in the UK and the Far East. Through the DTI's Design Initiative Scheme, Paul Halpin, whose company is heading the project, has commissioned Munro Associates to design the new facility.

Halpin: 'This will be a studio for people who want something really special. The (Brixton) Academy is a marvellous Art Deco Grade II listed building and we hope to retain that feel in the interior design of the studio.'

Halpin decided to get involved after doing some second unit directing at the Academy for clients, including Channel Four. He realised its potential as a recording venue with its excellent acoustics and because it attracts high profile acts who may want to record live.

The studio will run autonomously and has independent access. Based on the first floor in what used to be a preview theatre, the studio will have natural daylight and a small recording area. The equipment list has not yet been finalised but it will include a 72-input console which Halpin believes will create quite a stir when it finally arrives. Opening date is slated for the Autumn.

Sue Sillitoe

Track Truck 1

Media Sound of Sweden have added a specially-built 16.5m long OB truck to their fleet, Track Truck One. Equipment includes a 96-channel Raindirk *Symphony* console with 48-track routing. *Yellowtech 4* automation, Westlake monitoring and Sony digital multitrack. Service also includes a bar area.

Media Sound
Tel: +46 8 7159195.

Track Truck One a specially built OB truck

Run DMCs

West Heath Studios in North London has been leased by songwriter and arranger Eric Woolfson and upgraded with all-digital technology.Woolfson has teamed up with digital consultant Ian Sylvester and together they have chosen to cascade three Yamaha *DMC1000* digital mixing consoles rather than buy one analogue console. Three DMCs give the studio 48 channels with 66 inputs on mixdown. HHB Communications supplied the consoles and software support during the first month's evaluation period.

Other equipment includes a DAR *SoundStation* digital editing system, a large range of multitracks, DAT machines and digital effects. Although the studio is not available for commercial hire, all equipment can be disconnected for rental; Sylvester has been arranging hires with his own equipment for several years, mainly through Hilton Sound and Audio FX. 'We wanted a studio which could be flightcased' he says.

This unique way of operating allows individual consoles,

tape machines or the *SoundStation* to be taken to other studios or locations. Some of Woolfson's projects are partly recorded at Abbey Road Studios, especially when orchestras are being used.

● A Yamaha *DMC1000* seminar was held at HHB Communications at the beginning of April to further introduce the concept to a mainly video-based audience. Cascading consoles was advised as a way to a larger format digital console. The DMC console retails at £19,500 ex-VAT ($3,315 approx).

Caroline Moss

Contracts

● Recent SSL sales include a *ScreenSound* digital audio editing system to Studio Holly in Vienna; *SL8000* consoles to the new Air Studios and Abbey Road Studios in London; and the first *Ultimation* equipped SL *4000 G* Series console to be installed in London at Livingston Studios.

● TV Nacional de Chile has recently taken delivery of five new Soundcraft consoles. Intervideo, the local distributor, has supplied a 40-channel *Europa* along with two 24-channel *8000* series and two 40-channel *500* monitor to be used with an existing Soundcraft *S4*.

● US TV company NBC will install 14 Tannoy System *15DMT* reference monitors into its broadcast control rooms being built for the Olympics in Barcelona.

● Focusrite have sold a *Studio* console with GML automation to Sound Design Studio in Tokyo.

● Essex Radio in Southend has chosen a DDA *AMR24* console as the centre of their new commercial production facility.

● Thomas Spring is the latest customer to purchase a custom mobile version *Vector 432* for his new Move It Studio based in Eschlikon, Switzerland. A *Vector 432* to Malaysia has been ordered by Noize Records of Kuala Lumpar.

● Saje has taken its third order in Germany for a *Memory* console for the Staatsschauspiel theatre in Dresden.

● Warner Hollywood has become the first company to re-order Audiomation System's *Uptown* moving fader console automation system for retrofitting to a Harrison *PP1*.

Agencies

● Sennheiser UK is to exclusively handle the sales, distribution, service and technical support for the entire Neumann product range within the UK and Eire.
Sennheiser UK. Tel: 0628 850811

● Tannoy have appointed TEAC Deutschland GmbH as its sole distributor for professional audio in Germany. Tannoy. Tel: 0236 420199

● Solid State Logic has expanded its operations and established Solid State Logic Audio Technik GmbH in Germany. SSL Audio Technik GmbH, Rontgenstrasse 104, 6100 Darmstadt 12.
Tel: +49 6151 938686
Fax: +49 6151 938680.

In-brief

● **Figures from AES Vienna:** AES 92nd convention hosted 7,132 attendees; new membership includes 23% increase from former Eastern Bloc.

● **Munro & Air venture:** acoustic designers Munro Associates and Air Lyndhurst in London are to embark in a joint venture with speaker manufacturer DynaudioAcoustics and Macademy, the project management for the new Air Studios. The aim is to develop the 'ultimate monitoring system' said David Harries of Air.

● **Skydome for Manchester?:** The Manchester Olympics Committee has been told that construction of an 80,000-seat stadium based on the Toronto Skydome model is a feasible project for the area and for the Olympic Games 2000 bid. Such a stadium would also provide superb scope for trade shows, rock concerts and opera spectaculars

● **IMAX for London:** The British Film Institute (BFI) have announced plans to build an IMAX theatre on London's South Bank. The facility would be part of the £8m scheme to improve the BFI's London site.

● **Price reduction for Otari:** Otari have announced an immediate price reduction of £2500 for its *DDR-10* digital audio disk

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CONSOLES (used)

AMEK

Amek Angela 36 frame, 28 channels, Mosses & Mitchell p/bay	VGC	£12,995
Amek BC2 broadcast console 8/8/4/2/ with full p/bay	IMMACULATE	£11,995
Amek MC01 broadcast console 12-4		£2,995

CALREC

Calrec UA8000 48 channel with automation	VGC	POA

DDA

DMR12 44 channels with p/bay, private use	AS NEW	POA
DDA AMR24 44 frame fitted 36 channels, Optifile automation many extras	VGC	£27,000

HARRISON

Harrison MR3 36 channels, 1 owner from new, private use only	VGC	£19,995

NEVE

Neve VR60 Recall + Flying Faders	VGC	POA
V-3 48 frame fitted 36 channels, 2 1/2 years	VGC	£88,000
above mixer + 12 new channels 48 channels		£110,000
above mixer with flying faders		£138,000
Neve V-1 48 frame fitted 40 channels, p/bay		£49,950
Neve 51 series 24-8-8 broadcast console	Superb	£30,000
Neve 10 channel line amps in 19" rack	VGC	£995
Assorted spare modules, mic amps, PPM's etc		POA

NEVE 2 CHANNEL EQ UNITS

2 Neve eq modules fitted into new 1U case with separate balanced Mic/Line inputs, balanced in/outputs, £1,495

NEVE COMPRESSOR/LIMITERS

2 Neve compressor/limiters fitted into 1U rack mounting case, 240/110 volts VGC £1,495

RAINDIRK

Raindirk Concord 36 inputs, 36 monitors, P/bay	VGC	£5,995

SOUNDCRAFT

Soundcraft TS24 40 frame fitted 36 ch + 8 fx ret, Mastermix	VGC	POA
Soundcraft TS12 40 channels, 8 VCA sub groups	VGC	POA
Soundcraft 6000 36/24/24 p/bay, little use	AS NEW	£7,995

SOUNDTRACS

Soundtracs QUARTZ 48 channels, private use	VGC	£19,000
Soundtracs QUARTZ 32 channels	VGC	£12,995
Soundtracs PC Midi 32. 64 inputs in remix	VGC	£3,995
CM4400 32 inputs, 24 monitors, 56 ins in remix	VGC	£3,500

SSL

SSL 4048E total recall	RE FURBISHED	£69,950
SSL 4000E total recall, 56 frame fitted 52 channels	VGC	POA
SSL 6056E total recall, G-Series computer + eq	VGC	POA
SSL 5000 series		WANTED
SSL E Series input module, unused		£1,495

TRIDENT

Trident TSM 32 channels, LED metering, internal 19" FX rack	IMMAC	£11,995
Trimix 38ins, 8 sub groups, 8 way matrix output	VGC	£2,995

RECORDERS (used)

AKAI

AKAI A-DAM 24 Channel system, demo use only	£12,000
AKAI A-DAM 12 Channel system, demo use only	£6,500

AWAI

AIWA F250 cassette deck	£45

CARTRIDGE TECHNOLOGY

Cartridge Technology CT1001 Series stereo replay cart machines NEW Normal price £1,800 (3 units only)	£995ea

FOSTEX

Fostex G24S 24 track 1"/ Dolby S & remote	BOXED	£6,500
Fostex E16 with 4050 autolocate, private use, boxed	IMMACULATE	£2,750

JVC

6400 professional VHS edit, recent new heads	VGC	£595

MCI

MCI 2 track in hardwood console, 71/2-15-30ips	£550

MITSUBISHI

Mitsubishi X880 32 track digital	POA
Mitsubishi X850 32 track digital	£35,000

NAKAMICHI

Nakamichi MR-1 cassette decks, 2 available	£395ea

OTARI

Otari MTR90 MK2 24 track, remote	VGC	£12,995
Otari MX5050 MK3 8 track	VGC	£1,500
Otari MX5050 4 track 1/4"	VGC	£550
MX55 2 track Time code machine c/w trolley	VGC	£1,995
CB120B t/code autolocator Use with MX80/MTR100		£1,400

SATURN

624 24 track with remote/auto, 1,000hrs	AS NEW	£15,995

SOUNDCRAFT

MK3 24 track with remote Soundcraft serviced	VGC	£5,995

STUDER

A80 MK3 24 track.with Studer remote & autolocate on stand, private use, only 2,400 hrs	IMMACULATE	£11,995
Studer A80 MK2 24 track	VGC	£8,500
Studer A80 MK1 16 track with full remote/auto, 1300 hrs 15/30ips		OFFERS
Studer A80 MK2 2 track 15/30ips	VGC	£1,995
Studer A800 24 track,	VGC	£16,000
Studer A807 2 track 3 3/4, 7 1/2, 15ips with trolley (2 available)	VGC	£2,500ea
Studer B67 in console with VU's 71/2-15ips	VGC	£750
Studer B62 in console with VU's, 2 available.	VGC	£495ea

TASCAM

ATR24, 24 track 2" + remote/autolocate, ex dem	VGC	POA
Tascam MSR24DBX	EX DEMO	£4,995
Tascam MSR24S	NEW	£7,500
Tascam MS16 with DBX, rem/auto, in console	VGC	£3,500
Tascam X1000 2 track, has been rack mounted,		£250
Tascam 32 2 track	VGC	£395
Tascam 122 cassette deck	VGC	£250
Teac V300 cassette deck	VGC	£95

3M

3M M79 24 track with remote	VGC	£3,995

24 TRACK PACKAGES (used)

Soundcraft 6000 36/24/24 patchbay, private use only, as new
Soundcraft MK3 24 track recorder with remote.
S/craft serviced vgc with loom £12,995

Soundtracs Megas (new) 32/24/24 with midi muting
Soundcraft MK3 24 track recorder with remote,
S/craft serviced vgc with loom £12,995

Harrison MR3 36 channels, patchbay, private use only
Studer A80 MK3 with remote/autolocate only 3000hrs with loom £26,995

Soundtracs Megas 32/24/24 (new)
Fostex G24S (used, vgc.) £13,995

Amek Angela 36 frame fitted 28 channels, patchbay.
Otari MTR90 MK2 24 track + rem/auto £23,995

Amek Angela (as above)
Studer A80 Mk3 24 track with Studer remote & autolocate on stand. Only 2,400 hours, private use £22,995

VARIOUS (used)

AK 410 Q-LOCK with interfaces	£950
AK 310 Q-LOCK with interfaces	£750
AKG ADR68K digital FX & reverb	£1,995
AKG TDU 8000 2in 8out DDL	£1,500
Alesis Microverb (3 in rack)	£250
Alesis SR16	£175
Alesis MMT8	£125
AMS DMX15.80S chorus interface	£395
APHEX type 'C'	£155
ART Pitch transposer with display	£295
Audio &'Design E900RS sweep eq	£495
Audio & design F7969X vocal stressor	£495
Bel BF20 mono flanger	£195
Bel BC3 24 channel noise reduction system	£750
Bel BC3 8 channel 30db noise reduction	£225
BOKSE SM9	£125
BOKSE SM8	£125
DBX 150 stereo noise reduction units	£155ea
DBX 160 compressor	£375
DOD R825 stereo compressor	£195
Dolby 280 SR CARDS (6 available)	£350ea
DOLBY-A SP24	£2,750
DOLBY-A SP cards (8 channel modules)	£1,200
Dolby-A M24	£1,500
Dolby A & SR units	WANTED
Drawmer DL221 Dual comp/lim	£195
EMT 140 stereo echo plate with remote	£995
Emulator 2	£995
Eventide H949	£595
Eventide H910	£400
Klark Technik DN22 graphic eq	£295ea
Klark Technik DN27 graphic eq	£345
Klark Technik DN34	£495
Korg 700S	£150
Lexicon LXP-1	£395
Lexicon Prime Time	£300
Neve 2 channel comp/lim, 2U rack mounting, 240/110 volts VGC	£1,495
Patchbays GPO 2x24 row (2 available) (2 available)	£25ea
P&G Faders model D25081 short travel, 24 avail NEW	POA
Roland SPV-355 pitch/voltage synth	£150
Roland SRV2000 reverb	£495
Scintillator	£125
Survival Projects stereo panner	£395
Synton 903 phaser	£195
Valley People Keepex 2 (pair)	£250
XRI XR300 SMPTE Syncroniser	£155
Yamaha TX81Z	£195
Yamaha REV7	£475
Yamaha RE50 multi fx	£225
Yamaha Q2031 2x31 band graphic eq	£225

MONITORS (used) PAIR £1,995

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Lockwood Academy cabinets/Tannoy 15" Super Reds		£495
UREI 813C coming soon, phone for details		POA
Tannoy little gold monitors	AS NEW	£650
Visonik David 5000		£100
Visonik David 4000 with Sub 3 Bass cabinet		£250
Visonik David 6001		£125
Westlake BBSM10 with stands		£1,500

AMPS (used)

Yamaha PC2002M	£550

MICROPHONES & HEADPHONES (used)

AKG C12a		POA
AKG C414ULS coming soon		POA
Amcron PZM 30GPB (3 available)		£55ea
C-Ducer CX		£55
Neumann U47 fet (new capsule)		£750
Neumann U47 valve (new capsule)		£1,800
Neumann U49 valve mic with psu,	IMMACULATE	£1,995
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D-20 Updates

When the Fostex *D-20* was originally launched as the first timecode-capable DAT machine, with Fostex's own timecode implementation. Fostex assured users that when the IEC established a standard timecode format it would be available on the *D-20*. With a remarkable lack of publicity. Fostex have kept their promise with the release of V3.02 of the machine's software. This requires the presence of the 8310 interface board, which is already installed in most machines and fitted as standard on recent ones. The 8310 handles the remote control and the 9-pin interface, and the upgrade includes a new EPROM for this board as well.

The software provides the promised facilities, and more, without the loss of any existing functions. This means that timecode can be recorded in IEC format. Fostex format, or both, and either type can be played back, with the user deciding which has priority when both are present. An on-board timecode generator is now incorporated, which will record IEC format code either free-running or jam-synced to code on tape. Tapes can be pre- or post-striped in all formats, and synchronous IEC code can be post-striped on a tape which already has Fostex code. Since DAT subcodes can be a minefield at the best of times, I checked compatibility with another timecode machine from the Sony *7000* series. Everything behaved as it should, including code from the Sony replayed on the Fostex.

In addition to all this, the software will convert A-time — recorded by most DAT machines — into synchronous timecode at any frame rate, which, of course, means that almost any DAT recording can be slotted into any timecode-driven system as it stands. When playing back, the machine can now be set to resolve to incoming timecode; this is simply frame synchronization at this stage, although apparently full on-board chase synchronization may not be too far away.

Another useful feature is the *Tacky-Timer*, as Fostex affectionately call it. This is a turns-driven real-time counter for tapes which don't even contain A-time. Naturally, for this to work properly the machine has to be told what size tape is loaded, but once this is done the read-out is remarkably accurate and consistent.

All these facilities are controlled by what Fostex call 2nd Level functions, which are accessed by various front-panel key combinations. Configuration is only possible while there is no tape in the machine, and none of the functions is available on the remote. A further recent upgrade, V3.13, allows IEC code to be displayed on the machine's front panel, and indicates which format of code is in use.

This software is surprising in two ways: firstly, because it adds so much to the machine's capabilities above and beyond the IEC compatibility, and secondly, because Fostex have made so little mileage out of the fact that their original undertaking has been fulfilled, with bells on.

Dave Foister

DD1000 news

Cheery news for owners of Akai *DD1000*'s: the first major revision of the software, Version 2, is now available. It comes in the form of ROM chips, to be fitted by Akai as part of the update package. Features include:

Timestretch — significantly better quality than the *S1000* and all in a little longer than real-time. No more making excuses to your jingle clients or loop merchants.

RS422, *DD1000* as master — control of VTRs via the Sony 9-pin connector for audio post-production applications.

DAT Archiving — what a relief! You can now dump all audio and edit data to DAT, including Qlists, Songs and Playsheets.

Automatic Incrementing of Take Name in Record — if your last Take was called 'Leslie 1', your next will automatically come up as 'Leslie 2'. It's also intelligent enough to jump to 'Leslie 3' if 'Leslie 2' is already in existence. It should always have been thus.

There are many other smaller but important improvements too numerous to mention, for instance, up to 50 cuts can be made in real-time in Record mode or Edit Cuts mode; you can play a Qlist from the record page and finish a recording and save the resulting Qlist all with one button push from the Record page. If you own a *DD1000*, you'll want this update!

Jim Betteridge

TAPELESS TRENDS

Yasmin Hashmi & Stella Plumbridge appraise the non-linear digital audio product market in the wake of the show

There are now around 80 different tapeless recording systems on the market. These range from simple stereo cart replacement systems to networked multichannel post-production systems. More than half were demonstrated at this year's AES show in Vienna, giving the potential purchaser a sometimes bewildering choice. In the past, due to the small number of systems on the market, the direction in which tapeless technology was progressing was sometimes difficult to assess.

However, with hindsight, we need only have looked at how the computer industry developed to get a good idea of what was going to happen. Nonetheless, there have been factors beyond manufacturers' control which have served to hold the technology's progress at bay. These have mainly been lack of recording capacity, lack of processing power, storage media costs, disk bandwidth restrictions and the problem of archiving. Of course those manufacturers who could afford it could go to great expense to surmount most of these problems and as a result produce systems which only the few could afford.

However, disk capacities have increased significantly, more powerful processors are available, costs have decreased, access times are getting faster and the development of faster and more reliable tape streamers, as well as faster optical discs, have done much to alleviate archiving problems. In addition, for broadcast applications, where arguments over the absolute quality of audio are few and where sophisticated editing is not of paramount importance, the introduction of powerful data compression techniques has helped to significantly reduce storage requirements.

Market developments

These factors, as well as the fact that the performance of PCs is now sufficiently high as to provide a suitable development platform, have led to a marked increase in products being introduced to the market. There are now systems aimed at every pocket and every manufacturer has at least one competitor — in some cases as many as a dozen or more. It is unlikely that all of these systems will survive. There is, therefore, a great deal of pressure to keep up with the rest of the market and to stand out in some way. This was never so evident than at the Vienna AES show, where the effects of increased competition coupled with technological developments have resulted in the emergence of definite trends. Some of these are confined to specific markets, while others cover the market in general.

Niche markets

One way to decrease the competition is to target a specific market, employing terminology, operational strategies and control which is familiar, and therefore probably more attractive to a particular type of user. The increase in the number of different tapeless systems aimed specifically at radio broadcast has been dramatic, with as many such systems at the show as general stereo and multichannel systems put together. A number of simple cart replacement systems were present such as *Dynamax* from **Fidelipac,** *Discart* from **Sonifex**, *Digicart* from **360 Systems,** EMT *460/461* from **Barco-EMT,** *VAMOS* Cart Replacement System from **Maycom,** *DPR 612* from **ITC** and *DART* from **ASC**. All of these systems use removable disk except *EMT 460/461* and *DPR 612* which use RAM. Two systems with more sophisticated cart replacement features included *AudioVAULT* from **Broadcast Electronics,** which has different software applications for different types of machines and *AR-200* from **For.A,** which has comprehensive search facilities.

Systems with automation capabilities included *DER 1* from **Larsen,** *Digicenter* from **ITC**, the new *DDO.2* from **Audio Follow** and *Master Jukebox* from **Digigram.** Systems with automation and networking capabilities included *VAMOS* Broadcast Station 1 from **Maycom,** *Digispot* from **R. *Barth KG,*** *EMT 466* from **Barco-EMT,** *DCS* from **Computer Concepts,** *Cartouch* from **Ranson Audio** and *MAD* from **Numisys.**

Nearly all of the radio broadcast systems present use data compression. Since the type of editing used with such systems is generally limited to simple topping and tailing, this poses no problems. However, its advantages for broadcast are that more audio can be stored per Mb, which is important when a large and diverse amount of audio is required daily. It also means that audio can be transferred quickly via a network. This is essential if news reports are to be disseminated rapidly to multiple locations, or if on-air studios are to be automatically updated with other types of audio. Another advantage is that remote stations can be updated digitally via digital telephone lines such as ISDN.

As well as those systems aimed specifically at cart replacement or station automation, three other application-specific systems on show were *Digiton* from **gtc,** *Audio Solution* from **FEG** and *Direct* from **AKG.** Both *Digiton* and *Audio Solution* are aimed at post-sync dialogue and *Direct* is aimed at direct replacement of multitrack tape recording for music. It supports up to 32 tracks and operation is via a custom remote with dedicated MARK and LOCATOR keys and a *Mac* laptop/portable with LCD display. There are currently no editing functions and tracks are not independent.

gtc's *Digiton*, which uses a custom controller, has external machine control and slaves to time code, bi-phase and wordclock, now supports four tracks and up to four systems can be connected together. A new system on the market is **FEG's** *Audio Solution.* It is a two-channel system with a custom controller and slaves to time code and bi-phase.

There are also a number of mainstream systems which address niche markets by offering application specific software modules. Such modules on show included **NED's** *SoundDroid* which is aimed at offline spotting for film, **WaveFrame's** *Editorial* software — also aimed at spotting for film and **Sonic Solution's** CD mastering software which includes PQ encoding and CD recording using a CD Printer. This writes a CD at double speed and the resultant CD is already being used by some CD pressing plants used to produce a glass master.

The *VAMOS Broadcast Station 1* from Maycom

Buy outs

In the past, the major proponents of tapeless technology have been companies whose main, if not only, activity was the design and development of such systems. These pioneers had the vision but not the market. It seems that the larger pro audio corporations on the other hand, were content to let these companies do the running until the time was right to invest in the technology themselves. It seems that this time has now come.

For large corporations, there are usually two main options for entering a new market — develop a system yourself or buy an existing one.

Studer was one of the first to acquire and develop an existing system, namely *Dyaxis*. They also showed the latest addition to their tapeless portfolio, *MAD*, which was developed by Numisys and is aimed at station automation. **AKG** have acquired the *Direct* and **Otari** the *PD-464*. Then there are acquisitions by companies who are not traditionally associated with pro audio. **Carlton,** for example, lay claim to the *SoundStation* range from **DAR** and *ScreenSound* from **SSL** and **Siemens** now have *AudioFile*.

There has also been a certain amount of cooperation between manufacturers. **Otari,** for example, based their *DDR-10* on **Digidesign's** *Sound Tools*, **TBS** (not present at the show) based their *Digital Spot* on the *DD1000*, **Fidelipac's** *Dynamax* and **ASC's** *DART* have the same roots, *Digiton* is based on **Steinberg's** *Topaz* hardware, and **Mitsubishi** in the UK market *Topaz* as the *Diamond* Workstation (not present at the show).

AMS *Spectra*

Diversification

Some would suggest that if you have the choice, don't put all your eggs in one basket. Some of the early tapeless manufacturers such as **AMS, Lexicon, SSL** and **Audio Design** have always had other product lines, but most did not. One solution to enhance your product range is to design peripheral devices. **DAR** now offer a sample rate/format converter, **Sonic Solutions** offer two types of format converter as well as an A/D, D/A unit and **Maycom** offer an optical-based portable recorder.

Plasmec's strategy is to gain wider appeal by making *ADAS* available on three platforms, namely IBM *PC/AT, Mac* and Atari, as well as offering a rackmountable stand-alone unit.

NED, WaveFrame and **Fairlight** have had the advantage of addressing either the sampling, synthesis and sequencing market, or the disk-based recording market, or both. **Akai** have now joined in by expanding their disk-based recording to the *S1100* sampler. The recording medium can be the *S1100*'s internal hard disk or any external drive, thus allowing stereo disk-based recording and replay alongside 16-voice sample replay. *SoundLink* from **Korg** addresses the sequencing aspect by providing an integrated 16-track MIDI sequencer which features automatic generation of a tempo map for a sequence to match a cue which has been time compressed/expanded.

An interesting development is the introduction of simple VTR slave machines. **gtc** were showing a prototype of their 4-track optical-based recorder/player. The system supports time code, bi-phase, wordclock, digital I/O and will behave as a recorder or player or both. Using an interface from **Numisys,** the *DD1000* will also behave as the audio tracks of a VTR. The *408 OMX* has a 'listen' mode, whereby it obeys commands from a video editor and records accordingly. The *HRC-4000* is the soon to be available system from **Tascam** (seen at the show, but not demonstrated) and will slave to a **Sony** editor and has an optional custom remote for editing/locate functions.

Price wars

Yet another method of staying ahead of the competition is to offer a low-cost version. Four such systems were on show. The *Sonic Station* is **Sonic Solution's** base model with two inputs and outputs, real-time EQ and crossfades, internal mixing of up to 12 channels and an optical drive interface. **Studer's** *Dyaxis Lite* works on a *Mac Classic* and is mainly aimed at low sample rate editing of news and speech (although sampling rates up to 48 kHz are supported). It operates with a small custom remote and can be upgraded to a standard *Dyaxis* (now called *Dyaxis I*).

AMS launched their low-cost AudioFile called *Optica*. It is a 4-channel optical-based system which uses the same control surface and operation as a standard *AudioFile*. It is mainly aimed at preproduction and track laying and can also be used as a background recorder in a video editing suite.

WaveFrame *401* is WaveFrame's very competitively priced 8-channel system. It supports 8 inputs and outputs, digital I/O and two 100 Mb hard disks. A standard 8 into 2 monitor mixer is included and a 10 by 6 mixer with real-time DSP and EQ is optionally available. The system is also compatible with WaveFrame's other products such as the WaveFrame *400* and WaveFrame *1000*.

System developments

In a bid to keep up with the competition, efforts are being made all round to make systems friendlier. More systems are now performing DSP functions in real-time, tactile controllers are becoming more popular and colour is being increasingly used to enhance displays. **AKG**'s *DSE 7000* for example has a new VGA colour monitor with low radiation.

Tactile controllers

These are now being increasingly used to supplement PC-based user interfaces. The most popular third party controllers are **JL Cooper's** *CS-1* and *CS-10*. The *CS-1* is a simple remote with jog wheel, transport controls and a few function keys. The *CS-10* has more controls including faders and was seen at the show being used with **Augan**'s *408 OMX*, **Digidesign's** *ProTools* and **Spectral Synthesis'** *Audio Engine*. **Digigram** showed their *Xtrack* system being controlled by a remote from *Mediatron* and **Studer** have designed their own remote for *Dyaxis Lite*. Custom designed controllers are also being planned for the **Sonic System** and the *PD-464*.

However, manufacturers who already have custom-designed user interfaces are not complacent. The *408 OMX* from **Augan** now provides expanded displays with a flat LCD display, **Lexicon's** *Opus* now has a colour monitor and **AMS** introduced *Spectra*. *Spectra* maintains the same operational structure as the existing control surface but is slimmed down, ▶

generally enhanced layout. It is provided as standard with a 16-channel *AudioFile PLUS* and is optional with an 8-channel *PLUS*.

More optical

Many predict that the optical disc will one day replace hard disk as the primary recording medium and moves in this direction were clearly visible at the show. Systems being demonstrated using optical included the *DD1000*, the *Sonic System*, *Optica*, *Infernal Workstation*, *Direct*, *ADAS* from **Plasmec**, *VAMOS*, *EMT 466*, *Sound Tools*, *DDO.2*, *Audio Solution* and *Digiton*. Unlike some systems which record directly to optical, **Digiton** only takes a 6 s re-initialisation before the disc can be reused, rather than having to carry out an erase pass (or reformat).

Although optical still poses problems for multichannel purposes because of its slower access times, this has not deterred a number of manufacturers using it anyway — each with their unique way of dealing with its limitations. **AMS** limit the number of channels to four with *Optica*. **Publison** introduced their new *Infernal Workstation 1600* — a 16-channel system which also limits the number of channels to four per disc. The system is aimed at post-production and can be controlled directly by a video editor or will perform EDL autoconforming.

AKG's *Direct* records 8 channels per optical by using a buffer of two hard disks per optical drive. **Augan's** 8 channel optical- based *408 OMX* also uses hard disk as a buffer. The system now features 4-track punch-in/out, enhanced displays and background transfer to an optical jukebox.

Mark II versions

Another method of staying ahead of the competition is to offer an enhanced mark *II* version. Adding to existing mark *II* versions such as *AudioFile PLUS* and *SoundStation Sigma* was the *MFX 2* from **Fairlight.** *MFX 2* supports 16 channels from one hard disk by using **Fairlight's** 'turbo' SCSI. The operating system has been enhanced with scrolling waveforms, library search facilities and macro functions. The system also performs EDL autoconforming with additional features using an external IBM *PC* and a third party program called *Shotlister*.

DAR were demonstrating the networking capabilities of *Soundstation Sigma*

Studer have entered the multichannel market with their new *Mac*-based *Dyaxis II*. This will support up to 48 channels and 12 inputs and outputs. A 16-channel system was being demonstrated with real-time crossfades, dynamic envelopes, mixing, 5-band parametric EQ, gain, pan and dithering. Digidesign launched *Sound Tools II*. This is a 2 input, 4 output *Sound Tools* with a *ProTools* audio interface, faster DSP and will support popular software packages such as *Studio Vision* and *Digital Performer*.

Networking

Although most station automation systems can be networked as a matter of course, networking non-compressed multichannel digital audio can be far more problematic. AMS claim to have alleviated the need for networking because *Optica's* discs are removable and interchangeable with *AudioFile PLUS*. Audio can therefore be transferred from one system to another, albeit it manually. However, **DAR** and **Sonic Solutions** have joined **SSL** in offering networking capabilities. DAR demonstrated two *SoundStations* networked using *Ethernet* — allowing transfer between remote systems at around three times faster than real-time. The external machine(s) appears as an online device in the system's library. Audio can be auditioned from the external system while it is in use and up to four channels of cues can be sequenced and replayed from the external machine.

Conclusion

It seems that despite indications that there are already too many tapeless systems on the market to survive, there are still manufacturers who believe that there is room for yet another product. Sony, Yamaha and Tascam, for example, have yet to officially launch their new systems and when they do, the competition will no doubt stiffen further.

However, the increase in competition not only comes from the tapeless market itself, but also from outside. With the introduction of low-cost multichannel tape-based systems such as **Akai's** *A-DAM* and possibly even lower cost systems from **Alesis** and **Teac,** potential purchasers have a daunting choice between extremely low-cost tape and the advantages of random access. For certain applications then, non-destructive editing could easily be sacrificed to number of tracks. Nor is the stereo market immune and may find itself under fire from DAT which offers low-cost media, portability and compatibility.

Therefore, in order for their systems to survive, manufacturers must develop them to the point where they become indispensable. This is being achieved more easily in niche markets, but may in fact be brought on in any case, given time, by the expectations of a new generation of users. ■

The Second Edition of the Tapeless Directory, now with an update sheet, gives information on over 990 systems. Priced at £25 (£28 outside the UK) it is available from Sypha, 216a Gipsy Road, London SE27 9RB. Tel: 081 761 1042.

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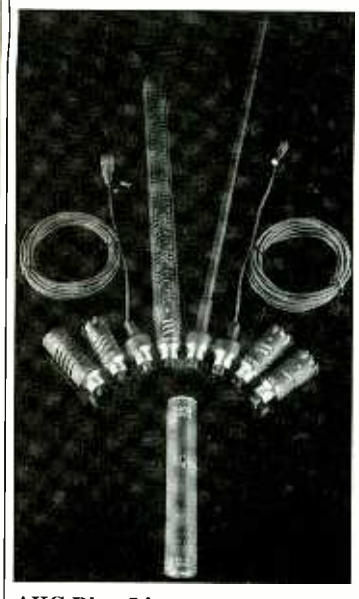


AKG Blue Line

Blue Line

AKG have introduced the Blue Line Series modular microphone system, consisting of one preamplifier and eight different capsules, together with a complete line of accessories.

Main features include rugged but light construction, bayonet fitting for the capsules, low impedance capsule termination and very low noise floor. The design permits the use of an extension cord between capsule and preamplifier and the output stage incorporates a transformerless SMD design that includes a switchable high-pass filter and –10 dB pad.

Other new products from AKG include the *C547BL* hypercardioid boundary microphone and *C647* condenser gooseneck microphone.

AKG mbH, Brunhildengasse 1, 1150 Vienna, Austria.
Tel: +43 222 95 65 17 241.
Fax: +43 222 95 65 17 205.
UK: AKG Acoustics.
Tel: 0483 425702.

ENG Mixers

Audio Developments Ltd., have introduced two new mixers for location recording, the *AD261* and the *AD146*.

The *AD261* stereo ENG mixer features four microphone inputs which can be configured as two stereo link channels or as M-S channels. The mixer features very rugged and compact construction and full monitoring facilities, including an M-S decoder, transformer balanced microphone inputs and line outputs, electronically balanced line inputs, input and output level controls and pan for each channel. Powering is provided by internal C Drycells or NiCads (9) or external 10 to 24 V DC. Total weight is 2.5 kg.

The *AD146* location mixer is available in 6, 8, 10 and 12-channel versions and can be portable, rackmounted or installed in a console. Main features include four group outputs, M-S coding and decoding, a selection of Mic/Line, Mono Line, Stereo Line input modules, limiters that are stereo-linkable on the output groups and comprehensive monitor module. Powering is by 10 internal C Drycells or NiCads or external 10 to 24 V DC.

Audio Developments Ltd.
Hall Lane, Walsall Wood, Walsall, West Midlands, WS9 9AW, UK.
Tel: 0543 375351.
Fax: 0543 361051.

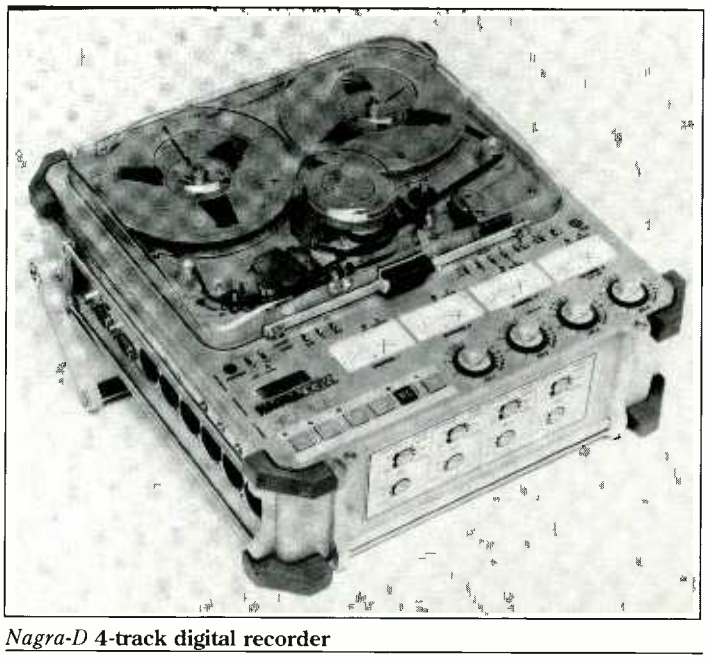
Nagra-D

The *Nagra-D* 4-track digital recorder features open reel technology coupled with a rotary four head configuration.

Designed as a portable machine for location recording, the *Nagra-D* features 2 + 2 channel operation with 24 bits, cue, time code, control tracks and rugged construction. Special attention has been paid to interfacing with the outside world and these include multiple synchronisation possibilities, RS-232/422 serial port, analogue and AES/EBU inputs and outputs.

The machine uses standard ¼in tape as for the DASH and PD formats and is powered by a Betacam battery pack.

Kudelski SA, 1033 Cheseaux, Switzerland.
Tel: +41 21 732 01 01.
Fax: +41 21 731 41 55.



Nagra-D **4-track digital recorder**

New Opcode

Opcode systems have released the version 1.4 of the *Vision* and *Studio Vision* sequencing programs.

New features include real-time editing in MIDI and digital audio, SMPTE locked markers, loop play and record and a redesigned control bar with FAST FORWARD, REWIND, SHUTTLE and LOCATOR buttons.

Opcode Systems Inc., 3641 Haven Drive, Suite A, Menlo Park, CA 94025-1010, USA.
Tel: +1 415 369 8131.
Fax: +1 415 369 1747.
UK: MCMXCIX.
Tel: 081 963 0663.

Otari DTR-90

Otari have introduced the *DTR-90* professional DAT recorder and *CB-149* Editor.

The *DTR-90* has a four-head configuration and selectable sampling rates for recording. An optional time code facility allows for synchronisation to VTRs and other equipment.

One of the most striking facilities is a removable front panel which provides a complete remote control unit for all of the many functions offered by the recorder.

The *CB-149* Editor allows two machines to be controlled for comprehensive editing operations, including independent control of channels 1 and 2 and selectable monitoring of both channels. The editor also conforms completely to the P2 protocol for system expansion with other equipment.

Otari Inc., 4-33-3 Kokuryo-cho, Chofu-shi, Tokyo 182, Japan.
Tel: +81 424 81 86 26.
Fax: +81 424 81 86 33.
US: Otari Corp. 378 Vintage Park Drive, Foster City, CA 94404, USA.
Tel: +1 415 341 5900.
Fax: +1 415 341 7200.
UK: Otari (UK) Ltd. Unit 13, Elder Way, Waterside Drive, Langley, Slough, Berkshire, SL3 6EP.
Tel: 0753 580777
Fax: 0753 542600.

Sonic Solutions

Sonic Solutions have released three new products: the *SonicStation*, the CD Printer and the Sonic A/D and D/A convertor.

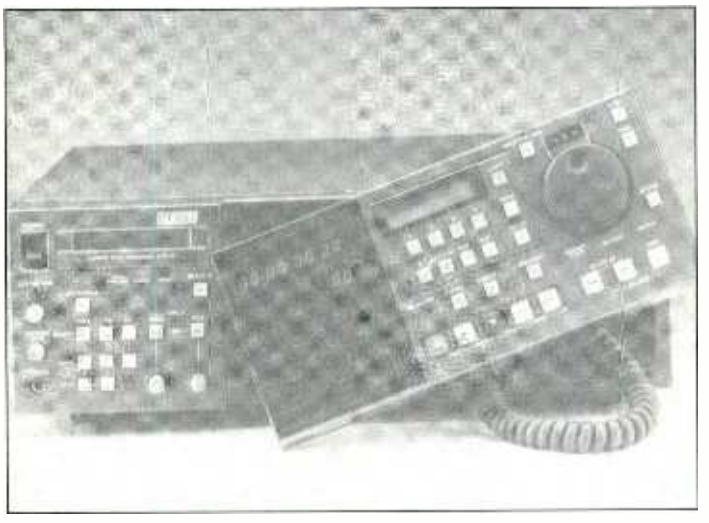
The *SonicStation* is a digital audio workstation with real-time playback of 8 channels (up to 12 with expanded memory) from a single hard disk. Features include mixdown in real-time, non-destructive editing and crossfades, background loading of audio to the hard disks and flexible undo/redo editing.

A wide range of options is available for system expansion.

The CD Printer provides high flexibility for recordable CD's and features double speed writing, precise track start and end times together with a PQ option, 74-minute capability, tapeless mastering with the PreMaster CD which allows direct glass mastering and CD ROM support. With the appropriate software, the CD Printer can write to all CD formats such as CD-ROM XA, CD+G and CDI.

The A/D and D/A convertor is a cost-effective high quality convertor for interfacing analogue equipment to the Sonic System and uses sigma-delta conversion with 64 x oversampling. Inputs and outputs are balanced.

The system operates at ▶



Otari's DTR-90 recorder

44.1 kHz from an internal crystal clock or at 48 kHz with an AES/EBU input/output on optical connectors. Convertors can be synchronised in multichannel systems via sample clock in/outs.

Sonic Solutions, 1891 East San Francisco Blvd. San Rafael, CA 94901, USA.
Tel: +1 415 485 4800.
Fax: +1 415 485 4877.

New Sony

Sony have launched several new products including the *PCM-3324S DASH* multitrack recorder.

Deriving from both the *3348* and new technology, the *3324S* offers digital 24-track recording at a price comparable to up-market analogue multitracks.

The recorder is available with 13 retrofittable hardware options which means that the machine can be optimised for a given situation. These options include two remote controllers (both with DASH chase), confidence monitoring and expanded time code operation.

The *3324S* is both lighter and more compact than its predecessors and features a faster transport speed and the ability to stripe tapes at 4 x speed plus built-in diagnostics for easy alignment and maintenance.

The DPS range of digital effects has been expanded with the *DPS-M7*, which provides a range of modulation and dynamics effects (many in stereo) together with separate stereo 3-band EQ. The unit comes equipped with 100 factory presets and 256 user memory slots.

Overall control to the three DPS processors is now available with the *RM-DPS7* remote control unit, which can handle up to 15 DPS processors via its control wheel and 2 x 40 LCD screen.

The *SMS-3* is a two-way reference monitor for nearfield use and features a 300 mm woofer and 30 mm dome tweeter. Peak power handling is quoted as being in excess of 300 W and the *SMS-3* features an exceptionally fast transient response for the monitoring of digital signals.

Other new releases from Sony include a 20-bit A/D and D/A convertor, the *DAF-4000*, and a retrofittable MADI board for the *3348* and *3324S DASH* multitracks.

Sony Broadcast Ltd. Jays Close, Viables, Basingstoke, Hampshire, RG22 4SB, UK.
Tel: 0256 483366
Fax: 0256 474585.

New Studer

Studer have released a plethora of new products, together with software upgrades for existing equipment, of which the following is a brief overview.

The Studer *927* in-line mixing console is available in three frame sizes up to 56 channels and features much of the technology from the *990* Series console such as stored presets and snapshots for switching functions. Each channel contains 4 mono and 2 stereo outputs, 4-band EQ and 32-track routing.

The *D780* professional DAT recorder features optional rackmounting, 9 definable autolocator addresses plus Last Cue address, auto-cue and a quick-start option for instantaneous play. Other features include balanced inputs/outputs, RS-232 and 422 ports, ES-bus, AES/EBU SPDIF interfaces, microphone inputs with phantom powering and synchronisation to external wordclock.

New monitor loudspeakers from Studer include the *A523* active two-way for situations where a small speaker is desirable and the *A823* which represents an entry into the large monitor speaker arena.

Fully active, the 4-band system features digital processing for the crossover and aligning functions with a total power in excess of a kilowatt for 112 dB SPL. The *A823* will also accept an AES/EBU digital input and the gain can be remotely controlled via DC signals.

The *A816* is quoted as a 'state-of-the-art' ¼in machine for broadcast and features an 'oxide-out' tape transport as specified by German broadcast. Designed for highest quality audio and flexible editing and operational features, the machine is able to operate under any kind of broadcast studio conditions.

On the software front, updates have been released for *Dyaxis I* as *MacMix* Version 4.0 and integrates the system with the *D740* DAT recorde4r. *MacMix* is compatible with *Macintosh* System 7 and Apple *Quadra* computers and special features include unlimited virtual track capacity, time scaling, sampling frequency conversion, various Window functions and 5-band parametric EQ.

The tape deck for the *D820* 48 and 24-track digital recorders has been updated to be much faster in operation and a new software, Version 2.3, has been released. A MADI interface has also been released which allows direct interface of the machines to digital consoles.

Also available under the Studer label are the *Numisys* range of automated broadcast systems and Digitec digichecktal switching and routing systems.

Studer International, Althardstrasse 10, 8105 Regensdorf, Switzerland.
Tel: +41 1 870 75 11.
Fax: +41 1 840 47 37.
UK: Studer UK. Tel: 081 953 3533.

Tascam

Tascam have introduced several new products for broadcast and production studios.

The *CD-601* professional CD player features a frame accurate search dial, auto cueing, rehearsal monitoring, pitch control and optional RAM buffer.

The *RC-601* one-machine control unit is suitable for both the *CD-601* and *701* players and provides the same features as the *RC-701* but with the addition of facilities such as End Check and Cue Return.

Also new from Tascam is the *DA-60* professional DAT recorder featuring confidence monitoring and time code facilities.

Teac Corporation, Musashino Centre Building, 1-19-18 Nakacho, Musashino-shi, Tokyo 180, Japan.
Tel: +81 422 52 5082
UK: Teac UK Ltd., 5 Marlin House, The Croxley Centre, Watford, Herts. Tel: 0923 22 52 35.
US: Teac America Inc., 7733 Telegraph Road, Montebello, CA 90640.
Tel: +1 213 726 0303.

Wadia

The Wadia *WA4000* Reference A/D convertor features 20-bit resolution, UltraAnalog chip set, DC coupled direct audio outputs and multiformat digital outputs.

The *WA4000* finds applications where highest quality A/D conversion is required, such as CD mastering.

Complementing the A/D convertor, is the *WD3200* D/A convertor with multiple digital inputs and 32 x 18 bit resampling.

Wadia Digital, 624 Troy Street, River Falls, WI 54022, USA.
Tel: +1 715 426 5900.
Fax: +1 715 426 5665.

Yamaha

The Yamaha *PC1000* and *PC3000* professional power amplifiers are rated at 100 W and 330 W channel into 8Ω respectively, referenced to a THD of 0.1%. Designed for highest quality monitoring situations, the amplifiers incorporate a 'wealth of innovations in semi-conductor technology and circuit design'.

The amplifiers feature electronically balanced inputs with loop-through and are 1U and 2U respectively.

Yamaha Corporation, PO Box 1, Hamamatsu, Japan.
UK: Yamaha UK.
Tel: 0908 366700.

LIVE SOUND

AGM Digital

The AGM Digital Audio Processing Platform finds applications for decoding Ambisonic signals as well as providing psycho-acoustic effects in multichannel sound systems. The system can be expanded up to 16 channels and integrates with the AGM Surround Sound systems.

The AGM Network provides full remote control of installations where equipment is fitted with the proprietary control cards and also supplies real-time system diagnosis.

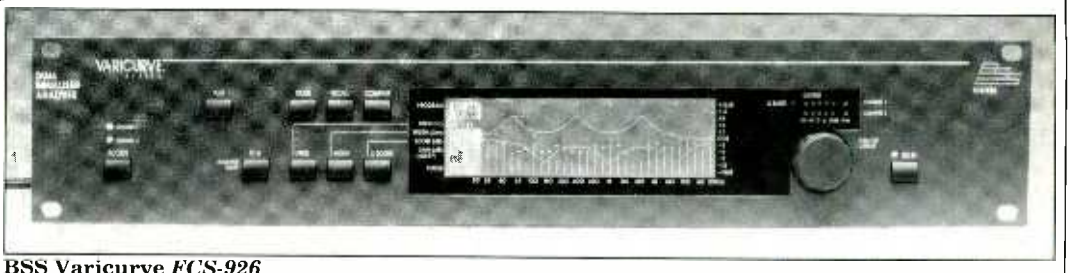
AGM Digital Arts Ltd.
14-16 Deacons Lane, Ely, Cambridgeshire, CB7 4PS, UK.
Tel: 0353 665 588.
Fax: 0353 667 637.

Beyer Mics

Beyerdynamic have introduced the *U700* Series of UHF radio microphones, operating in the 470 to 980 kHz range. Both handheld and beltpack versions are available, together with a selection of microphone capsules for different applications.

Up to 12 diversity receivers can be fitted into a rackmount mainframe and performance is enhanced via the *ZMP700* monitor and the *U9000* convertor, which provides high linearity. Both ground plane and optional directivity antennas are available, together with an in-line antenna booster.

Beyerdynamic, Theresienstrasse 8, Postfach 1320, 7100 Heilbronn, Germany. Tel: +49 7131 6170. Fax: +49 7131 604 59
UK: Beyer. Tel: 0273 479411



BSS Varicurve *FCS-926*

BSS VariCurve

BSS have introduced the *FCS-926* Dual Equaliser Analyser or Varicurve system. The unit features dual channel or stereo operation as a 6-band programmable parametric equaliser with inbuilt RTA or as a mono 12-band parametric equaliser.

Features include 50 user memories with Merge and Comparison functions, automatic room equalisation, selectable Cut and Notch modes and a Peak Fix facility to reduce interaction between adjacent frequency bands.

BSS Audio Ltd, Unit 5, Merlin Centre, Acrewood Way, St. Albans, Herts. AL4 0JY, UK.
Tel: 0727 45242. Fax: 0727 45277.

Turbo amps

The Australian Monitor *ALM2200* tri-amplifier has been specially designed for powering Turbosound *TMS-3* enclosures. However, the 3U amplifier finds applications for all systems where compact 3-channel amplification is required. The *AM2200* is rated at 1320 W/2Ω (Low), 610 W/4Ω (Mid), 330 W/4Ω (High) and features dual speed fans, full protection circuitry, AP8 speaker connectors plus XLR's and detented input attenuators.

Australian Monitor Pty Ltd., 53 College Street, Gladesville 2111, NSW, Australia.
Tel: +61 2 816 3544.
Fax: +61 2 817 3504.
UK: The Sound Department. Tel: 0491 613901.

Community

Community Professional Sound Systems have released four new additions to their range.

The *CSX58M* is a low profile stage monitor with high output and features dual 12in (300 mm) bass speakers, central pattern control horn with 1 in titanium driver and integral P2T super-tweeter. Overall control is provided by the PowerSense crossover. The enclosure is designed for heavy use and features a black carpet finish and touring protection grille.

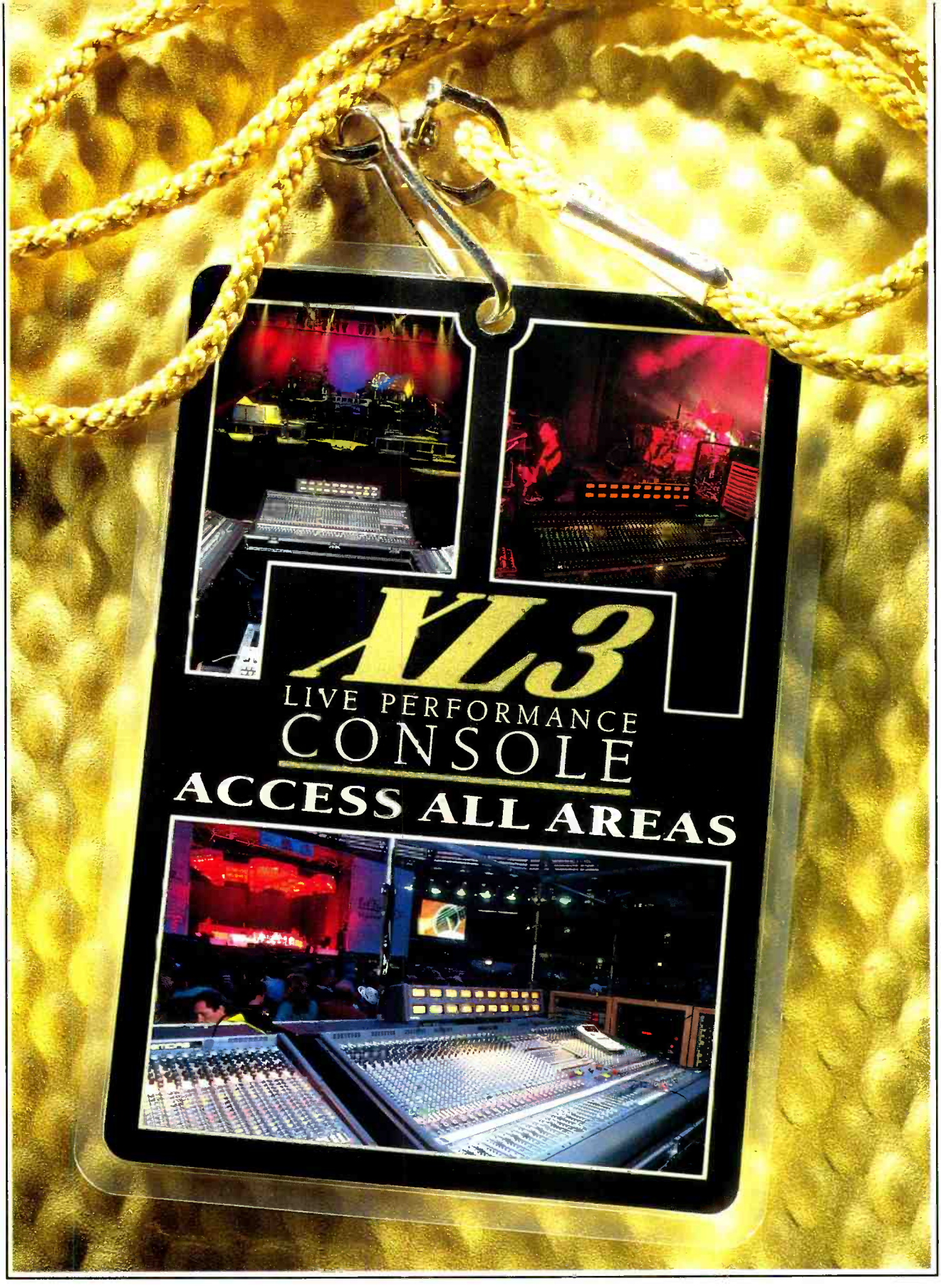
The N-Series *FB* enclosure features a three-way Wavefront Coherent design and is designed for small to medium venues requiring a compact enclosure with powerful bass response. The enclosure is trapezoidal and features black carpet finish and integral rigging points. The system is controlled and protected via the Community FB System Controller and may be bi-amped or operated with its passive crossover.

The RS *Jr.* is a 'miniature' two-way horn-loaded enclosure for vocal arrays, under-balcony fill and situations requiring a small enclosure with quality performance. The system is completed by the *Jr. System Controller.*

The *VBS412* electronically-controlled subwoofer has the same footprint as the *RS880* enclosure and provides powerful sub bass down to 35 Hz. The enclosure features four special 12 in (300 mm) drivers and is tuned for optimum accelerative impact for high definition bass reproduction.

Community Professional Sound Systems, 333 East Fifth Street, Chester, PA 19013, USA.
Tel: +1 215 876 3400.

Community's *VBS412* subwoofer



Around the world's prestigious concert venues, leading sound engineers and PA companies are endorsing the Midas XL3 as their classic live performer.

Already engineers on tours like Dire Straits, Level 42, Status Quo, Rod Stewart and Simply Red have discovered its unique abilities. These engineers including Robert Collins, Kerry Lewis, Mike Warren, Lars Bregaard, Gary Bradshaw and Stephen Flewin all respect the classically pure sound and superb channel EQ of the XL3.

Equally important is its versatility. As accomplished out front as it is on monitors, the XL3 offers features such as 16 discrete sends per channel, routing to any number of 8 VCA masters, two Grand Master VCAs and flexible 8-way mute assign. In fact, it lets you access more areas than ever.

Isn't it time you asked us for a laminate to hear the Midas touch in action?

MIDAS

a **MARK IV** company

DESIGNED FOR A PURE PERFORMANCE

Klark Teknik PLC Klark Industrial Park, Walter Nash Road, Kidderminster, Worcestershire DY11 7HJ, England. Tel: (0562) 741515 Telex: 339821 KLARTK G Fax No: (0562) 745371.
Klark Teknik Electronics 200 Sea Lane, Farmingdale, N.Y. 11735, USA. Tel: (516) 249 3660 Fax No: (516) 420 1863.

CONSOLES

A summary of new consoles introduced over the last year

Harrison MPC

Harrison have launched the *MPC* Motion Picture Console, which has been specifically designed for film post-production mixing.

At present the console is available in what is known as version 1 and this features digital control over analogue audio. Version 2 will allow the system to be changed to digital audio by just installing the necessary circuit cards.

The *MPC* concept divides the console into three main areas — the operator control surface, the audio processing racks and the processing control database. The console can be configured in systems ranging from 16 to 368 input channels and up to three control surfaces.

The console is controlled via a familiar control surface with switches, LED displays, rotary faders in the form of rotary optical shaft encoders and a motorised main channel fader, together with a CRT display with touchscreen for various functions.

A control surface channel may be 1-4 channel and control either inputs or groups. Dedicated controls include selectable line inputs and patch points, 4-band parametric EQ, multimode panning for all film formats, two auxiliary send controls assignable to up to 16 buses, main channel level fader and dynamics section with compressor/gate functions.

The console includes remote faders and these can be assigned to any combination of input channels, optional predub inputs or other remote faders.

A Bus/Tape panel provides full remote machine control and these may operate independently for each section or be linked to other console sections. The MPC provides full dynamic automation for all operating parameters and flexibility for systems design.

Harrison by GLW Incorporated, 437 Atlas Drive, Nashville, TN 37211, USA. Tel: +1 615 331 8800 Fax: +1 615 331 8883

Scenaria, the audio post-production system from SSL

SSL *Scenaria*

Solid State Logic's new audio post-production system, *Scenaria*, incorporates a 38-channel digital mixer with a 24-track random access recorder/player plus *VisionTrack*, a random access video system.

The console has moving faders and time code-based automation of 4-band digital EQ and dynamics and eight aux sends per channel.

The system allows soundtracks to be built up and edited to picture on the 24-track recorder which can then be combined with other audio from external sources and mixed through 38 channels digitally.

Solid State Logic, Begbroke, Oxford, OX5 1RU, UK. Tel: 0865 842300 Fax: 0865 842118. USA: SSL Los Angeles, 6255 Sunset Boulevard, CA 90028. Tel: (213) 463 4444 Fax: (213) 463 6568.

In brief

Capricorn: Neve's all-digital console

● Neve's *Capricorn*, featured last month, is their new all-digital fully assignable console with 48 multitrack mix buses connecting to digital multitrack via MADI. Rumours of the first sales abound but as yet are unconfirmed.

Late last year Neve released a version of their *VR* console known as the *VR Legend* that they described as 'the ultimate in analogue console design'. Features include the use of the Formant Spectrum Equaliser with four overlapping ranges and the use of oxygen-free copper cabling.

Neve Electronics. Tel: 0763 852222

● Amek's *Einstein* was first seen at the NAMM show in January. The desk provides up to 64 automated inputs in a compact frame. Amek *Supertrue* fader and mute automation is accessed via the integral keyboard and trackerball and every input and output is metered.

Amek. Tel: 061-834-6747

● The *Interface* was the first product to come out of the Mark IV Audio 'multi-brand concept'. Jointly developed by DDA & Dynacord and made by Dynacord in Germany — the console is sold under DDA, Dynacord, Altec Lansing and E-V brands. Frame sizes are 8, 16, 24, 32 and 40-channel.

DDA. Tel: 081 570 7161

● Soundcraft's *Europa*, launched at last years APRS show, this live sound desk features a sophisticated VCA system, switchable input channel noise gates, and a fully parametric EQ section.

Soundcraft. Tel: 0707 660482

● Cadac's *Concert* touring console, released last October, has a 'tour-proof' aluminium steel frame and is built to order with as many input modules as the client wants. And since the price you pay for automation is a fixed component in the total cost, larger desks will inevitably offer better cost-per-channel value.

Cadac. Tel: 0582 404202

● The Midas *XL3* console introduced last year is the only desk specifically designed for FOH, monitor and theatre duties. To function effectively in all these areas lots of mixes and outputs are provided. The *XL3* comes in 24, 32, or 40-channel frame sizes. As well as the 8/8 matrix option there is also a 16-channel extender version.

Midas. Tel: 0562 741515

● TAC's *SR6000* offers quite a comprehensive VCA grouping and muting system. On the input modules there's an equaliser that's based on the Amek *M2500* design. Internally TAC has opted for a steel frame with the rigidity necessary to protect its hard bussing system, designed to reduce signal path length and noise.

TAC. Tel: 0602 783 306

● Yamaha's *PM4000* was a direct replacement for the evergreen *3000*. The live desk comes in 24, 32, 40 and 48-input frame sizes and includes a new 4-band fully parametric channel EQ. A 22-mix/52 input *PM4000M* monitor version should be available soon. Also new is the *MC0411* series live sound reinforcement consoles.

Yamaha. Tel: 0908 366700

● Soundcraft's *Vienna* console launched at the AES Vienna exhibition is a replacement for their Series *8000* SR desk. There is new styling and features derived from the *Europa* desk. Also launched at Vienna the *Delta SR* 4-bus console and the *Venue II* with a Venue Theatre module option.

Soundcraft. Tel: 0707 660482

● D&R Electronica of Holland introduced the *Triton*, a 16-bus recording console featuring a 'floating subgroup system'. Also new was the *Orion* a 8-bus desk with a 4-band

variable sweep EQ and the *Axion* SR desk.
D&R Electronica. Tel: 31 2940 18014

● Ramsa have announced a new range of live sound consoles called the *WR-S44* Series. The range includes three units offering 12, 16 and 24 inputs with the largest model being just under 1 m wide.
Ramsa Tel: 0344 853550

● Soundtracs introduced the *Solo* range of consoles designed for PA and recording markets. The *Solo Live*, PA version is a 4-bus split design with the option of 16, 24 or 32 inputs. The *Solo MIDI* is an 8-bus in-line design with the addition of MIDI muting.
Soundtracs. Tel: 081 399 3392

● Neotek have introduced the *Esprit* console system, which is particularly targeted at the broadcast and television production market. Features include claimed superior audio performance, powerful talkback and comms facilities, eight auxiliary buses and multiple mix-feeds, 4-band EQ and a wide variety of options for customising the console to individual requirments.
Neotek Corporation. Tel: +1 312 929 6699

● The *IBIS* series digital mixing console from Harmonia mundi acustica features 8-input channels expandable to 24 and more. Digital mixing buses and auxes are in 24-bit format and outboard digital effect devices operate entirely in the digital domain.
Harmonia Mundi Acustica. Tel: +49 761 04 91506

Ramsa's *WR-S4424* live sound console

Mackie mixers

In the world of home studios, one of the last great success stories was the Mackie *1604* mixer, an extremely low-cost, but nonetheless very high quality 16-input mixer geared at the small tape or MIDI based studio or modest sound reinforcement system. One reliable indicator of how the product has influenced the market was that at the NAMM show in January at least a half-dozen manufacturers were showing their own new home studio consoles, with specs, looks, and prices strikingly similar to Mackie's.

Mackie has not been standing still, however, and have since announced two new products. The 8-bus console series , available in 16, 24, and 32-input versions, includes an independent monitor control on each input, with a FLIP switch that reverses the main and monitor inputs for mixdown, and allows for double the number of active inputs at mixdown.

The switchable 3-band EQ section includes sweep low and mid-range controls, plus an 18 dB/octave 75 Hz 'mud' filter. Like the *1604*, there are six aux returns as well. Stereo in-place soloing is featured.

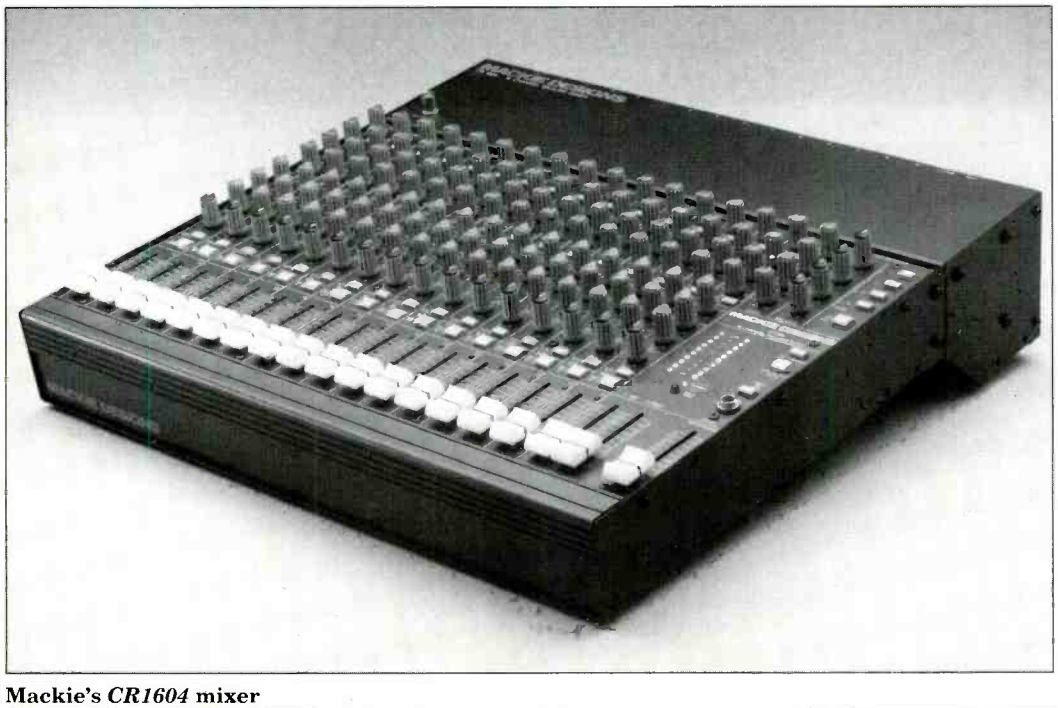
The consoles are designed to deal with a variety of input and output levels. Dynamic range is claimed to be 116 dB and the circuitry is +4 dB throughout. XLR mic inputs and unbalanced (-10) line inputs are provided on each channel, as well as 48 V phantom power, direct outputs and inserts. Separate outputs are provided for main mix, monitor mix, studio, control room, and two different headphone systems. An optional meter bridge will be available.

This all sounds like a fairly conventional mid-line desk until you realise that Mackie could well be asking less than $3000 (£1800) for the 16-input version, $3700 (£2300) for the 24-input model, and $4300 (£2600) for the 32-input model. All prices are to be confirmed and delivery should start in June.

Also on the horizon for Mackie is an automation system for the 1604. An internal VCA controller board can be retrofitted to the mixer, to allow external muting and level control for each input channel, the four aux returns and the main outputs.

The board has MIDI inputs and outputs so it can be addressed by any MIDI device or sequencer. Various control schemes using note, velocity and continuous controller information will be available, which will serve to make the desk equally friendly to users with simple MIDI setups or those with multicable systems. Price should be $700 (£450).

In addition, Mackie plans to release a dedicated hardware box with faders and switches for controlling the automation. It will include memory for 99 snapshots, as well as various preprogrammed effects. And, yes, the new 8-bus consoles will soon have automation probably costing less than $1000 (£650) for 16 channels.
Mackie Designs, 16130 Woodinville-Redmond Rd, Woodinville, WA, USA. Tel +1 206 488 6843.
UK: Key Audio Systems, Unit C, Chelford Court, Robjohns Road, Chelmsford, Essex, CM1 3AG. Tel: 0245 344001



Mackie's *CR1604* mixer

These studios demanded an audio console that sounds as good or better than any in the world. And they broke tradition to get it.

These professionals have a tendency to "go for it"—to put all other considerations aside except the quality and originality of their work. They care little about "the way it's usually done," and even less about who has, or has not, done it before. As a result, they show up a lot at the top of the charts, and on Emmy night, or Oscar night...

Otari Corporation
U S A
(415) 341-5900
Fax: (415) 341-7200

Otari Inc.
Japan
(0424) 81-8626
Fax: (0424) 81-8633

They recognize that in the audio console business, terms like "vintage" and "traditional" are often ad-speak for *old*.

And not only do they demand a console that sounds as good or better than any console in the world, regardless of price, they're also business-smart enough not to mortgage their entire facility to get it.

They buy Otari's Series 54 for music recording, and the Series 54-P for post.

While Otari's name is new to the *console* business, three decades in the *audio* business have taught us that most audio professionals reject the practice by manufacturers of selling new names on old technology, year after year. Instead, they expect fresh, rigorous designs that work, and the best customer support in the business.

They get it from Otari.

If you don't own an Otari console by now, it's time to figure out why.

Call your nearest Otari regional sales office for complete information.

OTARI

Otari Corporation
378 Vintage Park Drive
Foster City, CA 94404
U.S.A.

Otari
(UK) Ltd.
United Kingdom
(0753) 580777
Fax: (0753) 542600

Otari
Deutschland GmbH
Germany
02159 50861-3
Fax: 02159 1778

Otari Singapore
Pte., Ltd.
Singapore
(65) 743-7711
Fax: (65) 743-6430

PRIVILEGE

Patrick Stapley travelled to Paris to see Lafont's film desk in action

Film dubbing to the uninitiated, like myself, is very alien to the familiar world of music recording — strange practices are carried out, like putting the console in the recording area, working in the dark and mixing to five tracks. My introduction to the mysterious art was at Paris Cite Productions where a *Privilege* film console from Lafont Audio Labs has recently been installed.

Lafont is perhaps not a name that everyone is familiar with outside France; the company was started nearly five years ago by Jean-Pierre Lafont who previously set up Optimix in 1983 to market the *Optifile* automation system. Lafont make a range of consoles for multitrack music recording, video post and film. To date they have sold 45 desks, including three *Privilege* consoles, making them one of just a handful of companies to specialise in this field.

The *Privilege* is a split analogue desk that incorporates some digitally assignable master controls as well as shared patchable facilities such as dynamics. As tends to be the case with this type of console the design must be flexible enough to accommodate customisation — for example a one or three operator console. The *Privilege* has been constructed with this kind of versatility in mind and has a modular design, although not to the same degree as Solid State Logic's *5000* Series where the channels themselves are sectionalised into discrete modules. It is inevitable that comparisons should be made with the *5000* as it's considered by many to be the 'Rolls Royce' of film desks; this being said the *Privilege* stands up well and although less sophisticated in some respects it matches it in others. One significant difference though is cost — the Lafont console is considerably cheaper.

Input Module

The input module is arranged rather differently to a conventional music console — aux sends are positioned at the top, line input controls in the centre, and EQ quite near the bottom. The reason for this is simply that the more regularly used controls are sited closer to the operator. Another surprise is that there are no mic amps on the channel; instead patchable mic amp modules are supplied in the centre of the console. Unlike multitrack music recording, film dubbing requires few mics and at Paris Cite Productions they use just three — close, ambient and distant. These are used either individually or as a blend to recreate the correct spatial effect. The Paris facility tend to 'mix as they go' adding reverb where necessary and making level adjustments directly to tape — they also prefer to make adjustments from the mic amps rather than using the channel faders.

Each channel is equipped with two selectable line inputs. These balanced inputs feed separate Phase Reversal switches and detented Trim controls providing ±10dB of gain. This arrangement allows quick selection between two machines for mixing. The equaliser is 4-band parametric with stepped gain controls designed specifically to allow the operator to feel what he's doing in the dark. Although the steps are 3 dB the control is still variable between steps permitting smooth continuous gain changes. The HF (800 Hz–18 kHz) and LF (35 Hz–700 Hz) sections are switchable Peak/Shelf with a fixed Q, and the HMF (400 Hz–7 kHz) and LMF (100 Hz–2.2 kHz) sections are Peak only with continuously variable Q (0.6–3.00). All Boost/Cut is ±16 dB. Positioned in the centre of the EQ section are IN/OUT and PRE/POST buttons for the Insert — both buttons have LEDs.

Directly above the equaliser, and switched in separately to it, are high and low-pass filters operating at 12 dB/Octave. The high-pass filter has been designed with voice treatment in mind and to eliminate infra-low disturbances.

The pan section is situated below the EQ. It's comprised of three different pan pots — Stereo, Front/Surround, and LCR — which can be switched in individually or used together to suit the film format. Depending on master Track Format switching the Stereo Pan will either function as a conventional left/right (front) pan, or it will act as a left/right surround pan — the mode is indicated by LEDs. A Divergence control is also provided that adjusts the depth of separation between channels from maximum to mono.

The console has 12 auxiliary buses arranged in

six groups. The first four are mono sends, above which are two stereo pairs with pan pots that can be switched between stereo buses — that is the first pair either feeds buses 5 and 6, or 7 and 8. Each of these six groups has On/Off and Pre/Post switching.

At the base of the module are MUTE and SOLO buttons. There are two global solo modes, AFL and SIP, which are indicated locally, and a SAFE button prevents the channel muting in response to SIP. Indicators are provided to show the presence of signal and to warn of overload (measured at three points in the module) — both functions are user presettable. Also situated at the bottom of the module is the SET button that is used for channel routing.

Routing is an assignable function and the SET button is responsible for selecting the channel to a master routing module in the centre of the console. This routing matrix is divided into three 8-track groups designated A B C, which can be assigned to Music, Dialogue and Effects. According to the Master Track Format selected, these 8-track groups will behave in different ways: in Mono format outputs 1 to 8 are mono; in Stereo odd and even outputs feed Left and Right; in LCRS outputs 1 and 5 feed Left, 2 and 6 feed Centre, 3 and 7 feed Right, and 4 and 8 feed Surround; and in Multichannel Format outputs 1 to 6 feed Left, Centre, Right, Centre Surround, Left Surround, and Right Surround respectively — outputs 7 and 8 are not used.

Routing can be applied on a channel by channel basis or globally, in addition all routing selections may be globally cleared down from this panel — Set All and Clear All functions are protected by UNLOCK switches. The A B C routing selection is permanently displayed at the top of each input module by a grid (3 x 8) of LEDs, and each group is distinguished by different colours (A-Red, B-Green, and C-Yellow).

In addition to the A B C matrix, which has been designed more with sprocketed tape machines in mind, there is also an optional master routing module for multitrack machines, which is accessed from the output module.

Output module

The standard console contains 12 dual output modules, but more can be added to provide for 32 or 48-track operation. The module is divided into two identical sections each dealing with group and monitor functions.

The group section provides a ±10 dB Trim to the output, contains an INSERT key similar to the one on the input module, and includes a TONE button that routes the console's oscillator directly to the individual group output. The module also houses a grid of 24 LEDs (4 x 6) and one of these will be lit to identify the group number; each grid display follows the colour coding associated with the A B C groups — so the first eight are red, the next eight yellow and so on — this provides a clear correlation between channel and group sections. If the secondary routing option is fitted, the groups can be sub-routed to different outputs allowing the user to reorganise track assignment between sprocketed machines and multitrack. The facility will override the normalised routing that follows A B C selection — that is A1-8 parallels to tracks 1-8, B1-8 to tracks 9-16, and C1-8 to tracks 17-24. This secondary routing function works in the same kind of way as the A B C routing in that a local SET button assigns the channel to a master matrix from where assignment is made to tracks 1 to 24. The local SUB-ROUTING button then activates the displayed secondary routing disconnecting the normalised path.

The monitor section has a short throw fader (60 mm) which only comes into play when the UNCALIBRATE key is activated — normally the level will be fixed at 0 dB to +4 dBM and the fader will remain down. The idea here is to calibrate the monitor output of the desk to an SPL of 85 dB, thus recreating the listening conditions of a cinema. Speaker assignment is from a central module that routes to eight destinations — Left, ½ Left, Centre, ½ Right, Right, Left Surround, Centre Surround, and Right Surround — configurations can be set globally or individually using the monitor SET key for access.

Bus/Film(Tape) switching is carried out either locally or via a group function — each monitor has four selector keys D (Dialogue), M (Music), F (Foley/Effects) and A (Ambience), by selecting one of these categories on each monitor, the monitoring can be organised into four centrally controlled groups. The Master Monitor Bus Select module allows these groups to be individually or globally switched between Bus, Film or Cut. This provides a very convenient and quick method of itemised monitoring — for example to monitor just dialogue or just music and effects, as well as allowing specific line-in/out selection and comparison. The facility also includes a FREEZE button for each group permitting status to remain unaffected by switching, and a BOUNCE button that reverses On/Cut selection. Cut switching is mirrored by the individual monitor mute lamps at the Output Module. This DMFA group function is a unique feature of the console and carries a patent.

Two foldback sends provide headphone monitoring for the engineers; they are normally muted until an associated Record Ready selection has been made from the Machine Control Module. Each send has independent level control and Bus/Film switching which will override the current selection. The monitor section also includes a prominent MUTE button and has a separate SIP/Safe circuit to the input module.

Master section

Some of the master control functions such as routing and monitor bus selection have already been discussed. Also centrally placed is the Monitor Format Module which contains individual MUTE buttons for the eight speaker outputs, plus MUTE ALL and AUTO MUTE which cuts the speakers during rewind or when entering record mode. The nominal listening level as mentioned is set to 85 dB, this can be overridden either by pressing an UNCAL button which puts the monitor level control into circuit (±10 dB), or by selecting the 88 button which elevates the level by 3 dB to accommodate the 2-track Dolby *SR* matrix. To calibrate the monitors (which should be done on a regular basis), pink noise is sent to the speaker outputs at reference level by pressing an SPL button — used in conjunction with the individual speaker mutes, each monitor can be accurately set up with the aid of suitable measuring equipment. An Academy ▶

Filter inserts filtering to mimic the frequency response associated with optical tracks, and a Noise Filter adds low level filtered noise to simulate the acoustic effect of cinema ambient noise on the recorded program. Also on this panel is an internally adjustable DIM key.

Other centrally placed modules include the Auxiliary Masters which incorporate ON, SOLO and TONE keys; Foldback Masters with individual On/Off and stereo switching; Machine Control with transport and Record/Sync switching; Talkback to four selectable destinations including Slate, and Listen mic level (a Listen speaker is built-in below the master meters); and a six-frequency oscillator with pink noise.

The console includes patchable dynamics modules which are divided into two sections containing an Expander/Gate and Compressor/Limiter/De-esser. Each function has a separate IN/OUT key and each section is supplied with a nine-LED gain reduction indicator. The Expander/Gate features an Hysteresis control, and both sections have Auto-Release options. A LINK key is provided for ganging sidechains between modules — control being taken from the leftmost module. Another patchable module is the Telephone Simulator which contains high and low-pass filters (18 dB octave), variable distortion, and separately filtered noise — it can be switched in and out by the console's automation system. The mic amplifiers mentioned earlier provide up to 75 dB of gain, have a 20 dB pad, 48 V phantom power, and indicators for both clip and output level (-30 to +10 dB) — phase reversal is catered for at the line input stage on the Input Module.

Space is left in the middle of the console for automation, traditionally film consoles are fitted with a moving fader system. Lafont currently recommend either *Flying Faders* or Uptown — but watch this space!

Metering

The standard metering comprises 24 Bus/Film and 12 auxiliary mechanical VU meters, 4 horizontal bargraph and 4 mechanical LCRS master meters, and a phase meter. The output and auxiliary meters can be optionally supplied as bargraphs, in which case they become switchable PPM/VU. The master meters may be extended to deal with additional discrete outputs, that is five-track mixes.

The Future

Lafont are continuing to develop the console and new features such as a joystick panning module are to be made available shortly. At the time of writing, the company had just received a further three orders, including one from the film section of the French army! Interest is also beginning to be shown further afield, in particular from North America where Lafont have exhibited for the first time at NAB in Las Vegas — it will be very interesting to see how a low cost, dedicated film desk is received. With this and other consoles, the future looks busy for Lafont, and the company should start gaining greater recognition on the international market.

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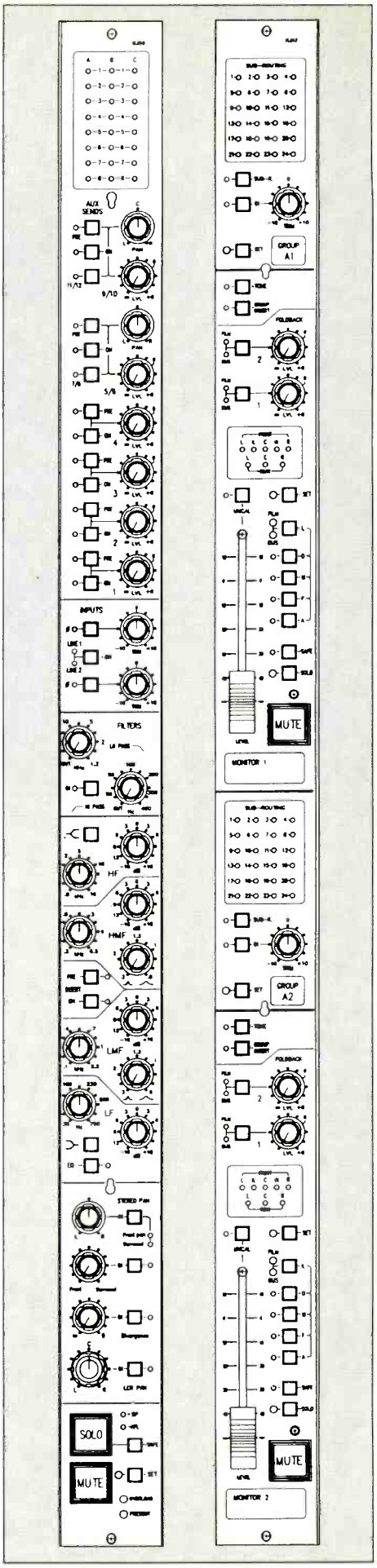
UK: The Home Service, 178 High Street, Teddington, Middx TW11 8HU. Tel: 081-943 4949.



Left: Input Module. Right: Output Module

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SPROCKET IN THE POCKET

London film post-production company Twickenham Sound Station has opted for DAT and DAR in place of analogue technology. Simon Croft reports

Fostex PD2 DAT recorder

Digital pioneers like George Lucas apart, the sound side of the film industry is largely conservative. So when Twickenham Sound Station was formed recently as an island of digital in the otherwise analogue Twickenham Film Studios, it perhaps signalled the beginning of the end for analogue location recorders and sprocketed mag film.

Supporters of the existing technology may point out that Twickenham Sound Station is an independent entity occupying a single cutting room in a complex of 42 tradionally configured rooms but Sound Station has just completed its first all digital production using the Fostex *PD2* location DAT recorder and the DAR *Soundstation II* with *WordFit* dialogue replacement, suggesting that this is just the beginning.

Gerry Humphreys, a director of both companies, has no doubt that it is 'the way the whole industry is going'. Twickenham may be ahead of the trend as far as the UK is concerned but other facilities are moving in the same direction.

His son, Dean Humphreys, is a rerecording mixer and a director of Twickenham Sound Station. He agrees that 'digital is the buzz word' among film producers.

'In a music recording, a lead vocal has probably gone through no more than three generations by the time it ends up on CD. In the film industry, from the original location recording, through mixes and the final dub, the sound may have gone through eight generations. The need for digital is therefore even greater in the film industry.'

Until the advent of Dolby Stereo, cinemas produced a very limited bandwidth, thanks to the Academy Curve, which rolled off the high end and took most of the extraneous noise with it.

Dolby Stereo greatly increased the quality of sound replay in the cinema, with a commensurate impact on production values. Now, the Dolby *SR-D* digital standard promises CD quality cinema.

The system should appear in cinemas later this year. In July, Humphreys starts dubbing *Charlie,* a film on the life of Charlie Chaplin, produced and directed by Richard Attenborough. They are hoping that SR-D will be available. Once the final link is digital, 'the sky's the limit'.

But until then, Twickenham is doing its bit for technology with Wild West, believed to be the first film in the UK to be digital up to the final dub. It is produced by Eric Fellner for Initial Film & Television and will be released in the Autumn.

The digital chain starts with Chris Munro, a location sound man and the third director of Twickenham Sound Station. He made an early commitment to DAT although he says he is 'still using the Nagra as a back up'.

The European miniseries *The Strauss Dynasty,* directed by Marvin Chompsky for a consortium of major television stations, provided the initial motivation for the move. 'The music was digitally recorded and I didn't want to degrade the music when the dialogue and effects were mixed so it was necessary to shoot on DAT,' he recalls.

He again used analogue and DAT in tandem for the film *Robin Hood Prince of Thieves,* using the Nagra for the cutting copy and sending the DAT to the US where it was transferred for the soundtrack.

Just before Christmas, he started work on *Wild West* using DAT on location, combined with digitally mastered music and post-production on the DAR, 'The first film in this country to go digital from start to finish.'

He has just bought the Fostex *PD2* location DAT recorder, although he also owns a *D20.* He was a beta tester for the *PD2,* which led to some changes in the software before the machine was released commercially. The *PD2* costs around £7,000 (around $11,900) and Munro insists that the difference in quality is 'definitely' evident from the first generation recording onwards.

He says that in comparison, the analogue recording 'sounds awful' due to 'noise and limited dynamic range: even radio mics sound better on DAT'.

Because Munro has been running analogue and digital in tandem, he has noticed several differences, some of which are not expected or even explicable.

'DAT picks up less camera noise in some situations, even when the machine is recording from the same microphone in the same situation. I have no explanation for it but other people have noticed it as well.'

It is not a good idea to overload digital recordings but Munro finds he actually has more room to manoeuvre, as the absence of noise allows a lower average recording level. Limiters in the mixer provide the fail-safe. Munro has also discovered that DAT gives more flexibility at the post-production stage.

There is a scene in the film *Ghengis Kahn* where a man is shouting and a boy is talking very quietly. 'In the theatre at Twickenham, on the analogue recording the boy was down with the hiss but with the digital you could pick him out.'

There is a myth that there is something peculiar about the sync on DAT recorders. Munro says he has no sync problems and points out that DAT is inherently synchronous by virtue of the digital process. However, he has a plausible explanation for the origin of any sync problems.

If you transfer from a Nagra to a 35 mm mag recorder and there is any fluctuation in the mains supply, both machines will be affected, he reasons. But the play speed of DAT is 'carved in stone', so it will not mirror any deviation in the running speed of the mag recorder. The answer says Munro is 'good housekeeping', as 'a lot of people have ignored house sync' in the past.

Twickenham has borrowed a trick from the sound for video business and can autoconform audio, using the edit points of the picture. In video, this is a matter of converting the video editor's electronic Edit Decision List into something similar that the audio system can read. With help

from DAR, Twickenham adapted the technique by recording timecode on the original 35 mm or 16 mm magnetic transfers. The discontinuities created by the picture editor on the work print gives the *SoundStation II* all the information it needs to autoconform.

Once the location audio is in the DAR, the sound editor can begin work. This is the point at which conventional working practice goes out of the window, along with shelves stacked with cans containing thousands of feet of magnetic film.

Dean Humphreys points out that this magnetic stock is costly and the conventional system cumbersome because the location material is put onto magnetic film in the transfer bay. If for some reason the editor needs a take that was not transferred, he has to go down to the bay and ask for it. With DAT and DAR, all the original material is in the same room and can be transferred on demand.

Similarly, vast numbers of sound effects can be stored on optical WORM, or loaded in from regular CD, as required. Alternative effects, such as a choice of gunshots, can be loaded and tried on for size.

Dean says the decision to opt specifically for the DAR 'certainly wasn't cost!' as there are cheaper alternatives but 'we felt that to move from present day 35 mm to digital techniques, the DAR was the most easily understood. We did two years of extensive research and the large majority of sound editors said they felt DAR's approach was the easiest to understand. It's all very well us hurling a load of specifications at sound editors but in the end, they are the ones who will physically use the machine.'

The conventional technique of interspersing sections of magnetic film with blank sections of the correct length and then running a number of reels in parallel, locked in mechanical sync by the sprockets, has been going strong for about 70 years. The reaction of editors to a new system is very important because they will have to train on the new technology.

'The sound engineer who is working on the *SoundStation* now has never in his entire life had anything to do with digital or computers. For the first two weeks we had to sedate him! But we have a *SoundStation* expert up there to hold his hand.'

After working with physical strips of film, there is an initial psychological hurdle for operators and Dean Humphreys says the most common response is, 'I don't know anything about computers'. But apparently the technophobia disappears fairly fast, an analogous relationship with the traditional process.

And there are things the *SoundStation* can do that are difficult with conventional techniques, like dialogue replacement. The *SoundStation WordFit* uses the original dialogue and a kind of template, stretching the new dialogue to fit the original pattern.

Before, the only corrective measure was to advance or retard sections of the soundtrack and dialogue replacement was a lengthy process of take and retake. Although *WordFit* has not been promoted on this basis, it has even been used to fit French dialogue over an English speaking soundtrack.

Once all the parts have been loaded into *SoundStation*, there are two possible ways to proceed to the final soundtrack. Either the DAR can physically be taken into the dubbing theatre, or each track on the *SoundStation* can be transferred onto 35 mm magnetic and dubbed conventionally. The latter option may seem a regrettable lapse into the analogue domain but it is the preferred technique because the *SoundStation* will not play backwards, as Gerry Humphries explains.

'When you are doing your premixes you may notice that something is too loud, or too bassy. On the way back, you can find a level or 85% EQ it, even though the dialogue is running backwards. So on the way forward, you are most of the way there. If you weren't able to listen going backwards it would almost double your premixing time.'

An alternative would be to go to multitrack tape but digital tape will not play backwards either and analogue has the problem that it is far more difficult to advance one track with respect to the others, should this be necessary. However, the quality loss going to a single generation of analogue mag film is not great, particularly if Dolby SR is used.

In theory, you could mix using the mag stock and then autoconform the digital version with the help of a dynamically automated desk but in reality this would be 'endlessly time consuming', which defeats the object of the exercise. It is probably a mistake to imagine that a more efficient working method will lead to reduced post-production times. The increased quality offered by Dolby SR-D and the greater flexibility of digital dubbing, is likely to mean more layers added to the soundtrack.

Gerry Humphries observes, 'If you give any director an option, he will use it. So I don't see this speeding up the process in any way. But the quality is infinitely superior to anything we have been able to do so far. ■

Location sound man, Chris Munro.

ENERGISE!

The world of corporate presentations is harnessing increasingly sophisticated audio techniques. Simon Croft investigates

In a bid to convince the British public that it offers a safe form of energy, national supplier Nuclear Electric staged a highly sophisticated audiovisual display at the recent Ideal Home Exhibition in London.

An 'audiovisual wall' combined dancing vacuum cleaners and coffee jugs with fast-cut sound effects, television monitors and an electric train. Even a set of traffic lights and a dbx RTA1 analyser with colour display got in on the act.

Behind the scenes, a computerised system supplied by Orbital Acoustic Ltd ran the sequence in continuous 39 second cycles.

The heart of the audio system was a UK made Out Board Electronics *SS1* automation unit, more often associated with top end theatrical productions such as *Miss Saigon*.

Fitted with motorised faders and an automated routing matrix, the *SS1* allowed complex pans, routing changes and level controls to be set up on site and then repeated approximately 20,000 times without hitch.

Orbital was contracted to design and supply the sound system by Pile Probert Kelly, the agency which won the overall design contract from Nuclear Electric.

Orbital director Chris Headlam-Morley said the sound budget was already fixed by the time the company was involved. This could have been problematic as he realised the complexity of the system dictated 'some form of automation on site'. There were too many variables to allow a pre-mix in the studio.

Fortunately, Out Board rented out the *SS1*, making the budget manageable. It was used to execute 12 fader cues and three rerouting cues to the multiple speaker system.

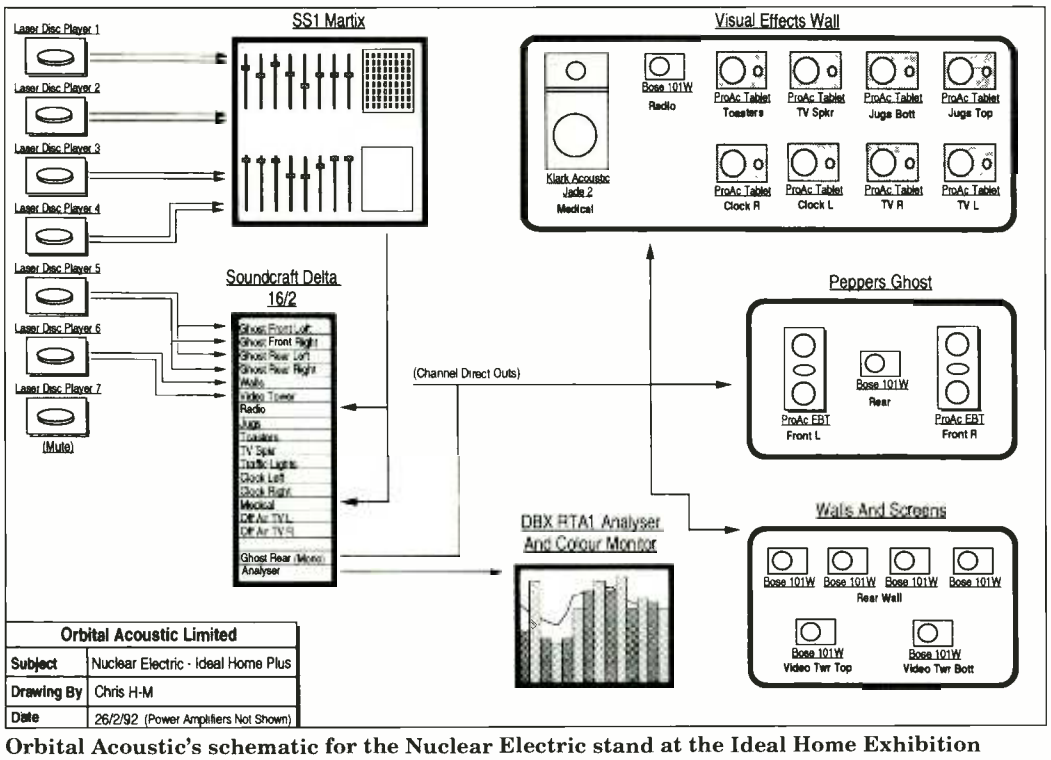
'Where the *SS1* scores is that it is a physical box and easy to program,' said Headlam-Morley. A mouse-based system would have required 'a lot more time'.

The audio and video sources came from Laser Discs prepared by Brian Creighton Video. Six players were used in the system, with one back up. Four of the players were used on the wall itself, while the other two fed other parts of the stand.

These were controlled by a PC-based Electrosonic program which also sent MIDI commands to the *SS1* and the hydraulics used to move the domestic objects in the display. Also cued from the Electrosonic were the lights, this time via RS232.

A Soundcraft *16/2 Delta* was fed from the eight matrix outputs of the Out Board unit. Given that the levels were already under control, the Soundcraft was used mainly as an economical source of multichannel equalisation, with direct outputs feeding the different speakers channels.

The exceptions to this were the *RTA1* analyser — which was fed from the right *Delta* programme output creating a mix that produced the most interesting visual results — and a clever audio visual system called a Pepper's Ghost. ▶



Orbital Acoustic's schematic for the Nuclear Electric stand at the Ideal Home Exhibition

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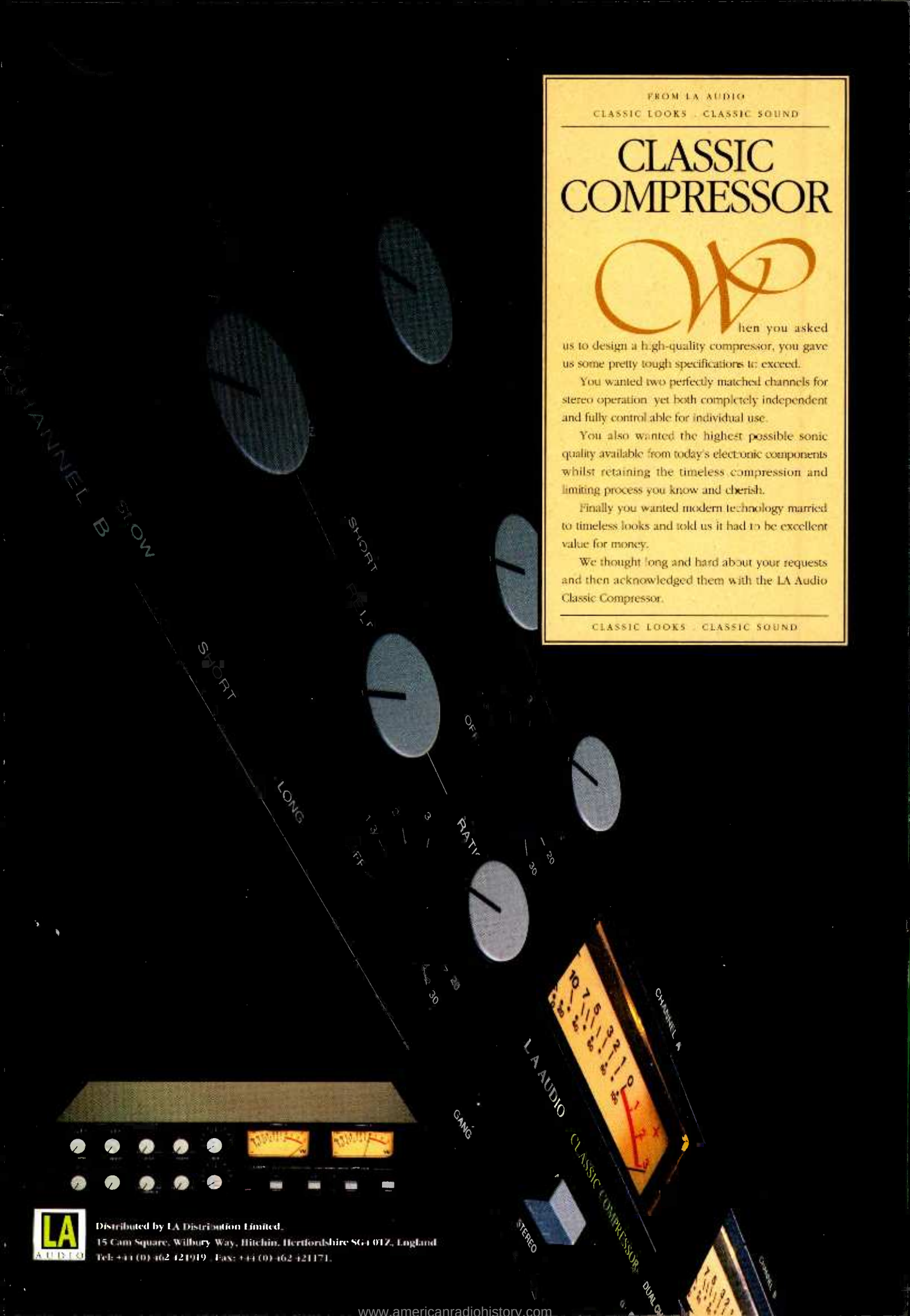

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This uses a two-way mirror to allow video images to be superimposed on a physical model. The depth of this effect was matched by the speaker system, which had left and right channels fed from direct outs of the *Delta* and a mono centre speaker fed from the remaining programme out.

Amcron *Microtech* amplifiers were used, powering in the main ProAc *Tablet* speakers. These are a compact two-way design of high performance. On the wall, these were supplemented by a Klark Acoustic *Jade 2* handling a heartbeat used to illustrate a medical theme.

Left and Right on the Pepper's Ghost were handled by ProAc *EBTs*, 'extraordinary' units that use two 4 in bass drivers and a soft dome tweeter. A Bose *101w* was chosen for the centre speaker and this unit was chosen again for the six units powering a wall at the rear of the stand.

On larger productions, such as car launches, Orbital will use a 16-track tape machine to allow some 'pretty hairy sequences'. But the growing presentations market is not necessarily easy pickings for live sound companies in other areas.

Headlam-Morley pointed out that little of the equipment used for concert reinforcement was applicable to the corporate sector. The nature of the work was also highly demanding.

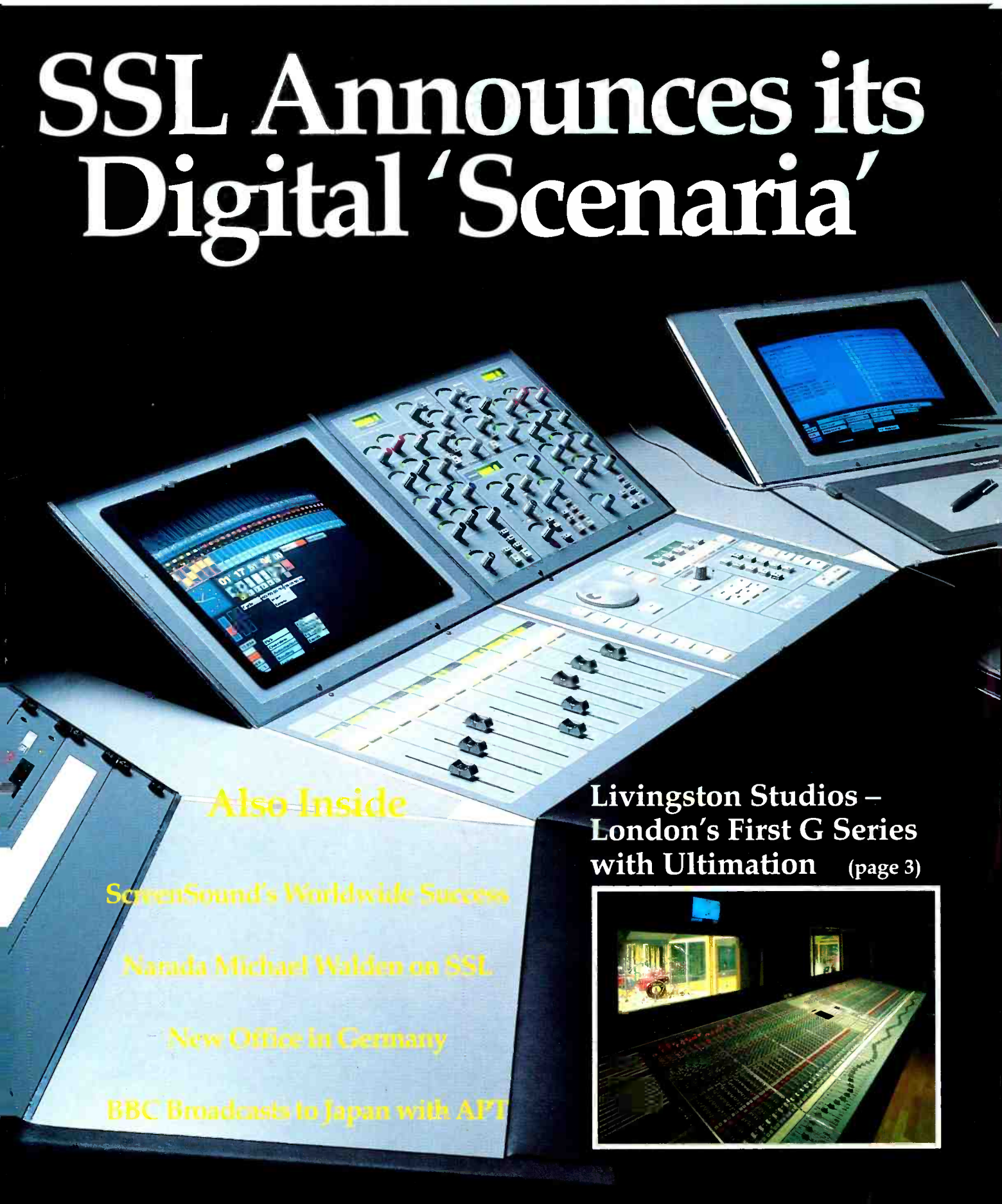
'In West End theatre, you probably have two weeks of sound practice followed by 10 days of previews.' Orbital is more likely to get a run through the day before. 'And if you don't get it right on the day, you won't be asked again.' ■

Behind the scenes. Laser disc players under electrosonic control

Spring '92

Solid State Logic

SSL Announces its Digital 'Scenaria'



Also Inside

'Scenaria' – New Digital Post-Production Mixer

A major new digital audio post-production system has been added to SSL's growing range of digital products.

Called Scenaria, the system comprises a remarkable array of advanced features, including:

- **38-channel fully automated digital mixing console**
- **Integral 24-track random access recorder/player**
- **Integrated multitrack editor**
- **VisionTrack™ random access video storage system**
- **Computer controlled audio routing**
- **Multiple machine control**

Scenaria – Large scale digital audio recording, editing and processing to picture

Scenaria allows soundtracks to be built up and edited to picture on its integral 24-track random access recorder/player. These audio tracks can then be combined with others from external sources, such as analogue or digital tape machines, and played back together through the Scenaria 38-channel digital mixing console for final sweetening.

The console provides both audio clip and timecode-based dynamic automation of all parameters. These include a moving fader system, 4-band digital EQ and dynamics, 8 aux sends per channel, and comprehensive project management capabilities, including centralised project set-up and save capabilities.

Scenaria allows recording, editing, signal processing and mixing to be carried out entirely in the digital domain. Complex multi-channel audio from a variety of sources can speedily be mixed to picture. Instant Locate™ and replay is possible from any point, with level, EQ, dynamics and pan information stored for each audio clip.

Mix revisions and amendments (including track slipping and editing) can be carried out easily and rapidly from the Scenaria console, while high-resolution, full-colour screen graphics provide a detailed insight into the progress of the project.

In addition to its own comprehensive facilities, the Scenaria system provides central control of multiple VTRs and ATRs, through Sony 9-pin, VPR3 and Laserdisc serial protocols.

Scenaria is also fully compatible with ScreenSound and SoundNet, enabling a variety of multi-user configurations and expansion possibilities. Projects can move from ScreenSound to the console for final editing, mixing and processing, with existing gain and pan automation data automatically transferred with the audio.

With the inclusive VisionTrack™ random access video system, Scenaria also provides simultaneous insert editing of audio and video. VisionCue™ graphic displays provide an insight into past and forthcoming picture events, and enable Instant Locate™ of both audio and video to scene changes.

Studios Go 'Beyond Stereo' with SL 8000 G Series

London's renowned Air Studios has ordered one of the first SL 8000 Multi-Format Systems. The console, which is an 80-channel frame with 72 modules fitted, also has Ultimation. It is to be installed in Air's new Lyndhurst Hall facility due to open later this year.

The advantages of the SL 8000 have also quickly been appreciated in Japan, where a number of organisations have placed orders for the Multi-Format system for use in HDTV projects.

The SL 8000 can work in all current audio formats, enabling a single studio to handle an increased range of audio projects, from stereo music recording and mixing, through stereo surround sound mixing, to multi-channel discrete mixes for cinema digital soundtracks.

A versatile output bus structure makes the SL 8000 extremely flexible. The master mix bus can be 2-channel or 4-channel (Left, Centre, Right and Surround) stereo. 2-channel or 4-channel panning modes are selected centrally, and the console has an additional four stereo mix busses.

◀ *SL 8000 Multi-Format Production System*

Separate music, dialogue, effects and audience/Foley mixes, plus a stereo or 4-channel surround sound mix, can be created. A variety of mix and mix-minus feeds are also possible for live broadcast work.

The SL 8000 is particularly suitable for use in, TV post-production with up to 4 stereo stripes; Dolby™ Surround Sound TV production; Film post-production – from 4-stripe LCRS to multiple DMEF dubs; and 5/6-channel discrete mixes for HDTV and Dolby SR.D or Kodak™ CDS multi-channel digital film sound formats.

Livingston Installs London's Largest G Series – and First with Ultimation Moving Fader System

London's Livingston Studios, one of Britain's most prestigious recording studios, has installed the first Ultimation-equipped SL 4000 G Series console in the capital.

The 72-channel console, which is fitted with PPM meters and Total Recall™ in addition to the Ultimation automation system, is part of a major facilities upgrade in Livingston's Studio 4.

Livingston owner, Jerry Boys, says: "I'm sure that we will see the end of the recession in 1992 and now is the right time for us to invest in the future. There is a definite market opportunity for a 72-channel, Ultimation-fitted desk in London. It's an absence which has driven some clients to America to do their mixing. We needed a new console which would fill that gap, and help reinforce the image of Livingston as a world-class studio."

"We looked at a number of different consoles," says Boys, "But the natural decision for us was a new G Series. Most of the world's leading recording artists and producers prefer SSL. It's the market leader. Also the new Ultimation system is fantastic! They really have combined the best of moving faders with their conventional automation system. There was simply no contest!"

In addition to the new console, Livingston is also updating the rest of the studio's facilities with a wide range of new outboard gear, including the latest in MIDI equipment. Everything is designed to emphasise Jerry Boys' description of Livingston as: "London's first modern music studio designed to meet the recording needs of the '90s."

▲ *Jerry Boys and Livingston's new 72-channel SL 4000 G Series console, fitted with the Ultimation dual automation system*

Teaching The Benefits of SL 4000 G Series

Training centres for the recording and broadcast industries in Europe and America have been installing SL 4000 G Series consoles in their new instruction facilities.

The Radio and Television Training Centre of the Finnish Broadcasting Company (FBC), in Helsinki, is where a 40-channel G Series console now takes pride of place in a new television training studio, which will also be used for broadcast purposes.

▲ *SL 4000 G Series console at Middle Tennessee State University mass communications complex*

Project Engineer at FBC, Olli Sipila, says they decided on an in-line console because of: "Our requirement for training in music recording as well as broadcasting. After looking at other consoles, we decided on the SL 4000 because we found it the best for specification, and performance."

Middle Tennessee State University (MTSU) has also installed an SL 4000 G Series console in a new mass communications complex, housing the Department of Recording Industry Management. The control room of the studio that houses the SSL console is equipped with closed-circuit video cameras, enabling students in the adjacent lecture room to follow the instructor's actions at the console in close-up.

"We chose the SSL because, as so many of the finest studios have SSL consoles, it's a logical choice for teaching engineers of the future," says Chris Haseleu, Studio Manager of MTSU's Department of Recording Industry Management.

Two Ultimation Systems for Mega

▶ *This SL 4000 G Series console at Mega Studios, Paris, is one of two SL 4000 consoles with Ultimation that the facility has installed*

BBC Chooses G Series for Reliability

At the BBC's Maida Vale Studios in West London, the Corporation has just installed its latest SSL console in Control Room 4, an SL 4056 G Series which replaces a previous SSL console.

Studios 4 and 5 have been the subject of an intensive re-design and refurbishment programme by Harris Grant Associates, and they now present an integrated complex of three recording rooms and two control rooms. Sophisticated tie-line, patching and video facilities enable any, or all, of the five rooms to be used together.

The two studios are used primarily to record music programme material for later transmission on Radio 1 and Radio 2. The complex is also used for occasional on-air programming.

Maida Vale Studios were amongst the first to choose SSL consoles in 1980, replacing Neve consoles that the BBC had used previously. Control Room 4 is now on its second SL 4000.

Bob Conduct, Assistant Manager Operations Music, explains: "These consoles probably get much harder use in here than they would in a commercial recording studio. They are in almost constant use all day, every day, so we need something that not only sounds good, but is ultra-reliable as well. After such a long experience of SSL, it was natural that we should replace the previous SSL console with a new G Series."

▲ *Bob Conduct, with the BBC's latest SL 4000 in Studio 4 at Maida Vale*

Good Movers Go For Moving Faders

▲ *Marly Marl, with the Ultimation-equipped SL 4000 console at his 'House of Hitz' studio*

Many of America's leading dance music artists are realising the advantages of the Ultimation moving fader system, and are either recording their latest projects at suitably equipped studios or installing SSL consoles in their own studios.

At Encore Studios in Burbank, California, Motown recording artists Da Boys have been busy at the 80 input SL 4000 G Series console with Ultimation, recording and mixing tracks for their forthcoming third album.

Other US artists/producers to have installed SSL consoles with Ultimation include Womack & Womack and Marly Marl.

▲ *Da Boys working with Ultimation at Encore Studios – (left to right) Hakim, lead vocalist; John Karpowitz, engineer; Tray-Ski, vocals*

Ultimation for East Hill

East Hill Studios in New York has added an SL 4000 G Series with Ultimation as the centrepiece of its new Studio A.

"The SSL console is versatile enough to meet the needs of our recording and our mixing clients," says Joel Kipnis, co-owner of East Hill with Paul Bernhardt. "Ultimation is the way of the future; it allows our clients to work with their choice of VCA or moving fader automation."

◀ *SL 4000 G Series console with Ultimation in Studio A at East Hill Studios. At 650 sq. ft. this is one of the largest control rooms in New York. The desk also features both E Series and G Series EQ*

Far East Studios go SSL

Apart from SSL's continuing success in Japan, growing numbers of studios in other Far East countries are installing G Series consoles.

Thailand's first SSL, an SL 4040 G Series is being installed in Bangkok record company, RS Promotions' new music recording studio. Synchro Sound Recording in Kaula Lumpur, Malaysia has ordered an SL 4056 G Series with Ultimation, while an SL 4064 G Series is going to a private studio in Brunei.

Paradise Studios in Tokyo has installed three SL 4000 G Series consoles in a brand new building. Two 72-channel consoles are fitted with Ultimation ▶

Digital Audio Editing Now Available for KEM Film Editor

A new ScreenSound interface is available for the popular KEM film editor, enabling audio editors to design and mix their sound digitally while simultaneously making film cuts.

This revolutionary film-to-sound interface was first used at Los Angeles-based Hollywood Way during the editing of Steven Spielberg's motion picture release *Hook*.

"This interface marries the industry standard film editor with the latest in digital audio technology," says Dave Collie, SSL Manager of Western Operations. "It allows editors to cut film with traditional methods, but still benefit from the flexibility and sound quality of the ScreenSound system."

The ScreenSound-to-KEM interface is based upon a unique VSI film machine controller that was developed by JSK Engineering Inc. of Santa Monica, California. It is now in regular operation at Hollywood Way and Weddington in Los Angeles, where further enhancements are already being made.

▲ *ScreenSound and KEM machine with editors of 'Hook' at Hollywood Way, Burbank*

Largest SL 6000 G Series Down Under

Australian broadcaster GTV-9 has ordered the largest SL 6000 G Series console to be built so far.

This 96-channel console, with 80 mono and 8 stereo inputs, VU meters and Total Recall™, is to be installed in GTV-9's main production facility in Melbourne. The desk will be used in the production of live and recorded variety shows, game shows and for current affairs programming.

GTV-9 is part of Channel 9, Australia's leading TV network. A sister station in Sydney – TCN-9 – also has an SL 6000. This 64-channel desk was also the largest at the time of installation – and the first with stereo modules.

Geoffrey Tomes, Chief Engineer at GTV-9, says that the station chose the SL 6000 because: "It has all the facilities necessary for the large scale productions for which the station is famous, and SSL were prepared to accommodate some special requirements as well, such as 8 extra aux sends and special monitoring facilities."

SL 5000 Best Investment for Film Facilities

Studio L'Equipe has recently installed an SL 5000 Film Post-Production System in its brand new facility, based a short distance from the company's existing premises on the north-eastern outskirts of Brussels. The studio is located between Brussels international airport (10 minutes) and the city centre (15 minutes).

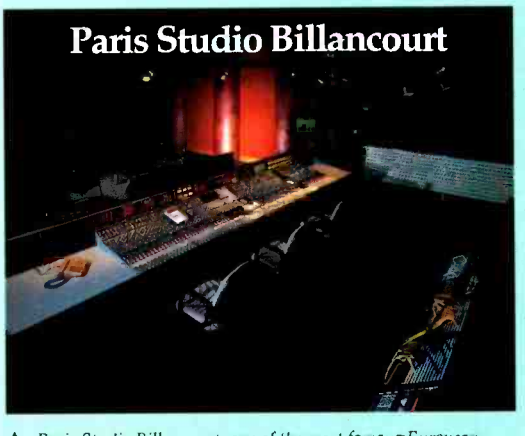
The SL 5000 is installed in a large re-mix theatre equipped with a THX monitoring system. The facility also has a second, smaller re-mix room designed for video post-production. Foley, footsteps and post-sync dialogue will continue to be recorded in L'Equipe's original studios.

The console, the first SSL film system in Belgium, was supplied with 40 input channels fitted in the 56 channel frame. The system has a G Series moving fader automation system and Instant Reset™ computer for snapshot recall of console settings.

Studio Supervisor, Yves Bradfer commented: "The SSL console is the best investment we have made in this new facility. And the installation was easy, without any problems." L'Equipe expect to be involved in about 20 films in 1992, and have already been busy with work from France and Germany.

◀ *SL 5000 Film Post-Production System at Studio L'Equipe, near Brussels, Belgium*

Paris Studio Billancourt



▲ *Paris Studio Billancourt, one of the most famous European film studios, recently installed a second SL 5000 Film Post-Production System*

The World of ScreenSound

Since the introduction of SoundNet, and the latest advanced features detailed in the last newsletter, the ScreenSound digital audio editing and mixing system has seen sales grow dramatically in many parts of the world.

Video post-production houses from Los Angeles to Japan are using ScreenSound on a variety of projects, and the latest KEM film editor interface brings ScreenSound's speed and flexibility to film flatbed editing.

Some of the latest recruits to the world of ScreenSound are detailed here.

USA

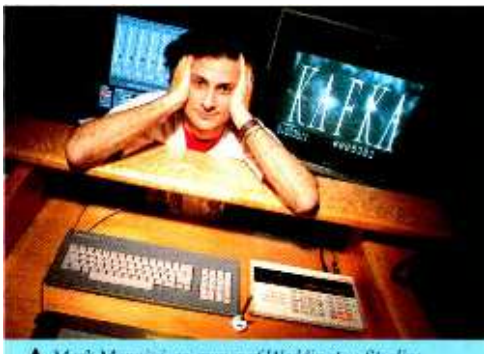
Weddington Studios

This 22-room facility, with film credits that include *The Color Purple, Die Hard, Robocop, Raiders of the Lost Ark, Poltergeist, Gremlins,* and three of the *Star Trek* films, has installed a new ScreenSound digital editing/mixing suite.

"We tested a number of digital editing systems, and ScreenSound has the best user interface of them all," says Mark Mangini, who owns Weddington along with partners Steve Flick and Richard Anderson.

Weddington recently completed its first major motion picture project on the ScreenSound system. *Kafka*, based on the life and writings of Franz Kafka, stars Jeremy Irons and is produced by Baltimore Pictures.

"With ScreenSound, our work on *Kafka* was less labour-intensive and significantly faster," says Larry Blake, the sound editor and re-recording mixer on the film. "ScreenSound allows for precision in editing that is just not possible with many other systems."



▲ *Mark Mangini, co-owner of Weddington Studios, Burbank, California with the ScreenSound system*

Malaysia & Singapore

Animated & Post Production Techniques

is part of TV3, the biggest commercial channel in Malaysia. Its new post-production facility features ScreenSound, a Silicon Graphics 3D computer and a Quantel Harry system. The company specialises in TV spots, commercials and corporate videos.

Meanwhile, **SBC Enterprises** in Singapore, the commercial arm of the country's public broadcaster, Singapore Broadcasting Company, has set up a post-production wing, where ScreenSound has been purchased to provide a digital audio capability.

Japan

Sapporo Eizo Productions

Sapporo Eizo describes itself as the "complete production company" with staff engineers/producers for both audio and video.

ScreenSound is the centre point of a new digital post-production suite at the Sapporo Eizo complex, which will be used on a number of projects, including the studio's major project – a long term video record of the local Ainu culture. Since 1975, Sapporo Eizo has recorded this Japanese ethnic group's lifestyle, ceremonies and culture in a series of unique video productions.

Due to the studio's proximity to Soviet territory, this project has also recently expanded to include the ethnic groups in Far East Siberia.

▲ *Daniel Gable and ScreenSound at Ladybird/Pickwick Studios, London*

England

Ladybird/Pickwick Studios

This North London facilities house and production company works on video, audio and music recording, and Senior Audio Engineer, Daniel Gable, foresees that the flexibility of ScreenSound will be of great benefit to them, particularly in ADR and other post-production applications. "What is so important is the user interface. When I first saw the pen and tablet system, I thought it would be much the same as a mouse. But, now I've had the chance to use it, I find it's really much better. I feel comfortable with it, it's very straightforward and easy to use," Gable explains.

Pickwick chose ScreenSound because it is fast and flexible and, through its multi-user networking capability, gives them the potential to add aditional units when they need to.

Spain

Duy Studios

Duy Studios plans to stay ahead of the field, helped by its purchase of a ScreenSound system and SoundNet digital audio network in time for the 1992 Olympic Games to be held in the city.

Duy has three editing suites, for voice-overs, radio production and music. Recent projects have included television and radio commercials for international market leaders like Martini, Sony, Nestlé, Ford and Volkswagen. The studio's work is shown throughout Europe and has recently won them awards at both the Cannes and New York festivals.

"ScreenSound, particularly when allied to the SoundNet system, is ideal for this kind of complex assembling, mixing and laying back of soundtracks," Managing Director of Duy Studios, Rafael Duyos says. He adds that he was impressed by the opportunities opened up by the latest ScreenSound software features.

"One of our main reasons for choosing ScreenSound was the new Public Domain Interface, which enables us to customise the control of the system to suit our particular requirements."

▲ *Tom Perkins, ScreenSound operator at Clack Studios, New York*

Austria

Studio Holly

Probably best known for its work on the German language versions of the Steven Spielberg blockbuster film *Indiana Jones and the Temple of Doom*, and the long-running *Dallas* television series, Studio Holly has recently purchased two ScreenSound digital audio-for-video editing systems.

Three factors persuaded Robert Holly, Managing Director of Studio Holly, that ScreenSound was the right system for them: "We were impressed by how easy it is to work with ScreenSound, how fast it is, and how exact it is." So impressed, in fact, that they decided to invest in two ScreenSound systems, one for each of their two main studios.

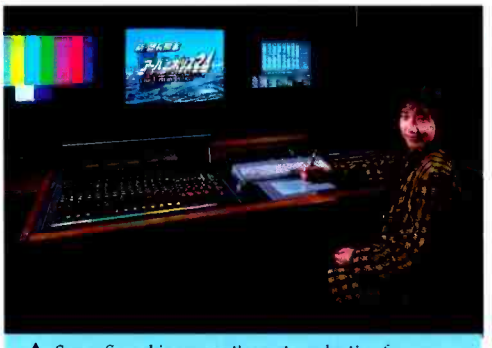
▲ *Conny Minoretti, Studio Manager, with the ScreenSound at Tonstudios Z in Zurich*

Japan

Osaka Art Institute

The Osaka Art Institute provides a two year course in visual design skills for film and video production. A ScreenSound was purchased for post-production work on soundtracks for animation and computer graphics projects produced by the students.

ScreenSound's colour graphics were a major factor in the Institute's purchasing decision.



▲ *ScreenSound in use on the post-production for 'Urban Police 24' at ABC-TV, Osaka*

Switzerland

Tonstudios Z

The largest audio facility in Switzerland, Tonstudios Z has also recently purchased a ScreenSound system.

Studio Manager, Conny Minoretti says they chose ScreenSound because it is simple to learn, easy to operate and convenient to work with.

The ScreenSound system is switchable between the two control rooms and the studio hopes to upgrade soon with SSL's SoundNet digital audio network system.

Tonstudios' main business is producing radio and television commercials - they made the world's first radio commercial on CD in 1986 - educational films, on-board music for major airlines and computerised announcements for railway stations and answering machines. They also record a wide variety of music, from heavy metal bands to chamber orchestras.

USA

Clack Studios

This New York audio post and mixing facility, which specialises in commercials for television and radio, has added two ScreenSounds for audio recording and editing on commercial projects. Its clients include Nickelodeon, MTV, VH-1, Lifetime TV, Comedy Central and the Fox Television show, *A Current Affair*.

"ScreenSound is a truly amazing system," says David Picken, President of Clack Studios. "It is the one system where the clients really get involved; the user interface is so well designed that our clients can see on-screen exactly what is happening."

Within weeks of installing its first ScreenSound, customer demand was so high that a second system was ordered. Sound Engineer, Tom Perkins, comments: "With ScreenSound, the editing process is easy and accurate. I can finish a session in a third of the time that it used to take with multitrack - and the sound is fantastic."

Japan

Asahi Broadcasting Co. (ABC)

ABC is one of the major television broadcasters in Japan. The Osaka-based company has introduced ScreenSound into the post-production process of its in-house drama programmes.

The new digital post-production suite with ScreenSound has already been hard at work on the station's successful drama, *Urban Police 24*.

▲ *Jim Gorton, Audio Engineer at Video Wisconsin, with the studio's ScreenSound system*

USA

Video Wisconsin

"ScreenSound has enabled us to do more kinds of projects, in a variety of different ways, that simply weren't possible before," says Pat Callus, Chief Engineer at Video Wisconsin. "We're much more creative with ScreenSound, and now we're able to get things done at greater speed."

A full-service commercial, video and film post-production company, Video Wisconsin features three on-line editing suites, an off-line graphics suite and one audio suite. The company recently completed television commercials for several clients, including GMC Trucks and Lawnboy.

George Harrison Live on ScreenSound

◀ *Audio Engineer Steve Rainford has recently been working on a new George Harrison live album at The Mill, in England.*

The two CD set features highlights from Harrison's 1991 concerts in Japan and Rainford used the ScreenSound to carry out the complex editing, sequencing and audience crossfades necessary.

"I had used ScreenSound on post-production projects before," says Rainford. "Although there is no video in this case, because of the complexity of the editing and assembly, I knew that ScreenSound would be perfect for the task. It has allowed us to keep everything in the digital domain, and the sound quality is great."

Support for SSL Users

Supporting the ever-increasing number of SSL owners and users around the world is an important consideration for the company.

Detailed operational and maintenance manuals have been produced on every SSL system, from the individual console systems, through the G Series and the Ultimation automation systems, to the latest digital products like ScreenSound and SoundNet.

In addition, SSL also runs a series of operator and maintenance training courses. These are conducted in fully-equipped training centres at Begbroke (which includes a commercial-standard recording studio and digital post-production suite) and New York. Alternatively, to suit customer's particular requirements, training courses can be run on-site.

SSL has also run successful ScreenSound familiarisation and training courses specifically for independent operators. These have proved particularly popular with large numbers of freelance editors in the movie capital, Hollywood, who are seeking to improve their knowledge of a system which is fast becoming the standard with video and film post-production companies.

For further information on SSL Training Courses, contact your nearest SSL office, or Dave Grinsted, Training Manager at Begbroke.

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From the Desk of...

Narada Michael Walden

Narada Michael Walden started as a drummer and worked with the Mahavishnu Orchestra, Jeff Beck and Weather Report, among others. He also has nine solo albums to his credit, and has won Grammy Awards for both songwriting and record production.

Narada's credits include Whitney Houston, Aretha Franklin, Mariah Carey, Natalie Cole, Gladys Knight, Barbra Striesand, The Four Tops and Eddie Murphy. At his SL 4000-equipped Tarpan Studios in San Rafael, California, he is working on a number of projects with artists such as Al Jarreau.

"When I'm working, I try to get deep inside the artist's head and heart. I like the joy of writing an album from scratch with the artist – the music is really natural that way. And it's important to me to make the music the best that it can be.

"The people I work with help me with technology. I have two great engineers, Dave Fraser and Alvin, who keep me abreast with technology. I find the SSL console is a highly refined board, which helps me to combine technology and music."

New Office in Germany

SSL is expanding its operations in Germany with the opening of Solid State Logic GmbH.

This latest addition to SSL's worldwide offices will enable the company to provide an improved sales and service presence to the growing numbers of SSL users in the largest and most prosperous economy in Europe. Solid State Logic GmbH can be found at Röntgenstrasse 104, 6100 Darmstadt 12.

BBC Broadcasts to Japan with APT

The BBC is transmitting a 24-hour World Service to Japan with the help of Audio Processing Technology (APT).

Broadcast standard audio signals from the BBC World Service headquarters in London, pass through APT DSM 100 Digital Audio Transceivers, where APT's **apt-X™ 100** 4:1 data compression technology encodes the signals.

The encoded signals are then transmitted along international low capacity (64kbps) digital lines to the Osaka Yusen Broadcasting Corporation in Japan. After decoding through DSM 100 transceivers in Japan, the programme signals are then distributed via cable to Japanese listeners.

APT's **apt-X™ 100** technology has also been well received by AM broadcasters in Japan, where AM stereo broadcasting commenced in April 1992. Nine stations in Tokyo, Osaka, Nagoya and Hiroshima have licences granted. The Japanese broadcasters will be using the DSM 100 in pairs to transmit digital audio signals over ISDN or leased digital lines from studios to transmitters, and from OB locations to the studio.

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EQ retort

Dear sir, with reference to the reply 'EQ Empirically — a response' in *Studio Sound January 1992*, one or two points were raised to which I feel I would like to respond.

Andy Millar is indeed correct in his assumption that the console which was used to make the measurements was pre-1986, and therefore has the high and low-pass filters without the endstop bypass switches. Also in his observation that measurements should initially be taken with the equaliser in circuit, but set 'flat' to establish that there are no phase/amplitude anomalies which could lead to false conclusions being drawn. With this in mind, all equalisers were indeed measured 'flat' prior to any further investigation, and it was only when I was satisfied that there were no anomalies occurring elsewhere in the signal path, that I proceeded with further measurements.

While Andy Millar suggests measuring the equaliser in the monitor path, with the filters switched to the channel, so as to remove them from the path being measured, the method used was to inject the signal at the insert point, with the filters set to the channel input (ahead of the insert point) and the output taken from the output of the channel, via the small fader. This set-up satisfied me that there were no confusing artifacts in the chain being measured.

I can only agree most strongly with Andy Millar about how much the ease with which a particular sound can be achieved matters to the user, and to my mind this, as described in the original article, includes things like sweep range, or — on upper and lower ranges — the provision of bell/shelf switching.

Regarding the possible subjective differences in sound between Wien bridge and state variable equalisers, we performed quite an interesting test, taking advantage of the possibilities afforded by SSL's *Total Recall* system . . . Using a multitrack tape which had a *Total Recall* set-up stored, using only 16 channels or so, the two halves of the console — one with SSL *E*-series EQ, one with AAD EQ were set up as identically as could be achieved. On soloing individual instruments, the difference was indeed not really noticeable, whereas the overall character of the two mixes — when compared back to back — seemed to be more noticeably different. For this comparison, it had first been established that the equalisers' front

panel settings agreed like-for-like; that is to say that a setting of 5 dB boost at 3.5 kHz with a wide 'Q' on each front panel did indeed produce basically the same result on each equaliser. This is most certainly not to suggest that either one is better than the other, rather to encourage more pondering as to what really does contribute to a particular equaliser's 'sound'.

Yours sincerely, Keith Andrews, Chief Engineer, Amazon Studios, 35-45 Parr Street, Liverpool L1 4JN, UK.

For the record

Dear sir, I would like to bring some historical facts to your attention about CD-R. It appears that whenever an article is published which includes examples of facilities who have purchased CD-R systems, those responsible for researching the subject have consistently failed to mention the two facilities who were the very first to pioneer the application of this technology in the UK. Although the technology is relatively new, both of these facilities have been offering a CD recording service for over two years now.

The first was Bill Foster of Tape One Studios who purchased a Gotham System in order to offer his customers reference CDs as part of his CD mastering service. Bill ensured high media coverage of his unique service and this should not have been missed by journalists interested in the subject.

Tam followed a couple of months later with their Yamaha *YPR 201* fully professional system and were the first to offer low-cost CD recording for the mass market, including one-off CDs from any format. Again Tam were widely mentioned in the press at the time and this should not have been missed.

Furthermore, anyone researching the subject would surely need only look in the classified ads section of trade magazines such as *One to One* (aimed at mastering/duplication) to see who has been offering one-off CD recording.

Yours faithfully, Tony Batchelor, Tam Studio, 13a Hamilton Way, London N3 1AN.

Letters should be addressed to: The Editor, Studio Sound, Ludgate House, 245 Blackfriars Road, London SE1 9UR, UK.

ON WITH THE MUSIC

Patrick Stapley talks to Euphonix console addict Hans Zimmer and to Andy Wild about the present and future of the *CSII*

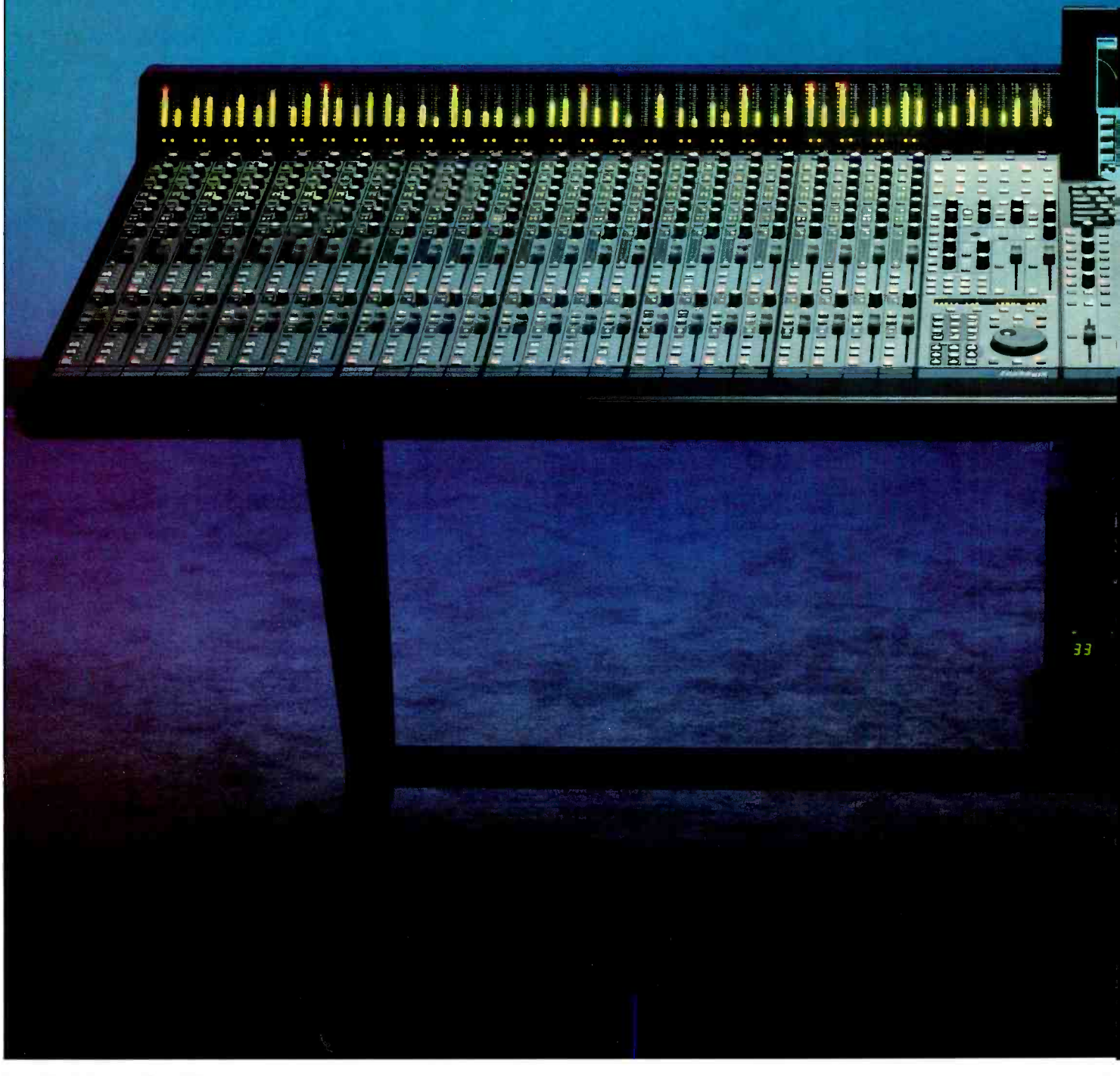
Hans Zimmer sits surrounded by the chaos of the temporary recording studio — audio and video monitors sit perched on table tops, computer and synth keyboards straddle chairs, samplers and synth modules lie piled up on the floor, and assorted cables snake around the room restrained to the floor by strips of gaffer tape. At the centre of all this electronic clutter is what I've come to see — the Euphonix *CSII*.

'Do you feel intimidated by it?' asks Zimmer observing me, observing the console.

'It's certainly different.' I reply cautiously, thinking that on first appearance it looks extremely intimidating.

'Ah but it's really easy . . . it's all so completely logical.'

And if anyone should know, Hans Zimmer should. Zimmer, the ex-Buggle turned film music composer, was among the first people to buy the console, and he's so delighted with it, that he's ordered a second for his US studio. I met him at London's Snake Ranch studios, where he had

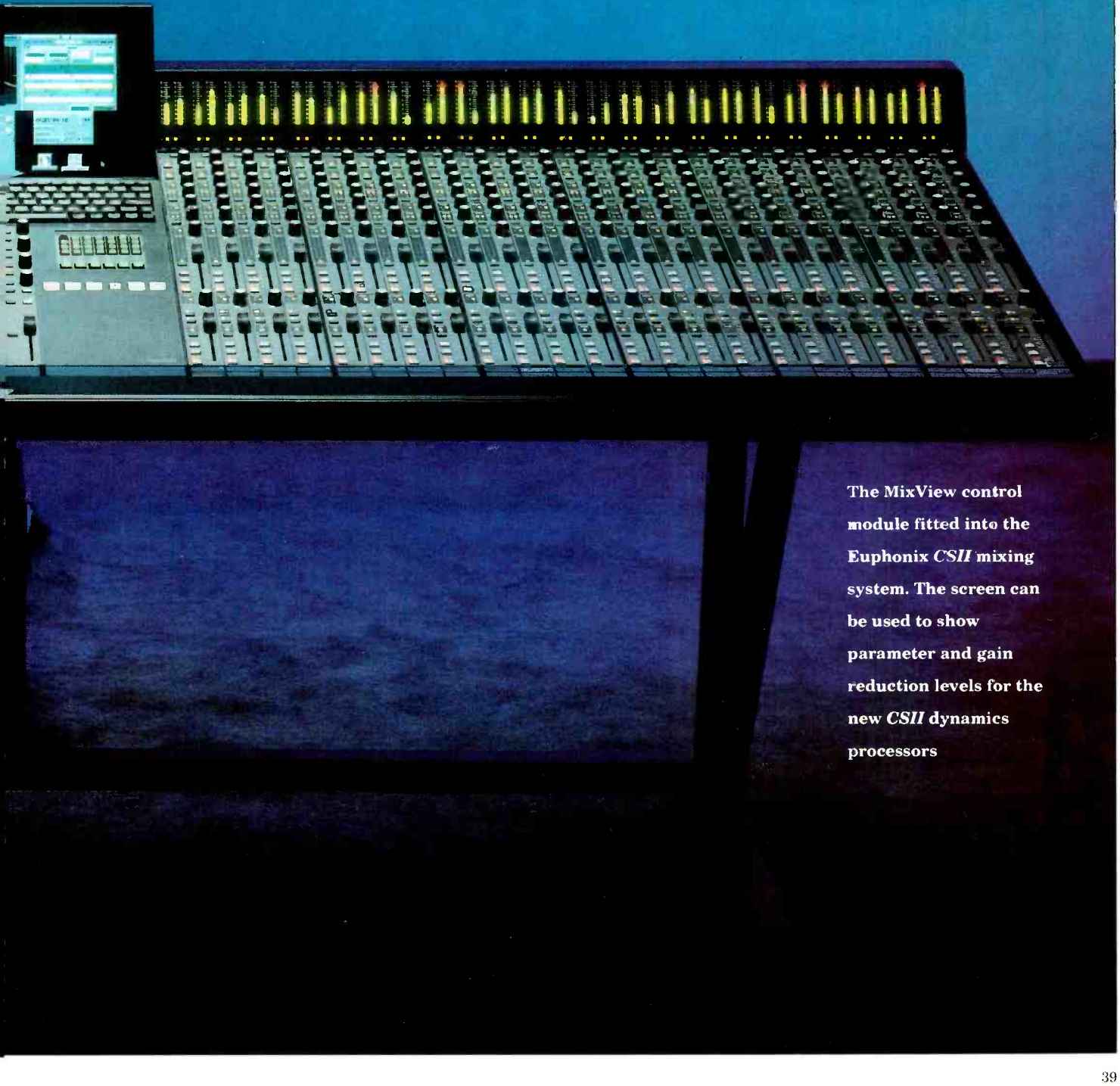


brought in his own equipment together with the only *CSII* in the UK at the time, on loan from Stirling Audio, and an Otari *DTR-900 II*, which he'd recently purchased. So what is it about the console that makes a man like Zimmer want to work in this makeshift manner?

'I suppose you get a bit addicted to it and to a way of working — when I first saw the console, I realised it was everything I wanted. For the kind of work I do, its resettability is fantastic — for example I may have 44 musical cues that I want to play to the director — I don't want to commit them to tape because as soon as you do that it's inevitable that he'll really hate something and you can't remove it. So this means setting up a mix for each cue. On a conventional desk it would take forever, and by the time you've done it the guy's either dead or just bored, or worse, left. So with the Euphonix I simply store each cue as a snapshot, and I can reset the whole desk in a split second — it makes most recall systems look a bit silly. It also means that while I am writing, I can do my subgrouping, EQs, get my sends and levels together so that the mix actually builds along with the music.'

The *CSII* is the second generation of digitally controlled analogue console from the Californian based company Euphonix; many will already have seen the system, with its compact console and separate audio tower, at one of the recent trade shows where it's been creating a lot of interest. To date in excess of 30 consoles have been installed worldwide into music and broadcast studios, post-production facilities and theatres — the console's configurability making it suitable for a wide variety of applications. The user literally assembles the console in assignable blocks to suit personal requirements, and because all control surface data can be stored in a snapshot, many different desk configurations can be saved and recalled. What was Zimmer's experience of setting up the console?

'When I first got the console there was absolutely nothing set up — it was like getting a console in bits and having to plug them all together to make it work. I thought "Oh my God" what am I going to do here — but all I did was to pick a channel and work my way through it. First of all I assigned inputs to the channel fader, using Mic 1 and Mic 2 to give me stereo, then I assigned the output to Stereo 1 to give me a monitor output. OK, that's a very basic signal path, to which I can add stereo EQ, balance control, aux sends, inserts and so on — you can make it really tricky if you want to. Once the channel is set up how I like it, it's just a matter of copying it across to the other channels, and the whole desk is configured very quickly. Of course, you can set up every channel on the console differently, but I tend to work quite simply — actually, because there are so many permutations, the big problem is making up your mind what you want the desk to do. At my studio in the US, I normal all the equipment to the ▶



The MixView control module fitted into the Euphonix *CSII* mixing system. The screen can be used to show parameter and gain reduction levels for the new *CSII* dynamics processors

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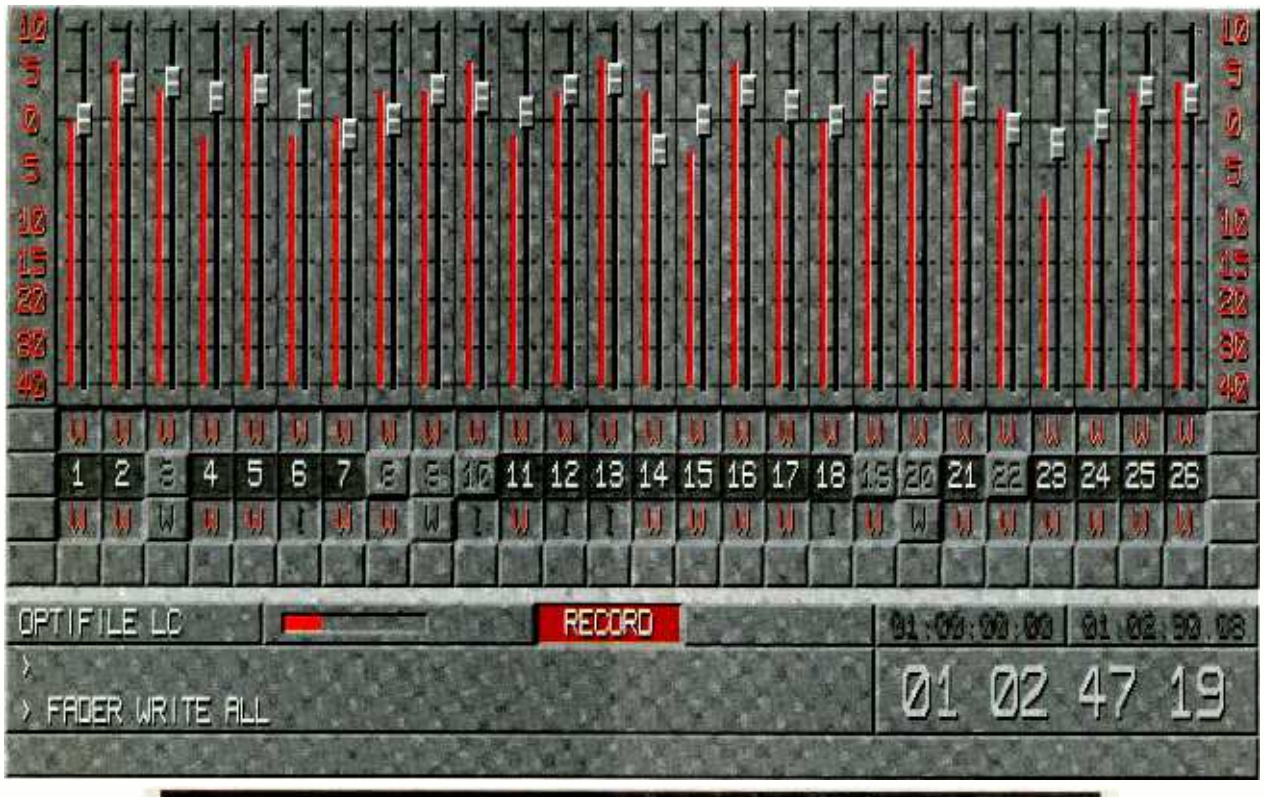

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Hans Zimmer in his studio

console, so there is a snapshot that configures the desk for that — by loading the same snapshot into this console in London, I immediately have an identical layout — it's fantastic.'

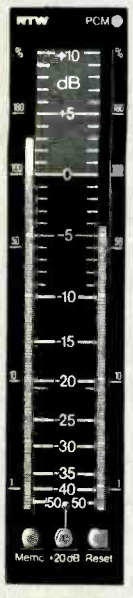
Each channel of the console can have two or more completely independent signal paths arranged in mono or stereo — the channel strip includes 2 mic inputs, 4 line inputs, 2 4-band parametric equalisers, 4 sends to 8 aux buses, 3 programmable inserts, and 2 long-throw faders. Another advantage of the system is its size: because all the audio electronics, apart from the talkback mic, are installed in the Audio Tower, and due to the assignable nature of the digital control surface, the console is considerably reduced in size — a 32-channel desk, which can provide 64 stereo inputs, measures less than 5 ft wide x 2 ft 6 in deep. This compact design places controls in easy reach, both from side to side and front to back; it also reduces the console's acoustic effect on control room monitoring, and because the desk is fitted with wheels it becomes very portable. Zimmer regularly moves the console from room to room at his own studio.

'We leave the electronics where they are and simply wheel the console next door and plonk it in between the speakers — it's just like wheeling in a tea trolley. There are only two leads coming out of the back — a power cable and the umbilical to the audio tower which can be as long as you want. Imagine doing that with a conventional analogue console.'

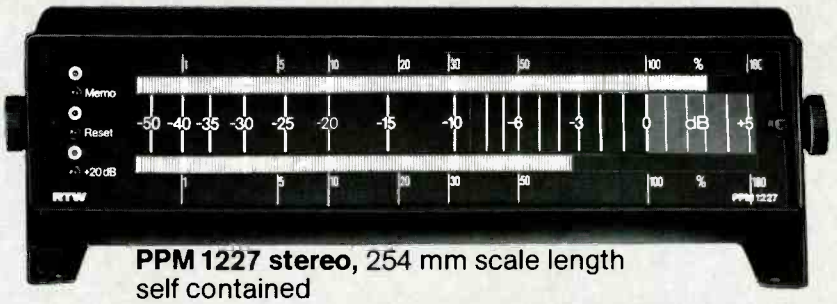
The size of the console has definite advantages, but I wondered how clients would react to its slight proportions.

'The people I deal with don't have the kind of snob mentality that judges a console by its size — its not a matter of the bigger the better. There's a real move now to make things neat and ▶

RTW Peak Programme Meter

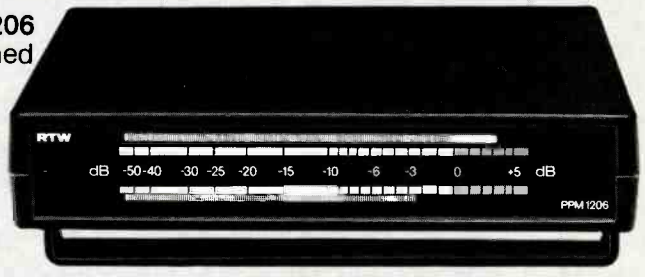


PPM 1109 stereo
Analog + Digital
Audio Peakmeter

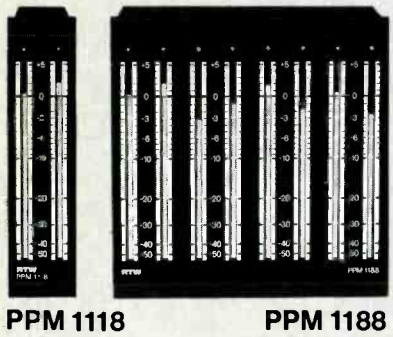


PPM 1227 stereo, 254 mm scale length
self contained

Model 1206
self contained

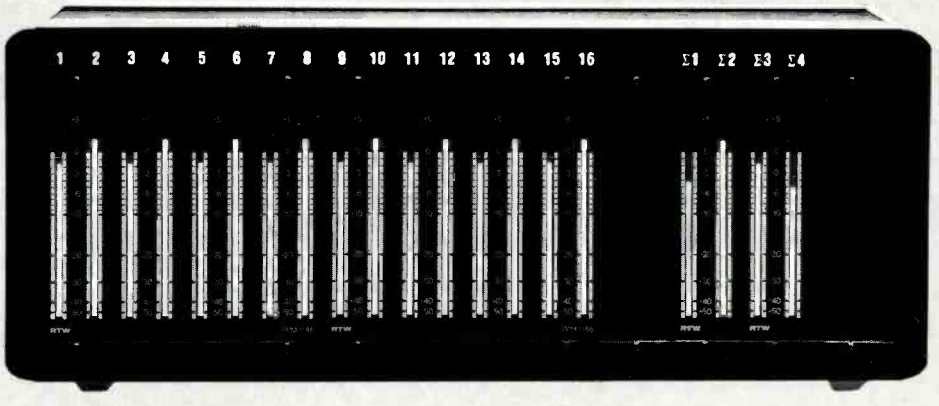


Peak programme meters
for monitoring the peak level
in analog and digital audio



PPM 1118
2-Channel
Module

PPM 1188
8-Channel
Module

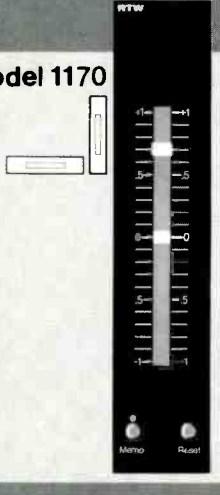


Multi-Channel Unit 16–4 and 24–4

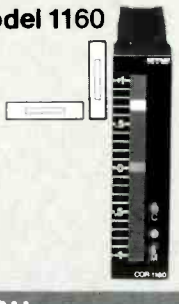
RTW Correlator

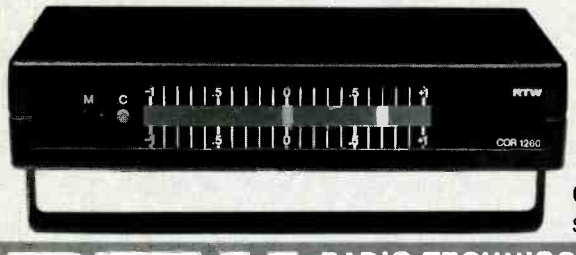
Compatibility meter
displays the phase correlation
of stereo recordings

Correlator Model 1170



Correlator Model 1160





Correlator Model 1260
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compact, people are at last realising that it's not such a good idea having controls placed miles away from them. I much prefer working on a console where I can reach everything from a central position, and with this desk I don't end up with chronic backache from endlessly leaning over searching for controls.'

Each I/O module contains just eight rotary controls, and an upper and lower fader with associated SOLO and CUT buttons. The remaining buttons are used to assign centralised control to specific areas of the channel strip — that is to access the equaliser that may have been assigned to the lower fader signal path. EQ-adjustments are made from the master control panel where a numeric keypad provides 4-band selection of parameters, and a large data wheel adjusts them. The parameter currently being adjusted is displayed in the alphanumeric display and the overall EQ curve is drawn in real-time on the MixView screen. Operationally this is obviously very different from adjusting a group of dedicated EQ pots, but how intuitive is it? Zimmer seemed perfectly at home with it.

'During the first demo I had with Scot Silfvast, who designed the console, I found that as I was talking to him I was also changing the EQ and my fingers were falling into all the right places. It's really surprising how quickly you pick it up. The graphic display is great, and at first you become totally fascinated by it, which, of course, is a major disaster because you spend hours fiddling about with all kinds of different shapes. Actually it's quite interesting because you end up associating shapes with sounds and vice versa. Another detail which is very useful is the CLEAR button that allows you to zero the EQ without having to reset all the controls individually like on a conventional desk. I also love the way that frequencies are additionally represented as musical notes, and because this is an automated console you should in theory be able to play the frequencies — I haven't tried that yet.

'One of the things I was a little concerned about was that being analogue there would be some audible variation between channels, so we did a test and copied identical EQ settings to 16 channels and then cycled a bass drum from the Fairlight through them — the sound was identical.'

'What about the overall sound of the console?'

'I don't particularly like the idea that a console should sound of something — I absolutely appreciate the value of an old Neve for example, but I think a desk should be, and this is an inevitable word, as *transparent* as possible. What I put through it I want to come back the same — this is certainly the case with the Euphonix. I was doing an orchestral session recently in Hollywood where the console was an old Quad/Eight — the type where you can't bypass the VCAs — so we decided to plug up outboard mic pre-amps. Needless to say we couldn't EQ anything, but when we came to the mix it was a revelation because we didn't need EQ — everything sounded terrific and you could really hear mic placement. So the less I hear of the console, the happier I am.'

Zimmer dislikes overdubs and runs everything live including orchestral guide tracks — 'I fake up the parts with samples to see how an arrangement's going to work, it produces the effect of an orchestra, but never the emotion you get from real players.' Typically he will prepare a 32-track slave for the orchestral recording, and lay down all the synth parts to an additional 32-track — two machines are then locked together for a 64-track mix. He mixes down to an Akai *DR1200* using at least six tracks but more normally he'll use all 12 (Orchestra Left, Centre, Right; Synths LCR; Percussion LCR; and Solo Instruments LCR).

'The reason I subgroup the mix is because I hate it when they pull all the music down under a piece of dialogue — this way they can reduce an element and retain the strength — it causes much less of a drop that way.'

'What are some of the other advantages that the *CSII* gives you?'

'The number of inputs is a real plus point and it means I can plug everything up in stereo — all those things that we used to plug up mono, just because of lack of space, sound so much better now in stereo — I like stereo, I would have been very unhappy in the days of mono. Another thing is that it really speeds things up — whereas before we would spend three days transferring cues to multitrack, it takes just one day with the Euphonix, plus we have lunch and dinner, and go home early fresh for the orchestra in the morning. It also allows you to try things out — for example I can keep a number of different snapshots of the same cue and directly compare them to see which works best.

'The great advantage of working like this is that everything is recorded to multitrack the way we want it, so when we come to mix, our starting point is with all the faders in a straight line — you don't have to go through the process of building the track up again from scratch, and you don't get that awful thing of trying to find the track again. I tend to worry less — I don't worry any more about whether I'll be able to get things sounding exactly the same again.'

'What problems or drawbacks have you found ▶

with the system?'

'The one thing that springs to mind is the auxs. At the moment there are only four rotary pots per channel that send to eight buses, which is a bit limiting. Of course a single send can be assigned to all eight buses if you like, but that's a bit crazy. I think Euphonix intend to increase the auxiliary capability very soon (see Future developments). The only other thing, and this is also being changed, is that the lower faders should be able to send to the multitrack bus.

'The really important thing for me is that the console is as easy to use as possible, and that it makes my job as efficient as possible — I don't want to be distracted from writing the music. I'm surrounded by high technology, and my theory is — and this is going to make me highly unpopular — that every year we get more functions on this stuff and it all sounds a little worse, especially with synths and stuff like that. Look, you either write music or read instruction manuals — you can't do both. The Euphonix console lets me get on with the music.'

Hans Zimmer has since expanded his *CSII* with a new 80-fader mainframe, additional modules and the new 1.4 version software.

Future developments

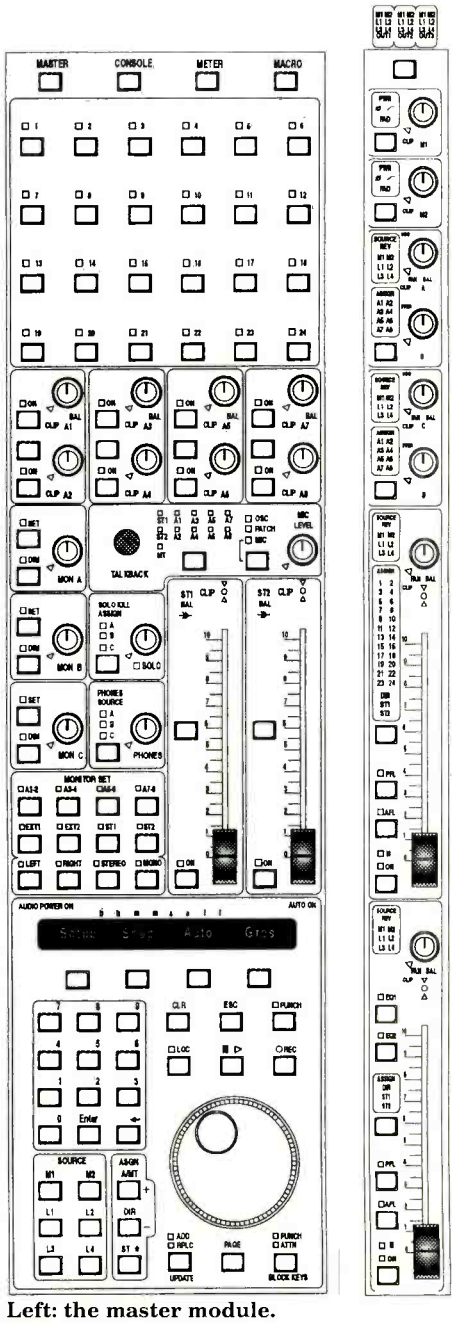
Andy Wild, formerly with SSL, joined Euphonix in May '91 as Vice President Sales and Marketing. He outlines some of the developments soon to be implemented on the *CSII*, as well as giving an insight into the company's aims.

'One of the principles with the *CSII* is to bring a high performance console to the market at a reasonable price. I think, over the last couple of years, it's been proved that record companies will not pay more for studio time, and with the proliferation of 48-track recording and beyond, studios are being forced to spend huge amounts of money on large consoles if they want to keep attracting clients. Very soon, by adding dynamics and additional aux sends, we'll be able to provide the equivalent of 2-channel strips of a standard console in one of our channel strips. On top of this the entire channel strip will be dynamically automated and the console will feature the SnapShot system. Price-wise it will be 40% less than equivalent top-line consoles.'

'How will these additional facilities be added to the console?'

'On every console we've left space to slot in extra functions — we have introduced a machine control module which will handle up to six machines. Another panel we're working on is a double width panel, eight faders wide, which will contain assignable moving fader groups, and access to external racks of equipment, which we'll manufacture. This will include the dynamics and extra aux sends and things like monitor matrices for film monitoring and so on, we showed the Dynamics for the first time at the AES in Vienna. The principle is that we don't want to change the existing channel module, or increase its size because we'll be in danger of destroying the compact nature of the console which is very important.'

'There has been some comment of the auxiliary



Left: the master module.
Right: I/O module.

capability that it is insufficient — how many auxs do you intend to add?'

'As many as you like — you simply buy extra packages to suit your needs. The universal control panel I just mentioned will control the external aux sends, and will be assignable in the same way as the EQ is now. The beauty of this is that just like EQ, you will be able to set up aux levels and dynamics while sitting at the centre of the console, and, of course, all this will be automated.'

'At the moment the system is supplied with a remote keyboard, is this something you may integrate into the console?'

'Yes, and we showed the new MixView module at the AES Vienna show which integrates a keyboard and track ball into the control surface. The new module also allows the engineer to control the EQ with 12 assignable knobs. We are moving to built in active Matrix screens for displaying MixView. These screens are going to become an increasingly important part of the system, and as more become available it's perfectly feasible to add additional support computers and monitors to enable different screens to be displayed at the same time — for example, we've designed a screen that will show all the EQs set up on the console, and another that will display all console controls during automation. This will lead in turn to far greater control from here if you want it — there are all kinds of interesting possibilities, for instance off-line editing of snapshots. In fact this is something we've been asked to do by people in theatres who want to be able to set up the entire console off-line as they go along in rehearsals.'

'Have you developed a cue list screen?'

'Yes, and quite a unique one. What we've done is allow cues to be stored in groups. What people normally do with cues is to break the song down into components — verse, chorus, middle eight, etc — then they'll start adding cues for things like tom fills and guitar breaks, the end result is an enormously long list. By splitting the list into groups, you can have individual groups for specific things like vocals, guitar solos, strings and so on. Another thing we can do is display the groups in a piano scroll, so as you play through, the cues scroll past horizontally rather like the displays on some hard disk editing systems — you can even add lyrics if you want to. This display will also play an important part in cut and paste editing for the automation system.'

'What stage is the dynamic automation at now?'

'A new revision has been released that greatly enhances the system. The original system was, I admit, a little primitive, and when I joined the company one of my priorities was to define and put together a first-class automation system. An important consideration was that it should be as familiar as possible to people used to working on top end systems — don't forget that we're not just talking about fader and mute automation here, but all the channel functions, so in terms of software it's ten times more complex than a standard automation package that's only really dealing with faders. We've had versions of the new software running for the last few months, and the final version, with all the neat little features, was delivered in February to all clients. Incidentally, another package we've just put together is MIDI which allows faders to control external devices such as screen faders in *ProTools*. Again, we showed this at the AES.'

'Is the Macro system now fully operational?'

'The Macros have been extended to four pages providing 96 keys. The Macros were added to supplement the power of the Snapshots system. When you think what they can do, they totally change the way you deal with a console like this, because you can basically build your own master functions to suit your own requirements. For example, with a function like talkback, instead of having dedicated TALKBACK buttons for different destinations, you can program MACRO keys — or they can be used to set up mute and switch groups — or to provide one button selection for console status if they're combined with snapshots — there are endless things you can do. We're also incorporating the MACRO buttons into MixView. The MixView screen shows the names of the MACRO keys in the console and allows the engineer to customise them.

'Having created the digital control surfaces, is the next step to go the whole hog and replace the analogue tower with digital audio?'

'When it becomes affordable and when the quality's up there with analogue we will be shipping digital audio modules. In reality about 90% of the advantage of going digital is the control side, which we already do with the *CSII*. In our mind the only reason for going fully digital is if the cost comes down, because in reality you're not going to improve the audio performance — this is a debatable point, but in my opinion a digital system is never going to better a good analogue console — that argument doesn't apply to tape by the way, there are a different set of parameters connected with storage, but as far as mixing is concerned you're not, for example, going to beat analogue EQ, you may equal it, you may be able to do it in a different way but you're not going to be able to improve upon it.

'We already have some digital hardware in R&D, we have always been looking at a fully digital or a combined analogue/digital system in the future using the same control surface we are working with now. Whenever we bring out new products for the *CSII* we make the analogue/digital decision based on performance, audio quality, serviceability and price. We always have the digital control and that is what really matters, that is what the engineer wants, the power of digital control.'

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BAD ANIMALS

Rock group Heart's new studio has opened in Seattle. David Miles-Huber reports

One of the most recent major studio facilities to be built in the US has just been completed and is on-line for business among the evergreen trees and snow-capped mountains of the Northwest. This new studio complex in Seattle, Washington, is called Bad Animals and is one of the best west-coast facilities to be found north of LA.

The 24 and 48-track facility is jointly owned by Steve Lawson (of Steve Lawson Productions and current SPARS treasurer) and Anne & Nancy Wilson (of the Seattle-based rock group Heart). This cooperative effort was formed as a result of Heart's desire to build a major studio facility in the Northwest, and as a direct consequence of Lawson Productions recent move into what was formerly Kaye-Smith Studios (the very same complex that Heart had used to record many of their major hits, including 'Barracuda' and 'Even It Up'). Since a top-notch production staff, maintenance crew, administrative personnel and strong reputation were already in place, it was jointly decided that the newly-dubbed Bad Animals facility would take over Steve Lawson Productions (which will continue solely as a production service for TV and radio broadcast spots) and that a major, world-class room (known as Studio X) would be constructed in addition to the facility's two, previously existing, 24-track rooms and three production studios.

Studio X

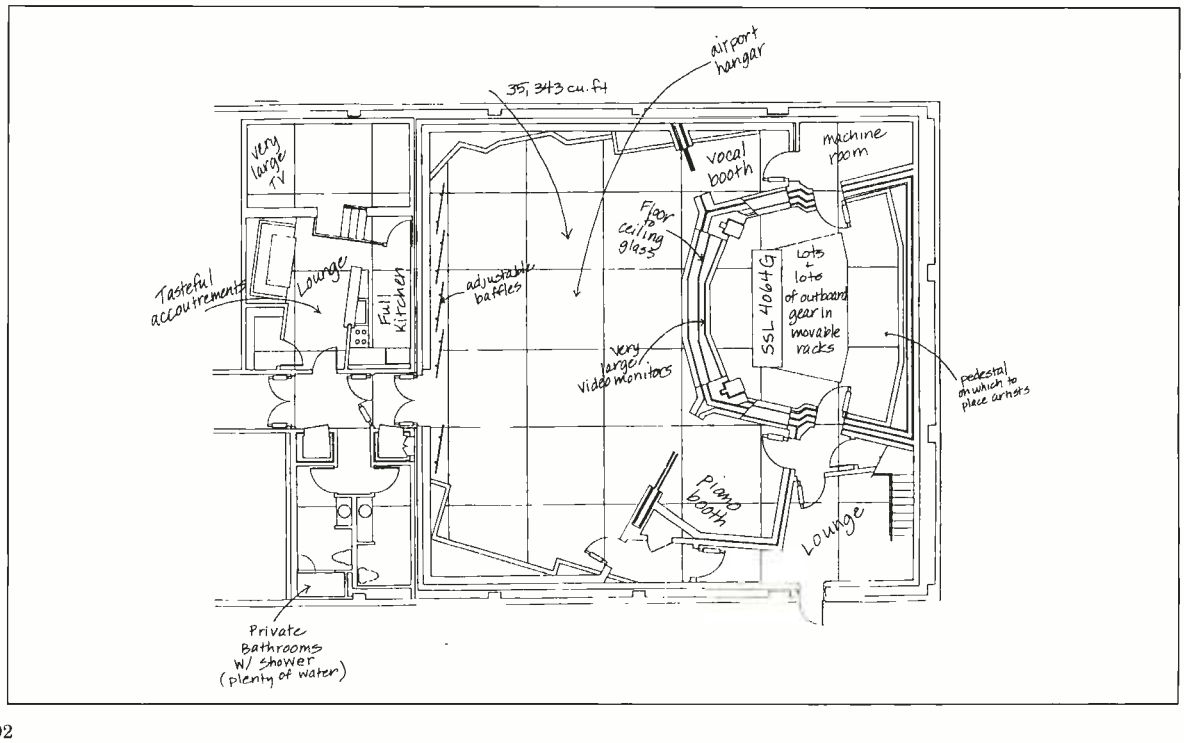
The newly completed Studio X was the design child of the LA-based design firm — Studio Bau:ton. One of the major goals in creating this flagship facility was to create a large room which has as many cubic feet as possible, within the existing shell. The studio's depth from the control room wall to the back panel is around 35 ft, with an overall width of 60 ft, so that the room is wide in relation to its depth. To ensure as many cubic feet of space as possible, they removed an extremely heavy, wooden ceiling beam, which allowed them to raise the ceiling by about 9 ft. As a result, the central ceiling area of the room is 26 ft high, while the lowest section is about 16 ft high. Likewise, the control room is also large, with its dimensions being 25 ft deep by 27 ft wide.

In addition to these rooms, two, large iso-booths have been placed adjacent to both the studio and control room and incorporate sliding glass walls for increased visibility (a hallmark of Steve Lawson's studios, which I've found creates a sense of increased open space). These iso-walls can also be opened out to increase the studio's overall effective space.

The larger of the two iso-rooms, which is known as 'the piano booth' is 12 ft by 14 ft in dimension, while the smaller 'vocal booth' is 8 ft by 11 ft. Both of these rooms have an approximate ceiling height of about 14 ft. In addition to these, an isolated tape room is located just off to the right side of the control room, with the recorders being directly visible through a large window.

When I asked one of the senior designers (George Newburn) what was unique to the studio's overall design, he felt that it was the incorporation of a specially poured cement wall that exists between the control room and the studio. This ultra ridged, high-mass 6 to 10 in thick wall has been specially designed around a glass, floor-to-eyelevel iso-wall. A central focus of the wall is the use of the large speaker soffits. Usually, these open areas are designed so that existing speaker systems can be placed inside. However, this design has the large, poured concrete 'boxes' as being part of the speaker enclosures themselves, thereby eliminating any spurious resonances that are often found in wood cabinet designs. In completing these speaker systems, a specially designed dense particle board, lead-laminated, front baffle assembly has been roto-hammered directly to the cement wall.

Leon Sievers, product planner for Technical Audio Devices



(TAD) custom designed this ridged, high mass speaker/enclosure combination in conjunction with the studio's design firm. Although it is realized that much of the studio monitoring will be done on bookshelf monitors, the specially-designed system is available as an accurate reference monitoring option. This wide range reference uses new TAD technology to offer a tight low-end and smooth mid-to-upper range over a dispersion angle which effectively covers the working length of the console. Along these lines, the control room's acoustics had been designed to create a first reflection-free zone at the console position, so as to reduce high-end 'splash' that might otherwise occur around the room.

Toys

When looking at equipment, one of the goals set out for Studio X was to provide their clients with a wide range of state-of-the-art design and technologies, while at the same time offering an impressive number of quality vintage gear.

Many of you may have already seen the Bad Animals console, as it was recently featured at SSL's AES booth in New York. It is an SSL *4064 G* series board that has been equipped with *Ultimation* and *Total Recall* automation, 24 *E* Series equalisers, 40 *G* series equalisers and is otherwise fitted with *G* series electronics throughout. Included is also SSL's new *Ultimation* moving-fader/VCA automation system and VU meter bridge option. As with many facilities, Bad Animals chose the SSL for its familiarity and acceptance as a worldwide standard among the engineering community.

In addition to the SSL, the studio also offers 12 channels of Neve outboard modules. These are comprised of four *31105*'s, which include 4-band EQ strips that came out of the *8088* series console; as well as eight *1073* three-band strips, which are known for their warmth and sound quality.

The tape machine line-up offers a range of digital and analogue machines, including two Sony *3324A* digital multitracks, Studer *827* 24-track analogue deck, Otari *MTR 90III* and Sony *JH-24*. Many of the analogue 2-track machines within the complex are the much sought after Ampex *ATR 110*'s (in both ¼ in and ½ in formats). In addition, 24 tracks of Dolby, *SR* or *A*, can be patched into any multitrack recorder, while a number of 2-track machines are fitted with NR module frames. Synchronisation between both audio and video-related transports is established via a *Lynx* systems supervisor. This system is capable of tying any of the recorders together from a central controller which is located near the console position. When speaking of computer-based audio systems, the entire facility houses three fully-floating New England Digital *Post Pro* workstations for use with album, TV and radio production applications.

Although the studio offers a wide assortment of new and vintage-styled outboard gear and collection of modern mics, the Bad Animals complex is quite proud of the vintage tube microphones that can be pulled from its treasure chest. These include two Neumann *M-79*'s, three *U-67*'s and an AKG *C-24*, many of which have been re-conditioned by Maestro Claus Heina of German Masterworks (Corvet, Oregon).

On the people side of the biz, Bad Animals is quite proud of their production team as well as their top-notch maintenance staff, which is headed by the chief engineering supervisor — Jim Haveland. Jim's background in the field includes work with Universal Studios in Chicago as a technician, with Neotek in the construction of their consoles and also as a musician.

In the area of amenities, Studio X provides its clients with an upper-level producer's loft that sports a desk area, TV, phone, etc. Located at the back of the studio is the artist's or main lounge, which is equipped with a full kitchen, bar area and an eight person restaurant booth, as well as a sunken TV lounge area and two fully-appointed bathrooms.

Studios A and B

In addition to Studio X, the Bad Animals facility also offers two, fully-equipped 24-track music studios (A and B). Each of these Westlake designed rooms are fitted with a 32-input Automated Processes Incl (API) console with DiskMix automation. Studio B is also fully equipped with Dolby Surround for film mixing applications. Three additional post-production rooms (C,D and E) add to the facility's range of services and center around two *636* series MCI/Sony consoles and a Tangent board.

Studio Philosophy

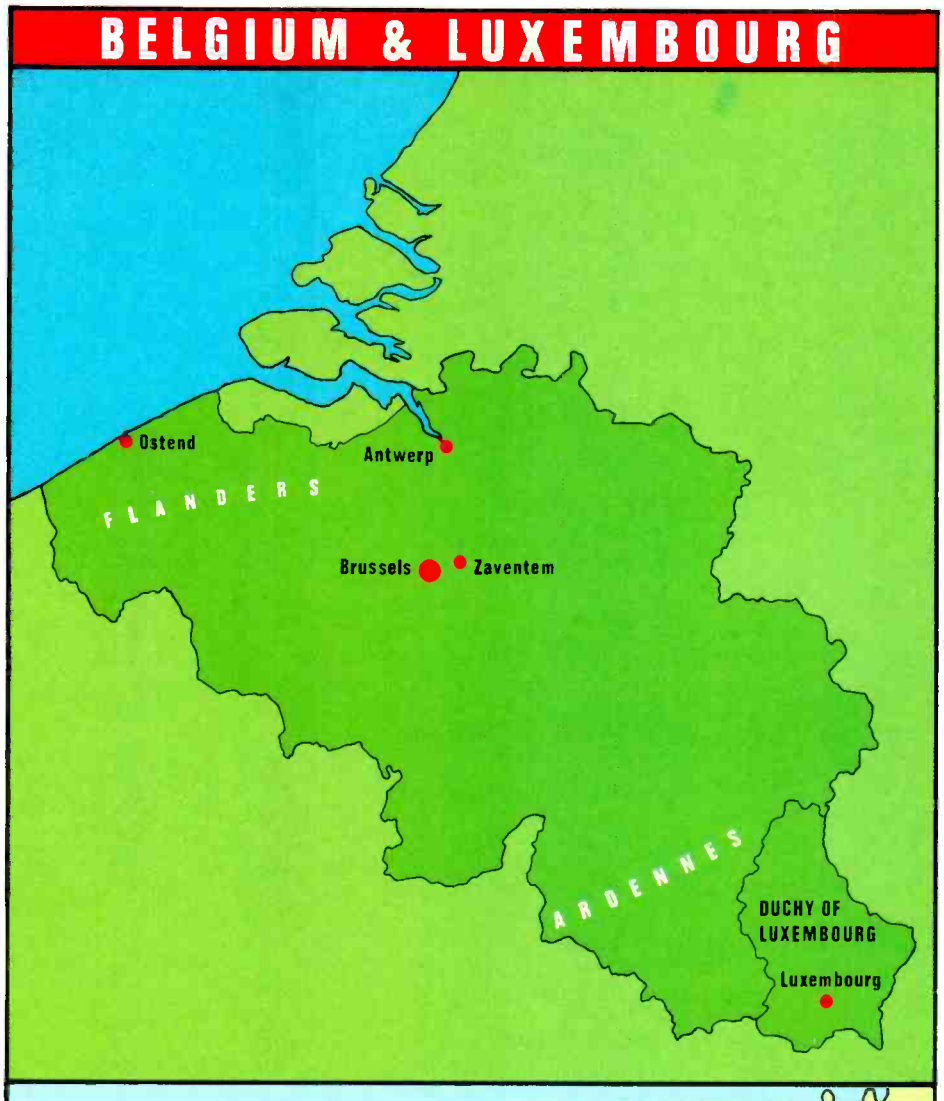
Being a 'Seattlite' myself, it has been both interesting and exciting to watch my own backyard slowly transform into a major metropolitan area. With regard to the music industry, the Northwest has long been a haven for artists and musical groups that have developed their own, individual sound and as a result have gained prominent commercial recognition. In light of this, along with the added bonuses of the area's natural beauty, outdoor activities and, yes. . . rain, Bad Animals looks to offer world class production facilities to those who would like to escape the frenzy of other, more densely populated metropolitan areas.

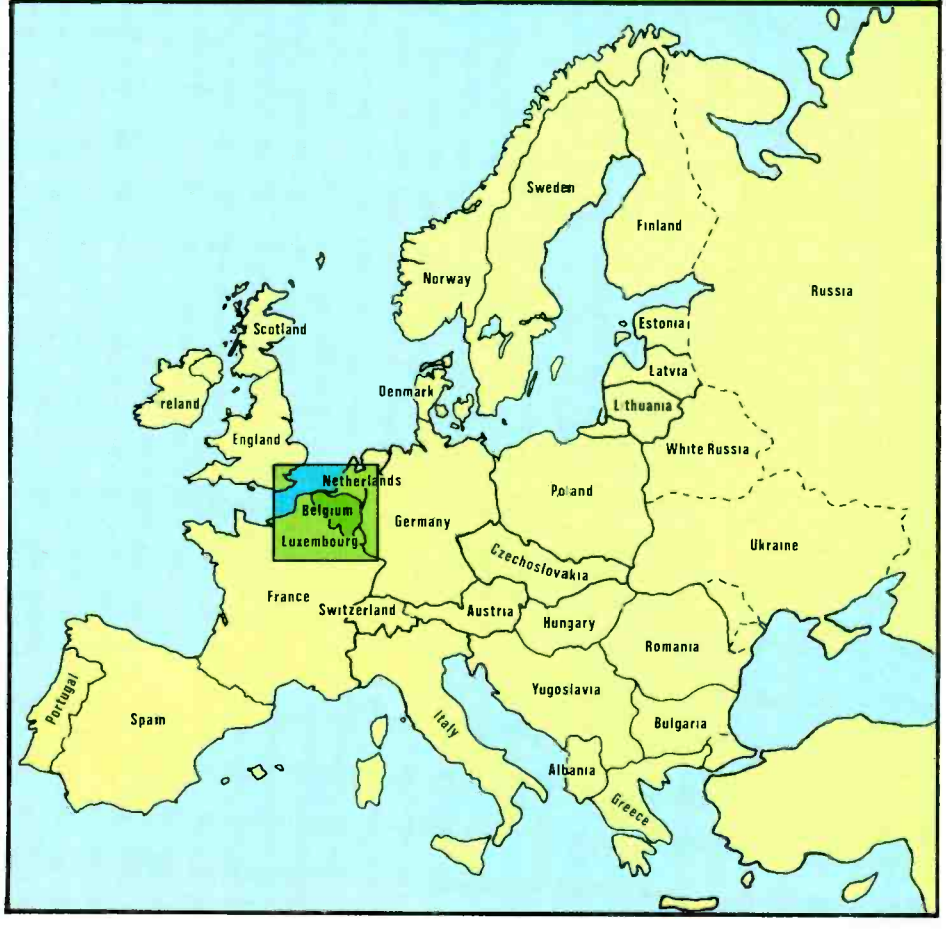
One of the facility's main philosphies is that of offering as much flexibility and as many design 'flavours' as possible to those who are looking for a particular sound. In Lawson's words 'I guess, if we were to have a motto, it would be "Service and Flexibility". We have carefully tailored our facility to give our clients as many production options as possible, without compromise.'

Studio Credits

Architecture & Studio Design: Studio Bau:ton (principles-in-charge) — Peter Greuneisen AIA, Peter Maurer and George Newburn; (project team) Denton Dance, Briggs McDonald and Thomas Fuhrer. Lighting Consultants: Ove Arup & Partners California Ltd. Jason Chan, associate-in-charge. Structural Engineer: Bruce C. Olsen, consulting engineer General Contractor: R.J. Dedinas Inc.

Bad Animals, 2212 Fourth Avenue, Seattle, WA 98121, USA. Tel: +1 206 443 4666. Fax: +1 206 441 2910.





BELGIAN BREAK

Part Four of our European Survey. Leo Brabant & Peter Ridsdale discover the delights of recording in Belgium

Surprisingly for a small country roughly the same size as Wales, or the state of Massachusetts, Belgium has no less than three languages and is deeply divided both linguistically and culturally. It has a population of approximately 10 m but there is no love lost between the Dutch-speaking Flemish of the flat northern part of the country (Flanders) and the French speaking Walloons of the south (Wallonia). Many Belgians prefer to speak English as a second language. There is a small German speaking area contiguous with the German border and in the Grand Duchy of Luxembourg which lies beyond the rolling hills of the Ardennes yet another language (Letzeburgesch) is spoken, although the official language is French. Luxembourg has a population of approximately 365,000 and is known primarily for its scenic beauty, for being a tax haven and for its recently demised commercial radio station, Radio Luxembourg.

In either country, language should not be too much of a problem for English speakers, especially in urban areas and especially in recording studios. The sort of people who gravitate into studios usually speak English very well indeed having spent much of their youth watching English/American films and TV programmes and ▶

also listening to a lot of British music.

The climate in Belgium is nothing to write to *Studio Sound* about, in fact the best place to be in either country is a studio. Luxembourg enjoys a subalpine climate and there is usually heavy snowfall in the winter.

Brussels is not only the capital of Belgium but the 'capital of Europe' as well, being the headquarters of the EEC and NATO It is well situated for this role being about three hours drive from Paris and about two hours away from Bonn or Amsterdam.

Flying time from London is about one hour. There is a busy international airport at Zaventem not far from the city centre with frequent flights to most international destinations. There are daily flights to New York and Chicago and about three flights a week to Tokyo. If you are flying from the UK check with your travel agent that you are getting the best deal — it costs £140 for a return flight with Aer Lingus from Bristol to Brussels for example and almost £100 more for a return flight with Sabena from Brussels to Bristol. There is a regular car ferry service from Dover to Ostend if you are planning to bring your own equipment and you will need a carnet for anything other than 'personal use'. If you are travelling by vehicle you will, of course, need a 'green card' from your insurance company. Some underwriters do not charge for this if your visit takes less than 15 days. You do not need an international driving license. Work permits are required if you are earning money in Belgium so you will not need them if you are recording. You will not need a visa if you are coming from an EEC country, the US or Japan.

Driving in Belgium can be an adrenalin enriching experience with lane discipline being at best a theoretical concept. You are legally obliged to carry an identity card or passport at all times. If you are bringing your own equipment make sure that you have a suitable mains plug adaptor, if you do not have the round two-pin continental plugs on your gear they are sold in the ferry terminal shop at Dover but may be hard to find abroad.

Mains power is 220V, 50 Hz. and the TV/Video standard is Pal G.

Money

There are roughly 60 Belgian francs to the pound sterling and about 36 to the dollar. Belgian francs have the same value as Luxembourg francs and are acceptable as currency in the Grand Duchy but Luxembourg francs are not usually acceptable in Belgium. VAT, which is known as TVA, is a swingeing 19%.

Music

The British Rave phenomenon, which has only recently caught on in the States has a virulent counterpart in Belgian New Beat, mention of which causes many a Belgian studio owners' lip to curl — not only because New Beat mostly flows from the bedrooms of Flanders but one also senses here an element of song-writer sensibility as well. Another ingredient in the sonic melting pot is African music which comes to Belgium via Paris, arguably the world capital of World Music.

Studio Steurbaut in the city of Ghent

There are two national radio and TV institutions, namely RTB (French) and BRT (Flemish) and there is also a commercial Flemish station called VTM and a French commercial station RTL which broadcasts from Luxembourg. Everything in Belgium is done twice. Apart from a number of independant record companies dealing with local product, EMI, Virgin, Ariola, Carrere, WEA, Polygram and even Readers Digest all have offices here.

There is no Musicians Union as such in Belgium although orchestras tend to have their own unions. The New Flemish Symphony Orchestra is an exception however and there is no union for non-classical music. Session musicians are few but good. Hiring equipment is not as easy as in London but studios tend to be self-sufficient in this respect. The same is true of maintenance.

The major Belgian studios can be counted on the fingers of two hands and it is therefore possible to mention most of them. Exemplifying the big international music studio is **ICP** which is run by an expatriate Brooklynite called John Hastry who claims that Belgium is 'the last undiscovered country in Europe'. The Brussels based complex is the largest in Belgium, fully residential and with three extremely well equipped studios, one of which has an 80-channel *G* series SSL *Ultimation* console and two of the latest Otari 32-track machines which are permanently linked. That's just for starters; ICP's equipment list runs to four science-blinding pages. Hastry is, however, emphatic about the principle that a good studio is much more than the sum of its equipment. ICP's continuing success story is in his opinion due to the use of good in-house engineers and as he puts it, 'chart success helps'. Previous clients include Simple Minds, The Cure, Alison Moyet and Youssou N'Dour to name but four.

At the other end of the spectrum we have **Steurbaut** which is based in the historic city of Ghent. Gilbert Steurbaut has been recording classical music here since 1968 and offers a complete service with an in-house musical supervisor who teaches at the Music Academy in Antwerp and is also familiar with digital technology. Recording is direct to two-track using the Sony *DMR 4000* and editing is done on the Sony *DAE 3000*. Clients leave the studio with a U-matic master ready for CD pressing. The studio hall measures 28 m x 26 m x 7 m and has a natural 2.5 s reverb time which greatly enhances strings and brass. There is enough room for 1000 musicians and all for about half the cost of recording at Abbey Road. Steurbaut offers a mobile recording service for orchestral concerts and also for organ and carillon recitals. (Carillons are something of a Belgian speciality and consist of sets of tuned bells usually hung in church towers and operated from a keyboard that is played with the fists.)

Studio L'equipe, in Brussels, is Belgium's major film sound studio and they have just opened an impressive new suite with an auditorium studio equipped with an *SSL 5556* and in addition to a Sony *3324A* there are 15 Set Magnetic Transports and a THX monitoring system with 30 channels of Dolby *SR*. This is just one of nine rooms in which various processes such as colour correction and film duplication are carried out as well as film sound related activities. Studio N, for example, is equipped with an *Angela* console and the DAR *Sigma Soundstation*.

Jet Studio used to belong to Belgian star Adamo and before that it was owned by Decca. It still holds Belgium's first synthesizer. It's a *VCS3* and it is still there, along with a Fairlight *Series III*, a *Series II*, a *Synclavier* and a number of other classic synths both ancient and modern. Mitsubishi *X-880* with *DDA-DCM 232* are also included

Videaudio was featured in the June '91 issue of *Studio Sound*. Concentrating mainly on sound to video work with three AMS *AudioFiles* they are now providing a film projection facility as well with an Albrecht Set Mag.

Kitsch will also be mentioned in passing as this studio was featured in the August '90 issue. As with Videaudio the studio was designed by Andy Munro and is notable for its Neve *VR60* console with GML automation interfaced with an SSL computer.

Antwerp, which is about three-quarters of an hours drive north of Brussels, is Belgium's second city and is the home of **ACE** which caters mostly for the national market. The genial Rudy Torfs has just installed an Amek *Hendrix* console which feeds an Otari *DTR 900 II*. The studio has enough room for 40 musicians although 50 were squeezed in for a recent film music project.

Gam, which is situated in the small town of Waimes, deep in the Ardennes, offers a studio in idyllic country surroundings. SSL *4048 E* console with two Sony *3324*s and a Studer *A 827*.

All that is known about **IMPULS** (sic) is that it is situated in *Herent* and that Belgian bands who have achieved some sort of international success such as Soulsister and Technotronic have recorded there.

There is only one studio of note in Luxembourg ▶

MONITOR

March '92 GENELEC® Company News Vol. 4

IN THE NEAR FIELD

It is interesting to note that everyday expressions often have more than one meaning. An example of this is "near field monitoring". The near field monitors are certainly closer than the main monitors but are they still in the near field?

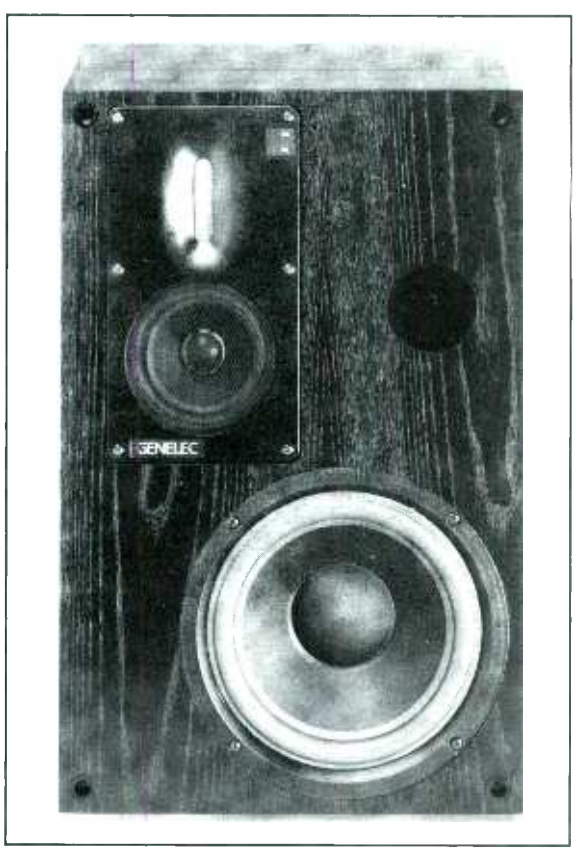
We all know that sound pressure decreases with increasing distance from the source, following the inverse square law. Trained acousticians know that an acoustic near field is the space in close proximity to the sound radiator, where the inverse square law is no more valid. Obviously, the size of this area is frequency dependent. At low frequencies, it extends to approximately twice the diameter of the radiator. For a 200 mm woofer, the near field extends to about 35 cm from the cone surface. All normal listening takes place in the far field. Due to the nature of the phenomena, it is actually better to listen in the far field.

In order to realize the benefit of the relatively short listening distance normally associated with meter bridge mounting (i.e. the significant reduction of room reflections), some thought should be applied to the positioning of the speakers. On top of the meter bridge is far from ideal for two reasons. Firstly, the console changes the LF radiation space around the speaker and generates some boost at low frequencies. Secondly, in addition to the direct sound from the speaker, the engineer will hear sound reflected from the mixing console surface. With typical dimensions, the reflected sound will cause first interference dips significantly below 1 Khz and the perceived balance is also incorrect. The most common approach to solving this problem is to make the midrange of the speaker more prominent. The environmental boost tends to correct the missing LF and the cancellation dips reduce the general level in the midband.

A better solution is to limit the radiation angle of the speakers in a controlled manner (using a DCW), and mount them on stands just behind the console. Not only does the LF boost disappear but the interference pattern is also minimised, as the meter bridge will, at least partly, shadow the path to the reflective console surface. Acoustic treatment of the rear of the console will further prevent unnecessary reflections.

With these simple changes, both the measured and perceived response is significantly improved. Why not try them? IM

THE NEW S30C



The Broadcasting Reference Speaker in numerous companies since 1978, the S30, has been upgraded. The new model is called S30C and it is available in vertical (S30C V) as well as horizontal (S30C H) versions. The vertical version comes in mirror image (L/R) configuration; the horizontal version is user changeable to L or R. Naturally it is shipped from the factory as a symmetrical L/R pair.

The S30C is a three way active monitoring system including drivers, amplifiers and active crossovers. Designed originally for broadcasting control rooms this system is ideal also for mobile recording vehicles,

digital workstations and post production facilities. Versatile crossover controls allow for precise matching of the speaker system to different acoustic conditions. Its high output and absolute reproduction accuracy make the S30C the ultimate nearfield monitor in recording studios.

The amplifiers are completely new and their output power is 120 W per channel. A special circuitry is provided to protect drivers from overload and amplifiers from overheating. The woofer has a very large magnet and a long excursion capability. The midrange driver and the proprietary ribbon tweeter are mounted on a common cast panel to match their dispersion characteristics and acoustic centers.

The S30C combines the wide dispersion of S30 with the high output of the S30B. All this and one additional crossover control, "tilt", is available at the price of S30. The S30C is in production since March 1st, 1992.

NEWS

Peter Riebeek, the owner of **Studio 150** in the heart of Amsterdam, has decided to purchase Genelec 1034A for his control room.

SPEAKER IN A ROOM

Significant amounts of engineering time and effort have been used to achieve a flat pressure response on speaker axis in a free field. Many speaker manufacturers still believe that this is the only reasonable design goal.

However, no one of us listens in anechoic rooms. In real life the sound at engineer's position is affected as much by the room as the speaker itself. The direct sound represents the speaker system's own pressure response but the total sound field is a product of interaction between the speaker and the room.

In the last issue of Monitor Monitor we discussed the DCW Technology and how it improves stereo imaging by reducing unwanted reflections from the control room walls. The frequency range of interest was midband and low treble.

Let us now look at some of the phenomena which affect the perceived low frequency response at the listening position. The LF performance has a minor effect on stereo imaging; its importance is in the total frequency balance. First in our list is the speaker installation in the listening room.

FREE STANDING SPEAKERS

Free standing installation is used in most broadcasting control rooms, small post production suites and other applications where the speaker is fairly small.

All normal speaker systems are practically omnidirectional at low frequencies. The radiated sound spreads not only to the listening direction but to all directions, even to the back side of the speaker. The main problem of free standing installation is the reflection from the back wall. The sound reflects from the acoustically hard wall and interferes with the direct sound. Depending on the distance to the wall this interference will cause a dip in the frequency response typically around 100 Hz. If the distance to the back wall is increased, the dip frequency is lowered. Depending on directivity of the speaker (i.e. the level of radiation to the direction of the back wall) dips are possible also at multiples of the lowest dip frequency.

Other nearby walls and the room floor cause more interference dips at different frequencies. At very low frequencies, however, where the distance from the speaker to the wall is small compared to the wavelength, the nearby walls will cause a bass boost. This is due to the changes of the radiation space. If the speaker LF response is poor, this environmental boost may enhance it. Most wideband speakers nevertheless have high LF responses and thus need correction to avoid boominess.

FLUSH MOUNTED SPEAKERS

The way to eliminate back wall reflection is to flush mount the speakers, i.e. mount them inside the back wall. This is the most common way to install main monitors in a control room. If the side walls are far away, interferences from them are relatively small.

At upper bass frequencies flush mounting fairly well represents the case of radiation into half space which will boost these frequencies by 6 dB. At lower frequencies, where radiation space is still more limited, the boost is respectively higher.

Although back wall reflection is no more a problem with flush mounted speakers, floor reflection remains. Also the side walls and ceiling may cause reflections. Another significant source of acoustical disturbance is the mixing console itself. Acousticians have been aware of this for a long time but only recently has it been subject to more general discussion.

Also the equipment piled on top of the console will usually shadow the direct sound path from the main monitors to the listening position. Near field speakers are the most obvious part of this pile.

CONSOLE TOP MOUNTING

Near field speakers and meter bridge mounting was discussed already in the editorial of this issue and thus does not need to be repeated here. It is sufficient to say that all alternatives are compromises.

In the next issue we will discuss ways of minimizing the problem areas by careful selection of the speaker positions and by applying electronic controls.

NEWS

Genelec have appointed **Sontronics** Electronic Equipment LTD as sole distributor for their products in Israel. Contact:Sonny Schmueli tel: 03-5705223

AUDIO EXPORT GEORG NEUMANN

Audio Export Georg Neumann is based in Heilbronn, between Frankfurt and Stuttgart. The company was formed in 1969 to export Neumann microphones worldwide. Gradually, it started to import products in Germany and currently holds the distribution for Lexicon, Switchcraft, and Sonifex among others. Today, the company employs about 20 people, 12 of whom handle domestic distribution leaving the remainder to concentrate on export activities.

Volker Siegmann, Vice President of Marketing and Sales, joined Audio Export 13 years ago having previously been involved in the sound contracting field. This, along with the sound mixing he did in his spare time, provided him with a good grounding in the world of pro-audio.

Karl-Heinz Schaak

Product Manager Karl-Heinz Schaak has been with the company for 5 years and is primarily responsible for Genelec sales, installation and maintenance in Germany. Karl-Heinz personally handles all sales of the larger Genelec systems. His hobby is building PA speakers so he can apply a lot of the practical experience he has accumulated over the years.

Heike Kubicki, Sales Manager, has been with the company for ten years over which time she has developed a vast working knowledge of the German audio market. She is also heavily engaged in customer liaison.

Volker Siegmann

Genelec began discussing distribution with Audio Export in 1987. Although Genelec did not have a particularly high profile in Germany, Volker already knew of their name and reputation. His first target group, having taken on the distribution, were the broadcast companies. They had already embraced the concept of active monitors and the 1019A fulfilled an existing requirement; it was small, self-powered and competitively priced.

In Germany, like everywhere else, customers want to hear the larger systems in their own studios but smaller systems are often demonstrated at Audio Export's premises. For the benefit of local clients, they have built an attractive demo room where clients can get a "feel" for which monitor will best fit their needs.

Audio Export have also set up a dealer network, to handle the smaller Genelec systems, with outlets in München, Hamburg, and Köln. These dealers service the local broadcast and project studio market whilst Audio Export take care of installations and technical support. Audio Export's overall service policy is fast service turnaround so that if a unit cannot be repaired immediately by one of their four technicians, they offer a replacement.

The first large Genelec system to be installed was a pair o 1035As in the Toyoshoma-Flynn room at EMI Maarweg Studios in Cologne, after the studio manager had been impressed by the installation at Metropolis in London. Another important installation was at Dierks Studio, which is also in the Cologne area. A pair of 1034As were installed in studio 1 which had just been redesigned by Neil Grant. Karl-Heinz Schaak had to use extra long cables as the machine room was some 20m from the monitors but according to Peter Lang, the studio manager, the sound was not affected. It would appear that the most difficult aspect of the installation for Peter had been which Genelec system to choose!

Heike Kubicki

Five years on, it is Volker Siegmann's proud boast that Genelec have now penetrated all aspects of German pro-audio. 1019As find their way into broadcast and small studios, 1031As are conquering the nearfield market and the S30 (in all its forms) is proving very popular in film and video applications. The 1033A is also much sought after by studios who want 1035A quality but do not have the space, the most recent installation being in the G+G Tonstudio in Düsseldorf.

NEWS

Italian **RAI** have ordered another 40 pieces of Genelec 1031A and 2 pairs of 1033A systems.

ISO 9001 QUALITY SYSTEM

Why spend thousands of hours in creating painfully accurate descriptions of different working procedures, why spend still more time in training the personnel?

In January 1991 Genelec started to build up a TQC System (Total Quality Control) according to the European ISO 9001 standards. The idea is to generate working methods and processes so that defects are prevented before they might occur; the quality is built into the operation. For example in production the role of the control stations, like acoustical testing, is not only to pick faulty units from the line, but to generate feedback to the previous manufacturing stage. The feedback is used to correct the process so that the final product would be defect free. (This sounds like amplifier design for minimum distortion!). No law by Mother Nature dictates that a process cannot be freed from errors. The quality system includes all company operations, not just the control of the technical quality of the products but also improved working methods and practices.

NEWS

In Cologne, Germany **Sound Studio N** have chosen Genelec 1031A for near fields and in Düsseldorf **G+G Tonstudio** have purchased a Genelec 1033A system.

TESTED BY T.V.

Tapani Väisänen is the man whose signature "T.V." with date code is printed in most of our PCBs. Having now tested thousands and thousands of amplifiers with Audio Precision system One Tapani is well trained to see where the potential improvement areas are. While generating the test & measurement procedures he also maximizes the testing efficiency.

The current testing procedures include tens of individual checkings of different operational parameters. These include distortion measurements, crossover filter frequency response measurements, input CMRR measurement, protection circuit reaction time and level measurements, checking the room response controls etc.

Tapani, looking seriously at his AP station. The demanding test procedure is obviously at an interesting phase.

Part of Tapani's responsibility is the burn-in procedure which is performed to all amplifiers. Prior to the final measurements the amplifiers are operated at a high temperature for a predetermined time. This is done primarily to confirm that the systems perform as designed in any practical operational environment.

Tapani graduated from the Electronics Program of the Iisalmi Trade School in 1986 and has worked at Genelec since 1987. He started on the amplifier assembly line and later was promoted to module testing and QC. He is now responsible for all analog amplifier testing. Married, he lives in a nearby country village some 25 km south from Iisalmi. His hobbies include tennis and computers.

NEWS

George Massenburg has purchased Genelec 1031A. 'This is the first time I have switched near field monitors in ten years', he commented.

In Amsterdam, **Studio 150** have bought the Genelec 1031A as near fields.

Townhouse Studios in London have ordered two pairs of Genelec 1035A monitors. One of them is already installed, and the second pair will be installed in June'92. With this order Virgin group has ordered in total 5 pairs of Genelec 1035A systems, three of them being at the Olympic Studios.

GENELEC®

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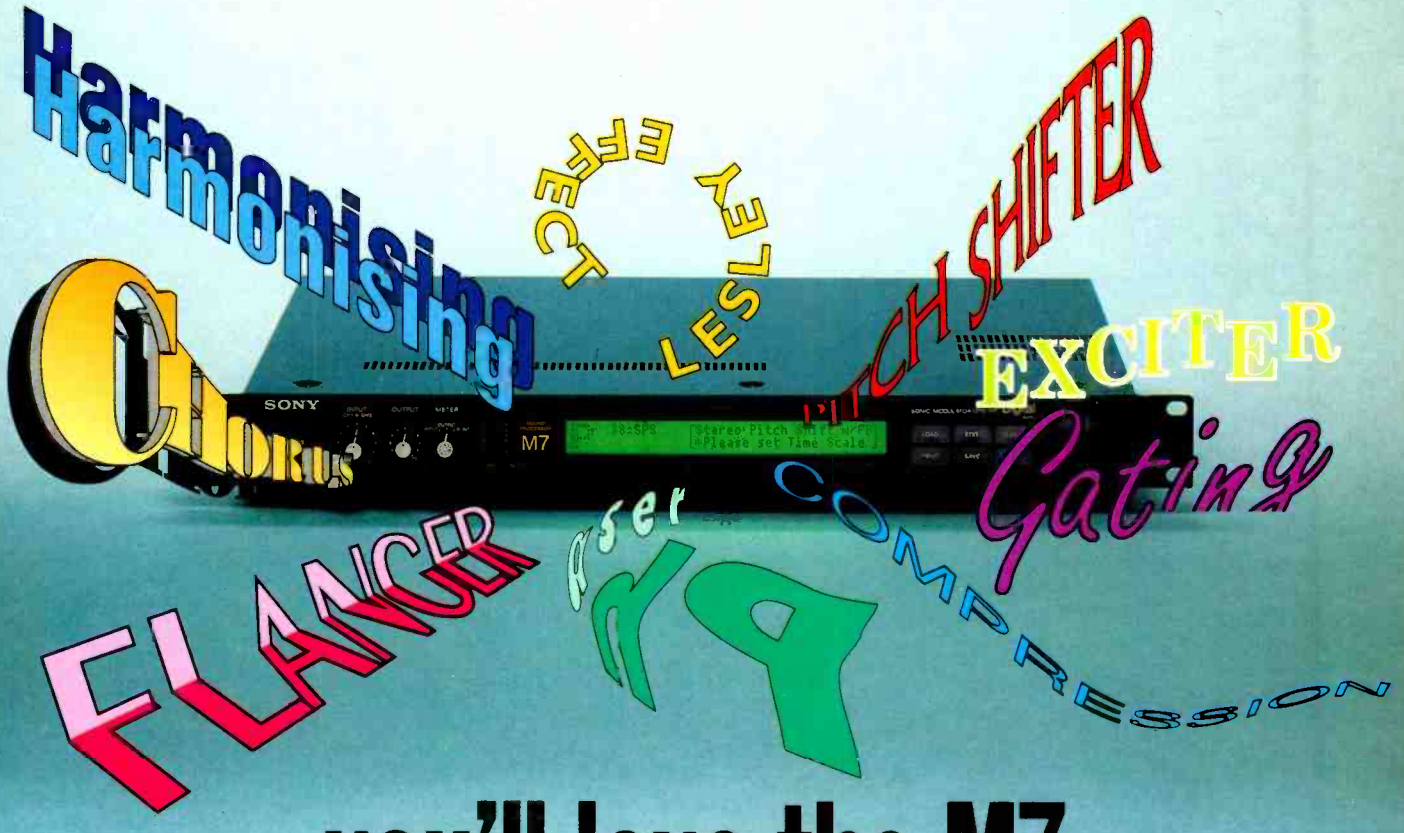
If you're amazed at the quality and versatility of the DPS-R7 and D7...



...you'll love the M7.

The latest addition to the Sony DPS range of audio multi-effect devices is the new DPS-M7 digital audio modulator.

Multi-purpose, versatile and much less expensive than you might think, the M7, together with its stablemates the R7 digital reverb and D7 digital delay, renders most single effect devices obsolete.

As well as delivering unique effects, the M7 offers endless permutations of over 20 basic algorithms, with 100 preset memories and 256 user presets.

As you would expect from Sony, the sound is of the highest quality, featuring 18-bit quantisation and a 22 kHz bandwidth, achieved by 1-bit pulse converter technology.

An optional remote unit, which allows editing of all parameters on up to 15 individual units, coupled with full MIDI capability means you can concentrate on the job in hand.

So if you're looking for something new and exciting, introduce yourself to the Sony DPS family - it'll be love at first sound.

A sound choice!

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Helsinki 0 50291 Jeddah 02 6440837 Lisbon 01 859 4269 Madrid 091 536 5700
Milan 02 618381 Oslo 02 303530 Paris 01 4945 4000 Rome 06 5920 801 Stockholm 08 7336100
Vienna 0222 61051 Zurich (Schlieren) 01 733 3511 Czechoslovakia, Hungary, Poland, Romania, - Vienna 0222 554 606, East Central Europe (others), UK 0256 55011
Middle East, Geneva 022 7336350 Africa, UK 0256 55011

Sony Broadcast & Communications

STUDIO SPOTLIGHT

Jet Recording Studios
218 Chausse de Jette, 1080 Brussels
Tel: +32 2 425 91 56
Fax: +32 2 425 55 08
Bookings: Irwin Vervaecke (also runs BARS)
SSL 4064 G 56-channel console with *Total Recall* Mitsubishi *X-880* 32-track digital, MCI-Sony 24-track
Mastering: MCI-Sony *JH110*, Studer *A810*, Sony DAT *PCM 2500*
Sony *5850* U-Matic Sync with 32-track for video post-production
Monitors: Stage Accompany, Yamaha, JBL Bluthner Piano, Hammond and Leslie
Studio Area: 13m²
Accommodation. Video protected parking.

and that is **Linster.** If you want to do a bit of recording next time you attend to your numbered bank account then this is the place to do it.

So. Why record in Belgium? Well, recording in Belgium can be much cheaper than recording in neighbouring countries and could be an attractive proposition for bands who are touring Europe and who suddenly feel the urge to put something down on tape. Nearly all the major studios have residential facilities. Those who spend any time at all there will realise that its phoney reputation as a somewhat grey area is largely unfounded and uninformed. (Apart from the weather that is.) There is an elusive continental quality of savoir vivre that is hard to define but no lesser for it and what is often perceived as brusqueness, (especially in Flanders) is usually a cultural misinterpretation that does nothing towards an understanding of the often warm and generous natures within. Those who believe that Belgium is a cultural desert should be reminded that this is the country that gave the world Rubens, Van Eyck, Magritte, Jacques Brel, Cesar Franck, Django Rheinhardt and Adolphe Sax. After all, what would modern music be without the saxhorn and the saxophone?

USEFUL CONTACTS AND INFORMATION

Belgian Embassy in London.
Tel: 071 235 5422

Belgian Institute for Information and Documentation (INBEL).
Avenue des Arts 3, B-1040 Brussels

UK Customs and Excise. Tel: 081 346 1144

P&O Ferry Reservations, Dover.
Tel: 0304 203388

ICP. Tel: +32 2 649 22 06

Steurbaut. Tel: +32 2 91 28 74 06

Studio L'Equipe. Tel: +32 2 245 81 21

Synssound. Tel: +32 2 425 01 83

Videaudio. Tel: +32 2 649 01 87

Kitsch. Tel: +32 2 646 32 05

Ace. Tel: +32 3 887 05 90

Gam. Tel: +32 80 67 99 20

Impuls. Tel: +32 16 20 00 03

Evergreen Hotel, Brussels.
Tel: +32 2 732 16 60

Customs at Ostend. Tel: +32 59 80 06 70

TV/Video Standard: PAL G

Mains Power: 220 V/50 Hz

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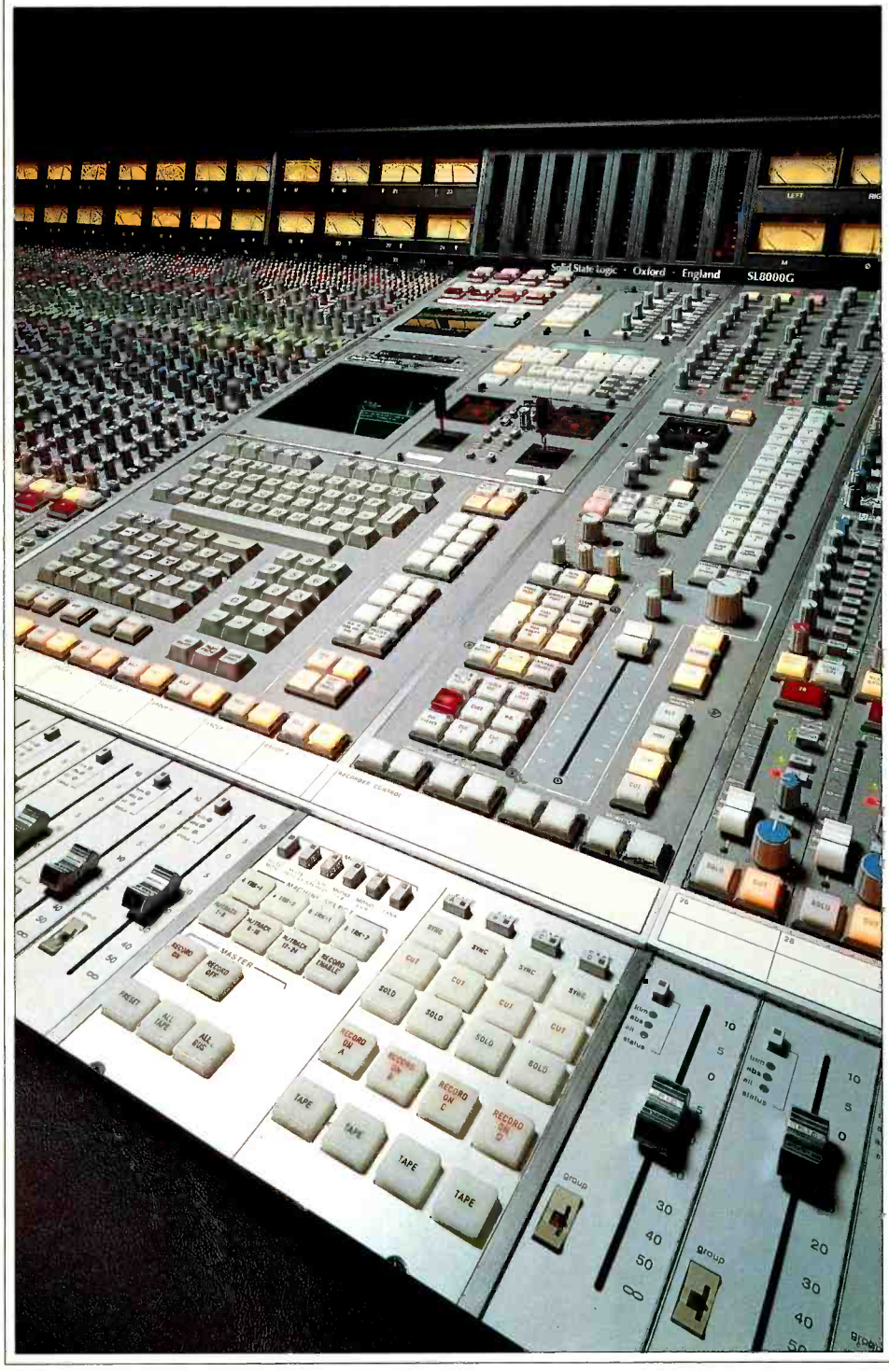
A Hit.

SL 8000 G SERIES

Patrick Stapley reports on SSL's new multiformat console



One of the key factors in running a successful studio is versatility — there can be nothing more irksome than losing potential work due to lack of facilities, particularly in this current climate. Consequently an increasing number of music studios are diversifying into other areas, in particular video and film. Solid State Logic, the 'Listening Manufacturer', have responded to this with the *SL 8000* multiformat console, which retains all the familiar *SL 4000 G* Series features while offering a host of new facilities designed for audio to picture. Of course, the console is also aimed at the established post-production market where dedicated A/V desks are something of a rarity.

Film and video post-production consoles are not new to SSL; the *SL 5000* Series has filled a specialist niche for many years, and according to the company will continue to appeal to the top end facility requiring a high degree of customisation. Many *SL 5000* features have been incorporated into the *SL 8000*, but the price of the new console is considerably less — just 10% more than an *SL 4000 G*.

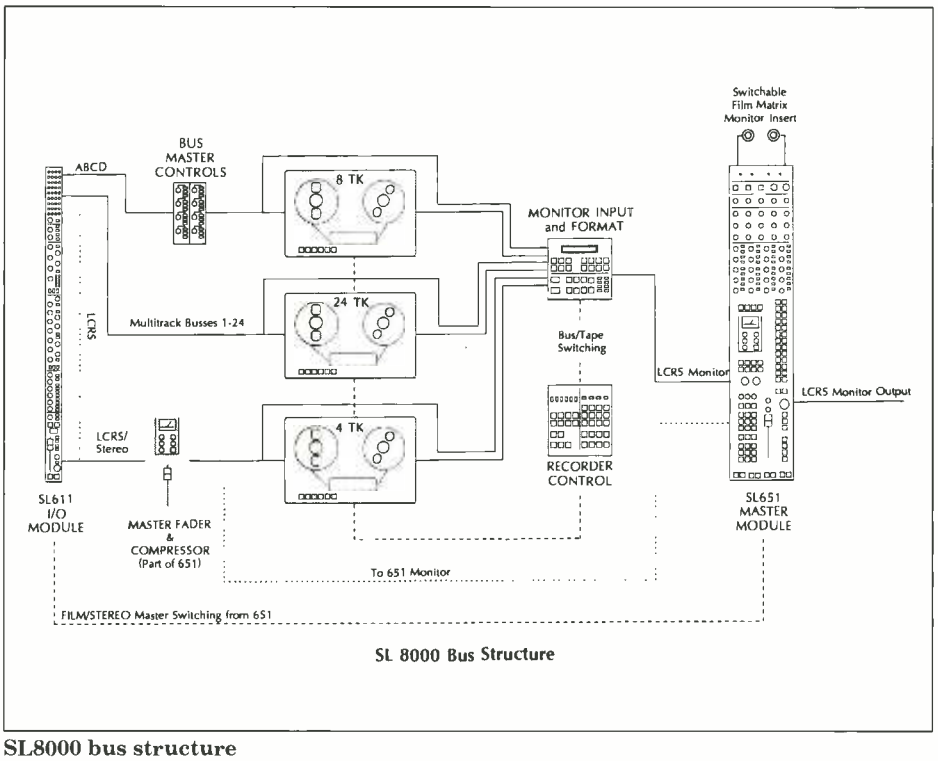
So what's on offer from this multi-format console? To start with, the output bus structure has been changed — the Master Mix bus remains switchable between 2-channel and 4-channel, but the 4-channel Quad Bus is replaced by the Film Bus (Left, Centre, Right, Surround). In addition to the main mix bus there are four separate stereo mix buses (A B C D) suitable for M D E F (Music, Dialogue, Effect, Foley) submixing — each of these buses has a master control section. Multitrack buses have been reduced from 32 to 24 which with cross normalling can feed a 48-track machine. All bus outputs can be monitored via a separate monitor matrix called the Monitor Input And Format module, and a Recorder Control Panel allows individual machines to be assigned to Record and Monitor (Bus/Tape) switching. All control and master modules are placed centrally in the console including two programmable joystick pans, and selector keys (seven sources) for the additional eight, switchable scale, LCD bargraph meters.

The result of this restructuring makes the console suitable for TV post-production with up to four stereo stripes, Dolby Surround TV post-production with LCRS panning for each channel, Film post-production ranging from LCRS mixes to multiple DMEF dubs, and 5/6 channel discrete mixing for multi-channel digital film formats. Of course, the console retains its familiar music track laying/mixing operations.

To give a more detailed view of the console, I'll run through the areas that have changed or been added. I'm assuming the reader is familiar with *G* Series consoles, and in turn the assumption can be made that the console remains unaltered apart from the points mentioned.

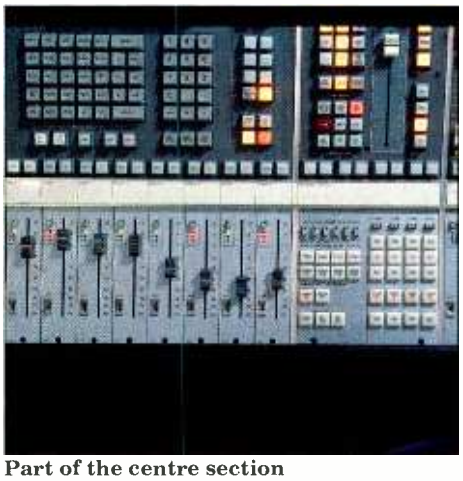
I/O module

The I/O module sees changes to the routing matrix, main pan controls, FLOAT button, and SMALL FADER INPUT button — the last two function buttons have been renamed ROUTE and SURROUND respectively.

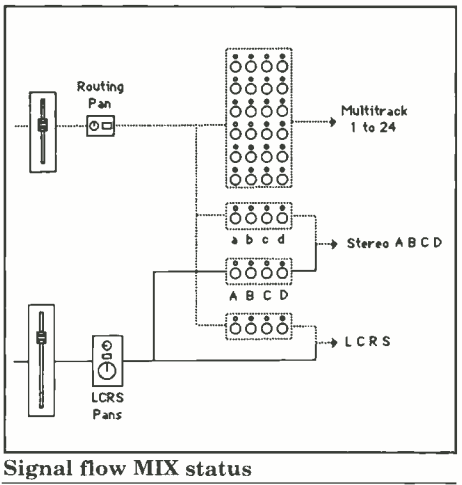


SL 8000 Bus Structure

SL8000 bus structure



Part of the centre section



Signal flow MIX status

At the top of the routing matrix are two rows of colour coded A B C D buttons — a b c d — capitals for Large Fader routing, lower case for the Small Fader. Below the 24 multitrack routing buttons are the LCRS main mix routing buttons. At the base of the module, the original FB (Front-Back) pan (situated above the LCR pan) has been designated FS (Front-Surround), it no longer has a detented Centre marker.

If the console status has been selected to Mix, the Large Fader will feed the main pan controls. The signal path from here is dependent on central global switching — Stereo (2-channel) and Film (4-channel). Stereo will cut the Centre and Surround bus outputs, and because of this the FS pan should be switched out so that the signal is fed unhindered to the LR bus. If the Large Fader is selected to the A B C D stereo bus, its feed to the main mix bus (LCRS) will be cut and stereo panning will automatically be selected for that channel. This panning is then conveniently controlled by the main LR pan, and not the routing matrix pan. Similarly if the ROUTE (previously FLOAT) button is pressed, the Large Fader will access the mutitrack buses in Stereo mode with main pan control. The Route function is also useful during track bouncing, removing the need to duplicate pan settings between the two pan controls.

The Small Fader in Mix feeds the routing matrix where it can access all the bus outputs, providing additional mix inputs as well as sends. Panning is via the routing pan.

The SURROUND (previously INPUT) button is used where a stereo surround signal is required. When the button is pressed, the surround output from the FS pan is picked up by the Small Fader; from here it is routed/panned to one of the A B C D buses providing a stereo feed — this configuration would be used for mixing to a format such as Dolby *SR D*. As before if the SURROUND button is selected along with the OUTPUT button, the Small Fader will receive a pre- Large Fader signal post processing.

A B C D master modules

The console is supplied with two A B C D Master modules — each providing control for two stereo buses. The module contains four identical control sections arranged in a column allowing level adjustment (±10 dB), tone On/Off selection following Group selection at the oscillator, and Solo/AFL. A scribble strip is provided for each section.

Monitor input and format module

This module is divided into two halves: the upper section deals with the monitoring format, the lower with monitor inputs. Eight monitor sources can be selected either individually or summed depending on the pre-selected operating mode. Source selection is from eight illuminating buttons as follows: 8-TRACK EXTERNAL 1, 8-TRACK EXTERNAL 2, 4-TRACK 1, 4 TRACK 2, MULTITRACK 1-8, MULTITRACK 9-16, MULTITRACK 17-24, and A B C D Each 4-Track input is provided with individual TRACK ON/OFF buttons. The monitoring will be either post Bus or Tape depending on machine switching from the Recorder Control Panel.

Each input can be given a monitoring format as required — for example 4-Track 1 = LCRS, 8-Track 1 = LR, LR, LR, LR. A total of 99 stores are provided for saving and setting formats, the first eight of which can be accessed from dedicated keys to allow easy set-up of regularly used configurations. The remaining stores are accessed via cursor control. Formats can be set on an individual basis or summed to all the inputs. As an input is selected, its currently set format is displayed in the LCD display at the top of the module.

The outputs of this module are selected from the External to Monitor section where the bottom button has been designated for the purpose and labelled MONITOR MATRIX. The Monitor Input and Format Module have eight outputs; on the standard console only the first four of these are monitored by the External To Monitor section, so if full 8-channel monitoring is required, an optional monitor output module must be supplied — this would be necessary for monitoring LCR with Stereo Surround.

Recorded control panel

The machines already mentioned under monitoring — two 8-tracks, two 4-tracks, and a 24-track — can be controlled from this section. On ▶

the right-hand side of the panel are four columns of switches — SAFE, SYNC/REPLAY, CUT, SOLO, RECORD ON/OFF, and BUS/TAPE — which directly control the machine assigned from the MACHINE SELECT buttons. The way in which these switches function is governed by additional Mode selection: 2-Channel Stereo, causes the switches to operate as stereo pairs, so for example if an 8-Track machine were selected each switch would be controlling a pair of tracks, that is 1/2, 3/4, 5/6, 7/8; if Mono 5-8 had been selected, the switches would act upon single tracks. As with monitor input selection the 24-track machine is broken down in eight track groups (1-8, 9-16, 17-24) to allow control, but in some cases it may be easier to perform switching from the I/O modules in the normal manner; this would also mean that monitoring would have to come from the channel strip rather than the Monitor Matrix Panel.

Other features on the panel include Auto Monitor which caters for machines that do not have Auto Input switching during record, Master control of Record On/Off, Bus/Tape switching; and a Preset of Bus/Tape selection. There is also a LINK Key for use if more than one panel is fitted to the console — that is multi-operator consoles.

The computer keyboard RECORD key can additionally be used for record commands to the selected machine, and automated drop-ins will also perform as normal. No machine though will go into record without the RECORD ENABLE button being selected first.

Joysticks

The two joystick controls are accessed from mono inputs on the patchfield and four outputs are normalled to the main LCRS output bus. There are in fact a full eight panned outputs available at the patchfield, and outputs 5-8 of each pan have been normalled to Bus Inject points for the AB and CD stereo buses. Each pan can be selected to one of eight output modes ranging from 2-channel LR to 7-channel L, ½L, C, ½R, R with Stereo Surround. A box display indicates the selected mode by positioning LEDs around its periphery, while the position of the pan is indicated within the box. The two Joysticks may be linked so that the first controls the second, and a delay of up to 5s is available. Movement of the controls can be automated by the *G* Series computer, although at present there is no null facility.

Other matters

MAIN LEFT, CENTRE, RIGHT, and SURROUND MONITOR CUT buttons are provided, and a switchable insert has been included for the LCRS matrix. Provision is made for 22 option switches of which the following are fitted as standard — CHANNEL IN TO METERS, MASTER READY GROUP, MASTER CUES CUT, SOLO 0 AND CUT 0, SOLO LINK, VCA TO MONITOR INHIBIT RHS (CHANS 25-48), CHANNEL INPUT FLIP RHS (CHANS 25-48). The original Stereo 5 position on the External To Monitor selector has been replaced with a film encoder's Left Total and Right Total outputs. The new features are well supported and clearly marked on the patchfield.

Options

All *G* Series options are available and *Ultimation* is supplied as standard. Patchable VCAs and Split Cues are not fitted. EQ can be supplied in two formats — *G* Series or *E* Series. Other items such as VCA controlled automated graphic equalisiers, Dolby CAT 43 noise filters, and telephone filters (TleFX) may be optionally fitted; the console can be supplied for multi-operator use.

Conclusion

The *SL 8000* provides an extremely flexible all-round mixing console, which retains familiarity whether it's used for post-production work or for multitrack music recording. The console's ability to function in so many different ways should satisfy the most demanding requirements. With the proliferation of A/V formats, and anticipated growth in the audio for video marketplace — a multi-format console like the *SL 8000* makes a good deal of sense.

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Barry Fox

DTI's Press Office; DCC text copying; and are you a hummer?

The DTI, which administers government grants for firms exhibiting at overseas trade fairs, says it is trying to make the rules of the game simpler.

The new rules came into force on 1 April 1992. One aim is to give trade associations greater freedom of choice in how exhibition grants from the DTI are spent.

The present 50% subsidy level remains, for space and stand construction costs. Administration grants will be introduced to help sponsoring organisations make arrangements for exhibitors. The level of travel grant support will be increased for events outside Western Europe.

The DTI pledges that its fairs and promotion branch will 'streamline' administrative arrangements. This is to be split into two units, one concerned with the administration of grant support and the other with providing exhibition project management services. There will be fixed grants towards the cost of space and construction, and greater freedom of choice for sponsoring organisations to negotiate directly with exhibition organisers, contractors and constructors.

Currently the DTI spends £13 million a year, providing support for around 7,000 British participants in over 300 overseas trade fairs. The DTI reckons the new arrangements will reduce administration costs and leave more money for exhibitors.

All this comes out of the report of a Rayner Efficiency Scrutiny Review. Anyone interested could buy a copy, for £10, from the DTI's Library and Information Centre at 123 Victoria Street, London SW1E 6RB.

Some audio industry firms speak highly of the grants system; others complain of bureaucracy. Sometimes those who complain have not learned the rules of the game. My experience of the DTI Press Office, over a period of 20 years, is that it is all a question of luck. The luck is in dealing with someone who has been in the job just long enough to know it, but has not yet been moved round in the DTI's mad-hatter's tea party of department job-swapping.

Sony boss Akio Morita was in London earlier this year, to give a lecture sponsored by the DTI. I have met and interviewed Morita many times over the last 20 years, but he visits the UK only occasionally now. So it was a rare and welcome opportunity to hear his latest thoughts.

Unfortunately Sony relied on the DTI's Press Office to send out the invites — and failed to check with the DTI on where they had been sent. I was just one of many people, including policy makers inside Sony and trade magazines, who never heard about Morita's talk until after it was over.

The DTI Press Office's handling of the Morita affair left a lot of people reckoning they had a better understanding of why British industry is in such a mess.

Nostalgia is all very well but I thought publicity for 'glamorous' female vocalists had gone out with the 40's and 50's. Since then it has mattered more whether a vocalist can sing.

Sadly not always. 'Gala line-up, including Kenny Baker, Tommy Whittle and glamorous vocalist Sheila Southern' promised The Guardian newspaper in its listing for a concert by the Don Lusher Big Band at Croydon.

Why not also promise 'dapper' trumpeter Kenny Baker, 'handsome' tenor saxist Tommy Whittle and 'dashing' bandleader Don Lusher?

While on the subject of vocalists, surely that extraordinary bootleg tape which is circulating the industry cannot really be of Linda McCartney? I went to one of McCartney's concerts last year and was bored stiff by the samey sound. There was no horn section, just synths proving that synths programmed to sound like horns are no substitute for the real thing. What a sad let-down after the Who's concerts with full blooded horn section.

Although wife Linda McCartney was there on stage, singing and playing keyboards and banging a tambourine, very little of her sound came through. After the concerts the word went round that some naughty engineer had taped the feed from Linda's mic to explain why she was held so far down in the mix.

The tape that is now going the rounds captures an absolutely excruciating out-of-tune female voice. Words cannot describe how bad it sounds. Far in the background you can just hear Paul singing Hey Jude. I cannot believe that he would allow someone so plainly unable to sing to sing with his band.

So if it is not Linda on the tape, who is it? And who has perpetrated this cruel hoax?

On the face of things, if the record companies charge the same for prerecorded DCCs as premium CDs, the public will just buy CDs and copy them onto blank DCCs bought at less than £5 a time, for example for use in a car or portable player.

Here both Philips and Polygram put great faith in the text facility, and Table of Contents for fast access, as a deterrent to home copying. The TOC will let a DCC player search out tracks quickly, by switching sectors to find the shortest fast wind route to the selected track point. The text mode will provide track and artist identification, and later karaoke.

Polygram says, and Philips has now confirmed, that when a digital copy is made of a duplicated cassette, neither the text code nor the TOC will copy across with the music.

To the best of my knowledge this very important point has never been brought out. The copy-proof nature of the TOC even came as news to many people inside Philips who are close to the DCC project.

The first DCC players will have a 12 character display on the front panel. Future players will have a video output to let a TV display 21 lines of 40 characters. Most interesting is the intermediate plan for a remote control, like a VCR remote, with LCD panel which displays two 40 character lines. This can be used to identify tracks or display karaoke lyrics.

> Philips put great faith in the text facility

UK readers may have seen some media coverage of an odd story I have been following for at least ten years. 'Hummers' are people who can hear low level, low frequency noises. At best it is a curiosity. At worst it drives sufferers to suicide. And the authorities simply pass enquiries round in circles, with Health Inspectors unable to comprehend the problem because they cannot hear the noise — usually a very low pitched throbbing drone, most noticeable in the still night hours.

There are any number of theories. Almost certainly many hummers are suffering from low frequency tinnitus, a disorder of the ear which usually causes high pitched whistles. But as anyone who has had a hospital ear test will know, these tests are designed to check serious hearing defects, not low frequency, low level subtleties. The noise floor of the test room is likely to be higher than the perceived noise. Also it may be that low frequency tinnitus is triggered by low level sounds.

The other pet theory is that hummers are hearing sound from the distribution network of high pressure gas pipes which now criss-cross the UK. Natural gas is pumped by turbines down underground pipes. The noise of the turbines may propagate and resonate.

I first got interested when I heard some odd noises and then learned that digital music recordings made in a local chapel suffered from spurious noise. I used an early Betamax PCM system and picked up some sounds which showed up on a spectrum analyser as peaks below 50 Hz induced hum. In those pre-DAT days, digital recording on location was awkward. None of our results could prove what people were hearing, or thinking they were hearing, or where it was coming from.

After a long fight, sufferers have finally pushed the government's Department of Environment into funding some research. The grant is so small, just £50,000 over two years, that it looks suspiciously like a DoE fob-off. So I have a idea.

Has anyone in the studio business found unexplained low frequency noise on their tapes? If so, dub off a short section onto DAT cassette or better still CD-R, and send it to me along with a note of time, place and date of the original recording. If you can run it through a spectrum analyser, all the better.

I will report later on any significant results. ■

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Martin Polon

Our US columnist on ways to protect your hearing outside the studio

Jack Albright was a clever and promising lad or so his boss at Magnum Recorders would always tell him. He had been with the studio for more then ten years and he now approached his thirtieth birthday with some trepidation. Ellen, his girlfriend-cum-fiancée, expected them to marry when he turned thirty. That seemed alright with Jack. He knew that he loved her. He even thought that he wanted to have some kids. No, that wasn't it. It was money that he was worrying about.

They paid him well at Magnum and he had risen to the status of second mixer. He also knew that Bob Hatch, the first mixer, had been solicited by Island Post to take over their busy and profitable post-production facility. That would give him the plum job of first mixer. Then he could tell Ellen 'yes', without a worry in the world.

Or almost without a worry. He had been asked by John Morgan, the genial owner of Magnum Recorders, to see an otologist — Dr Morton. He knew of Dr Paul Morton by reputation only. The ear specialist had made a name for himself treating rock musicians who had damaged their hearing while performing. Jack wasn't especially worried about the ear examination and audilogical testing he was about to undergo. Everyone at Magnum had the examinations and in fact most of his friends at other studios had been examined as well. It had something to do with the changes in government standards and the uniform regulations being adopted for on-the-job safety throughout the industry. They called it 'baseline threshold testing'.

'Genial John' had said his work injury insurance carrier had asked him to have his employees and himself tested. Recording studios were considered a high risk employment category for hearing damage. Jack chuckled over the boys at Platinum Sounds, who had been selected to take part in an experimental programme. They all wore audio dosimeters, like miniature recorders. The devices reminded everyone of radiation badges and the fellows took a lot of kidding at McGee's over a beer or three.

He was not exactly nervous about the tests as the fateful day arrived.f It was more a sense of general unease. He had noticed how much higher he ran the monitors now to hear. He thought it might have been the ageing of some component in the booth monitoring system. He was more concerned about the fact that he had a spot of difficulty in hearing spoken conversation. Nothing really dreadful, mind you but there were times when he could not hear what was being said.

Dr Morton was very calming to Jack. He conducted a complete otological examination of both ears and had his staff audiologist perform a sweep of Jack's hearing. After all of the procedures were completed, he and Jack sat down in the doctor's spacious office. 'Jack', Dr Morton began, 'I have to tell you that there has been some damage'.

'How much?' Jack blurted out.

'A fair amount', the doctor continued. 'It would seem that there has been some hair cell death and the result is a definite notch in the range of 1500 Hz. What puzzles me is that the notch is greater and in a different place than that of any of your cohorts at the studio.'

Jack trembled with concern. 'I am very careful to avoid monitoring in the studio at high levels. I even use ear plugs on some sessions and I always watch the sound pressure level meter hung near the monitors.'

'Do you have any other exposure to high sound levels,' the good doctor queried gently.

Jack replied, 'Only the Walkman I use daily when I ride my bike for exercise. Being in the business, I have to use the best equipment. I have a pair of really powerful professional headphones. Oh, and then I do have a super CD sound system in my car. Five hundred watts of power. Boy, does it sound great!'

There you have it, gentle readers! Another tale of woe befalling the innocent. Or perhaps the not so innocent. Any guesses as to the future of Jack's promising career? Not too many employers want the potential liability of having someone on the job with damaged hearing especially where they have to make mixing decisions based on that hearing. Not to mention the problem of obtaining the necessary workman's compensation coverage for that individual.

It is not surprising that a large number of those employed in the field of audio have a varied and enthusiastic interest in music outside the studio. But, unfortunately, that complicates the potential for hearing damage on the part of those who work in the studio industry. Audio practitioners generally respond to their home, activity and automotive listening environments in three ways. The possession of the very best audio equipment is frequently a prerequisite to their being part of the 'club'. A recent study confirmed the home monitor phenomenon in a peculiar way. A number of audio practitioners were queried as to their home audio equipment preferences. The results were quite different for those under 40 years of age. The younger mixers all possessed the very latest and largest in amplifiers and speakers. Almost to a person, they echoed the phenomenon of buying and then replacing the latest gear when something newer became available — just as the top studios do. The older mixers were almost all satisfied with high quality equipment but at a lower power and at a greater longevity. It was curious that the over 40's wanted to own an acknowledged 'great' piece of equipment — however old it would be. The younger mixers wanted the newest and the biggest.

Secondly, the conscious need to boost levels equivalent to that used in the studio is a frequent imperative. Conversations with numerous mixers have validated the theory that audio professionals will try to listen in their homes at the same approximate level they use in the studio. That is complicated by the fact that many professionals bring their work home and frequently try to have the same or similar speakers with equivalent monitor electronics. The advent of the DAT machine has certainly made a digital 'dub' off of the master tape accessible for out-of-session listening. The stock answer from mixers about their home listening levels, especially when monitoring a mixing session, is that 'this is how I hear'. The feeling is that 'if I listen at the studio at this level, I need this level at home to hear the same things'.

Third, there is also a kind of natural selection going on, with those hearing damaged either on or off the job — raising the levels at the alternative venue to compensate. If hearing damage has already occurred and in-studio mixing levels are regularly boosted to make up for the hearing loss — the same thing is going to happen at home and in the car and with a 'Walkman' type unit. Of course, this keeps going on and on until the level of damage becomes severe enough to interfere with both employment and the quality of one's life. A standing joke amongst young hearing damaged rock musicians during the 1970's was how high they set loudness for on-stage monitors. 'There are two positions — off and loud,' was the standard gag line. Not so funny these days, in retrospect.

There are those in our industry who would suggest that some if not all of these responses are a male phenomena, perhaps some drive towards producing excessive acoustic wattage directed by the extraordinary production of C19 H28 02 or testosterone, as the male hormone is known. A female engineer of some repute understands the phenomena but isn't sure it is limited to the guys. 'When I first became a second [engineer], I didn't like how loud all of the studio monitors were set for. It was a big macho thing to the guys and I had to go along with it. Then, as I worked my way up to being a first [engineer], I realized that I liked it. It was like getting a high. A really good passage on playback at high levels would give me a rush especially if I had mixed it. So, I think it is the hormone thing, but not sexual. It's all that adrenaline that kicks in.'

All of this becomes much more of a problem due to the cumulative effect of hearing damage. The basic dynamic of sound exposure time on the job being balanced by ear recovery time off the job has been to a great extent thrown out of the window. For example, even if the basic exposure guidelines are followed and eight hours at 85 or 90 decibels is adhered to, several more hours at home or in a car may be spent listening to music at the same or higher levels. The amount of quiet time available for ear recovery is reduced accordingly and the opportunity to cross the unique and different damage threshold for each individual is increased.

Ignorance of the levels reached in the off-the-job listening environments further complicates the potential for damage. Even if the studio engineer is aware of the need for recovery, the concept of the home or auto listening environment being equal to or even exceeding the studio potential for high level sound exposure, frequently is missed. ▶

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In fact, many engineers/mixers still treat high SPL (sound pressure level) exposure as if it were one of the great mysteries of life.

Curiously, the problem of incurred damage from home listening environments is a new one for our industry and makes this problem very much one of youth. Those of us old enough to remember recording consoles with rotary faders and sessions 'laid down' on two-track Ampex machines frequently grumble that 'youth is wasted on the young'. But it also is true that the current combination of on and off the job exposure is almost exclusively the venue of the younger engineer. Historically, one barely had the levels to be dangerous in the studio, to say nothing of the home system. Amplifier power did not become available until the mid-1970's to create a certifiable hearing hazard in both the studio and the home. The Walkman with the high accuracy deposited metal and mylar headphones also dates from about that time. Ditto the true 'balls to the wall' car sound systems. Practically speaking, the current status 'quo' of hearing damage really represents the last ten years or so.

What further complicates all of the issues attendant to the hearing damage and conservation conundrum in the studio and in the home, is the fact that the youth population demographic today is generally hearing degraded by the time they enter the studio workplace. Of course, the seminal study on youth hearing damage is the one conducted by the University of Keele in Staffordshire. University researchers surveyed students between the ages of 15 and 23 who had a history of high exposure to personal stereo headphone usage, rock concert attendance and club 'crawling'. The researchers reported difficulty in finding youth at the University level who could serve as a 'low exposure' control group. The results were not exactly predictable, but alarming nevertheless. No overall loss of hearing acuity was detected in the high exposure control groups using routine measurement techniques but innovative laboratory methodology pinpointed two kinds of degradation. A diminished sensitivity to sound in a particular narrow range of frequencies and a reduced ability to discriminate between two distinct and separate pitches.

We have yet to truly measure the impact of having an entry-level audio practitioner population already exhibiting signs of degradation from previous recreational exposure to amplified music. One current study in progress in the United States seems to echo the University of Keele findings and suggests that not only is there a general youth population problem with hearing degradation but that a kind of 'natural selection' propels those most interested in music into audio careers. These individuals are coincidentally the most likely to be hearing degraded from amplified music exposure. Further, this study has identified in the United States that there is the added problem of damage from recreational shooting and from motorcycle ownership. In fact, a researcher quoted in the prestigious 'Harvard Health Letter' from the Harvard University Medical School in Cambridge, Massachusetts concludes that 'epidemiologically, the most common recreational cause of serious hearing loss is gunshot noise such as rifle fire'.

Finding ways to control the total exposure package is not as simple as it might seem. Industry peer pressure is at work both in and out of the studio. Prestige is frequently found in having a larger system at home than one's competitor. One mixer described the phenomenon thusly. 'Ian installs an 400 watt per channel surround sound system in his living room and his bragging and posturing like some bloody peacock makes me nuts. So I go out and install concrete horns in my house with 600 watts per channel. Did I ever show him.'

The same one-upmanship goes on in car audio systems as well. 'So what does Ian do? He takes his bloody Rover and turns it into a ministudio, complete with mixer and 800 watts of sound through 16 speakers. I didn't follow him on that one, though. I was thinking about it but Ian happened to be playing his Rover at full tilt as he passed a Valley police van. They did not think too kindly of him. I was pleased that at least I got to bail him out!'

Social out-of-studio listening sessions with previously hearing damaged musicians and producers can become a real horror story for the mixer trying to take care of his or her ears. 'I slipped a DAT copy of the session into my pocket and followed the others to the group leader's house. I was pleased to be invited to listen and enjoyed the selection of "designer" pizzettes and imported beers but I became alarmed at how high the listening levels were. 2,000 watts of power into four concert "stacks" certainly could fill the average living room with sound. With a digital source, I could feel the music in my stomach as well as I could hear it. When I suggested that I was concerned about the level, the leader of the group told me that I had to "tough it out with the big boys" if I hoped to work on any more of their project.' Similarly, attendance at a group's concerts 'front row center' is frequently both a perquisite and an obligation. Said one savvy engineer, 'When you mix an album project for a group and they ask you to attend their concert you go!'

The bottom line first, last and always is to protect your hearing at all costs. The best way to control out-of-studio recreational listening is to use the same tools found in the studio. The use of ear plugs at concerts, sound level meters in the car and in the living room and the purchase of top quality personal stereo's with energy limiting circuits (where earphones are used), must be considered as a given. Keep sound pressure levels below the threshold used at work. Common sense will serve to protect the very tools needed in the performance of a job in audio. If you work in audio don't own a motorcycle. Do not engage in recreational shooting unless you are wearing very elaborate hearing protectors. If you are part of a reserve military unit, carry hearing protectors with you. That advice might be useful for those of us who ride subways as well. The ears that you save will support you for all of your life. Just remember that there are tribes in the Sudan where an eighty-year old man has the hearing of a twenty year old in a developed country. The reason is virtually no exposure to loud sound in the daily life of the tribe. ■

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EXPLORING EQUALISERS

In Part Four Ben Duncan continues examining the influence of 'real world' factors

Inductors have some parasitics in common with capacitors, like self-resonance. Without vacuum impregnation in varnish, how can one be sure that the windings won't vibrate in high SPL soundfields, behaving like a dull dynamic mic? At least there's rarely a problem with inductors' leadouts, which are commonly trusty, wire-to-wire soldered joints. Inductors using magnetic cores have all the problems of audio transformers, except they may be excused covering the full bandwidth. *Hysteresis* in the core is the *dual* of dielectric absorption in capacitors. But hysteresis and core saturation are well known evils and should be foremost in the designer's mind when inductors are specified.

Inductors are no more than long wires, conveniently packaged. If the purity and metallurgy of audio conductors really matters, then exotic equipment interconnects are missing the point, unless the hundreds of yards of wire inside the console's inductors (and transformers, as applicable) are treated equally. At least the average inductor's coat of varnish will prevent the conductors' surface from disintegrating into a complex cupro-organic mess after a few months exposure to today's polluted atmosphere — a nasty end that's suffered by many a £200 per metre 'audiophile' cable with plain PVC insulation.

Shielding inductors is a perennial weakspot. The attenuation achieved with a single sheet of affordable (say 18 swg) thickness mu-metal is limited to about 30 dB. Even if an EQ's array of inductors are individually shielded (many are not), pick-up from neighbourhood inductors as well as console transformers (especially unshielded output types) may be enough to be affect sonics; only a small breakthrough residue is needed to enhance the programme's ambience by 'jittering' the system noise floor. This might explain in part the common impression in favour of inductor-based equalisers, as 'inductor-free' resonators are inherently superior at rejecting ambient fields, assuming careful layout.

Focus on band edges

In discussing and designing equalisers, it's easy to get bogged down in their principal business. Yet, if you set all the boost/cut controls at zero, you still have a line level buffer or unity-gain amplifier, with all the considerations this entails. In a recent article [1], the value of maintaining a flat response in the electronics chain well beyond the audio band was illustrated. To recap, LF and HF roll-offs in cascaded equipment need to be broader than they commonly are, to avoid excessive cumulative roll-off and differential LF signal delay at the back-end of the chain. As soon as EQ is deployed, these perfectionist aims can seem dwarfed by practical needs, especially if we think if EQs in terms of their gross response capability. For example, as soon as an EQ having a maximum HF boost/cut of +12 dB above 15 kHz is switched-in, it seems a tad perfectionist to insist on holding the EQ's background HF response (the intrinsic response lying behind the frequency-conscious effects) to within 0, –0.05 dB at 20 kHz. Still, if we're only applying ±1 dB at 3 kHz, the justification for being nonchalent about the EQ circuits' background response is less justifiable.

An EQ's bandwidth may be given only cursory attention at the design stage. It may have started out wide enough, but has become narrowed at the manufacturing stage. Capacitors governing HF response may have been enlarged by a cautious production engineer, to be sure of taming any tendencies towards RF instability in 'Friday afternoon' units. Bandwidth-governing capacitors may have also been rationalised; that is their values crudely adjusted ±100% by the buying department, to fit in with what they arbitrarily buy already, and without informing the designer. If, for whichever combination of reasons, the EQ section's background bandwidth is significantly curtailed at the audio band edges, the recording system's cumulative roll-off is further compounded. Moreover, there will be significant step changes in the amplitude and phase responses and associated signal delay, whenever the EQ is switched in — or out — and even if the EQ is set flat! So the equaliser is capable of creating an audible change that is nothing to do with its equalisation capability *per se*. However, set alongside the accumulated amplitude-frequency imperfections vested in present day systems, no one may ever notice. We'll turn now to look at one of the worst offenders.

Off Centre

When an equaliser's boost/cut knob is set to 0 dB, usually the centre position, users are led to believe that the EQ effect is nil. Faith that the EQ is neutralised is commonly reinforced by psychological means, namely the presence of a centre detent, the 'click stop'. Analogue circuit designers should know better. The resistance value of the pots that most console makers can afford to fit have quite wide element tolerances, typically ±10 to ±20%. For EQ boost/cut controls, this is less important than the electrical accuracy of the centre detent. In practice, the off-centeredness of detents averages 5 to 10%, but varies from under ±2% (for selected, laser-trimmed CP pots) up to ±25% for cheap, unselected carbon specimens. Added to this is the 1 or 2% tolerance of the associated stopper and gain determining resistors. As a rule of thumb, a mere ±6% deviation in these values corresponds to a gain deviation of 1 dB.

For a typical illustration of the outcome, **Fig. 1** plots the amplitude response of a randomly selected channel strip from a highly regarded, middle to up-market console with EQ switched out and in, with the four boost/cut controls set at their centre detent positions. By itself, the slight but broad LF boost of 0.1 dB between 30 and 150 Hz is easily enough to impart a noticeable tonal change (Michael Gerzon's text [2] stresses the audibility of far smaller ripples), while the 0.7 dB HF dip between 2 k and 3.5 kHz will be even more pronounced. These tonal changes occur as soon as the EQ section is switched in, *even if you only want to use only one of the 'n' bands.*

Note that the frequency sweep knobs were set randomly in the positions they were last used in, something everyone does in the expectation that it should not matter, presuming the EQ is neutralised. So the colouration introduced by imperfect detents will be doubly arbitrary, depending equally on the frequency sweep control settings. The ear's sense of pitch (that is the changing sensitivity to different frequencies vs. SPL) adds a third variable. A highly complex situation pertains. Much depends too, on the ▶

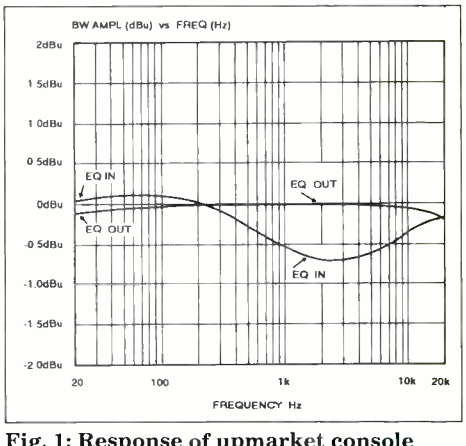

Fig. 1: Response of upmarket console channel, comparing EQ in/out, with all boost/cut set to 0 dB detent

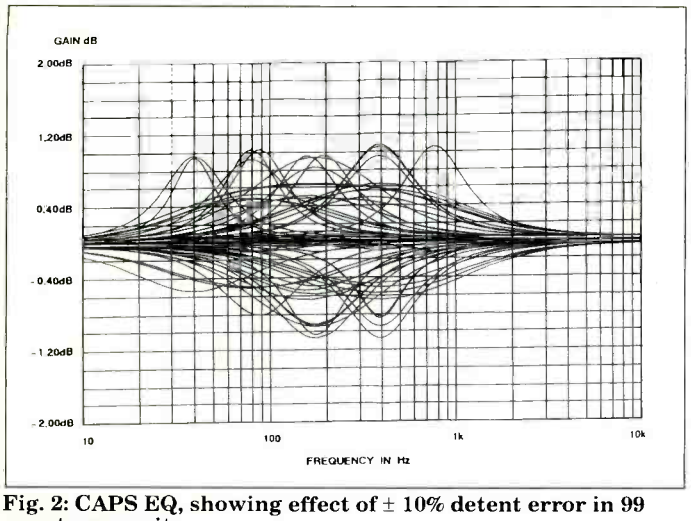

Fig. 2: CAPS EQ, showing effect of ± 10% detent error in 99 worst case units

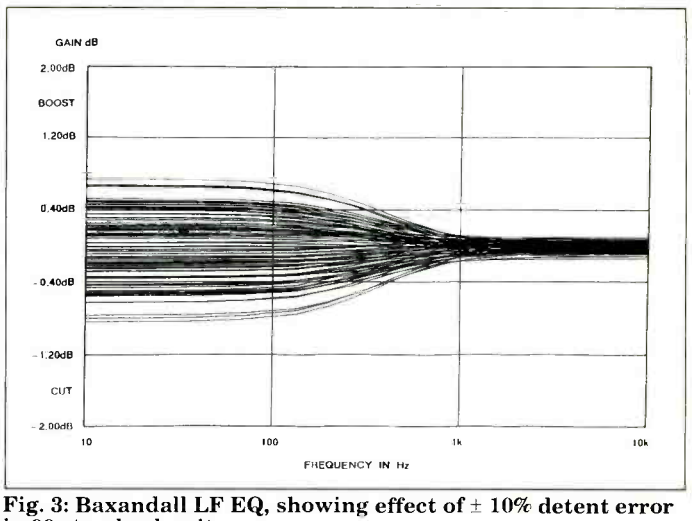

Fig. 3: Baxandall LF EQ, showing effect of ± 10% detent error in 99 standard units

spectra of the instrument(s) being processed by the channel. If the sound engineer happens to have measured the behaviour of each channel's EQ at the detent position, then the frequency sweep controls could be reset to do the least harm, relative to the signal being processed. For example, with HF and LF shelving EQ, you might get into the habit of setting the shelving frequency towards the band edges when they're not needed. It will wreck the band-edge response, but at least steer the 'flat' response colouration clear of the instrument's spectra. Still, being forced to husband dozens of extra knobs is no fun when working under pressure.

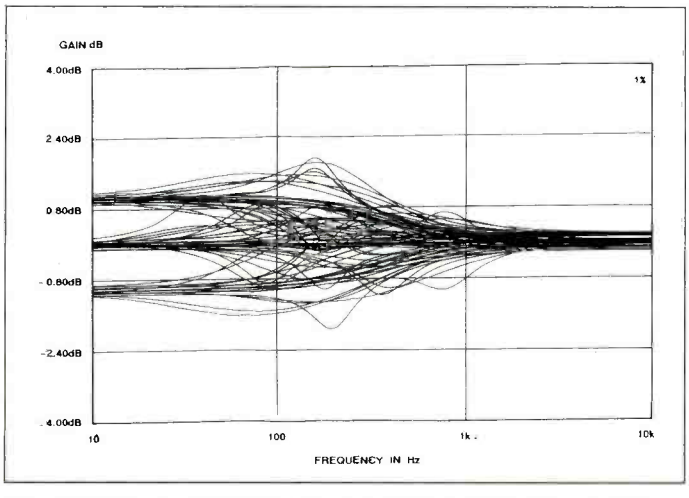

Fig. 4: 10% detent error in a two section LF EQ, showing 99 worst case units

Since the colouration arising from the part of the EQ that's out of use is down to the random combination of component tolerances, with the 'stopper' resistors at the pot ends adding to the pots' own variability, an overview of the severity of the effect suggests measurements of at least ten samples of the 101 different console and outboard equalisers in widespread use. This is where analogue circuit simulation comes to the rescue. Using *MicroCAP-III* software, a desktop PC can 'build and test' hundreds of equalisers per hour, adjusting the component values in successive runs to eke out the worst cases. **Fig. 2** illustrates the worst case variation of 99 single parametric low-mid EQ sections having typical tolerances up to 10% off detent and 1% stopper resistors, using *Monte Carlo* statistical techniques. The simulator has been arranged to *randomly* set the Q and frequency controls anywhere between 0.45 and 3.5, and 50 and 800 Hz respectively, as happens in real life. Other component tolerance variations are not modelled, so this is a conservative model in many ways.

The simulation shows that an individual EQ section is capable of boosting or cutting by as much as 2 dB at the 0 dB detent. **Fig. 3** repeats the procedure for a ±12 dB Baxandall LF shelving EQ, except a normal (Gaussian) distribution has been used. Here, the worse deviation is somewhat less at under ±1 dB. With fewer controls and components, there is simply less to go astray. In **Fig. 4**, the two types of EQ section have been connected in series and *Monte Carlo*'ed, to illustrate how the errors stack below 1 kHz, the LF end of a 3- or 4- band EQ. Note that while the worst case deviation is similar, the range of inflexions has increased. The untangling and redoubling of what looks like the *Gaudian Knot* in **Figs. 1 to 4** warns of the potential for random 'micro' equalisation throughout the audio band, that's different on every channel.

Overall, we have a situation where nominally *identical* multiband equalisers can clearly sound quite different, *even if the section(s) actually in use are perfectly matched for gain, Q and centre (or corner) frequency!* The widespread use of mediocre detented pots can be seen as a disaster for pro-audio equipment, bringing its consistency and reliability down to the level of 'consumer grade' packages. The situation has been aggravated by the industry's weakness when it comes to twisting the arms of potmakers, who with few exceptions have had an unwillingness (until The Wall came down, and since military business has begun to look less secure) to create or innovate more consistent, higher tolerance parts for audio. As we saw in Part One, thoroughly engineered EQ's feature centre-tapped boost/cut pots. The half-way point is connected to ground or some other null point, to help 'pull' the wiper into dead centre if it is anywhere near. Except this begs the question 'which potmakers are capable of delivering thousands of precisely located taps within, say half a per cent, at realistic prices?' As an alternative, the boost/cut controls on some up-market consoles are trimmed on test to be within 0.2 dB of zero (say). This is commendable on the surface, but it's fair to point out that the trimpot used is itself prone to drift with ageing. At least the regular alignment of the 192 presets needed for a 48-channel console with 4-band EQ would be good for friends in the maintenance business!

At heart, the trouble lies in the way that the majority of console and EQ manufacturers provide switches that unsubtly let you have either no EQ, or all of it at once. Assuming each EQ section has its own op-amp buffer, undesirable colouration (as well as noise) could be done away with altogether by arranging a switch to operate at the centre detent, to bypass the section, thereby positively removing any and all EQ bands that are not in use. In the meantime, readers may like to check their neighbourhood consoles for detent errors. The starting point is to set all EQ boost/cut controls to 0 dB. The console routing needs to be set to feed pure pink noise into every channel, and to enable every channel to be monitored individually. A 1 kHz slate will need to be used initially to normalise levels (ideally well within ± 0.05 dB) on every channel, because small level differences confuse tonal judgement. Other than differences between channels, individual detent effectiveness can be checked by sweeping Q and ▶

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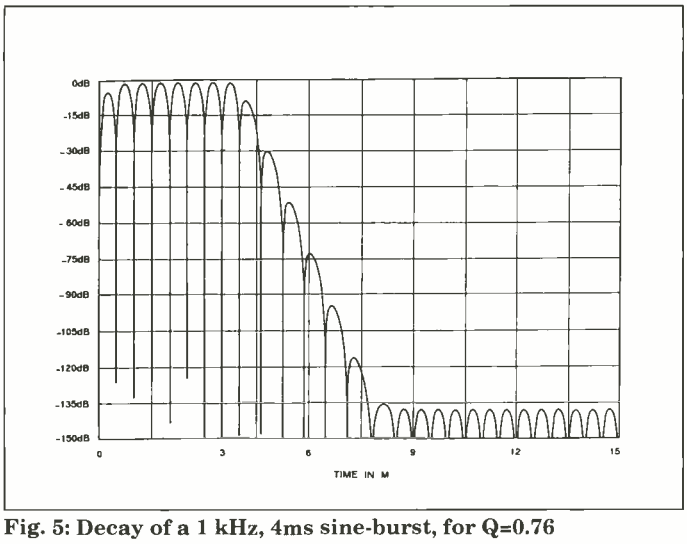

Fig. 5: Decay of a 1 kHz, 4ms sine-burst, for Q=0.76

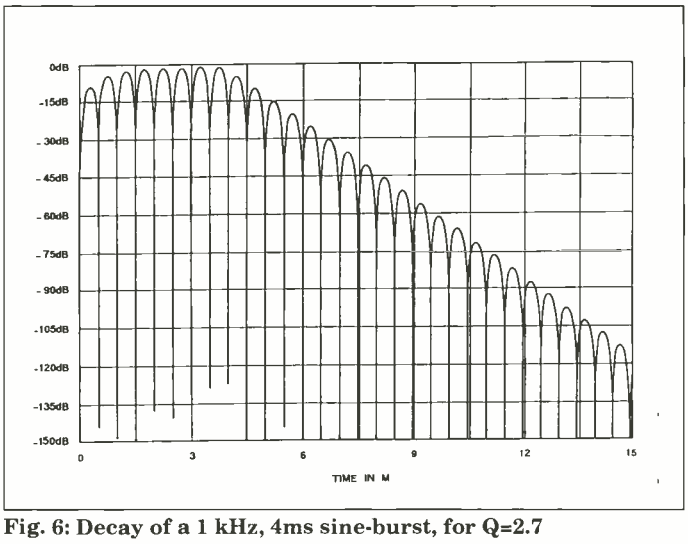

Fig. 6: Decay of a 1 kHz, 4ms sine-burst, for Q=2.7

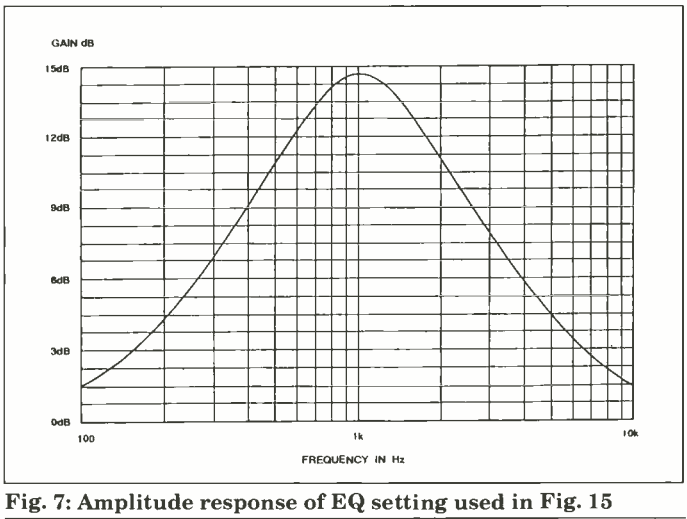

Fig. 7: Amplitude response of EQ setting used in Fig. 15

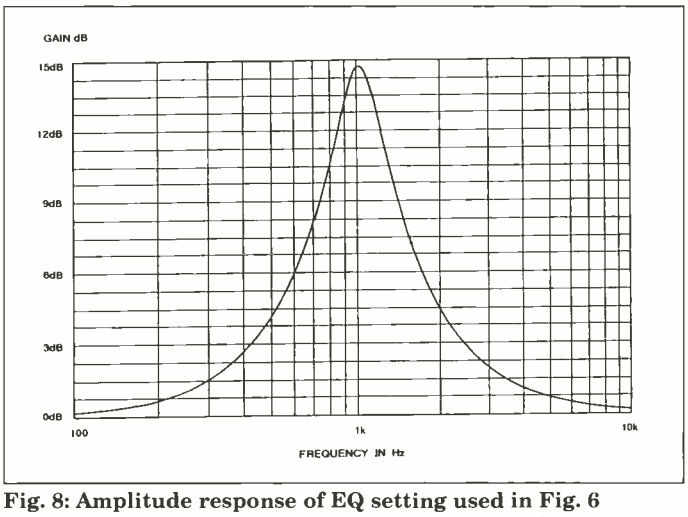

Fig. 8: Amplitude response of EQ setting used in Fig. 6

frequency controls. Pink noise at some 95 dB SPL is a very sensitive test, and with a perfect detent, there should be no audible change.

To complete our survey, it's time to return to Q. To recap, a key property of reactive components (that is capacitors and inductors) is to discriminate according to frequency or *periodicity*. This carries a penalty in the inverse dimension, that of time. Capacitors and inductors achieve discrimination by temporarily storing and releasing energy. Q is a measure of this. Mathematics dictates that an ideal single pole (lowish Q) bandpass equaliser decays to 37% (–8.7 dB) of its initial value in Q/π cycles. The rate of storage and release at the heart of frequency discrimination are fixed, and cause the response to events at any EQ's output to *lag behind the stimulus*, the lag varying with frequency. If the stimulus stops abruptly, the output takes time to react to this, and must initially continue rising for a period of time, before decaying.

A circuit free of reactance (for example with zero stray capacitance to everything else) cannot be built. Fortunately, the stray reactances (and any frequency compensation) built into ordinary circuits are nearly always small enough for the accompanying decay and delay to be wholly insignificant. Consideration of the audibility of delay and decay effects is valid as soon as reactive components are scaled up in value, to create audible tonal changes. *This is true even when equalisation is used to cancel an opposite phase/amplitude characteristic in the source,* for example, to get a realistically full sound from an instrument to overcome compromises in the microphone and mic placement. In this sense, all EQ degrades.

As discussed in Michael Gerzon's article [2], ▶

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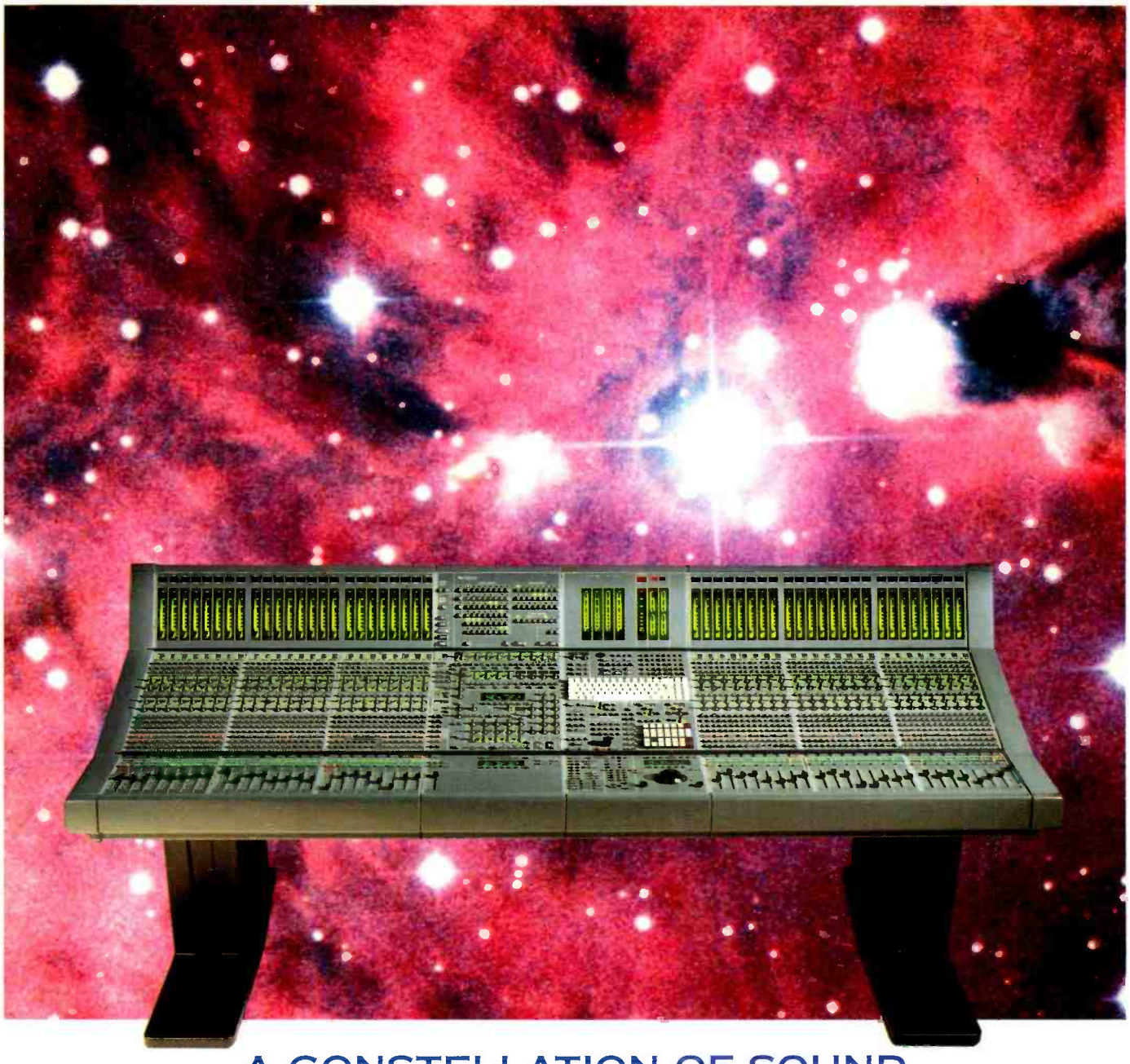

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signal impulses passed through an equaliser begin to oscillate about zero when the circuit's Q is above 0.5. Q's a little higher, as much as 0.6 (corresponding to a *Bessell* response), are just passable to the ear. Considering the *Haas* effect, we can expect any circuits (all *post* for the EQ circuits in common use) that leave significant artefacts *beyond* the ear's 40 ms window will be percieved differently. Gerzon suggested the use of a compressor to make decays more audible. Looking for low-level (< –100 dB) artefacts with real logarithmic amplifiers is notoriously prone to error. Only 1 μV of DC offset or RF will mask or interfere with decay residue below –100 dB; DC is significant, as DC blocking capacitors are ideally stripped away from the circuit, to preclude them interfering with the results. Again, simulation with *MicroCAP-III* comes to the rescue, as one fairly simple circuit can model the burst generator, the equaliser *and* a log amplifier, whose accuracy is maintained (somewhat hypothetically) down to –600 dB, in a regime that's free from noise!

Figs. 5 and 6 show the outcome of driving an EQ circuit set to give +14.7 dB at 1 kHz (**Figs. 7, 8**), with a 1 kHz, 4 ms (4 cycle) sine burst. Showing the decay for Q's of approximately 0.7 and 2.7 respectively, the results are being viewed in the time domain with a log (dB) scale. For readers unfamiliar with viewing log plots in time, both positive and negative peaks of the sine-wave are at the top, between which the plot dips to $-\infty$ dB at the sine wave's zero crossing point. The stimulus begins at T=0 on the left. After a few cycles, it settles at its peak level of 0 dB. Then at 4 ms, the sine wave stops. All the output after 4 ms is decay.

Looking closely at **Fig. 5,** the decay rate is about –37 dB/ms, and it takes just 3 ms to drop to –100 dB below the peak zero level (0 dB). If we take –100 dB as a rough threshold for audibility, then with a Q of 0.75, 1 kHz is taking the order of 3 ms to vanish after a high level passage or note ceases. The ear doesn't have too much of a chance to notice this. For the same Q and boost setting, but a 100 Hz centre frequency and 100 Hz sine-burst, it will be proportionately longer, at 30 ms. Over this period, the ear's receptivity will have changed, we can see that the longer decay that's characteristic of LF equalisers will be perceived differently to MF and particularly, HF equalisation. In a nutshell, *bass EQ lingers longest* or BELL!

Completing **Fig. 5,** the residual sine wave below –135 dB is just the breakthrough across the muting switch. It would be easy to fix this in the simulation, but it has been left to illustrate just one of the limits in real log measurements. Turning now to **Fig. 6,** the Q (at 2.7) is now about as high as one would want to use in most cases. Decay is about –10 dB/ms, or about four times slower than the Q of 0.75. Now the decay to –100 dB takes nearly 12 ms, and so the ear has longer to catch the aftertaste of every transient. The big question is, do different equaliser topologies perform differently? In a sense, yes, because the decay rate can vary to a surprising degree unless the Q's and boost/cut settings are very closely matched. As it's difficult to describe the 'fit' of two different EQ's plots, the first requirement is a measurement unit for a given frequency/gain pattern — or Q-gain singularity. In another sense, there are no differences: all ordinary (that is minimum -phase = 99.8% of) equaliser topologies give the same results, if you model a first order circuit, which omits many of the component errors discussed earlier. What happens when inductors' hysteresis and capacitors' DA and transmission-line properties are fully modelled isn't yet known (anyone with an idle *CRAY-II*, please contact the author!). At least with the bench-mark of matched decay plots for different topologies based on their first order circuits, the way is now open to including these second order component errors and pin-pointing their efforts (if there are any), both *per se*, and in the different equaliser topologies, via the double-edged analytic scapel of DSP/simulation.

Analogue equalisers are more critical and complex than the majority of audio circuits. There is more to go wrong, more scope for variation, and more dimensions for that variation to be manifest in. Apparently small variations across the manufactured population of a particular EQ can have surprisingly chaotic effects on measured response. Poor design and layout can exacerbate subtle, ideally latent effects, like microphony, temperature sensitivity and breakthrough. Add all these together, and it's unlikely that any two equalisers measure near enough the same, let alone sound the same.

Examined on a microscopic level with today's PC-driven DSP and Simulation 'scopes', analogue equalisers sail close to chaos. With these same tools, and the latest psycho-acoustic knowledge, the way is now open to designing a new class of analogue EQ, which achieves high sonic quality with economy. Meanwhile, in the territory that borders on chaos, the outcome of simple comparisons and changes is often counter-intuitive. To anyone trying to decide which console has the best EQ (to their ears), or trying to get the best out of a given EQ — there's a lot you need to know to avoid being tricked.

Remember, EQ sonic quality is multidimensional problem. Like the iceberg, most of it is under wraps. Discussing only the Q and phase response is like a surveyor obsessed with measuring the height and slope of a house's roof while neglecting to consider subsidence and interior decay. Only now, the wraps have been tugged back a little. ■

References
1 Ben Duncan, 'The Signal chain', *Studio Sound,* June 1991.
2 M. Gerzon, 'Why do Equalisers sound different?', *Studio Sound,* July 1990.

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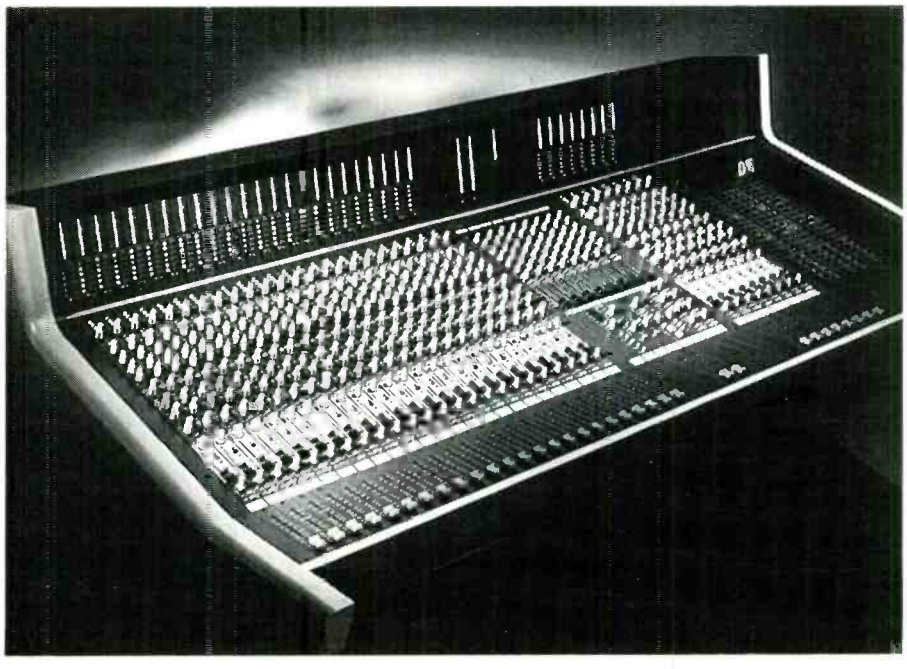

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1 x CANFORD AUDIO STUDIO TABLE	£150

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February First delivery of the **Stelladat** in the US.

Development of the software version 1.5 of the **Stelladat** human interface menu system.

March Celebration in Neuchâtel for the launching of the first 100 **Stelladats** production batch.

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During the AES in Vienna, presentation of the **Stelladat** Time Code hardware module.

April First delivery of the **Stelladat** Nicad and AC charger power supplies.

Development of the **Stelladat** 4-channel mixer and the fast charger for Nicad power blocks.

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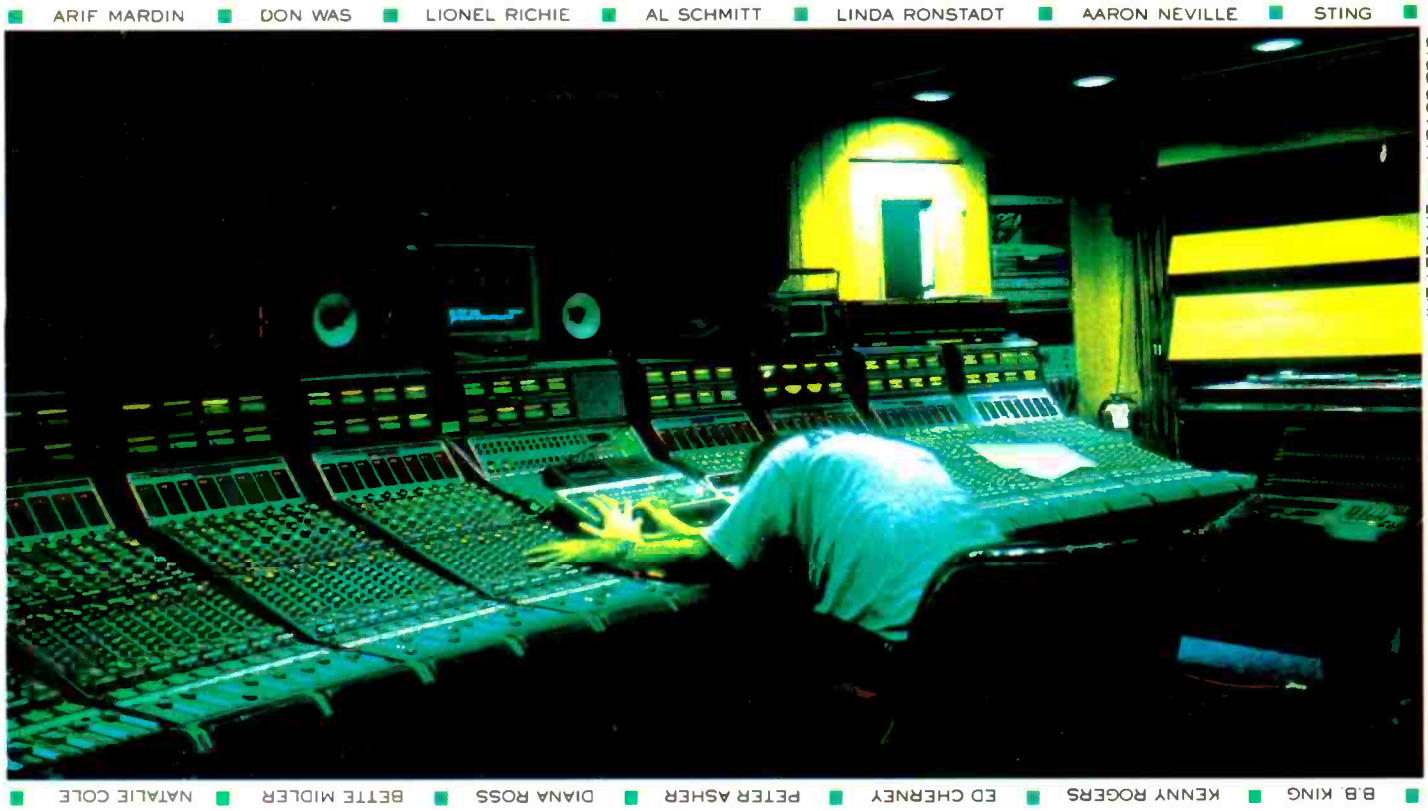

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