

January 1989 \$5.00 £2.00

STUDIO SOUND

AND BROADCAST ENGINEERING

STEINBERG PRO-24 III POOLSVER.SMG | 1772 Blocks free

17 18 19 20 21 22 23 24

Tempo: 200 SYNC: INT.

RECORD PLAY

20 / 2 / 0

0: 0: 23

STEINBERG PRO-24 III POOLSVER.SMG | 1772 Blocks free

1 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Track: 1_ NONAME_

Tempo: 200

Patt.: 1_ vvibes_

1 / 1 / 0 257 / 1 / 0

RECORD PLAY

20 / 2 / 0

0: 0: 23

STEINBERG PRO-24 III POOLSVER.SMG | 1772 Blocks free

1 2 3 4 5 6 7 8 9 10 11 12 13

ON ON ON ON - - - ON ON

QUANTIZE: OFF Functions

Mode: Record A B C D

MIX -- MIX -- MIX -- MIX --

1 2 3 4

CYCLE LEFT LOCATOR RIGHT LOCATOR

AUTO-REC 1 / 1 / 0 17 / 1 / 0

ZERO DEST.: 1 / 1 / 0

Track: 1_ NONAME_

TRACKINFO RECALL BUFF.

CUTCOPY BUFFER

Patt.: 1_ vvibes_

1 / 1 / 0 257 / 1 / 0

STEINBERG PRO-24 III POOLSVER.SMG | 1787 Blocks free

4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

ON ON

MIDI & AUTOMATION

OFF Functions

Record A B C D

Track: 1_ NONAME_

TRACKINFO RECALL BUFF.

CUTCOPY BUFFER

Patt.: 1_ vvibes_

1 / 1 / 0 257 / 1 / 0

Tempo: 200 SYNC: INT.

SOLO

Master: OFF MODE: SEQ

LEFT LOCATOR RIGHT LOCATOR

1 / 1 / 0 17 / 1 / 0

RECORD PLAY

20 / 2 / 0

STEINBERG PRO-24 III POOLSVER.SMG | 1772 Blocks free

1 2 3 4 5 6 7 8 9 10 11 12

ON ON ON ON - - - ON ON

QUANTIZE: OFF Functions

Mode: Record A B C D

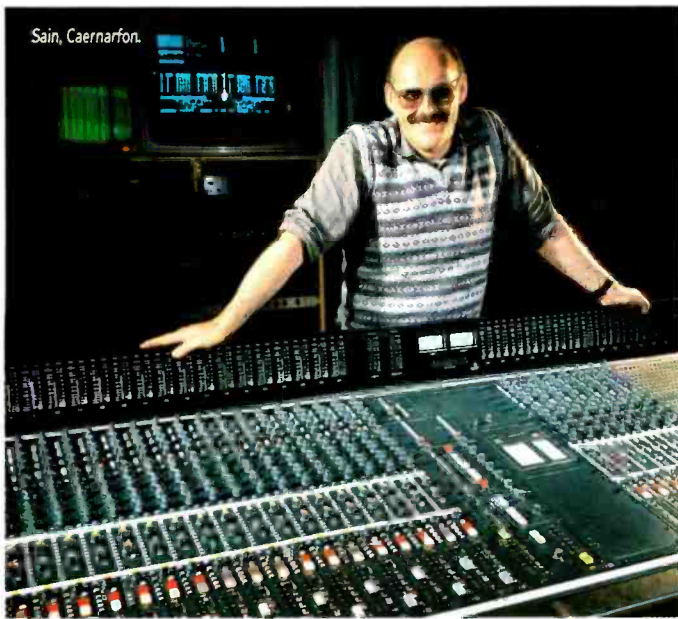
MIX -- MIX -- MIX -- MIX --

1 2 3 4

CYCLE LEFT LOCATOR RIGHT LOCATOR

AUTO-REC 1 / 1 / 0 17 / 1 / 0

ZERO DEST.: 1 / 1 / 0



Listen to the business end of a TS24.

Four successful studios.
And one choice of console.
As you can see, they speak for themselves.

Robin Black, Black Barn: 'Since we opened we've handled everything from instrumental work to Motorhead and they've all loved the desk. I wanted a console that was extremely versatile and easy to use without complications: and the TS24 with a Saturn made a great package. The EQ is first class, and the reputation combined with Mastermix means it sells itself.'

Brian Masterson, Windmill Lane: 'We've had our TS24 three years now. I really do like the sound - it's so neutral. But it's the operational design that's best: it

never gets in the way, the EQ's very comprehensive, it's easy to get your sounds, and it's the simplest board to bounce tracks down on. The signal flow concept and global switching is the way I like to work. We've had the Waterboys and U2 in recently and the TS24's a great asset when you're handling a wide variety of music.'

Bryn Jones, Sain (Recordiau) CYF: 'We needed a desk to keep up with the needs of independent TV post production and the TS24 is excellent for this. The main feature for us is its flexibility: essential for our work which includes rock, male voice choirs, folk and TV. We've only had two free days since we opened in

March 1987 and with Mastermix, it's a very well thought-out combination.'

Tony Millier, TVI: 'We had to go to 24-track to keep up, and everything's there on the TS24 for very fast work. You can re-configure very quickly indeed because there's virtually no need for re-patching. I'd say it was an informed choice - but after a couple of months with it I realised there was even more to it than I first expected. A great package.' For more details and a brochure on the TS24 in Line console, call Steve Gunn at Soundcraft.

Soundcraft
TS24

STUDIO SOUND

AND BROADCAST ENGINEERING



Greenwood's main studio

Editorial:	Keith-Spencer-Allen reflects on the brighter side of life at the Los Angeles AES Convention	5
News:	Events, news, moves and comment from inside and outside the industry	13
Products:	Information on new products, developments, upgrades and software updates	15
Music news:	Products, updates and developments from the other side	21
US News:	Electro Sound seminar . . . Installations . . . In brief . . . Personnel . . . Literature	22
Perspective:	US columnist Martin Polon looks ahead to 1992, the inevitable arrival of the United States of Europe and its effect on the audio industry	24
Business:	Recreating Charlie Parker . . . Magnetic tape supplies in Europe. By Barry Fox	29
Audio Tablet:	Yasmin Hashmi describes this Real World Research editing system and its related software	30
Sound at Polish Song Festival:	The installation of a new PA system was part of the celebration of this International Song Festival's 25th year. Kevin Hilton reports	32
Fairlight in the Freezer:	Dave Foister listens to the sound of clogs and the music of the lyre in an ancient Greek stadium and uncovers the Satyr connection	35
Synclavier on the Road:	Tom Miles talks to programmer Christopher Currell and engineer Mitch Marcoulier about taking a Synclavier on tour	40
Which Amplifier Technology:	In the second part of his survey, Ben Duncan looks at more recent developments in Class A-B amplifiers	43
Greenwood/Splash:	Raymond de Lacy visits a studio complex in Switzerland	48
Sound at Donington:	At the UK Monsters of Rock Festival the world's biggest ever PA system went into action. Mike Lethby and Richard Vickers spoke to the crew responsible	54
Realtime Mixdown—the options:	Vic Lennard assesses the various possibilities of MIDI for computer-controlled mixdown	62
Steinberg PRO-24:	A user report on the PRO-24 MIDI sequencing controller version III software by Ralph Denyer	66

Direct to disk from tape ...

Transferring onto hard disk takes time – real time. We all know how expensive that 'drive time' can be, not to mention the operator who's getting paid just to wait around ...



and direct to tape from disk ...

And once the editing is complete, there's still all that waiting around again while the final result takes its time (real time) to transfer back onto tape ...



and eventually to CD from tape ...

Then finally you're ready to take the finished tape along to the CD mastering facility. Still, patience is a virtue they say.

We at Sony believe that this process is just a little long winded and certainly very costly. Why use technology for technology's sake?

or direct to CD from tape.



You can be more direct – Straight to CD from tape, by way of the new Sony DAE-3000 editor.

The versatile DAE-3000 can handle up to four separate programme sources at one time and produce a perfect CD master, no waiting around to load onto disk and off-load back onto tape, no expensive processing time to pay for.

SONY

So find out more about going direct. The Sony DAE-3000 editor.

It's loads quicker!

Sony Broadcast Ltd. Belgrave House, Basing View, Basingstoke, Hampshire RG21 2LA, United Kingdom Telephone (0256) 55 0 11, International +44 256 55 0 11, Telex 85 84 24, Fax G2/G3 (0256) 47 45 85

STUDIO SOUND

AND BROADCAST ENGINEERING

January 1989
Volume 31 Number 1
ISSN 0144 5944

EDITORIAL

Editor: Keith Spencer-Allen
Co-ordinating Editor: Ann Horan
Production Assistant: Guy Cracknell
Secretary: Elaine Sweeney
Consultant: Sam Wise
Columnists: Barry Fox, Martin Polon (US)
Regular Contributors:

Janet Angus	David Hastilow
James Betteridge	Mike Lethby
Mike Collins	David Mellor
Ben Duncan	Terry Nelson
Dave Foister	Francis Rumsey
Neil Grant	Patrick Stapley
Yasmin Hashmi	John Woodgate

ADVERTISEMENTS

Sales Manager: David Reynolds
Display Sales: Shane Duffy
Copy Controller: Sue Chambers
Advertisement Production: Chris Baillie
Executive Ad Manager: Steve Haysom
Secretary: Dawn Boulwood

CIRCULATION

Circulation and Development Manager:
Colin Enderson
Controlled Circulation Manager:
Sally White
Enquiries: See classified advertisement

Director: Doug Shuard

EDITORIAL & ADVERTISING OFFICES

Link House, Dingwall Avenue, Croydon CR9 2TA,
UK
Tel: 01-686 2599
Telex: 947709
E-mail: 78:DGS1071
IMC: STUDIOSOUND-UK/US
Fax: 01-760 0973

AMERICAN OFFICE

Editorial contact: Hector La Torre
Studio Sound, 2 Park Avenue, 18th Floor,
New York, NY 10016, USA
Tel: (212) 779-1212
Fax: (212) 213-3484

JAPAN & FAR EAST AGENT

Contact: Mikto Tsuchiya
Media Sales Japan Inc, Tamuracho Bldg 3 3 14,
Shimbashi, Minato-Ku, Tokyo, Japan
Tel: (03) 504-1925
Telex: J25666
Fax: (03) 595-1709

© Link House Publications plc 1988 all
rights reserved

Printed in England by Lawrence-Allen Ltd,
Gloucester Street, Weston-super-Mare, Avon
BS23 1TB

 A LINK HOUSE
PUBLICATION

Studio Sound and Broadcast Engineering
incorporates Sound International and Beat
Instrumental

Studio Sound is published on the second Friday of
the month preceding the cover date. The
magazine is available on a rigidly controlled
requested basis, only to qualified personnel (see
classified advertisement for terms)

 MEMBER OF THE AUDIT
BUREAU OF CIRCULATIONS

Total average net circulation of 16,666 per issue
during 1987.
UK: 6,073. Overseas: 10,593.
(ABC audited)

Cover: Main page screendump from Steinberg
PRO-24

The brighter side of life

These few words have been written in the heady days that followed the Los Angeles AES Convention and the lingering euphoria that is engendered by a good show is a powerful stimulus to creative thoughts. Without a doubt it was a very good show and there was a very positive air. What I found particularly heartening was the way that several of the problems we have perceived and aired in these columns over recent months were not present to such a degree. For instance a few months ago we moaned about pre-emptive marketing of products but in Los Angeles firm delivery dates were being quoted on most of the major new product introductions. In fact Sony made quite a show of announcing that they were now sensitive to the problems of too early product introductions and the negative effect that they have on the industry. Apparently the new 48-track *PCM-3248* could have been shown during the early summer when the first announcements were made about the problems of manufacturing high density digital heads had been overcome. They commendably held back until it was possible to give firm delivery dates. Many times in the past Sony had been one of the companies we had in mind when commenting on what we saw as unsatisfactory marketing practice but now we would like to commend them for this major change in approach and hope that other companies follow their example.

In some ways this more comfortable marketing style must come from an increased practical experience with digital audio. We now know many of the problems inherent in practical digital audio equipment with the solutions and the realisation of user requests coming far more under the realms of the possible rather than the maybe. We are after all seeing second and third generation equipment in the digital domain and we are simply following the standard path to maturity of a new technology.

The other aspect of the show was the diversity of exhibitors. There were at least three companies who specialised in taking old equipment and rejuvenating it so that it could compete quite realistically with the new equipment on show. In the same show there were four semiconductor chip manufacturers with as many again walking the floor with processing and DSP chips. I don't think we had seen such breadth of technology present before. And a few years ago we had commented on this page that analogue tape recording might die just because there seemed to be a retreat from the manufacture of analogue multitracks. Well we saw three new digital multitracks at the show but there were at least as many new analogue machines and all the signs of a commitment to their continuation and development for the foreseeable future.

Do I have no concerns after the show? Well, a few but they do not appear to be anything that the audio industry can really get to grips with by itself. It became clear that international currency exchange rates are beginning to have a major effect on the future expansion possibilities of the studio market in certain countries whose currency is weak. There has always been a distortion of the value-for-money and market position of various products when currency barriers are crossed but I am talking about far more than this. More even than just short term fluctuations where the product cost 5% more on Wednesday afternoon than it would have done Friday last. We are seeing far more long term situations developing where products that we perceive to be realistically priced in one currency are seen as unrealistic in another. Recently we have seen a number of Japanese companies stop quoting international prices against the US dollar for the European market and turn to the German DM, which has maintained a far more even position against the yen than the dollar. With an increasing amount of pro-audio equipment being manufactured and developed in Japan and Europe particularly in the highly capital intensive areas, the low dollar is certain to bring increased pressure on the US top end studios when re-equipping. It remains to be seen what changes the recent US election will bring but certainly nothing will change quickly. It would be a shame if the buoyant atmosphere and exciting equipment developments we enjoyed during the show were to be denied to the host nation due to factors beyond the control of the industry itself. Let us hope for better news in 1989.

And finally on behalf of all the staff of *Studio Sound* I would like to wish you all a very prosperous 1989.

For Hot Licks And A Great Mix Do It With The Stylyx



Stylyx 31 console with optional meter bridge.

Get the sounds down right with a new D&R STYLYX console. Nothing in its class is sweeter to the ear or easier on the eye than this hot new split format console.

STYLYX sets the tone: The slick meterbridge and smart grey-on-black chassis are sheer elegance, and a contemporary colour scheme allows quick identification of all controls.

An extremely compact design allows up to 40 inputs. And beneath those good looks, features like smooth sounding 4 band EQ., super versatile aux section, true stereo input modules, and flexible dual channel subgroup modules make the STYLYX a perfect fit for broadcast production, video post production, as well as high quality sound reinforcement environments.

Eight and sixteen track recording studio's also benefit from STYLYX' digital quality specs, balanced inputs and outputs, custom configurations and one year warranty.

Call your local D&R dealer for more information or call us at D&R Holland.

**D&R STYLYX SERIES
BEYOND COMPARISON**

HEADOFFICE

D&R Electronica b.v.
Rijnkade 15B
1382 GS WEESP
THE NETHERLANDS
Phone (--) 31 2940 18014
Tlx 18503 dr nl
Fax (--) 31 2940 16987

U.S.A. OFFICE.

D&R USA
Rt. 3 Box 184-A
Montgomery, TX 77356
U.S.A.
Phone (409) 588-3411
Fax (409) 588-3299

U.K. OFFICE.

D&R (UK) LTD
5 Fulmer Drive
Gerrards Cross
Bucks, SL9 7HH U.K.
Phone (0753) 884 319
Fax (0753) 889 133

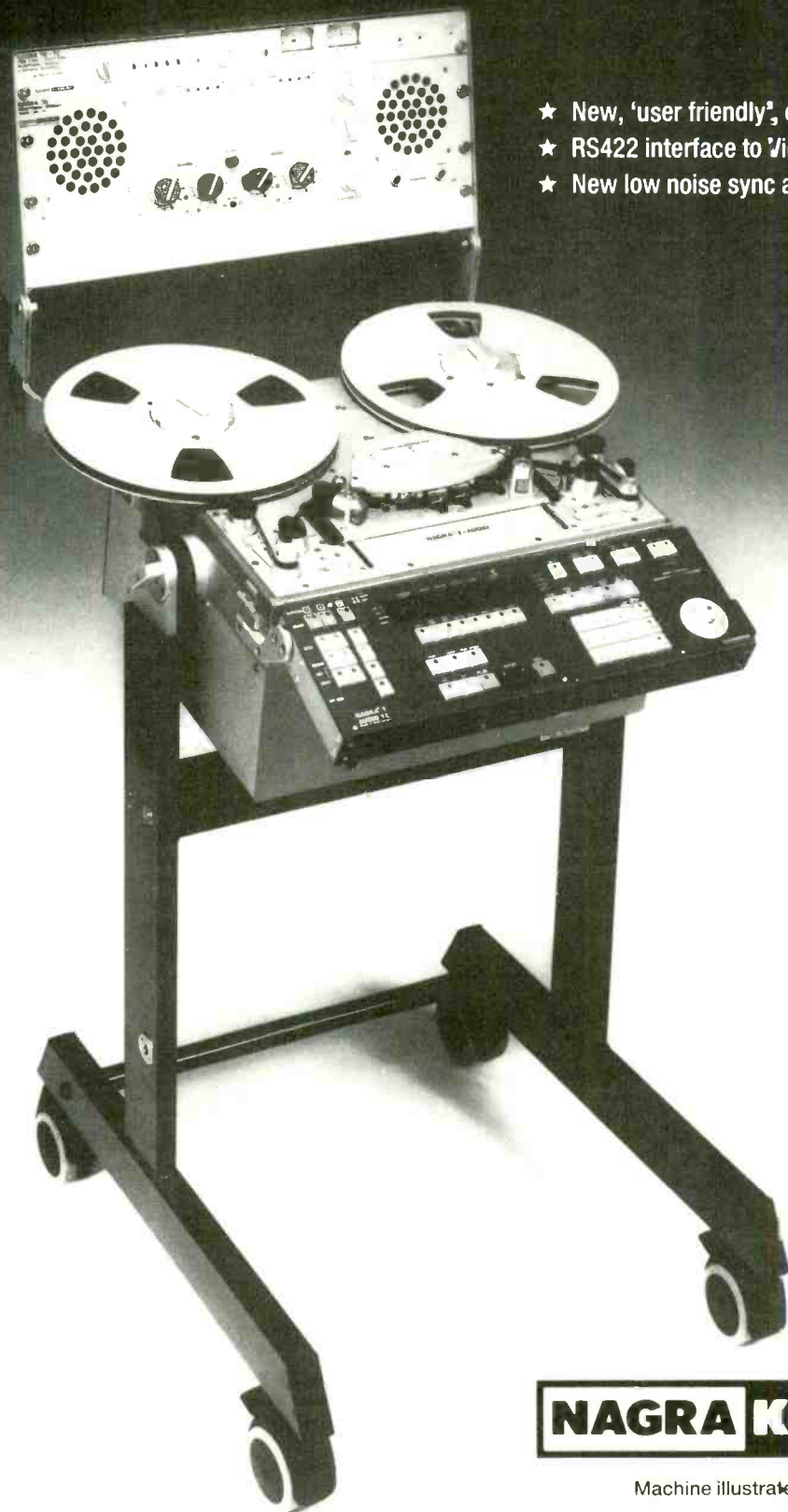
B.R.D. OFFICE.

D&R Electronica GmbH
Steinkaulstrasse 21
D 5100 Aachen
Tel (--) 31-2940-18014
Tlx (--) 31-18503 dr nl
Fax (--) 31-2940-16987



AUSTRALIA, AUDIO&RECORDING, 2019 Sydney, 36-38 Daphne St Botany phone: (02) 6669935. AUSTRIA, KÜNL & WURZER, A 4020 Linz, Waldeggstrasse 68, phone: 732668125. BELGIUM, ASE pvba, 2800 Mechelen, Kon. Astridlaan 216, phone: 15 421152. CANADA, J-MAR, M4H 1E9 Ontario, 6 Banigan Drive, Toronto, phone: 4164219080. DENMARK, P.S.S. 2200 Kobenhavn n, Aboulevarden 38, phone: (01) 390037. FINLAND, SAHKOLIKKEIDEN OY, 01301 Vantaa 30, P.O. Box 88 Sahkometsa, phone: 908381. FRANCE, METTLER AUDIO, 75009 Paris, 1-3-5 Blvd de Clichy, phone: 148782911. HONGKONG, JOLLY SOUND Ltd, Tower B, RM 1214-1215, Hunghom comm, centre 37-39, Ma Tau Wei Rd KLN H.K., phone: 36202025. ICELAND, SAMSTARF, P.O. box 1197, 121 Reykjavik, phone: 354153055. ISLD, CANARIAS, MUSIC ACCORD, S. Cruz de Tenerife Puerta Causco 35, phone: 22-289506. ITALY, PROFESSIONAL EQUIPMENT SRL, 20142 Milano, Viale Famagosta 37, phone: 02-817839/02-8910241/2/3. NORWAY, VEDUM ELEKTRONIKK, N-1381 Heggedal, Aamotveien 2, phone: 2798990. PORTUGAL, JORSOM AUDIO VISUAL, 1000 Lisboa, Rue Eca de Queiroz 20-3 phone: 19562850. SPAIN, BOSE SA, 28027 Madrid, Aristoteles 3, phone: 4050611. SWEDEN, MONTEZUMA RECORDING, 10265 Stockholm, Kocksgatan 17, phone: 8436291. SWITZERLAND, ISLER AG, 8048 Zurich, Badenerstrasse 808-810, phone: 14321444. VENEZUELA, SOUND AND POWER, 1070 Caracas, P.O. box 76766, phone: 2223201.

Nagra – Always one feature ahead!



- ★ New, 'user friendly', control panel.
- ★ RS422 interface to 'Video Edit Controllers.
- ★ New low noise sync amplifiers.

NAGRA KUDELSKI

Machine illustrated NTA.3 TCS

Switzerland

KUDELSKI S.A.
Route de Genève 22
CH-1033 CHESEAUX

phone (021) 731 21 21
fax (021) 731 41 55
telex 459 302 nagr ch

Great Britain

HAYDEN LABORATORIES LTD
FREEPOST, Chiltern Hill,
Chalfont St Peter, Bucks SL9 9BS

phone (0753) 888447
fax (0753) 880109
telex 849469

U.S.A.

NAGRA MAGNETIC RECORDERS, Inc.
Suite 715
19 West 44th Street
NEW YORK, N.Y. 10036

phone (212) 840 09 99
fax (212) 302 16 27
telex (0230) 960 252

France

SIMPLEX ELECTRONIQUE
48, boulevard Sébastopol
F-75003 PARIS

phone (14) 271 53 30
fax (14) 271 14 56
telex 230 045

Germany

NAGRA KUDELSKI GmbH
Tegernseer Landstrasse 161/11
D-8000 MUENCHEN 90

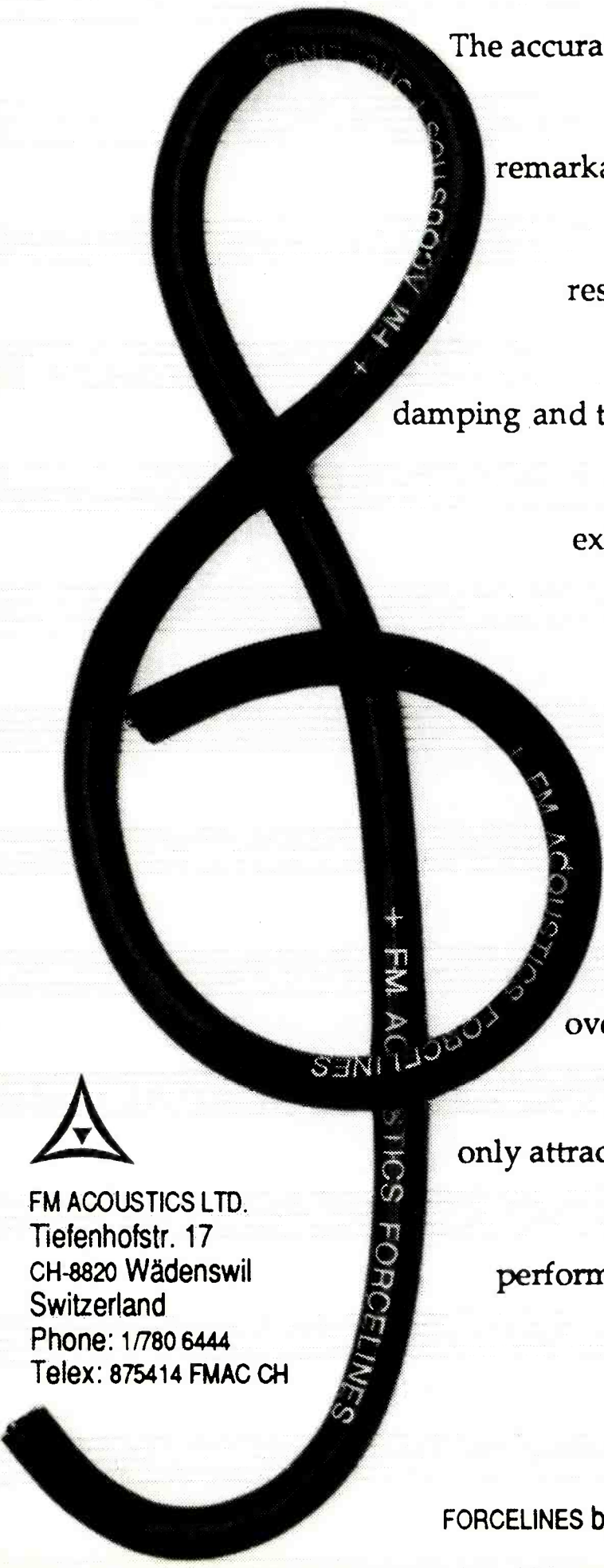
phone (089) 697 12 07
fax (089) 691 19 64
telex 529 893 tefo d

Italy

NAGRA ITALIA Srl
Viale Europa 55
I-00144 ROMA

phone (06) 591 09 32
fax (06) 591 09 32
telex 591 09 32

FOR A FEW \$\$\$ MORE ...



The accuracy of your monitor system can be remarkably improved. Even the smallest resistance negatively influences the damping and transfer characteristics. Replacing existing cables with the 1 Ohm/km FORCELINES results in striking improvements. This is confirmed by demanding tests the world over. Installing FORCELINES will not only attract more clients thanks to superior performance, but is a most cost effective investment.



FM ACOUSTICS LTD.
Tiefenhofstr. 17
CH-8820 Wädenswil
Switzerland
Phone: 1/780 6444
Telex: 875414 FMAC CH

FORCELINES by FM ACOUSTICS. There is no alternative.



Take a fresh look at the industry standard for DAT mastering.

Amongst audio professionals, the Sony DTC-1000ES is now widely recognised as the DAT standard. It's officially supplied by HHB – Sony's leading independent distributor. That means genuine service and spares support, as well as expert advice.

Second generation DAT hardware incorporates rationalised integrated circuitry and single A to D conversion. This may make DAT more accessible to consumers, but it's bad news for the audio professional. That's why we've talked to Sony and secured an extended production run for the DTC 1000ES.

Along with twin A-D conversion, all DTC 1000ES recorders from HHB are now specially adapted to record at 44.1kHz as well as 48 kHz. A modification that's impossible to implement in most



second generation devices. For additional professional convenience, we've even designed an optional 19" rack tray.

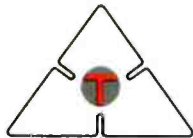
If you're thinking about a secure future with highly-affordable DAT mastering, take a fresh look at the new DTC-1000ES package from HHB. It's just one member of a powerful family of DAT equipment available from the industry's most experienced supplier of digital recording hardware.



TRIDENT IS GROWING

We're hiring in all areas and at all levels particularly purchasing, production and sales.

If you're thinking of a change and have exceptional technical and managerial capabilities or have the spirit and experience to lead our U.K. and European sales efforts, this is an exciting career opportunity with a growing, progressive and dynamic firm.



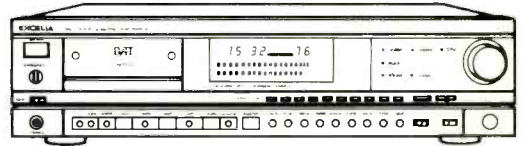
TRIDENT

TRIDENT AUDIO DEVELOPMENTS LTD.
 Rodd Estate – Govett Avenue
 Shepperton, Middx TW17 8AQ
 Tel: 0932-224665/Fax: 0932-226721

Contact: Bud Brimberg, Managing Director
 All replies held in strict confidence

NEW PRODUCTS FROM PLAYBACK.

THE NEW INDUSTRY STANDARD FOR DAT
 FOR 25% LESS*



AIWA XD001

- Twin A-D convertor
- Samples 32, 44.1 and 48 kHz
- Frequency response: 2 Hz–22 kHz (± 0.5 dB)
- S/N Ratio: over 92dB (recording/playback)
- Dynamic range: over 90dB
- T.H.D: 0.005% or less (1 kHz)
- Wow & flutter: below measurable limits.
- Maximum recording time: two hours non-stop (DT-120 cassette)

THE AIWA XD001 £865 + VAT

PLAYBACK

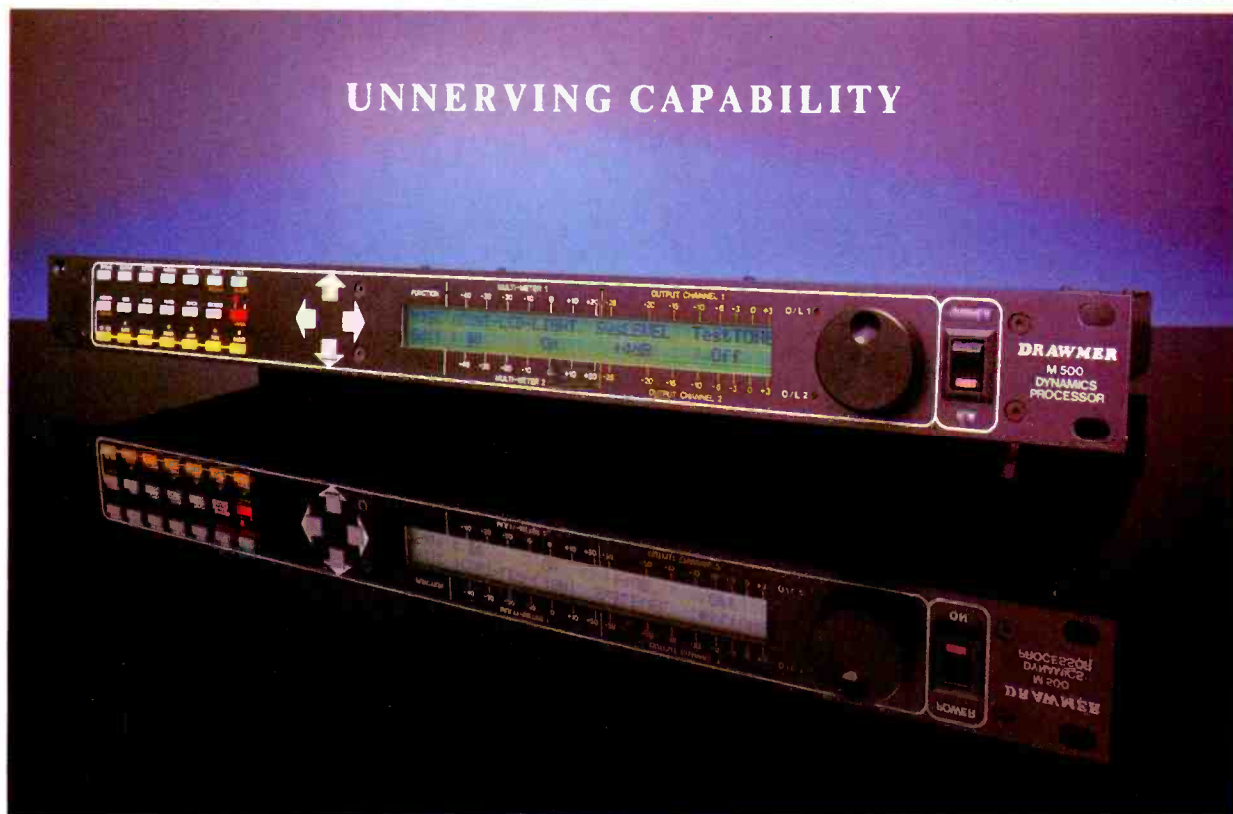
15 Percy Street, London W1P 9FD. Tel: 01-631 0939 Fax: 01-636 5011

*Based on Sony DTC 1000ES R.R.P.

Drawmer

Ingenuity

UNNERVING CAPABILITY



M500

DYNAMICS PROCESSOR – ALL YOU'LL EVER NEED

DRAWMER DISTRIBUTION CHARLOTTE ST. BUSINESS CENTRE CHARLOTTE ST. WAKEFIELD W. YORKSHIRE ENGLAND

TEL. 0924 378669 TELEX 556649 FAX 0924 290460

THE SATURN 824 MULTITRACK. ITS NEW SPECIFICATION IS JUST OUR FIRST ACHIEVEMENT.



The Saturn 824 with Auto Alignment is a major enhancement of a highly successful multitrack.

Its new specification provides many features as standard which on other machines are expensive options. Proven reliability and superb audio performance make its price even more of an achievement.

The enhancements include Auto Alignment as standard, saving valuable studio time, along with full size meters and a Tape Management panel to complement those on the unique Total Remote unit.

We've added a parallel interface for synchronisation; and a noise reduction interface for Dolby SR, resulting in a sonic performance that many consider superior to digital.

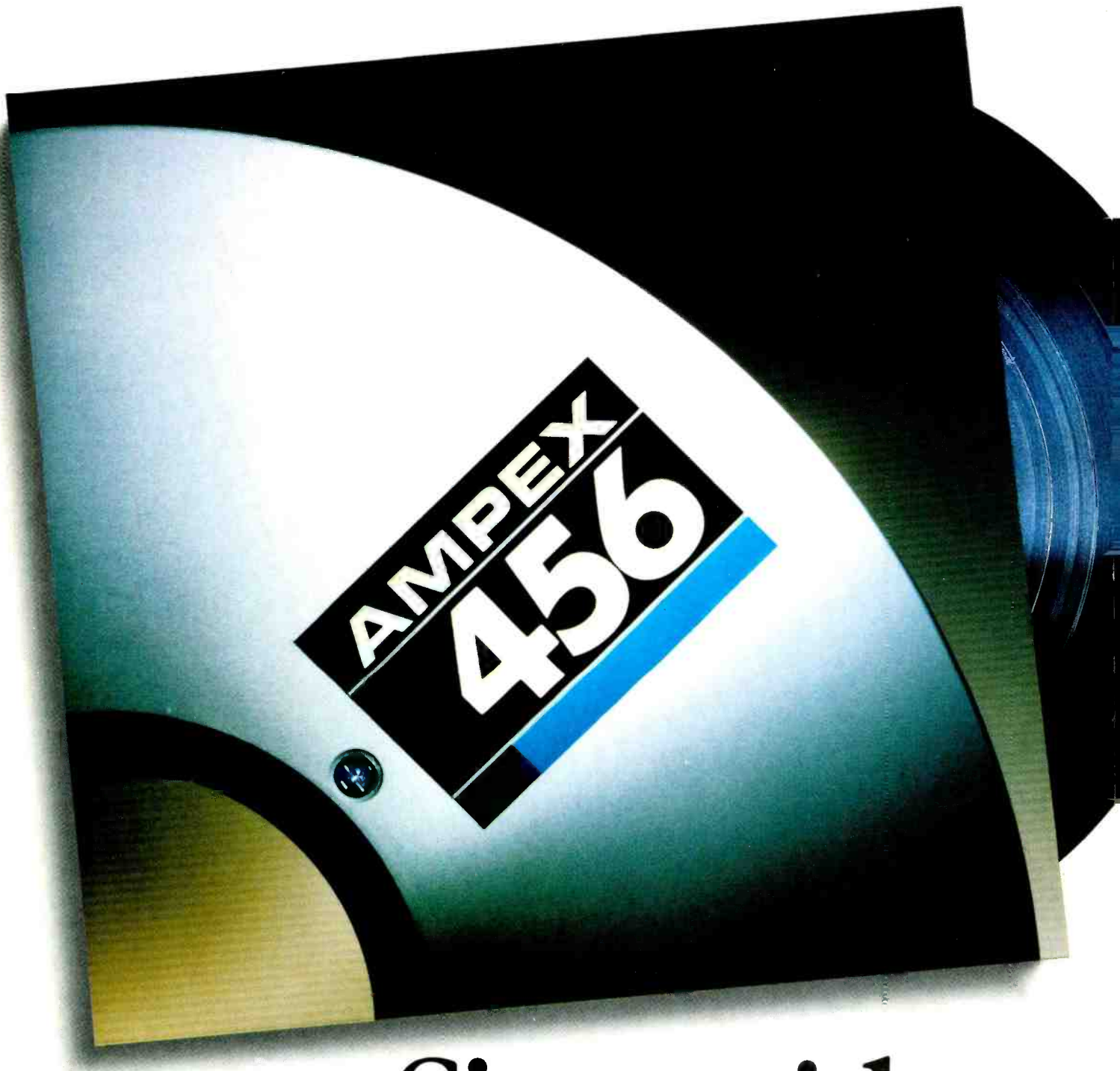
Durability is something else that has benefited, with the introduction of a new head design incorporating long life 'Recovac' composite alloy.

Reliability is also intrinsic to the precision-engineered 'Calculated Open Loop Tension' transport system and the fully modular tape path design. Twin high-torque motors and 'intelligent' sensing maintain perfect tape tension even at an exceptionally fast 600ips - the best spooling performance of any multitrack.

All proving that the new Saturn 824 is a more powerful and even more reliable long-term proposition than ever.

To put our new specifications to the test, call us for full details and a demonstration session.

SATURN
RESEARCH
SATURN RESEARCH LTD, UNIT 3A, 6-24 SOUTHGATE ROAD
LONDON N7 3J, ENGLAND, TEL 01-993 1892 FAX 01-241 3044



Sign with a major label

When it comes to hitting the top of the charts, the choice is Ampex Grand Master[®] 456 studio mastering tape.

It's not surprising, when you consider that our continuing refinements allow Grand Master 456 to always deliver unequalled performance.

No other mastering tape provides such consistent quality and reliability, or commands such respect from musicians and studio professionals alike.

More top performers have signed with Ampex tape than any other tape in the world. While opinion may vary on what it takes to make a hit, there's no argument on what it takes to master one.

AMPEX

Ampex Magnetic Tape Division, Acce Road, Reading, Berkshire RG2 0QR England (0734) 875200

AudioFile mobile service

A new digital audio post-production service aimed at productions shot either on video or film has recently started. Atlantic Post Productions is aimed specifically at American and European production companies, facility houses, music and audio sweetening studios.

The UK-based service centres around an AMS *AudioFile*, which is flight-cased and can be transported anywhere.

The package comprises a number of additional features as standard: a centre-track timecode ¼ inch able to play Nagra and Stellavox pulsed tapes in lock to *AudioFile*, VHS hi-fi and *U-matic* VCRs, R-DAT and audio cassette recorders, CD and record decks, audio mixers, amplifiers, speakers and TV monitor, timecode

generator/reader and a special device which inserts film style cue lines over a video picture. The package is triple standard and can also operate in different frame rates such as 24 f/s, video 30 f/s and drop frame and 25 f/s. Direct digital input/output is also standard to R-DAT and Sony 1610/30 compact disc formats.

The service is the brainchild of freelance sound editor Anthony Faust who has installed his own transfer bay, which is either digitally inside the *AudioFile* or off the master ¼ inch tapes.

Faust has an extensive background in sound production both in the USA and Europe and has worked on commercials, feature films, business TV, music specials and film documentaries.

Sound Stage CD library

After several successful years work overseas the Sound Stage Music Library in Surrey, UK, are expanding trade within the UK.

With their own 24-track studio and design centre now fully operational Sound Stage have acquired the exclusive representation of the entire Capitol Production Music Series.

With this acquisition Sound Stage believe they are now one of the major publishers of library music on CD in the UK.

Sound Stage are based at: Kerchesters, Waterhouse Lane, Kingswood, Surrey KT20 6HT, UK. Tel: 0737 832837. Fax: 0737 833812.

Exhibitions and conventions

January 21st to 25th MIDEM, Palais des Festivals, Cannes, France. Contact: Peter Rhodes, International Exhibition Organisation Ltd, 4th Floor, 9 Stafford Street, London W1X 3PE, UK. Tel: 01-499 2317.

February 21st and 22nd Sound '89, Heathrow Penta Hotel, London, UK. Contact: Sound and Communications Industries Federation, Slough, Berks. Tel: 06286 67633. Fax: 06286 65882.

March 7th to 10th 86th AES Convention, Congress Centre, Hamburg (CCH), AM Dammtor, D-2000 Hamburg, West Germany. **April 28th to May 2nd NAB**, Las Vegas, USA.

June 7th to 9th APRS 89, Olympia 2, London, UK. Contact: APRS

Secretariat. Tel: 0923 772907.

June 17th to 23rd ITS Montreux, Switzerland.

September 18th to 21st Media Visie 89, RAI International Exhibition Centre, Amsterdam, The Netherlands. Contact: RAI, Europaplein, 1078 GZ Amsterdam. Tel: (0) 20-549 12 12. Fax: (0) 20-461006.

October 3rd to 9th World Broadcasting Symposium, Geneva, Switzerland.

October 25th to 28th Broadcast 89, Frankfurt, West Germany.

October 19th to 22nd AES 87th Convention, New York, USA.

Contact: AES, USA. Tel: (212) 661-8528.

News from the AES

On December 12th Turbosound's Tony Andrews and John Newsham lectured on **Loudspeaker Clusters**. These clusters have been with us in various formats for some time but it is only in recent years that their usage in the more familiar current format has become widespread in Europe. An investigation of the perceived disadvantages versus perceived advantages and what this translates to in practical terms, introduces some interesting issues which can improve the industry's ability to satisfy that oft forgotten creature—the customer.

Subjects to be covered early in the new year will include BBC Radio Data Transmission, Acoustic Modelling, Mixing Consoles, Design of Pipe Organs, Studio Acoustics and Analogue Digital Converters. Details and dates will appear in due course.

Other major events in the calendar are the **86th Convention**, Hamburg, March 7th to 10th, 1989, and the **1989 British Section Conference**, which will take place on May 23rd and 24th on the subject of **Planning Sound Reinforcement**.

The AES publishes many books on audio-related topics as well as Convention Preprints, Standards, etc, which provide a wealth of technical information. Also two of our members have written books—John Borwick *Loudspeaker and Headphone Handbook* and John Watkinson *The Art of Digital Audio*.

For further details on any of the above or information on joining the AES, please contact: **Heather Lane, AES British Section, Lent Rise Road, Burnham, Slough SL1 7NY, UK. Tel: 06286 63725.**

Address changes

• **J L Cooper Electronics** have moved to larger premises. Their new address is: J L Cooper Electronics, 13478 Beach Avenue, Marina Del Rey, CA 90292, USA. Tel: (213) 306-4131. Fax: (213) 822-2252.

• **Pablo Music**, Danish distributors for Nexo, Carver, Samson and Formula Sound, have expanded and moved to a new site at Pablo Music, Silkeborgvej 268-270, DK-8230 Aabyhøj, Denmark. Tel: (45) 6 150100. Fax: (45) 6 159955.

• **Decibel Audio Sound Services** have moved to Unit 44, New Lydenburg Industrial Estate, New Lydenburg Street, Charlton, London SE7 8NE, UK. Tel: 01-853 2121.

• **Digital Audio Technologies SA**, formerly known as Stellavox, are now operating from Puits-Godet 20, 2000

Neuchatel, Switzerland. Tel: (038) 244.400. Fax: (038) 253.230.

• **Digital Audio Research** have moved their US office from San Francisco to Hollywood. The new address is Digital Audio Research Ltd, 6363 Sunset Boulevard, Suite 802, Hollywood, CA 90028, USA. Tel: (213) 466-9151. Fax: (213) 466-8973.

• **Digital Creations Corp/Sound Workshop** have moved. They are now at: 79 Express Street, Plainview, NY 11803, USA. Tel: (516) 932-7140. Fax: (516) 932-6573.

• **Klotz** have set up a UK office at: Klotz (UK), Capp House, 96 South End, Croydon, Surrey CR9 3SD, UK. Tel: 01-681 0726. Fax: 01-681 4069.

Klotz products are still available through Beyer Dynamic (GB) Ltd.

Courses and seminars

April 11th AES lecture, 'BBC Acoustic Modelling'. Contact: AES UK. Tel: 06286 63725

May 9th AES lecture, 'Decca International Pulling All The Stops Out'. Contact: AES UK. Tel: 06286 63725

May 23rd to 24th AES conference,

'Planning Sound Reinforcement'.

Contact AES UK. Tel: 06286 63725

June 13th AES lecture, 'IAC Studio Acoustics'. Contact: AES UK. Tel: 06286 63725

July 11th AES lecture, 'DCS High Resolution ADC'. Contact: AES UK. Tel 06286 63725

Gateway School restructures courses

The Gateway School of Recording and Music Technology in Surrey, UK, have restructured their courses in co-operation with Kingston Polytechnic.

There will be a limit of 10 students on any course and often fewer. The one year part-time course will take only six students who will work together for the whole year.

Two new teaching facilities have been equipped with the help of the

manufacturers which have enabled Gateway to offer two 16-track learning facilities and a 24-track studio.

In addition to the learning studios Gateway have set up three small rooms with Atari and Apple computers, Roland *D110s* and small monitor and mixing systems. The school is at The School of Music, Kingston Hill Centre, Surrey KT2 7LB, UK. Tel: 01-549 0014.

Contracts

● **Paul Farrah Sound** of Kingston, Surrey, UK, recently supplied the sound system for the UK launch of the new Vauxhall *Cavalier*. The system was based around a Soundcraft series 8000 40/8/8 mixer and used Meyer *UPA-1*, Nexo integrated *SI* and Martin *CX-2s* for the speaker systems. C-Audio and Yamaha provided the amplification and effects. A Tascam 38-8 and 34B, seven Sennheiser *Diversity* lapel systems with five handheld mics and 15 channels of dbx were also used. Paul Farrah Sound also supplied NBC Sports with a comprehensive distribution system to supplement the ROH communications package already supplied for NBC's 1988 Olympic Games coverage. The system specified by NBC was built around the ROH 212B ADA distribution amplifier and is a 1/6 unit. Eight of these active distribution amplifiers were included in each rack and there were 30 racks, one for each Olympic location. Other work includes the installation of a 16/4/2 Soundcraft 200B console at the Winter Gardens, Margate, UK, to replace fire-damaged equipment.

● **Audionics** in Sheffield, UK, have won a major contract to equip Hereward Radio's new CNFM radio station in Cambridge. This is the third time Audionics have been awarded contracts by Hereward, having undertaken the construction of Hereward's Northampton station

and the installation of six mixers and all switching and transmission equipment at their Peterborough station.

● The **JL Cooper MAGI** console automation system is being endorsed by guitarist Trevor Rabin. It has been installed at his 24-track home recording studio.

● **Flyte Tyme Studio**, Minneapolis, USA, has purchased a 32 Mbyte, 64-voice **New England Digital Corp Synclavier** digital audio system, fully integrated with a 16-track *Direct-to-Disk* digital multitrack recorder. This is equipped with an optical disk and 32 multichannel outputs.

● **QSC Audio Products**, Costa Mesa, CA, USA, are to supply 86 power amplifiers for the sound system of the 16,000-seat Globe Arena in Stockholm, Sweden. The arena will be the largest spherical building in the world and will host events ranging from circus performances to ice-hockey. Forty **QSC MSX 1500** amps will be used to drive a central cluster loudspeaker system, and an additional 46 **QSC 1200** amps will power speakers in the public areas.

● **Trident Audio** have announced the delivery of a *Di-An* console to the Music Room in London. Two other consoles are operating at Goodnight LA Studio in Van Nuys, CA, and Rock Studios, Burbank, CA, USA. The Music Room console is a large frame 48/32/48 configuration.

Agencies

● **Electro-Voice** of Ipsach, Switzerland, is now responsible for the distribution of Vega wireless microphones. Vega is a sister company of Electro-Voice and the sales and marketing of the mics will be handled by Electro-Voice's dealer network.

● **Digital Audio Research** of Surrey, UK, have added four new agents to their international distribution operation. They are: Thum & Mahr, Dusseldorf, West Germany; Primovisa, Madrid, Spain; 3M, France; and General Traders, Tokyo. They will be responsible for the distribution of DAR's *SoundStation II* and other professional audio products.

● **AMS** of Burnley, UK, have appointed two new distributors. They are: Windmill Munro Design, Dublin, Eire and Saetong Corp, Seoul, South Korea.

● **Digital Audio Technologies**, formerly known as Stellavox, have announced a US agent: International Audio Technologies Ltd, 13897 J Willard Road, Chantilly, VA 22021. Telex: 820529.

● The Sound Department, London, have become the sole distributors for **Community Light and Sound and Industrial Research Products**.

● Three ranges of power amplifiers from **QSC Audio**, CA, USA, are now available from Music Lab, 72-74 Eversholt Street, London NW1 1BY, UK. Tel: 01-388 5932.

● **Klotz** (UK) have been appointed sole European distributor for the **Audio-Line** range of patchbays.

● **Hayden Laboratories Ltd** have been appointed exclusive distributor for the UK and Eire for the **Otis Power Station** and other products from Otis Communications.

Currently the console is teamed with a Studer *A820* with Dolby *SR*.

● **Canford Audio plc** of Tyne and Wear, UK, recently fulfilled a rush order for NBC's Olympic coverage. NBC required 120 isolating units and Canford manufactured, tested and sent them to Seoul within 48 hours of the order being placed.

● **Pinewood Studios** in London have taken delivery of **Dolby SR** encoding and decoding equipment for dubbing theatre use. Pinewood has also purchased a **Dolby SRA5** processor for the preview theatre. This will allow the replay of *SR*-encoded Dolby Stereo optical soundtracks.

● **Lyrec TR-533** multitrack recorders have recently been supplied to Studio Multitrack and IIC Studios, Belgium; Midi Music Centre, Copenhagen; PT Musica Studios, Jakarta, Indonesia; and Bjartsyni HF, Reykjavik, Iceland. The *TR-533s* will be used for work ranging from publicity to music recording. Logos, Sweden's biggest tape duplicator, has taken delivery of a *P-4400* loopmaster with a *P-2508* double slave unit with the **Dolby HX Pro** headroom extension system. Lyrec have also supplied a *Master Type P-2609* for 1/2 inch tape and two *P-2608 Twin Slave* units to HP Cassettenproduktion, West Germany, to be added to its production line.

● **Totalsystems** of Basingstoke, UK, have supplied Abbey Road Studios, London, with five more **DBM-1A** digital audio metering units. Tape

One Studios London have ordered two more and other recent orders have come from Audio FX and Nova Studios.

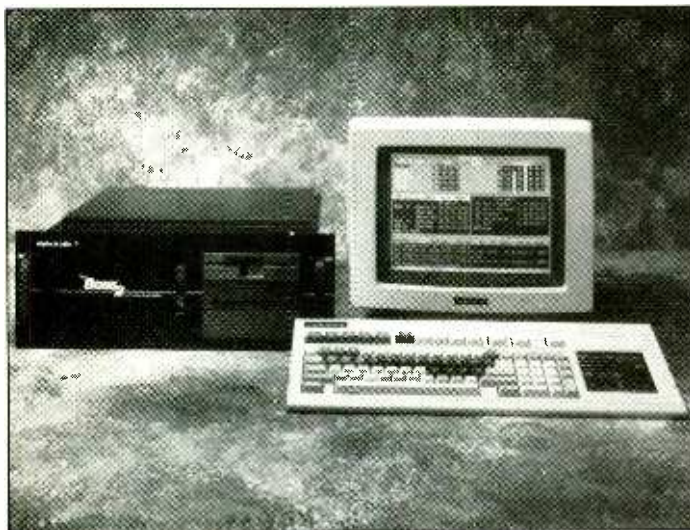
● **Sony** have installed a *PCM-3324* multichannel recorder at Professional Media Services—a new all-digital studio in Gainesville, FL, USA. They also have a *PCM-1610* for CD mastering.

● The Basement Studio, Wardour St, London, has installed the first **Trident 80C** console in the UK.

● **Soundtracs** of Surrey, UK, have announced sales of their *PC24* to five London studios: Air, Swanyard, Chrysalis, Eden and Westside. Jean Michel Jarre's studio in Paris have also bought a *PC24*. It has FX returns, MIDI automation, and an in-line format of 24-in/16-out. By splitting inputs and EQ, combined with eight FX returns, up to 52 inputs are available in mix.

● **Phase One Studios** in Toronto, Canada, have added a **Mitsubishi X-850** digital 32-track and an *X-86* digital 2-track to their existing facility. The *X-850* and *X-86* will be mated to the *SL 4000 E* mixing consoles which has recently been upgraded with *G* series EQ and computer.

● **Hinton Instruments** in Oxford, UK, have supplied The Woolhall Recording Studios with a custom MIDI-controlled audio processing rack comprising a *MIDI-P* programmer with 16 control voltage outputs.



Alpha Audio BOSS/2 automated editor

Alpha Audio BOSS/2

The BOSS/2 from Alpha Audio is the successor to the BOSS 8400 automated audio editor. The new version previews edits entirely in the digital domain, and features Concurrent Multi-protocol Communication, dealing with RS-422, RS-232, SMPTE and MIDI simultaneously. It will also interface directly to any machine using Sony, Ampex, ES-Bus or other serial

In brief

- Yamaha have announced an addition to their range of live sound consoles, the PM2800M monitor console. Available in 32- or 40-channel configurations, it has eight mix buses and a stereo master bus, and the added feature of channel-to-bus routing via level controls rather than switches, allowing for eight completely different mixes. There are eight assignable mute groups, and each input incorporates 4-band sweep EQ and four aux outputs.
Yamaha Corp, PO Box 1, Hamamatsu, Japan.
UK: Yamaha-Kemble Music (UK) Ltd, Mount Avenue, Bletchley, Milton Keynes MK1 1JE. Tel: 0908 71771.
USA: Yamaha International Corp, PO Box 6600, Buena Park, CA 90620. Tel: (714) 522-9105.
- Hybrid Arts are supplying modified versions of various sizes of hard disk drives, from 77 to 760 Mbytes unformatted; their improvements consist of a new proprietary controller and software, and double shockmounting. The

controls, and allows the use of various combinations of synchronisers.

Alpha Audio, Automation Systems Division, 2049 West Broad Street, Richmond, VA 23220-2075, USA.
Tel: (804) 358-3852.

UK: Stirling Audio Ltd, Kimberley Road, London NW6 7SF. Tel: 01-624 6000. Fax: 01-372 6370.

drives, known as the HDX series, are available for the ST and the Macintosh, and their launch coincides with that of the ADAP2 direct-to-hard-disk workstation. Use of the HDXST with ADAP2 provides a 4-track system where only two tracks are possible on other drives, and further compatibility is possible with the Akai S900 and S1000 samplers, E-Mu, Fairlight and Synclavier equipment.

Hybrid Arts Inc, 11920 West Olympic Boulevard, Los Angeles, CA 90064, USA. Tel: (213) 826-3777.
UK: SM Distribution Ltd, 24-26 Avenue Mews, Muswell Hill, London N10 3NP. Tel: 01-831 9489.

● Imhof has extended the range of acrylic smoked glass doors available for its Image cases with the addition of a new 12U 9 inch version. When fitted to the Image case, the lockable door provides a secure 'mini-rack' with front and rear access, easy top access and 500 mm of usable depth. Imhof say that LED and LCD displays can be easily read through them.
Imhof-Bedco Standard Products Ltd. Tel: 0985 37123.

Audio Precision Digital Signal Processing Module

A new addition to the Audio Precision System One audio test system is the DSP-1 Digital Signal Processing module. This provides digitally-based analysis and synthesis of audio frequency signals in both the analogue and digital domains. Its first use is to expand the general measurement capabilities of the system, covering individual harmonic distortion, erasure depth, total harmonic distortion without noise and so on, as well as operating as a waveform digitiser/FFT spectrum analyser, using 16 bit resolution and yielding FFTs of up to 8k.

Its second application is measurement of digital audio

equipment in the digital domain, for which it has both parallel and serial digital interfaces; it will handle AES/EBU signals and is electrically compatible with the Sony/Philips consumer products interface. The same measurement functions are available in the digital domain, allowing testing of digital processors separate from their A/D and D/A converters.

Audio Precision Inc, PO Box 2209, Beaverton, OR 97075, USA. Tel: (503) 297-4837.

UK: Scenic Sounds Equipment Ltd, Unit 2, 10 William Road, London NW1 3EN. Tel: 01-387 1262.

Soundtracs Tracmix fader automation system

Tracmix is a standalone fader and mute automation system operated via a remote keyboard and a colour monitor. Control of up to 64 channels of faders and mutes is possible, using dbx VCAs, and the system may be fitted to any console since the existing faders are used. Mix data is held in RAM and may be saved to 3½ inch disk either manually or automatically along with grouping

information, track listings and MIDI song data. A timecode reader and generator is built in, along with MIDI clock and song pointers slaved to the timecode.

Soundtracs, 91 Ewell Road, Surbiton, Surrey KT6 6AH, UK. Tel: 01-399 3392. Fax: 01-399 6821.

USA: Samson Technologies Corp, 485-19 South Broadway, Hicksville, NY 11801. Tel: (516) 932-3810.



Master Blaster DALC circuit

Part of the protection circuit from the *Master Blaster* and *Microblaster* sound systems is now available as a separate integrated circuit. Known as the *Delayed Automatic Level Control*, or *DALC*, it is intended for use in level control signal processors including compressors, limiters, companders and gates. The manufacturers say its attack and decay are automatically adjusted by the signal itself "to imitate the

natural curve of human hearing", and can be used in both feed-forward and feedback configurations.

Master Blaster Europe, Nijverheidswig 13, PO Box 275, 3760 AG Soest, The Netherlands. Tel: 21 55 20101. Fax: 21 55 22806.
USA: MB America, Keelox Square, 215 Tremont Street, Rochester NY 14608. Tel: (716) 436-3020. Fax: (716) 436-3942.

AMS Edit 1

Now available from AMS is the *Edit 1*, which they describe as 'the all digital minimixer'. Essentially a digital 8/2 console, with all ins and outs capable of running in stereo, it offers a variety of input and output options, including AES/EBU, Sony *PCM-1610/30*, Pro-Digi and analogue, as well as a taxi interface for the *AudioFile*. The control surface has a familiar analogue look to it, complete with faders and knobs, but the controls are assignable to many functions according to the control page in use.

Current functions are displayed on indicators adjacent to the controls and include comprehensive EQ, two

auxiliary sends, routing, soloing, metering and two compressor/limiters assignable anywhere within the desk. Desk settings can be stored in 99 memories, with the control panel used to preview memories. Internal signal processing uses a 32 bit floating-point system, and the resolution of the variable controls is at least 8 bit (255 steps) with 11 bit resolution for the faders.

AMS Calrec, AMS Industries Park, Burnley, Lancs BB11 5ES, UK. Tel: 0282 57011. Fax: 0282 39542.

USA: AMS/Calrec USA, 3827 Stone Way North, Seattle, WA 98103. Tel: (206) 633-1956. Fax: (206) 547-6890.

Software update

• The **E-Mu Systems *Emulator III*** now has *Version 2.0* software available in the form of a disk and a manual addendum. The main new feature is an SCSI capability, providing high-speed data transfer to and from *Macintosh* computers and allowing the use of other peripherals such as CD ROM drives. Further new functions include remote loading of sound banks via MIDI control, and

MIDI Sample Dump software allowing sample data to be transferred digitally to and from other MIDI samplers.

E-Mu Systems Inc, 1600 Green Hills Road, Scotts Valley, CA 95066, USA. Tel: (408) 476-4424.

UK: Syco Systems Ltd, 20 Conduit Place, London W2. Tel: 01-724 2451. Fax: 01-262 6081.



Hybrid Cases Rack Bag

A new idea in portable cases for rackmount equipment is the *Rack Bag* from Hybrid Cases. Consisting of a plywood shell covered in 1/2 inch of foam and finished with a material claimed to be waterproof and tearproof, the bags are available in 2U and 4U sizes, 14 inches deep. They include a racking strip at the

front, a pocket for leads, a shoulder strap and carrying handles, and zips front and rear allow quick access to controls and connectors.

Distribution: MTR Ltd, Ford House, 58 Cross Road, Bushey, Herts WD1 4DQ, UK. Tel: 0923 34050. Fax: 01-671 7306.



In brief

• A new version of **Larking Brothers' *Stand Easy Studio Pod*** uses a simpler construction technique to allow a reduced price. The unit is a mobile frame providing 14U of angled rack space on castors, and the new version features heavy single curved pieces to form the sides of the frame.

Larking Brothers Studio Products Ltd, 11/12 Cam Square, Wilbury Way, Hitchin, Herts SG4 0TZ, UK. Tel: 0462 421171.

• The latest addition to **Summit Audio's** range of hybrid signal processing equipment is the *Warm Interface*, designed "to warm up and enrich hard-edged or metallic digital signals" by "using vacuum tubes everywhere that sound quality is affected and solid state everywhere that reliability is required". Quoted specifications include a maximum output of +25 dBm, a dynamic range of 110 dB, harmonic distortion less than 0.1% and a frequency response of 3 Hz to 90 kHz.

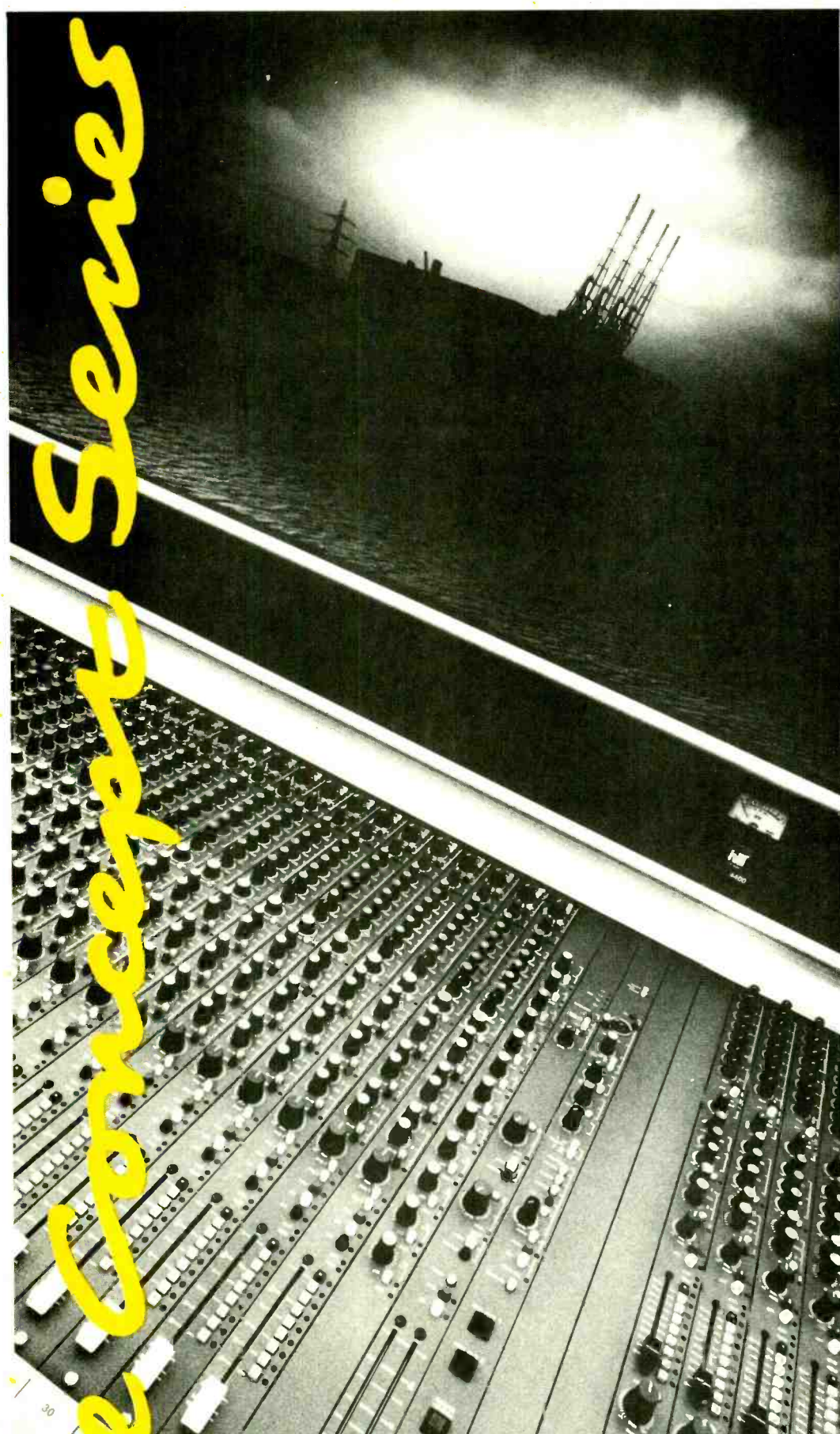
Summit Audio, PO Box 1678, Los Gatos, CA 95031, USA. Tel: (408) 395-2448. Fax: (408) 395-1403.

UK: Autograph Sales Ltd, 2 Spring Place, London NW5 3BA. Tel: 01-485 3749. Fax: 01-485 0681.

• **Digital Audio Research** have recently been showing advanced 2- and 8-channel configurations of their *SoundStation II*. New software features include Stereo TimeWarp, a program for audio time compression and expansion without pitch change capable of altering durations from half to two times, an animated playback display showing progress through the assembled audio sequence, and punch-in recording. New hardware allows the locking of the internal sampling rate clock to a variety of sources, including PAL and NTSC video and all longitudinal timecode standards, providing chase synchronisation.

Digital Audio Research, 2 Silverglade Business Park, Leatherhead Road, Chessington, Surrey KT9 2QL, UK. Tel: 03727 42848. Fax: 03727 43532.

USA: Digital Audio Research Ltd, 6363 Sunset Boulevard, Suite 802, Hollywood, CA 90028. Tel: (213) 466-9151. Fax: (213) 466-8973.



The Concept Series
limited only by your imagination

Only your imagination will limit the potential of the creative new Concept series of modular consoles from Hill Audio.

Available in any size from 16:8:2 to 56:24:48:2, the range more than matches the quality of existing studio consoles whilst they are tough enough for touring applications.

Popular all over the world with recording and film studios, dance companies and theatres, as well as with PA companies, the key to the consoles' success is its flexibility.

Choice of: metering, type of Eq, front end circuitry, patchbay facilities, VCA grouping and automation as well as a wide variety of input and subgroup modules mean that you get a tailor-made console. All for the price of an off-the-peg model.

Truly you are limited only by your imagination.

Hill Audio Ltd., Hollingbourne House, Hollingbourne, Kent ME17 1QJ England.
Telephone: (062 780) 555 Telex: 966641 HILL Fax: (062 780) 555.
Hill Audio Inc., 5002B N. Royal Atlanta Dr. Tucker, GA 30084 USA.
Telephone: (404) 934 1851 Telex: 293827 HLAD Fax: (404) 934 1840



Ariel ADC56000 and DSP-300

Two new development tools have been introduced by the Ariel Corporation to exploit the potential of Motorola's new 24 bit Digital Signal Processing Chip, the *DSP56001*. The *ADC56000* is an analogue I/O board, which provides two channels in and out of high-speed 16 bit data from and to line level audio feeds. A/D conversion is 16 bit linear PCM with a 5 μ s conversion time, with sample rate derived from the *56001* program operation or from an external TTL clock. For audio work anti-aliasing filters are optional, and future digital interface to compact disc is provided for.

The *DSP-300* is a second generation DSP co-processor for use with Hewlett-Packard 9000 series 200/300 workstations. Based again round the Motorola *DSP56001*, the unit offers a complete DSP programming and

development environment optimised for high speed data throughput. The usual host computer data transfer bottlenecks are avoided by bringing source signals directly to the co-processor's dedicated I/O port rather than through the host, and speed is enhanced by the unit's ability to communicate with the host while executing signal processing routines. Software modules for various processing functions will be available from Ariel; the first of these is an advanced Fast Fourier Transform package. As expected, the 24 bit architecture of the *DSP56001* gives 144 dB dynamic range, and 56 bit accumulators can hold intermediate results with a dynamic range of 336 dB.

Ariel Corporation, 110 Greene Street, Suite 404, New York, NY 10012, USA. Tel: (212) 925-4155.

Turtle Beach Softworks SampleVision software

Turtle Beach Softworks has taken over from Digidesign the distribution of the *SampleVision* sample editing package for the IBM *PC/XT/AT*. This allows the editing and other manipulation of samples from a variety of sources and formats using a driver architecture to interface with most of the current sampling systems, including the Akai *S900*, the Casio *FZ-1*, the E-mu *EMAX*, Korg and Prophet samplers, Ensoniq's *EPS* and any system using the MMA Sample Dump Standard. As well as allowing transfer of samples between machines in the digital domain and reading 8, 12 and 16 bit sample data files and Sound

Designer format files, the software provides a wide variety of signal processing algorithms from straightforward editing and sophisticated looping functions to equalisation, inversion, mixing, muting and crossfading, all in the digital domain. Frequency analysis displays using Fast Fourier Transforms are provided either giving a quasi 3D display or time slice bargraph presentation, and an Animate function shows the sound as it would appear on an oscilloscope. **Turtle Beach Softworks, PO Box 5074, York, PA 17405, USA. Tel: (717) 757-2348.**

Chromatec TVD20 stereo in-picture monitoring

New from Chromatec Video Products is the *TVD20* stereo in-picture monitoring system, which adds bargraph audio level metering to a video picture on-screen. The unit accepts a 625-line PAL composite video signal and overlays vertical stereo meter bars, in colour, derived from line level audio inputs. The bars, which can be placed at either side of the picture, are red and green for left and right, with white for levels above overload, and the ballistics are switchable vu or ppm. Peak store cursors for each channel

can be reset manually or automatically after a user-preset time. Because the meter display obviously encroaches on the picture area a fade control is provided to enable the picture behind the meter insert to be visible simultaneously. A further option allows selection of L-R or M-S metering, and all controls are removable.

Chromatec Video Products Ltd, Unit 7, Littlemead Ind Estate, Alfold Road, Cranleigh, Surrey GU6 8ND, UK. Tel: 0483 277610.

Sound Genesis Master Sampler collection

Sound Genesis have now launched the first three volumes of instruments in their *Master Sampler* collection for the Fairlight *Series III*. These are performance-ready Fairlight instruments compiled from specially-prepared samples, featuring a wide variety of playing styles and instrumental colours.

The available volumes comprise *Orchestral Stringed Instruments*, including solo instruments as well as medium and large ensembles playing with different dynamics (and including pizzicato), *Percussion*

Instruments ranging from timps to kick drums, to latin percussion, to bass samples, and a set of *Wind Instruments*, again with a variety of dynamics and playing techniques. Shortly to be added are *Keyboard Instruments* and *Vocalists*.

Also included is *ScoreKeeper*, a software package for the *Macintosh* providing a database for the collection and an interface to the Fairlight for loading the voices. **Sound Genesis Corporation, 7808 CreekrIDGE Center, Minneapolis, MN 55435, USA. Tel: (612) 944-8528.**

Signex MIDI & XLR patch panels

New additions to Signex's range of rackmount connector panels include single rows of 16 male or female *XLRs* (*CPX16*) and single rows of 22 5-pin DIN (MIDI) (*CPM22*) sockets. As with other Signex patch panels, these are available either with solder terminal rear connections or with further sockets on the back for termination. In the case of the MIDI panel these rear sockets are also

5-pin DINs, and on the *XLR* strips they are 3-pole jacks. Both types are 1U high and include slide-in ident strips.

Isotrack, PO Box 18, Poole, Dorset BH14 8EA, UK. Tel: 0202 743640.
UK & worldwide distribution:
UK: Kelsey Acoustics Ltd, 28 Powis Terrace, London W11 1JH Tel: 01-727 1046.

'Powerfully creative and sonically transparent'



The new ISA130 Dynamics Processor

The ISA 130 module has been developed to answer the need for a powerfully creative and sonically transparent dynamics processor. Built to the same exacting standard and performance that has helped to establish Focusrite as a world leader in audio design, it is intended to complement the existing ISA 110 input signal amplifier, utilising the same racking and power supply system.

In the quest to find a 'musical and transparent' control element, we developed a new V.C.A. (voltage controlled attenuator). After long periods of listening and much research we achieved a V.C.A. which does not sound like one and, features exceptionally low distortion, accurate and thermally stable control characteristics and the absence of modulation noise achieved through a class A circuit topology.

Functionally the ISA 130 comprises 5 sections:

1. Compressor/Limiter
2. De-esser/Exciter
3. Noise Gate/Expander
4. Gain reduction and signal metering
5. Eq and Filters

EQUALISER AND FILTERS

Individual High and Low pass filters together with a peaking mid range equaliser are provided. Each of these controls may be independently assigned to compressor side chain, gate side chain or audio signal path.

Input impedance 20Hz-20kHz 10,000 ohms + or - 10%

Balance > 60dB to 10kHz
 Distortion, - side chains switched out, V.C.A. in circuit:-
 Typically 0dBu Input 1KHz 0.002%
 +10dBu Input " 0.005%
 +20dBu Input " 0.01%
 Noise better than 80dBu below +4dBu output
 Frequency response -3dB at 120 kHz
 Power + and - 15 volts, 200ma (average, depending on L.E.D.s in use)

f first and foremost

FINLAND, Tehtaantie 17,
74100 Iisalmi tel. 3587713311

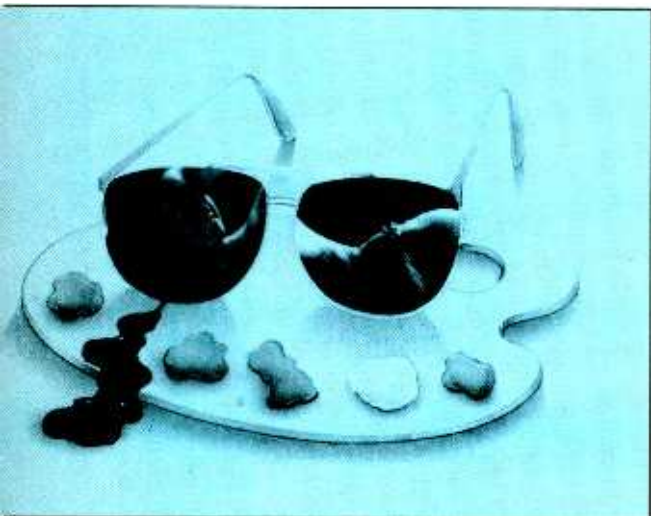
GENELEC®

COLOUR TRANSPARENCY



WE'VE NEVER BUILT MONITORS
THAT 'SOUND' GREAT. ANY
'SOUND' WOULD COLOUR YOUR
VISION WHILE MONITORING
YOUR SOUND. WE OPEN YOUR
WINDOW TO REALITY! HENCE -
GENELEC. FACTS NOT FASHION.

COLOUR TRANSPARENCY



BELGIUM, Hes Electronics
tel. 02-4652917,
FRANCE, Publison Audio Professional
tel. 1-43608464,
ITALY, Audio Equipment S.R.L.
tel. 039 2000312,
THE NETHERLANDS, Audioscript
B.V. tel. 02155 20400,
NORWAY, Siv Ing Benum A/S
tel. 02-145460,
SPAIN, Audio Sintesis
tel. 03-2128915,
SWEDEN, Intersonic AB
tel. 08-7445850,
SWITZERLAND, Emm-Studio AG
tel. 061-542045,
HONG KONG, Power Source
Development Ltd. tel. 3-7446189,
JAPAN, Otaritec Corporation
tel. 03-392-7811,
USA, Redwood Marketing
tel. 615-3314743,
UK, Scenic Sounds
tel. 01-387 1262,
WEST GERMANY,
Audio Export G. Neumann &
Co. GmbH tel. 07131-82275.

Tascam MTM-1000 Midiizer

Tascam have just introduced a three-function synchroniser that will act as an autolocator for transports as a MIDI synchroniser that syncs MIDI equipment to tape transports, and as a transport synchroniser that chases two transports.

The *Midiizer* can also be used for control and synchronisation of most popular VTRs and ATRs with the addition of an optional interface unit.

In addition to basic transport control, the *Midiizer* also features record function selection, auto punch-in/out, and autolocator functions for editing and centralised transport control. The MIDI/SMPTE synchroniser section will read and generate all timecode for 24, 25 and 30 f/s, drop-frame and non drop-frame formats. Up to eight songs may be chained without a pause. There is one MIDI In terminal, and three MIDI Out terminals, and a DIN sync output is provided for machines such as the Roland TR808, which are non-MIDI.



Kurzweil 1000 series sound blocks

Kurzweil Music Systems have announced the release of the first *Sound Block* samples for the 1000 PX Professional Expander. It will feature a full drum kit, electric bass with dual hardness mapping, electric piano and flute, plus a number of highly useful synthesis waveforms. *Sound Blocks* for the 1000 SX, 1000 HX and 1000 GX will follow shortly, and Kurzweil will continue to enhance the entire 1000 line with a continuing series of new *Sound Blocks*. These sampled sounds will be taken from the Kurzweil sample

Offsets to 1/100 of a frame may be programmed; memories may be dumped via MIDI; SMPTE/MIDI Timecode conversion is provided; incoming MIDI timing and performance data may be merged; and the timecode for MIDI sync may be referenced to either the Master TC, the Slave TC or to the internal TC.

The transport synchroniser allows for one master and one slave chase sync, with $\pm 50 \mu\text{s}$ accuracy. The optional VTR/ATR interface provides a video input for external video sync reference.

Teac Corp, 4-15-30 Shimorenjaku, 4-Chome, Mitaka-Shi, Tokyo 181, Japan. Tel: (0422) 45-7771.

UK: Teac UK, 5 Marlin House, The Croxley Centre, Watford, Herts WD1 8YA. Tel: 0923 225235. Fax: 0923 36290.

USA: Teac Corporation of America, 7733 Telegraph Road, Montebello, CA 90640, USA. Tel: (213) 726-0303.

library. The original *Sound Blocks* in the 1000 series units will still be accessible simultaneously when the new *Sound Blocks* have been installed. The advantage is that you are able to get the sound capability of an extra module at a fraction of the cost of a complete new unit.

Kurzweil Music Systems Inc, 411 Waverley Oaks Road, Waltham, MA 02154, USA. Tel: (617) 893-5900. Fax: (617) 893-2733.

UK: Syco Systems Ltd, 20 Conduit Place, London W1. Tel: 01-724 2451. Fax: 01-262 6081.

Spatial Sound SP-1 processor

This new processor is designed specifically for moving sound from up to four independent audio sources spatially between two to eight speaker locations to which its output may be routed. Obviously, a variety of panning effects may be achieved but there are many other possibilities as well. Dual Source mode allows the simultaneous simulation of two independent moving sound sources of two to four speakers. Reverb Processing mode incorporates an external reverb unit to enhance the external unit's spatial effects. Gerzon Processing mode uses a special phase-processing technique for more

realistic spatialisation, and so on. The unit lets you create effects such as the Doppler, the simulation of distance, the speeding up or slowing down of sound movements through space and the increasing or decreasing in size of sound movement patterns.

The *SP1* may be used in a variety of situations, from live performance to sound recording, to creation of cinema surround sound effects, to theatre sound effects.

Spatial Sound Inc, PO Box 1111, Mill Valley, CA 94942, USA. Tel: (415) 457-8114.

C-Lab Software

• **C-Lab** have announced software updates for *Creator*, *Notator* and *X-Alyzer*, their most popular programs, as well as three new products, *Unitor*, *Explorer 32* and *Explorer 1000*. In UK write to Sound Technology with your name, address, and retailer's name. At the same time, a C-Lab User's Club will be established and a newsletter is planned.

Updates for *X-Alyzer version 1.2* include a randomiser, a duplicate-sound eraser and so on. *Notator version 2.0* includes a vast array of enhancements and additions to the realtime, integral score editing and printing capabilities of the program, as well as to the sequencing side. The program now features drum, guitar and chord notation, multiple clefs/key changes, snap entry of notes, and so on. *Creator version 2.0* now includes features originally developed for the first version of *Notator*, such as 'User-defined Groove Design', 'Realtime MIDI Generation' and 'Realtime Ghost Tracks'. Additional new features, which have also been added to *Notator*, include a new interactive display of note events called 'Graphic Matrix'; a new step input method; and 'Realtime Transformation', which allows you to re-map or otherwise alter incoming data as you play. There are now nine different ways to record your music and the software now allows you to change tracks or instruments while cycle-recording. In addition, the software is MIDI File and Lynex compatible.

Unitor is the new C-Lab SMPTE/EBU synchroniser, and is fully compatible with the new *Creator* and *Notator* versions. This hardware product plugs into the ST's cartridge slot at the side. It transmits MIDI Song Position Pointers within 500 ms of SMPTE code being received, and all commands, including unlimited tempo changes are initiated using a special dialogue box. In addition, there are two more MIDI inputs with MIDI Merge, such that all three inputs are individually addressable from within the program, and there are two more MIDI outputs, which give you an extra 32 MIDI channels to play with. SMPTE/EBU/film timecode may be generated and read, and the SMPTE/MIDI timing clock conversion allows for tempo resolution to 0.0001 b/m. *Unitor* is intended to work exclusively with *Creator/Notator* software running on the Atari computer.

Explorer 32 is an editor/librarian/converter for the Roland LA synthesisers, the *D110*, *D10*, *D20* and *MT32*. With similar features to the semi-intelligent *X-Alyzer*, it allows you to have a single library of any length with a random access approach to sound retrieval and the editor is highly graphic in its approach.

Explorer 1000 does similar things for the Oberheim *Matrix 1000*, *Matrix 6* and *Matrix 6R*.

UK: Sound Technology plc, 6 Business Centre, Avenue One, Letchworth, Herts SG6 2HR.
USA: Digidesign, 1360 Willow Road, Stc 101 Menlo Park, CA 94025.

Installations

Marathon Recording Studios in New York recently celebrated its opening with a party for more than 200 industry guests.

The party also marked the installation of two new Neve consoles—a 60-input V series with *Necam 96* moving fader automation in Studio A and a 32-input 8232 console in Studio B.

Other installations of Neve equipment includes a new 48-channel V series console at Compass Point Studios in the Bahamas; a 48-input V series with *Necam 96* moving fader automation at Memphis Sound

Productions; a 60-input V series with *GML* automation at Devonshire A/V Studios in North Hollywood; a new V series console with *Necam 96* at Chung King House of Metal in New York City.

In addition to these installations, Neve have announced that the new *Prism* series range of rackmount units derived from the V series console is now available for rent from the Toy Specialists in New York. The *Prism* series incorporates a 4-band parametric equaliser, comprehensive dynamics and microphone pre-amp.

In brief

● **Electro-Voice Inc**, Buchanan, MI, USA, have awarded their EV '88 Rep of the Year award to Metropolis Audio Marketing of New Jersey, USA. The award has been given to Metropolis after two years of service in the metropolitan New York area.

● **Audio Technica US Inc** have appointed On The Road Marketing, NJ, Torbett/Keiser Group, CO, and Progressive Audio Representatives, MN, as new sales agents for their range of mics, portable field mixers, loudspeakers and studio phones.

● **Oberheim-ECC**, City of Commerce, CA, USA, have named seven new companies as representatives for their synthesisers, sample players, MIDI performance

effects and accessories. The companies include: DBA Marketing, Double Edge Marketing, Future Sales, JAMM Distributing, Pacific Audio Group, Reflex Marketing and Ron Tunks Sales.

● **DAX Audio Group**, Portland, OR, USA, have added six new reps to their sales force. They are: Smith and Company, Taub Sales, Raleigh Perry and Associates, Northland and Associates, Rowe Marketing Group and Michael Welch Enterprises.

● **Harrison Systems Inc** of Nashville, TN, USA, have purchased new executive offices to house their administrative, sales and engineering departments.



Artist/producer Kashif with Neve vice-president of sales Tony Langley with the V series console at Marathon Recording Studios

Literature

Bill Daniels Company, US trade publishers, have announced the publication of the 1989 edition of *Professional Audio and Commercial Industrial Sound*. It comes as two volumes and includes lists of complete product lines of professional audio manufacturers. Also included is current information on studio and remote audio equipment, sound

reinforcement, background music, paging, intercommunications and telecommunications systems and equipment. A telephone directory and product index is also printed. For information contact: Denise Willson-Charpentier, Bill Daniels Company, 9101 Bond, PO Box 2056, Shawnee Mission, KS 66201, USA. Tel: (913) 492-9000. Fax: (913) 492-2085.

Electro Sound seminar

Technical information, hints and hands-on experience were offered by Electro Sound Inc of Sunnyvale, CA, at its latest quality/production controls working seminar for users of its audio cassette duplicating equipment. The classes were held at its manufacturing headquarters in Sunnyvale.

Topics featured included: EQ, bias, maintenance, electronic and mechanical alignment, temperature

and humidity adjustments, tension, use of test equipment, tuning, azimuth, cabling, troubleshooting and signal circuit testing.

Those who attended were enthusiastic, one commenting: "I particularly appreciated the hands-on style of instruction as we are so often out there on our own; it's a comfort to know we have this kind of support."



Participants at Electro Sound's latest quality/controls working seminar

Personnel

● **Shure Bros**, Evanston, IL, USA, have announced the appointment of Alan G Hershner as director of sales, domestic distributor products. Hershner joined Shure in 1984 as Western regional sales manager. He will now supervise all Shure domestic sales representatives. Also promoted is Lottie Morgan to vice-president, sales. Morgan joined Shure in 1962 and has held a number of sales management positions.

● **Ampex** have appointed Frank Witte as product manager for 1/2 inch video tape. Witte has been Ampex's market research and planning manager and data storage product line manager. He joined in 1982

following positions with Weyerhaeuser, Technomic Consultants and Union Oil.

● **The Society of Motion Picture and Television Engineers** at White Plains, NY, USA, have elected 14 new fellows. They are: John H Streets, Frederick C Franzwa, Gustavo Dato Jr, Birney D Dayton, Arthur E Florack, Murray Forrest, David L George, Richard R Green, Frank J Haney, Tomlinson Holman, Richard A Hathaway, Nelson E Meacham, John P Watney and J Wayne Caluger. The announcement was made by M Carlos Kennedy Ampex Corp, president of the SMPTE.

The difference between hearing most of the music and all of it.



It's a vital difference. Especially if you're an engineer, musician, vocalist, composer, producer or broadcaster.

BBE Makes The Difference

And the difference is heard around the world. In leading recording studios, at major live concerts, and by audiences of top-rated radio stations.

What's The BBE Difference?

We make an exclusive line of audio processors. For all audio uses. Professional. Personal. Industrial. Wherever sound is involved, so are we.

Our technology restores the proper harmonic structure of sound by compensating for amplitude and phase distortion.

What's The Result?

You won't believe it. You literally will hear nothing like it. That's because instead of hearing most of the music, you'll hear all of it.

How Is It Done?

Well, we began 10 years and 42 patent claim awards ago. But simply, the BBE SYSTEM:

- Divides the audio spectrum into three bandwidths
- Applies specific phase corrections to each band
- Makes dynamic high-frequency amplitude compensations as required

What Do The Experts Say About BBE?

"The most hearable advance in audio technology since high fidelity itself."— *Music Connection Magazine*

"The effect is shattering!"— *Music Technology Magazine*

"I can't imagine working on another album without BBE."— *Steve Levine, producer of The Beach Boys, Culture Club, Denice Williams, and BPI Producer of the Year*

"The difference in (BBE) processed audio and non-processed audio is like the difference between high-fidelity speakers with and without pillows placed in front of them."— *Radio World Magazine*

"For my own personal system, it was the answer to problems I had been trying to solve with a graphic equalizer. The system has never sounded so good."— *Mix Magazine*

"You're in aural heaven."— *Music & Sound Output Magazine*

Full Warranty

All BBE products are backed by a full year's warranty on all parts and labor.

Where Can You Hear The BBE Difference?

For the name of the BBE professional sound dealer nearest you call toll free **1-800-233-8346**. In California 1-800-558-3963.

Then stop by. You'll love what you hear. All of it.

BBE

Sound Inc.

5500 Bolsa Avenue

Suite 245

Huntington Beach, CA 92649

(714) 897-6766

The rock band was feeling an excitement from this European tour that they had lost touch with through the years. It had been a great idea to start in Switzerland. The audiences in Gstaad, Lausanne and Geneva had been very receptive. After all, and even in the '90s, American '50s rock was still a marketable commodity and it seemed more so in Europe. Taking the train had been Jake's idea. What a great way to get to Munich for the next concert; they would see a little bit of Germany and unwind from the success of their Swiss opening. When the train reached the German border at 11.45 pm, the lads were half-stoned and half-asleep. They were not prepared for the presence at the door of their compartment of the two German customs policemen. Standing straight as a board in their reflectively-shined black boots, the two customs officers gestured the band off the train to the platform, in a mix of German and guttural English.

"That's our gear," shouted Erich, pointing at the mass of luggage on the platform.

"I know, dummy!" growled Jake, the band's manager. The first customs officer was looking at a list on a clipboard.

"Let me see. You have almost all Japanese and American equipment here. American microphones, Japanese house mixing console and Japanese monitor mix console. American processing electronics. American speaker systems. None of this can enter Germany without special permits."

"This is crazy," screamed Jake. "How come you aren't concerned with the power amplifiers?"

"They are made in England by the subsidiary of an American company," was the customs official's reply.

"I thought this was the United States of Europe," muttered Jake.

"Trust me, it is," quipped the custom's officer.

So the question of the hour, at least in the EEC (European Economic Community) countries is what is going to happen to the established patterns of world trade with the coming of the United States of Europe, circa 1992? And the question on all our lips is how will this affect the audio industry—a bit more international in flavour and trade than most? But needs of a small segment of the overall European economy are not going to be given very much consideration in a series of changes that some observers consider to be a steam-rolling of national sovereignties.

The pressure to accommodate the necessary changes has been great. France has been a leader of the movement, with Britain being viewed by many in Europe as being the most resistant to the changes.

The formal amalgamation of the members of the EEC into a compact with common trade laws, the abolition of barriers to the free movement of goods, services and investments within the overall political confederation, conformity of some criminal and civil justice codes, a central 'supreme' court and commonality of currency conventions is expected to be completed by 1992, if not before. Some members of the European Community wish to see the issues of basic social

Martin Polon

Oh say can you see—the United States of Europe? Comment from our US columnist

rights, collective bargaining and employee presence in management decisions addressed as well. But for many, it is a fact to be accepted that so much will be gained in internal efficiency by operating the EEC member economies in parallel in as many ways as is possible rather than in series, as in the past. That forwards motion to the creation of a United States of Europe is immutable. The advantages of all this are held as being very similar to those of the conglomerate economy of the United States of America.

Another expected outcome of these changes will be the adoption of the most restrictive current tariff barrier of the member EEC nations, as the norm for a uniform barrier for the whole confederation. That thinking has certainly been echoed by the US government, which has consistently engaged in warning American business of the potential impact of a European compact on the US. Quoted in print and as part of an education programme for entrepreneurial managers in the United States, the feeling in Washington is that this heightening, or if you prefer, averaging of the trade walls around Europe will proceed apace. The feeling is that this will represent a tightening of the current tariffs and perhaps a 180° turnround from the successful rounds of tariff reduction between the US and Europe that have taken place over the last several years. Many Europeans feel passionately that strong economic protection of the new confederation's borders must take place, no matter what the penalty to nations outside the 1992 boundaries.

Of most concern to observers of the world economic-political scene is the likelihood that any strengthening of the EEC tariff walls would bring retaliation from Washington. That sort of tit-for-tat negotiation has been the standard for the current round of talks between the EEC and the US of A. Consider the difficulty if American oil products are embargoed and US of E audio products are cut off at the knees. There is one major factor that prevents any of this from affecting major American companies: all the really large performers like Caterpillar Tractor, Ford Motor Company, General Motors, IBM, etc, have set up their European and British subsidiaries as indigenous extensions of the parent. The companies are registered in the countries they operate in, employ natives of whatever country is involved and manufacture all or most of the product in question within the country in question. They have become truly native business combines. This kind of American company 'gone native' is expected to thrive in the

atmosphere of the US of Europe 1992 and perhaps even out-perform its European-owned cousins.

To place all this in context, however, one must first remember that Europe and England have been wasting as much as 15% of the total for all transportable commodities according to some analysts. This sum represents paperwork and staff-time in dealing with the consuming bureaucratic process of moving materials across the several borders extant in the so-called 'Common Market'. The successful operation of a 'Single Europe' could mean a significant boost to the economies of all the member countries, as any and all materials move freely. It is estimated that these changes freeing the internal movement of goods, could yield as much as a 5% boost in the economies of the member states within a Single Europe, achieve price reductions for European consumers to the tune of 6% plus and yield the creation of nearly two million new jobs throughout the US of E. If there is some trade friction with the rest of the world as a result, it is viewed as an unfortunate side effect.

The specific problem for the world audio industry is that it is exactly that. A more geographically diversified trade would be hard to find. Yet the world audio business has a much more fragile base than most international industries and needs the continued evolution of unlimited trading possibilities. Americans buy British mixing consoles and, control desks, digital audio workstations and loudspeakers and speaker systems. They buy Swiss tape recorders, French signal processors and MIDI electronics, German microphones, mixing desks and test equipment. British buy American power amplifiers, speakers and microphones. German manufacturers buy American speakers and American chips and chip sets. This goes on *ad infinitum* with the Japanese audio industry contributing as much as, if not more than, America, in this 1980s audio electronic version of the triangular trade.

A sales manager for a British audio equipment maker had this to say about a Single Europe in 1992: "If any kind of trade war erupted with the USA because of this 1992 issue, we and most of our British counterparts would cease to exist. The American professional audio marketplace is a billion dollars strong every year. There are 10,000 recording studios and 1,500 television stations and 500 TV network and TV/film production and post-production facilities plus countless municipal auditoria and centres for the performing arts that purchase the kinds of equipment we make. In a 'Europe-only' situation, we would likely starve to death and it might not be that slow, either. I have eaten beans on toast in my life but I do not intend to do it again."

The worldwide extent of the electronic entertainment industry can be measured by a recent full page advertisement in *Daily Variety*, Hollywood's number one film business publication, for British Satellite Broadcasting Ltd (BSB). It indicated that BSB was spending over \$1 billion in the USA for a Hughes HS376 satellite, a McDonnell Douglas *Delta* rocket to launch it,

1. EXPERIENCE

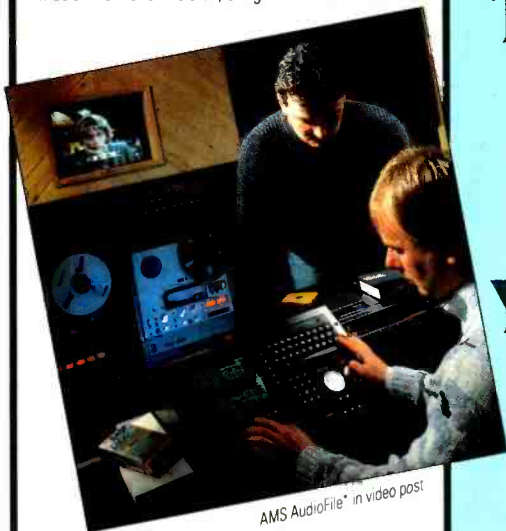
AMS AudioFile is the most successful disc based linear editor for the audio engineer. Introduced in 1985, both experience of owners and AMS's R & D have continued to shape AudioFile into the professional's workhorse of today.

2. THE INDUSTRY STANDARD

AMS AudioFile is now available in 19 countries from England to North America, from Japan to Spain, from India to Iceland. There are more AMS AudioFile systems in the field than any similar disc based audio system.

3. MORE APPLICATIONS SOFTWARE

A wealth of applications software means AMS AudioFile is equally at home manipulating dialogue, sound effects or music – either on its own, or against film or video.



AMS AudioFile* in video post

4. MORE INTERFACES TO THE OUTSIDE WORLD.

Not only can AudioFile talk digitally to a host of audio tape machines – including multitracks, Sony 701/601 recorders and R-DAT machines – its inbuilt synchroniser can control a selection of video machines from Mill right down to low-band video players (including jog and shuttle).

5. CONTROLLABLE BY EXTERNAL VIDEO EDIT CONTROLLERS

AMS AudioFile can record automatically whilst under commands from certain video edit controllers. Recorded tracks contain "tops" and "tails" which can be edited or cross-faded during post production.



AMS AudioFile*

TEN REASONS WHY AMS AUDIOFILE™ SHOULD BE YOUR CHOICE OF DIGITAL AUDIO DISC SYSTEM

6. COST EFFECTIVE AND PROVEN BACK-UP AND ARCHIVING

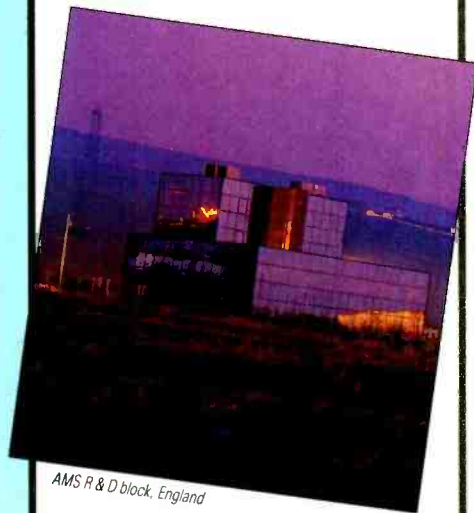
Whilst certain systems offer cumbersome or expensive back-up, AMS AudioFile continues to successfully use inexpensive digital audio tape recorders.

7. LOGIC 1

Over four years of R & D now means any AMS AudioFile user will have the choice of working with a stand alone AudioFile, or adding a totally dynamically automated digital mixing console – Logic 1 – to his system.

8. DIGITAL AUDIO NETWORKING

Whilst other audio disc manufacturers are working hard to try and incorporate as many features in their systems as AMS AudioFile



AMS R & D block, England

– AMS are introducing networking.

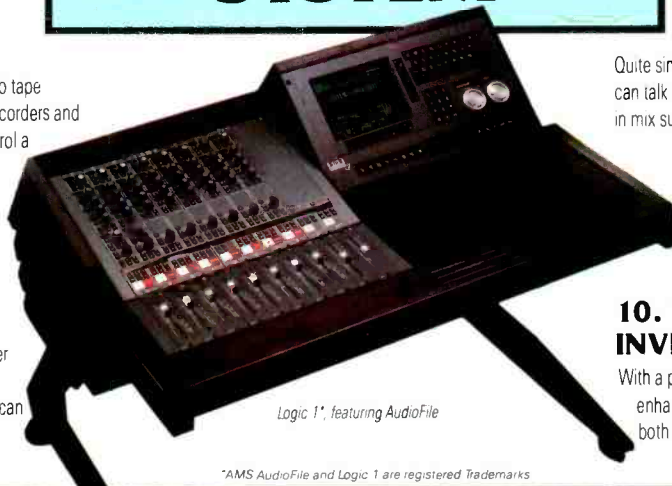
Quite simply, several AudioFiles in edit, dub or track-lay suites can talk to each other as well as to Logic 1's integral AudioFiles in mix suites.

9. EDIT 1

A new product from AMS Edit 1 is a digital audio mixer which can work with analogue or digital audio from VTR's, as well as AMS AudioFile.

10. WE'RE PROTECTING YOUR INVESTMENT

With a proven history of achieved development and enhancement we can give you an edge over your competitors both now, and in the future.



Logic 1*, featuring AudioFile

*AMS AudioFile and Logic 1 are registered Trademarks



Hard Disc Editor



Digitally Assignable Consoles



DMX/RMX Digital Audio Processors



Calrec Standard and SoundField Microphones



Custom Broadcast Consoles



Music Recording Consoles



Digital Mixing Consoles



AMS Industries plc

AMS, UK, AMS Industries Park, Burnley, Lancs. BB11 5ES, England. Tel: (0282) 57011 Telex: 63108 AMS-G Fax: 0282 39542
AMS, USA, 3827 Stone Way North, Seattle, WA 98103. Tel: (206) 633 1956 Fax: (206) 547 6890 E-mail: IMC 889

Demo systems available in the USA: New York, Chicago, Los Angeles, Miami, Atlanta, Seattle – for details contact AMS Industries Inc, Seattle.



The Queen's Award for Export Achievement to Edendeck Ltd 1984/85 and AMS Industries plc 1986. In July 1985 Edendeck Ltd became AMS Industries plc.

encryption for the satellite broadcast signal once in orbit via General Instrument's *Eurocypher* and for the purchases of a substantial library of original and theatrical programming. Conversely, the continued viewer support for non-commercial public television in the United States depends upon a steady stream of quality television co-productions from Britain's two non-commercial and two commercial television networks and associated production companies. It is a two-way street that needs to remain open in the 1990s.

There is a significant future for the world trade in audio and it encompasses more than just today's latest equipment. It encompasses such things as setting future standards for the interconnection of audio systems, digital sampling rates for mixers and other peripheral equipment, digital tape recording, and a broad range of other audio issues. These standards need to be world standards, so that every piece of equipment can connect with every other piece of equipment—no matter where in the world it is made. The Europeans have set up a Committee for Electrotechnical Standardisation to tackle these and all other issues involving inter-European standards for electronic technology. The real worry here is the creation of standards in the future that suit Europe best while ignoring the needs for technological reciprocity with the United States or Japan, or the rest of the world for that matter. Especially in terms of high definition television and some digital audio sampling rates, Europe has already shown an interest if not a propensity for 'going it alone'. It would be inconceivable to have a number of different standards just to suit the demands of regional politics and regional politicians.

Even the realm of legal interpretations requires a global perspective. The presence of a Single Europe patent office in Munich since 1978 has enabled patent protection through a one-stop system for all the countries within the European Community. How that would fare in a trade confrontation with the United States remains most unclear. European action on such intellectual property issues as the problem of DAT and the restriction of previously copyrighted recorded music has not co-ordinated with similar actions in the United States during the 1980s. What would the 1990s bring for these and other industry stultifying issues also remains to be seen. What is needed is for the European audio industry to remain a full partner with the rest of the audio world in creating a digital decade from the 1990s. The fear expressed by many observers both within and without the borders of the United States of Europe is that a comfortable parochialism will slip over European manufacturers who find that their intra-Europe business increases enough to replace past export activity, at least to some extent. That might not occur in the audio business but it could certainly happen in enough of the European industries to prevent a lessening of imposed trade barriers.

For the audio equipment maker outside Single Europe who decides to sustain a currently successful effort in exporting to the Continent, the pro-forma advice

strikes one as too extreme for all but the largest vendors. The theory at this point is for a manufacturer to achieve a complete European presence by establishing a subsidiary in Europe to manufacture there. Totally staffed by Europeans, this indigenous company would thrive from being inside rather than trying to look in from without. Of course, one could buy into another existing European company to achieve the same goal. In the case of US makers, all but a select few would be hard pressed to profit from this line of reasoning due to size, finances, management depth or cost of establishing an assembly line. There are a few American companies that have begun to collect European subsidiaries and several Japanese vendors have created totally European units for exactly this reason. But for most, it is a difficult goal to achieve.

Where does all this leave the studio owner? If within the United States of Europe, it seems likely that American (and Japanese) audio products will have a premium attached to them at some point in the future, even above and beyond the already high prices (due to existing duties) charged today. For the American studio owner, the dilemma cannot be solved just with more cash. Since America imports more than half of all the audio equipment it uses on the professional and semi-professional level, the dependence on European suppliers is more than just a vogue. Yet prohibitive import tariffs, if not total embargo, could follow a similar move against American audio exports. Such a rise in prices would be prohibitive to all but the largest studios and would probably not stimulate the creation of domestic industries to replace the foreign exports.

“If any kind of trade war erupted with the USA we and most of our British counterparts would cease to exist.”

If that scenario is replicated on a larger scale for all commerce between both sides of the waters, then it is just possible that the current US/Canada trade pact might be expanded as well. There is much information to suggest that US reaction to a European trade war might be to create hemispheric economic expansion that would clearly take in Mexico but could just as well force a revitalisation of the economic role of Central and South America *vis-a-vis* the United States and the rest of the world. Since the United States is currently conducting preliminary talks with the Japanese on free-trade status, it is also possible that Japan could be included in such a concordat. The logic for that is good since the Europeans currently discriminate against Japanese products and are not expected to change that policy. But can the United States of Europe succeed?

The first question of dropping trade and customs barriers is largely being solved and will be a reality by 1992 if the negotiations continue to be unscathed by politics. On the greater levels of common banking, currency, financial markets,

courts and law enforcement, the stumbling blocks become larger and more painful until the prospect for peaceful 'approachment' recedes. Clearly, the UK does not seem to benefit on the same scale as, say, the French. If Britain 'goes along', it will be the seeming inevitability of the whole package that will force many of the decisions necessary for the scheme. It is also interesting to consider that the US of E analogy to the US of A might also contain the roots of upheaval for the member countries. If the analogy is that accurate, then there will be member countries just like various US states whose economies do not prosper from the greater cause and who need significant support just to move at all, let alone forwards.

Lastly and perhaps the greatest threat of all, is the complete success of all of this. Assuming a completely successful Single Europe that begets a Single American Hemisphere with North, Central and South America responding with their own grouping and just probably including Japan and possibly even the four tigers of Asia, a competing economic machine would be created with capabilities for export and for consumption many times that of the United States of Europe. The solid satisfaction of this combine using only one primary language of business and technology (English) and one secondary language in commerce (Spanish) allows for a level of efficiency that cannot be matched with the *lingua franca* of the EEC countries. But even more important, the creation of a world dominated by two major economic zones plus the third world countries sounds suspiciously like two steps backwards, one step forward.

Now there is only one tiny codicil to all of this. Those who question the outcome of the United States of Europe 1992, may be just a bit paranoid. This whole thing could and may well be the greatest spur to economic growth the world has seen in some time. It could also give Europe some input to, and control of, the free world's economic engine rather than depending upon the boom and bust cycles of the previously dominant US economy to do it alone.

This article could be a boring waste of time except that the flag has to be raised and waved if we are to survive this experience without some of the scenarios painted above taking place. Americans are probably not jealous of this great undertaking. They are so uninformed about it even at the top levels of most businesses that it is just not a major factor in economic planning today, although that could change. In addition, relatively few American companies export, with government estimates somewhere below 10% of the total. Of those that do export, many of the larger entities have always operated with independent European subsidiaries. So the outcome of this is by no means mandated by any US pressures and perhaps this exercise in flag waving may alert a few folks to where the dangers could exist. It's just that some of us have noticed that the current wave of long term economic prosperity in the Western World has paralleled the gradual elimination of most trade restrictions around the world. We should all work to keep it that way. □

SOUNDTRACS IN LINE



BARRY BLUE AND LEE WITH SOUNDTRACS IN-LINE CONSOLE.

BARRY BLUE – THERES A NAME TO CONJURE WITH. WHY IS A TOP PRODUCER AND RECORDING ARTIST LIKE BARRY BLUE ONE OF THE FIRST TO BUY A SOUNDTRACS IN-LINE CONSOLE FOR HIS HIGHLY SUCCESSFUL AOSIS STUDIOS?

“We were looking for an In-Line console anyway – the width of the control room dictates it really – but this console, in terms of noise is very, very quiet; secondly it is very flexible and has a very pleasing sound. Thirdly it is easy to use and well designed; and fourthly, it looks the part.”

BARRY BLUE'S SUCCESSES STRETCH FROM THE LATE SIXTIES WITH ACTS SUCH AS URIAH HEEP, THE MESSAGE AND THE RAM JAM BAND TO PRODUCTION CREDITS WITH THE HONEYCOMBES, DANA, HEATWAVE, BANANARAMA, HOWARD JOHNSON, FIVE STAR, AND MOST RECENTLY AMAZULU, AS WELL AS MAJOR WRITING HITS SUCH AS PERHAPS HIS MOST WELL KNOWN SINGLE DANCING ON A SATURDAY NIGHT. HE IS CURRENTLY IN A POSITION TO JUDGE WHAT IS REQUIRED OF TODAY'S MIXING CONSOLE.

“It is everything you could ask for; simply a very well

designed desk which is straightforward to use. Everything seems to be there. Every other desk we looked at seemed to have something missing. It has been very well put together and thought out. We are in no doubt that it is going to be a very popular desk, so we have no qualms about being one of the first. Everybody who has used it so far will be coming back.”

“We were simply looking for a flexible, quiet, well designed In-Line mixer and the Scundtracs is just the job. We have been selling studio time on it from the day it was installed.”

Noise

Equivalent input noise (gain 60dB ref 200 Ohm) -127.5dBv
Mix noise (32 channels routed) -82dBr

Distortion (channel input through to mix output)

Line 100Hz<0.006% 1kHz<0.008% 10kHz<0.02%

Signal Cross talk

Between any two groups
1kHz<-82dBr 10kHz<-78dBr
Microphone/line
1kHz<-85dBr 10kHz<-75dBr
Monitor
1kHz<-88dBr 10kHz<-85dBr
Between any two channel line inputs
1kHz<-88dBr 10kHz<-85dBr



SOUNDTRACS
IL4832
IL3632

SOUNDTRACS PLC 91 EWELL ROAD SURBITON SURREY KT6 6AH ENGLAND TEL: (01) 399 3392 TELEX: 895 1073/STRACS/G FAX: (01) 399 6821
UK SALES: LARKING AUDIO 0462 422466

WITH OUR TAPE, QUALITY CONTROL STARTS HERE.



Even at the well-head, Sunkyong's in control.

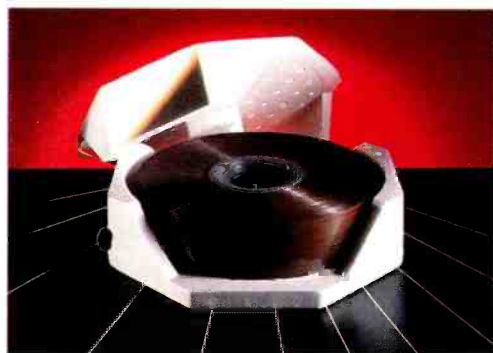
Sunkyong duplicating tape is made using high grade petroleum components from our own oilfields, refineries and chemical divisions.

Controlling the quality of every production element to such an extreme degree ensures consistency from batch to batch.

And we're talking in vast quantity here, just as much as quality. Our manufacturing facility can satisfy almost a fifth of the world's audio cassette tape needs.

Our R & D teams, too, are doing their bit to keep us ahead in a dramatically evolving marketplace.

Because, no matter where it begins, true quality control is a process that never really ends.



SUNKYONG SKC®

THE WORLD'S FASTEST GROWING TAPE COMPANY

SUNKYONG EUROPE LTD, SUNKYONG HOUSE, SPRINGFIELD ROAD, HAYES, MIDDLESEX UB4 0TY. TELEPHONE: (01) 561 1200/(01) 561 8686.
SUNKYONG MAGNETIC LTD, KWANG HEE BUILDING, 216 KWANG HEE-DONG, CHUNG-KU, SEOUL, SOUTH KOREA. TEL: 82 2 279 16 11. FAX: 82 2 275 21 44.

A fair degree of confusion surrounded the latest, and probably the best, in a long line of jazz biopics—*Bird*, the story of alto sax player Charlie Parker. But Parker died before studios started using hi-fi stereo tape recorders so all the material available is mono from the '40s and early '50s. And no-one can mimic Bird's sound and fluency to seem authentic on a modern re-recording.

There was talk earlier this year of the film being made in mono to match the original sound. But a decision was taken to go for Dolby stereo. There was also talk of San Francisco company Sonic Solutions being employed to process the Parker originals with their computer system known as *NoNoise*—now used by many record companies to clean up old recordings. But Sonic did not contribute to the final soundtrack.

Lennie Niehaus was hired to score a modern accompaniment for Parker's original solos—some from issued recordings, and others from off-air recordings and private tapes now owned by Parker's wife Chan.

Niehaus booked a number of names to record new material. He also brought in engineer Robert Fernandez to try to blend the new material with Bird's original solos.

The first step was to copy the original Parker solos on to a 32-track Mitsubishi recorder. These originals were mostly live recordings, and the tempos often varied. So Niehaus tapped out a manual click track as a guide.

Fernandez arranged the musicians close together, as they would play in a night club, to give a feel similar to the original recording.

He wanted a period sound, so went mainly for valve, ribbon and dynamic microphones. This avoided the potential problem of jarring contrast between the original Parker mid-fi recordings and a very bright condenser mic/digital tape sound from the new material.

Fernandez used a wide variety of mics. He had a Neumann *U67* for string bass, *U47* on bass drum, Neumann *KM54* on hi-hat and Shure *SM57* on snare drum. For the drum kit tom-toms he used three Sennheiser *421s*, with two AKG *452s* on the cymbals and a Neumann *M49* suspended around 10 ft over the full kit. For the piano he had two AKG *452s*, with a *U47* and RCA ribbon for the trumpets and *U67* for the saxes.

What ended up on tape was the original Parker sound, on one track and a completely new accompaniment spread over the rest of the tracks.

This left Fernandez with the task of stripping away or drowning out the original Parker rhythm section before blending in the new backing.

For this Fernandez used four parametric equalisers for processing, a Burwen noise gate for clean-up and UREI compressor/limiter to keep the level constant.

With a great deal of trial and error, it was possible to find the parametric control settings which left Parker's saxophone sound—around the middle of the frequency range—more or less untouched, while drastically reducing the lower frequency sounds of bass and bass drum and the higher frequency content of cymbals and snare.

Inevitably some of the sax sound overlapped the old accompaniment. Removing the accompaniment

Barry Fox

Recreating Charlie Parker and magnetic tape supplies in Europe

thus affected the Parker sax sound. So Fernandez reshaped the stripped Parker solos with a second run through the parametrics.

Some recordings, for instance *Lester Leaps In*, varied so much in audio quality on the original, that individual bars of the music had to be doctored separately. And some original Parker recordings, made in night clubs, had so much background noise on them that it was impossible to remove. So Niehaus and Fernandez simply added extra crowd noise in stereo to mask the original. They have done a clever job, neatly mimicking the sound of drunken GIs.

The final touch was a little reverb, from two AMS units, one set up to create ambience and the other to give a short decay to match the sound of a small room.

Of course the result is not perfect. There are times when Parker's sax solos sound rather boxy, compared with the modern rhythm section, and in some cases the modern string section on *Parker With Strings*. There are also some silly mistakes, for instance a drummer is seen playing a ride cymbal and heard on hi-hat. Doubtless saxophonists will be able to pick holes in the fingering of Forest Whitaker who plays Bird.

But on the whole it's a remarkable and respectful achievement.

Something similar was done around 10 years ago on a French LP when bass player Pierre Michelot helped graft the guitar 'choir' Guitars Unlimited on to original recordings made by Django Reinhardt and the Hot Club Quintet between 1947 and 1953. But as far as I know the Parker graft is the first of its kind in films.

It should be on general release by early December. CBS will release a record of the soundtrack (CBS 462 924) on CD, LP and cassette. Also, in the UK, to tie in with the film release, Spotlite has co-operated with the UK musical pop weekly *NME* to release a double album of all the Parker sessions recorded by Dial direct on to disc in 1946-7. The Spotlite re-issues have been sourced from the original metalwork with a little electronic processing to clean up the sound. But the music stands completely untouched, so the rhythm section remains as it was 40 years ago. The Spotlite and CBS soundtrack recordings thus make an interesting comparison.

German company BASF was once a household name in tape after inventing it around 50 years ago. BASF's invention was stolen by the Americans, notably 3M, and the British, notably EMI, who later both opted out of the audio tape

market. 3M concentrated on video; EMI devoted most of its energies to 'defence' equipment for killing people.

BASF clawed back market share in the '50s and '60s but in recent years has lost ground on the domestic market to the Japanese—especially in home video tape where the company took a bizarre decision to stop selling through small outlets and concentrate only on big stores like Woolworths, Boots and WH Smiths. These mammoths are always on the look-out for someone willing to supply special offers at a special price. Loyalty lasts as long as the special offer. In the long term this looks likely to prove a tactical disaster for BASF, which could well prove too expensive to reverse.

In the meantime BASF and Agfa have complained to the Common Marketeters in Brussels about cheap imports from Korea.

The one field in which BASF still dominates, is the supply of bulk audio tape to musicassette duplicators.

In the beginning, the record companies used cheap ferric tape and got poor results. BASF moved in and did a good job convincing the record industry that a switch to chrome was the right way to go. Now major recording artists have a clause in their contract requiring the record company to issue their recordings only on chrome tape. This raises the interesting question; would the artists be happy with cobalt-doped ferric high coercivity 'pseudochrome' tape of equal or superior quality?

The Japanese went for pseudochrome for two reasons. Making chromium dioxide tape is a messy business that risks polluting the environment. Du Pont, which developed and patented the process, restricted licences to Japan.

That was why TDK developed *Super Avilyn*, the first cobalt-doped ferric oxide with magnetic characteristics similar to chrome. And TDK recently signed a deal with Telarc to supply bulk pancakes of SA tape for duplication.

TDK believe that there will be no legal problem in supplying SA in bulk to record companies, who would simply stop referring to 'chrome' and start labelling their cassettes as suitable for playing in the 'chrome position'. The economic considerations, says TDK, are more powerful. Quite simply they cannot match the price charged by BASF for chrome position tape. In return for slim profit margins, BASF get their name on the cassette.

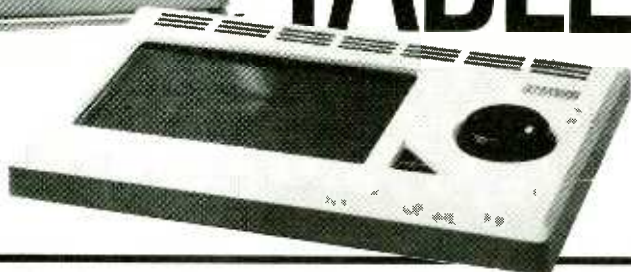
But expect changes. Korean company Goldstar already supply bulk video tape to video duplicator Rank, and packaged video tape to Kodak and Akai for those companies to sell under their own names. Kodak originally bought from TDK but were later seduced by Goldstar's lower prices.

In spring 1989 Goldstar move into audio tape and plan to "actively pursue all duplication houses to increase volume sales". Goldstar has even hired an ex-BASF salesman to do the job.

The record companies are not noted for their philanthropy. Quite simply if Goldstar offers bulk pseudochrome tape for duplication at lower price than the already rock bottom price asked by BASF the 'chrome' logo on musicassettes could soon start to change to 'chrome type'. □



AUDIO TABLET



Yasmin Hashmi describes the *Audio Tablet* editing system from Real World Research and reviews the software for CD mastering and stereo editing of music and speech for broadcasting

The *Audio Tablet* is a hard disk-based system for stereo editing and has taken about 2½ years to develop. Two main racks drive the system: the processor rack, which houses the processing and audio hardware; and the peripherals rack, housing the hard disk drives and tape back-up system. The peripheral rack can hold up to four disk drives, although seven drives may be addressed by the processor rack, which also supports AES/EBU, SDIF-2 and timecode interfaces. Connected to the processor rack is the *Tablet*, which has a touchscreen, a rotary 'jog wheel' and a Confirm button.

The *Tablet* has been carefully designed to lie horizontally so that the operator does not suffer from eye or wrist strain. All operations are done by using the touchscreen, the wheel and the Confirm button. Because the touch screen uses a

pressure-sensitive resistive membrane and gives an audible 'clack' when touched, the system is less likely to respond incorrectly if the operator's hand simply rests on the screen or approaches the screen at an angle. To further ensure clarity of intended command, screen displays are well-spaced and only active functions will respond when pressed. Active functions are surrounded by boxes with rounded corners while functions for display have square corners. Each display has two states with 'on' being full illumination and off being half brightness. Connected to the *Tablet* is an alphanumeric keyboard which is used for labelling and entering precise values.

Software

Processing is based on multiple transputers.

These process in parallel with 32 bit, 20 MHz processing. They are also designed to be linked together to form 'mega-transputers' and writing operating software for them is greatly facilitated by the use of the high-level OCCAM language.

The distributed processing system means that there are individual transputers controlling finite areas such as the disk operating system, the audio boards syncing interfaces and the *Tablet* itself. The thrust of the system is the applications program. This controls the rest of the system and dictates what operational features are offered. Real World Research intend to market a variety of dedicated operational packages, so their intention is that the initial design effort is re-used leaving the bulk of resources available for development of the applications program.

Operation

The software reviewed here was aimed at CD mastering and stereo editing of music and speech for broadcast and radio.

The system currently allows stereo recording, editing and playback. The left and right channels are stored separately on disk, which means that they can be recorded independently of each other. The digitised audio is scattered across the disks. This is done to allow random allocation of time and reduce worst case possibilities in terms of data retrieval.

The first thing to do before a session is to calibrate the touchscreen. This is a simple procedure involving pressing a circle in each corner of the screen. Once this is done the operator can elect whether to begin a new session or to work on an existing one. This is done on the Filer page. The principle behind file management is that a session is contained within a Folder (which is given the session name). This folder can contain more folders and loose files such as Takes and Edits (Fig 1). A Take is a raw recording. An Edit is an edited copy of a Take or a sequence of these. For the purpose of this article, a sequence of Edits will be called a Master.

The Recorder page is just one touch away from the Filer page. It displays left and right digital level meters, a headroom indicator and a horizontal strip representing a piece of tape. Vertically across the strip is a Now Line, which represents the tape head, and above it is a box that displays the Now Line's current position. At the bottom of the screen are tape transport controls, pressing Record initiates recording, which is 16 bit with selectable rates of 44.1 kHz and 48 kHz. If a clip occurs during recording a Clip message will appear and the point at which the clip occurred will be displayed on the strip.

While recording is taking place little dots move from left to right starting at the Now Line, this assures the operator that the system is recording and simulates tape movement. Labels (or markers) may be added on the fly and the operator may also drop-in. If the drop-in were bad, the original audio can be restored by using the Undo command. Pressing the Stop transport control halts recording.

The Cut & Splice Editor page is where editing and sequencing take place. Two types of editing are possible namely assembly and disposal. In simple terms this means a Master is made either by splicing Edits together or by copying the original Take and chopping unwanted sections out. The display has transport controls, the fast forward and rewind controls move the audio forward and backward respectively at 1½ times normal speed—any faster would make speech

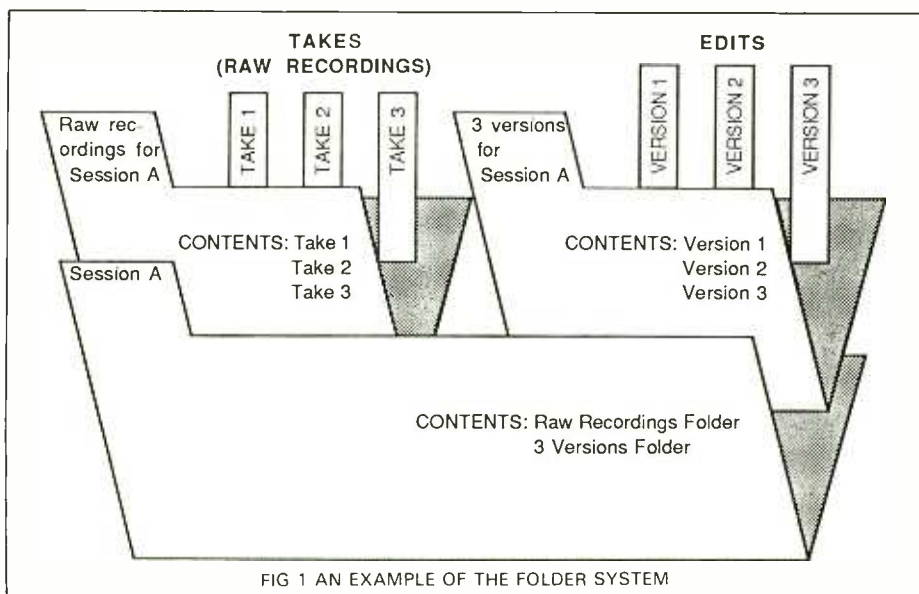
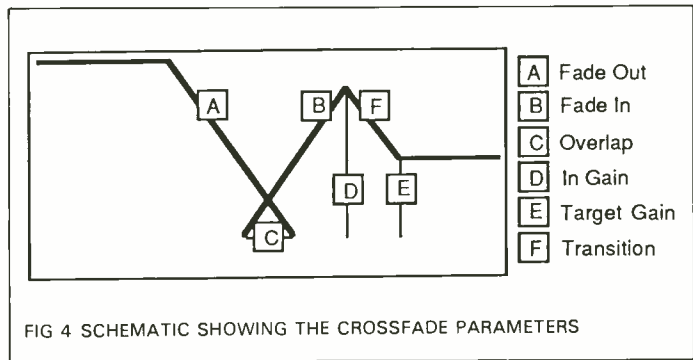
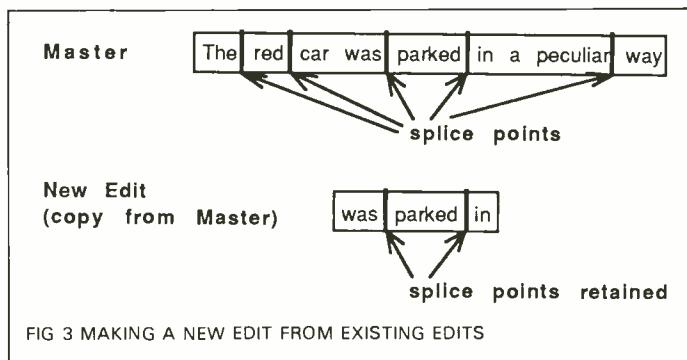
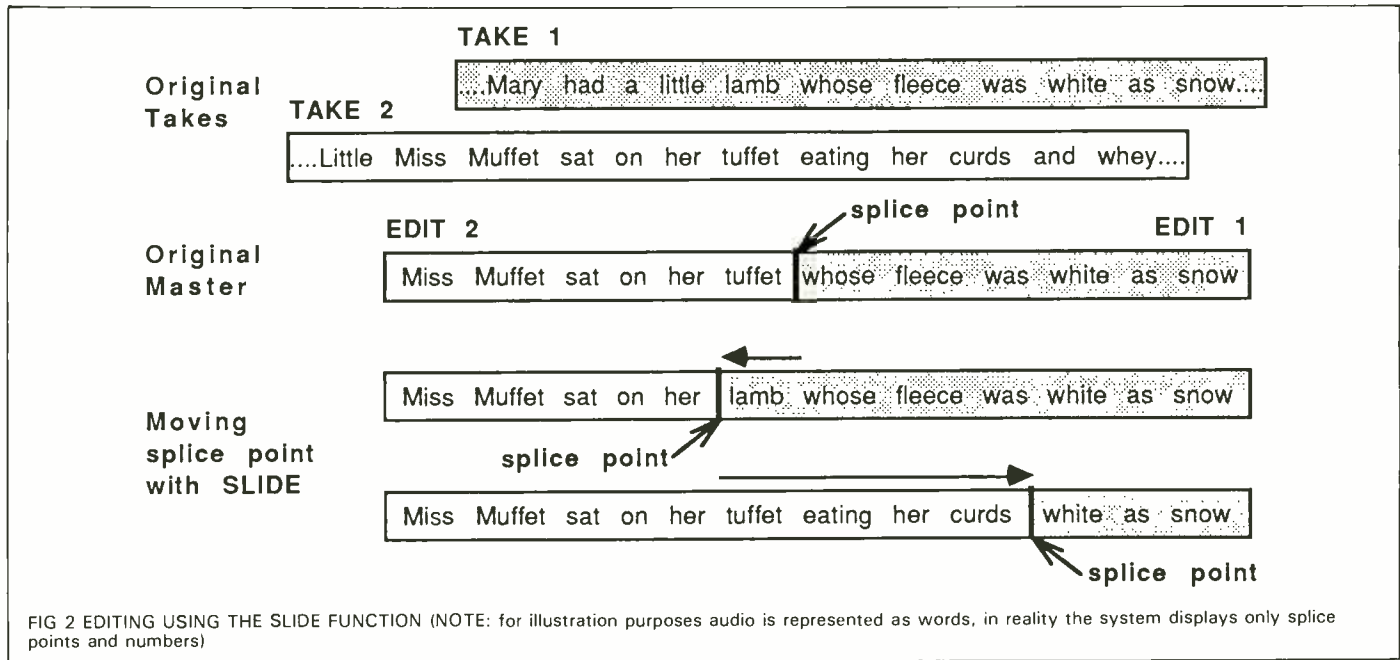


FIG 1 AN EXAMPLE OF THE FOLDER SYSTEM



unintelligible. The wheel is used for reel-rocking to locate edit points.

The centre of the displays shows two horizontal strips one above the other, the top represents the Source and the bottom the Master. The Source may be any Take or Edit within the system and may only be copied from. All splicing or cutting takes place on the Master.

To copy an Edit from the Source to the Master, the Source must first be accessed by pressing the Access button next to the source strip. The operator can then play the audio and reel-rock to find an In point for the Edit. Copy is pressed and the rotary dial or transport controls used to find an Out point. As the strip moves past the head, the area to be copied is highlighted. This gives immediate visual assurance as to what will be copied. Once the Out point is established Copy is pressed again. The Master strip must then be accessed and Splice is pressed, which causes the Edit to be spliced on to the Master where it is automatically given a number. The number is displayed in the Master strip. The first Edit is labelled 1, the second 2, etc.

There are commands that allow In and Out points to be changed in the Master as well as a very useful function called Slide. This moves the splice point between adjoining Edits in a way that, for example, if the Out point of Edit 1 is extended, the In point of Edit 2 is moved simultaneously so that Edit 2 becomes shortened by the same amount as Edit 1 is lengthened (Fig 2).

Another useful feature is that a new Edit can be made by copying a section of the Master and all splice points occurring within the area copied are retained (Fig 3).

There are a number of helpful commands on screen such as Undo, which reverts the system to its previous state prior to the last command, and Revert, which reverts the systems to the state it was in when the Keep command was pressed. The GoTo command may be used to jump to a pre-determined point and the Cycle command used to cycle between two points. Also provided on the Cut & Splice Editor screen are three selectable splice types, which can be user-designed on the Set Splice page.

The Fine Editor page allows 'fine tuning' of a splice in terms of crossfading and gain matching. The crossfade is displayed as a diagram showing the six parameters, which may be adjusted. There is a display box for each parameter and to change a parameter the corresponding box must be touched and the new value typed in. Crossfades can be made up to 300 ms in duration (Fig 4).

The Control Panel page allows access to parameters such as the sensitivity and display direction of the rotary dial, cycle times, amount of pre-roll and which timing format is being displayed (milliseconds, SMPTE, feet and frames).

Archiving

Incorporated within the peripherals rack is a Video 8 tape streamer. This downloads and uploads approximately in realtime. However, the system has an advantage in that the software allows for intelligent archiving. This means that once a session has been backed-up only changes to the session will be backed-up the next time, thus potentially saving a great deal of archiving time. Access to the tape's directory is provided and

Folders or Files may be selectively down or up loaded.

The future

The system is designed to be able to support networking. This would involve multiple processor and peripheral racks being connected to a main system via an optical link. Multichannel operation is planned along with applications programs more suitable for audio post-production purposes. Software for PQ subcodes is also planned.

Conclusion

The system was found to be friendly and easy to operate. I particularly liked the response of the touchscreen and the simplicity of the controls provided.

Although the applications program reviewed did not provide a large variety of editing features, those which were provided were effective and simple to execute. It will be interesting to see how the system develops, particularly with regard to multichannel operation and the fact that the BBC are collaborating with Real World Research for future developments. □

• The *Audio Tablet* was initially developed by Carl Schofield and a team at Sycologic (an R&D branch of distributor Syco). The project was recently transferred to Real World Research although the development team is still headed by Schofield. Real World Research, Sycologic and Syco are related companies and Syco have sole worldwide distribution.

SOUND AT POLISH SONG FESTIVAL

The Polish International Song Festival is broadcast live to Poland and surrounding countries and attracts a wide variety of performers and visitors. The 1988 show celebrated its 25th anniversary and coincided with the installation of a new PA system. Kevin Hilton reports

Sopot is a medium-sized town situated in the north of Poland on the Baltic coast a few miles outside the shipbuilding centre of Gdansk, birthplace of the Solidarity trade union and home of Lech Walesa.

In the past, Sopot was known as a seaside resort and health spa; these days, bathing in the sea is not recommended due to the amount of pollution in the Baltic. Despite this, it is still a popular and busy area and every year hosts the Polish International Song Festival, which is broadcast live on television throughout Poland and surrounding Eastern Bloc countries, and transmitted from VTR in Finland and Sweden.

Held in August, the 1988 show marked the 25th anniversary of the first festival and showed the extent to which the event has grown over the years. As well as indigenous talent, artists from around the world are attracted to enter the contest, which runs for four days. It has also pulled in well-known guest artists, among them Johnny Cash, Joan Baez, Charles Aznavour and Nancy Wilson.

The concerts are split into two sections: the Grand Prix where contestants perform two of their own songs; and the Polish category, where they adapt and arrange a Polish song to suit their style, and are held in the open-air Opera Lesna,

just outside the town. The surrounding woodland provides an impressive, almost fairy-tale backdrop to the stage. It is protected by a multicoloured canopy, which caused problems for the sound engineers in the form of slaps and reflections.

Over the years, the PA equipment for the Song Festival has been supplied by local companies. Two years ago, the state entertainment organisation, ZPR (which has run the Festival for the past seven years), decided to purchase a new sound system from the West. The two-year delay resulted from ZPR trying to decide exactly what it required because the organisation doesn't only run the Sopot show.

"The organisation has a variety of acts," explained ZPR's general director Stanislaw Nowontny, "therefore we needed equipment suitable to cover most occasions."

He added that they considered they needed the best equipment to compete with the established Western live sound outfits, not only other socialist countries.

A number of major manufacturers were invited to demonstrate their systems, among them Turbosound, Hill Audio, Dynacord, Altec and Harman Deutschland. Also present were leading Polish sound engineers and musicians. At this stage, the opinions differed and a second demo session was arranged. Nowontny sought the advice of Siggý Jackson, a Polish-born producer and manager based in Britain, who later arranged for the sale of the chosen system, supplied by Harman UK and Soundcraft, to ZPR.

"This is the first time a state organisation has bought a big rig to cope with big audiences," said Nowontny.

The speaker system shipped out to Poland consisted of eight JBL 4923 systems with a total power of approximately 20 kW, 24 4602 stage monitors, 4922 sidefills, three 5234A electronic crossovers and a rack of amps: two 6290s, one 6260 and one 6215. John 'Bruno' Wayte, JBL professional rep at Harman in Slough, UK, who has wide experience with festival rigs from his days with Entec Sound & Light and speech-based set-ups when he was with Paul Farrah Sound, flew out to Sopot to oversee the assembly of this gear and advise the engineers operating it.

The consoles selected were four Soundcraft series 8000s for out front mixing and two series 500 desks to operate the stage monitors.

The Festival is, in many respects, similar to the Eurovision Song Contest. The set is bedecked with flowers, the comperes sport the latest fashions and haircuts (depending on age of course) and the songs vary in style from MOR to straight pop to soul to heavy metal. Most artists are accompanied by the Alex Band, the leading big band in the country, organised along James Last lines. This meeting of so many disparate styles and the number of changeovers between the artists called for pre-planning on the part of the mixing engineers, who opted for the four front-of-house desks to each handle a different aspect of the whole.

The four out-front boards were made up of a 32-channel model for all feeds from the Alex Band except the brass section, which went through a 16-channel desk; a 40-channel version handled the choir and all the contestants; all these outputs were then fed into a 24-channel master console, which also took care of the vocals and presenters' mics.

ZPR assembled a group of some of the leading audio engineers in Poland to work on what is seen as something of a prestige event in the Polish entertainment calendar. The main engineer was Jack Mastykarz, who works at ZPR's SSL-



Engineers John Wayte (second left) and Peter Brzezinski (right) at the mixing position



equipped studio in the southern city of Krakow along with Peter Brzezinski; the other two operators, Peter Madziar and Jack Fraczek (the monitor man) work for Polish radio and television in Poznan.

The engineers appeared to play safe for the first two days of the event. As time went on, however, the equipment became more familiar and the balance improved although not all the artists were entirely happy with the result.

As with any event of this nature (a live concert with feeds going to OB trucks, lights and the constraints of camera sight lines), there were problems for the technicians to overcome, including the effect of the overhead canopy. A very varied audience also had to be kept in mind, with the ages ranging from 15 year olds to their parents and older relatives.

Engineer Brzezinski summed up the problem when he said that the idea was to play to everyone, not just the young people. "This is also a Festival of the song, so they (the audience) want to understand the words and that determines the mix," he said.

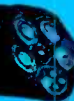
However, the audiences, which packed out the Opera Lesna on all four nights, were noisily appreciative, not only of special guests Sabrina, Grzegorz Ciechowski and Kim Wilde, but of all the contestants. Both sections of the competition were won by American soul singer Kenny James.

The two senior ZPR representatives present at the Festival, Stanislaw Nowontny and deputy general director/technical director Zbigniew Benbenek, were satisfied with how the concerts went and with the performance of the new PA system in particular. "It has been a revelation and the comments have been most satisfactory," said Nowontny. "We are also aware of the fact that there are technical processes that we are not used to using. This is refined and up-to-date equipment and there are still ways we could learn the various techniques used in the West."

During the course of the Festival, a specialised trailer was under construction in the UK to transport the sound system. The intention is to hire it out for different events in that region of Europe, not only using it for standard ZPR shows. Soon after the Sopot shows, the PA went to the Soviet Union for a major jazz festival. Nowontny commented that it would make sense for people to use their rig as opposed to bringing in a system from the UK or US. "It is cheaper to go to Austria, for example, with a PA than it is to bring one from England," he said. □

Schneider und Weibel

d & b audiotechnik mc 1220



Two Way Traffic.

We are not particularly interested in what the output of our amplifier is doing, but we are very interested in the behaviour of the speaker diaphragm. That's why we developed SenseDrive so that the diaphragm can talk back to the amplifier. In d & b systems the principle of including the speaker in the feedback loop of the amplifier has developed into a reliable and unconditionally stable means of achieving a very high damping factor with improved linear control of excursion. An audibly superior impulse response is achieved even when the going gets tough. For further information contact our UK-representative Michael Stevens & Partners Ltd. on 01-460 7299 or talk to us directly. d & b audiotechnik, Steinstr. 40, D-7054 Korb, Tel. 071 51/3 1018, Fax 0 71 51/3 5943.

d & b
audiotechnik



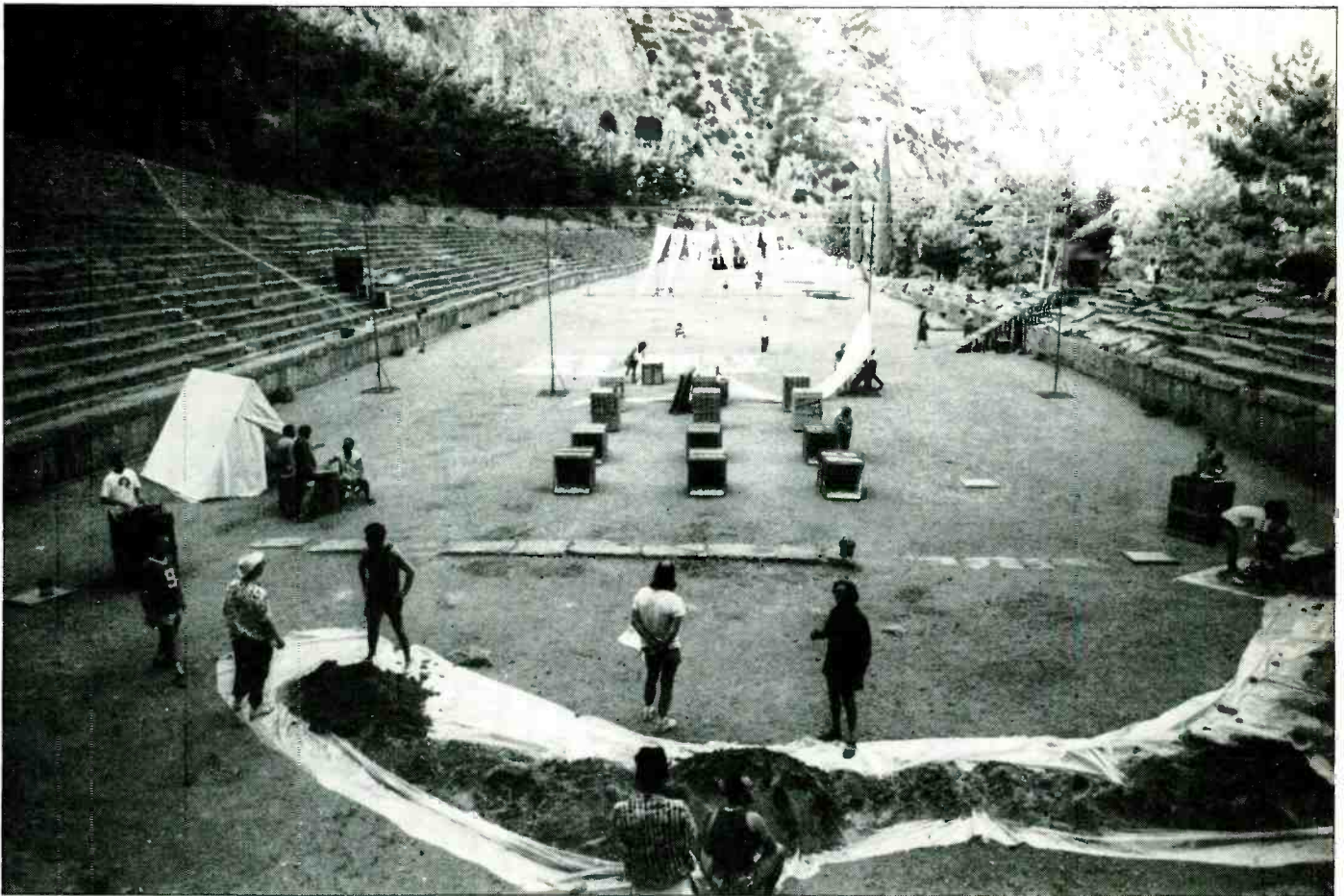
Genetic's Martin Rushent relaxing with the studio's new Mitsubishi X86 2-Track Digital Recorder. The X86 joins the Mitsubishi X850 32-Track Digital Recorder purchased by Genetic earlier in the year.

**Don't you wish you had a
Mitsubishi ?**



MITSUBISHI PRO AUDIO GROUP

Unit 13, Alban Park, Hatfield Road,
St. Albans, Hertfordshire AL4 0JJ. Tel: 0727 40584



FAIRLIGHT IN THE FREEZER

Transporting a Fairlight to Greece to produce a play was quite a feat in itself but operating it half way up a mountain in 110°F? Dave Foister reports on the sound production of *Ichneutes* in the ancient stadium at Delphi

The concept was grand enough to begin with; taking an English adaptation of a long-lost Sophocles play back to Greece. Assemble the details and you have a truly monumental project. For instance: the adaptation, by Tony Harrison (a poet long associated with the English National Theatre and responsible for its successful production of *The Oresteia*), was in comic Northern English; the

action centres on the traditional 12 mythical Satyrs, whose chief physical characteristic is an enormous erect phallus; the Satyrs' movements were to be based round traditional Northern clog dances—they would all be wearing clogs (and very little else apart from the aforementioned exaggerated part of the anatomy) and one of the actors happened to be world champion clog dancer; the musical side of the production was to

feature probably the most elaborate live use of the Fairlight and various interfaces ever devised; and as if that were not enough, the play was to be performed once only, in the open air in the ancient stadium at Delphi, half way up a mountain in the middle of summer, as part of the annual Delphi Festival where theatre companies from around the world present their interpretations of Greek drama.

The project began under the auspices of the English National Theatre Studio, and the original team was to be the one which worked on *The Oresteia*—Tony Harrison, designer Jocelyn Herbert and composer Harrison Birtwistle. In the event Birtwistle was too heavily committed elsewhere and his place was taken by Stephen Edwards, a young composer whose work with Birtwistle at the National had already involved extensive live use of the Fairlight, with which he had become very familiar during a long period of work in Sydney, Australia.

The play was Sophocles' *Ichneutes*, or *The Trackers of Oxyrhynchus*, and since its story hinges on the invention of the lyre and the consequent discovery of pitched sound, the musical contribution was clearly central. In the story, Apollo's cattle are stolen, and the physically well-endowed Satyrs are set to work to find them; they eventually discover Hermes playing the first lyre—which fills them with terror at first—and they work out that it has been made from the guts of the missing cattle. Apollo seizes the lyre and by learning to play it moves towards becoming the patron of music. The Satyrs are given their freedom, and finally return to the stage dressed as British football hooligans and tear the place apart (this was after all a one-off performance).

Stephen Edwards sums up the basic projects *raison d'être*: "At the turn of the century two Englishmen called Grenville and Hunt found the

Hundreds of Matchless consoles in use around the world testify to three years of continuous success in the 24 track studio market. A continual programme of innovative research and development has ensured that the console remains ahead of its competition.

The latest updates mean that it is now available with a range of VCA fader and mute automation systems. Disk-based on standard PCs and SMPTE/MIDI converters that you buy off the shelf, rather than expensive dedicated computer systems, they offer unrivalled facilities at an unbeatable price.



TAC MATCHLESS...

WITH AUTOMATION

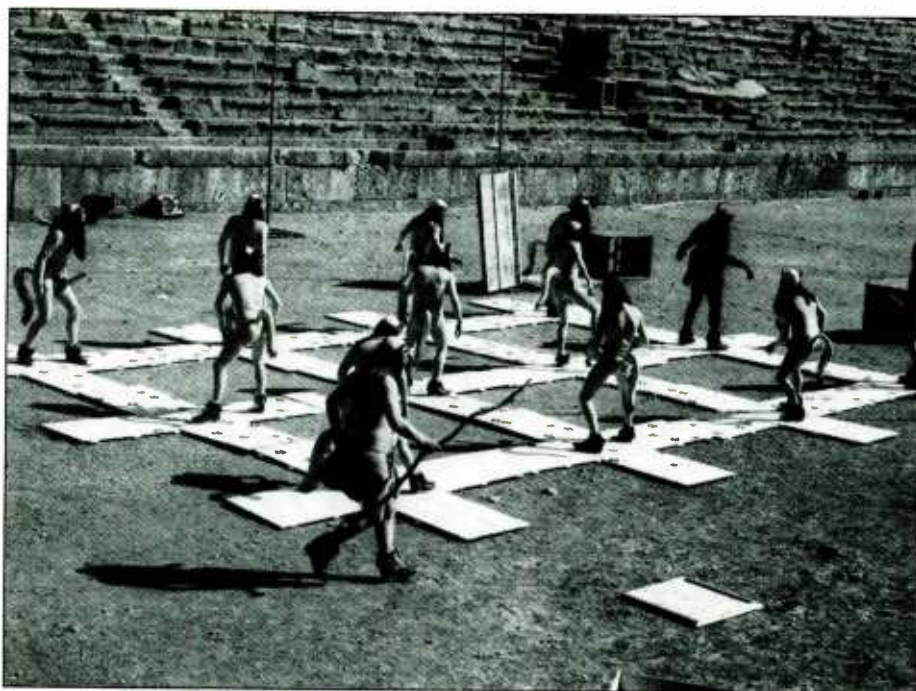
...OTHER
SYSTEMS
COST
THOUSANDS
MORE



SOUND ENGINEERING

Total Audio Concepts,
Unit 17, Bar Lane Industrial Park,
Bar Lane, Basford, Nottingham NG6 0HU.
Telephone: 0602 783306.
Telex: 37329 AMEKNT G.
Fax: 0602 785112. E Mail: DGS 1947.

In the USA:
Amek/TAC US Operations,
10815 Burbank Blvd.,
North Hollywood, CA 91601.
Telephone: 818 508 9788.
Telex: 662526 AMEK USA
Fax: 818 508 8619. E Mail: AMEK US.



The Satyrs practise for the evening's performance

△ remains of this play by Sophocles in some rubbish heaps in Egypt. The idea was that two Englishmen had found it, Tony had done the translation and put it into comic Northern-English, and the English were then going to bring it back to Delphi and perform it for the first time in two and a half thousand years."

The role of the music was obviously crucial; the task was "to create an environment which was exciting enough to sustain over an hour and a half with just rhythm and no pitch until the lyre is invented."

Edwards wanted to find a new way to link the actors and the music, letting them generate the music rather than be controlled by it. "Once you fix them to something, that then restricts their freedom to pull it about and that works against their discipline. The difficult thing is to give them the freedom but still make the music work." The means of achieving this end was to abandon any idea of pre-recorded music or even an off-stage band, and to hand the music-making over to the actors by fitting radio microphones to their clogs and elsewhere and using the signals from them, via Syco's *PSB* audio/MIDI interface, to trigger the musical material in the Fairlight, which was to run live at the stadium mixing position. In this way the musical score was performed by the actors themselves, by means of carefully choreographed polyrhythmic clog dance sequences, in which spontaneous variations—or even mistakes—generated new musical events rather than clashing with a prefabricated score.

In order to preserve the illusion and mystery, the radio transmitters were hidden behind the most prominent part of the Satyrs' anatomy. "We ran the leads up the seams in their body stockings; there's a fair amount of fur up there, and we put the transmitters in there. I was keen to disguise how we were doing anything; our mixing position was up on a ridge out of sight of the audience, and by the time it got dark you couldn't see any of the speaker positions."

The only musicians involved were two percussionists, also triggering the Fairlight by means of Simmons pads. So what was the Fairlight itself actually doing?

"A lot of the samples were super clog sounds.

What I like to do with the Fairlight, which is not something that other people seem to be much concerned with, is to take the natural sound you want, get it up about 12 to 14 times on the RS page and make a rhythm sequence to make another sound, then by lowering the values of the pitches and so on build it up larger than life so you're playing back the original sample as well as 12 others which are either slightly slower or slightly faster. You do that process two or three times and you can still hear it's a clog, but now it's huge. It was a real clog hitting a real wooden floor but much, much bigger.

"What I've also begun to do is put in human guttural sounds, like the sounds drummers make while they're playing; they're very effective if you put them into percussion sounds because they give a human quality which makes the things—oddly enough—sound more credible. It's no good having, say, a *DX7* sound coming off the bottom of a clog—it doesn't work, it has no effect on you. We also made other percussive-type sounds out of voices and so on."

Obviously samples and configurations were changing continuously throughout the piece, and another ambitious system was set up to control this: "The Fairlight's got this thing called a Cue List. You can set up, on a clock, a great series of commands, so you can set a whole piece up as far as changes go; you couldn't physically get round the keyboard fast enough to program the stuff in. You can almost keep the thing on a continual change, so the first time the actor does something he goes 'Gunk', and by the time he gets round to number four he's 'Gunking' slightly differently. You can load things off disk at the same time while this is all happening, so you're not limited in the way you were before where you could only have one set of samples for a five-minute piece. To control the Cue List we used a Kahler *Human Clock*, triggered by one of the percussionists on the assumption that he had the best sense of tempo and would lead everybody off. He was then generating a MIDI clock which was driving the Fairlight through its Cue List."

The Fairlight had other contributions to make: "We wanted to get the audience to chant (in ancient Greek); I also pre-recorded the chanting,

put it into the Fairlight and built it up into a huge crowd. We were going to fill the empty far end of the stadium with the ancient crowd, so we had the ghosts of the 10,000 people who would have been up there being generated by the Fairlight; the modern crowd start cheering and the ancient crowd start joining in, so the thing just becomes absolutely huge. What I'd overlooked was the time delay; by the time the sounds come all the way back to us—this is about 200 metres—it's a good two beats behind, so I had to take two beats out of every sequence in the Fairlight to bring it back in sync.

"We also panned things round the stadium; we could bring things right from the bottom of the stadium and throw them at the audience—the audience were given the effect of the sound coming up towards them. The natural acoustics of the thing were tremendous; we had the slapback echo, and a mountain to bounce the Fairlight off. We had a Yamaha *REV7* standing by; I thought we might need it, because I'd left all the samples dry. We went out in March to have a look at the stadium and I did a couple of tests to see how long the sound lasted and hung in the air, and even the acoustic sound of the clog sounded like a distant gunshot without any help whatsoever. That's when I thought of making them much larger than life so we could really get the mountain to resonate. We had a pair of Turbosound speakers pointing away from the audience, angled up at the mountain, and there was a slapback echo anyway; there was so much going on the last thing you needed was any artificial reverb. We never even turned the *REV7* on.

"We also used the Fairlight *Voice Tracker* on the actor playing Apollo so that when he plucked the lyre he could sing a note and you'd hear the sound of a lyre; for the lyre I took an ordinary harp, took the attack off as it's much more lyrical that way, then put voices and breaths in so it felt as if the thing was breathing as it played. I put the voices at the back of the stadium and had the lyre sound at the front, and of course the mountain did its own bit on it."

To say that a project of this scale was liable to run into a few problems would be the understatement of the millenium.

"We weren't blessed with a lot of luck when we got out there. We were warned that there were huge winds that come up in the middle of the night; I'd been up there two nights running and we'd had nothing, but then we got to the technical rehearsal. We'd realised that because of the heat we could only tech through the night—by nine in the morning when the sun came up over that mountain you were in the hundreds and it was time to go to bed. The idea was to tech 'til about 6am, have breakfast and then do our dress rehearsal. We never got that far; we never had a dress rehearsal, we never even got to the end of the tech because about three in the morning this wind came up from nowhere and systematically took each element of the production out. One by one it took the huge back projection screens down, then took the rest of the scenery down, then took tents down; even the lighting gantries looked like they were going to go at one time."

The fact that the place is a tourist attraction didn't help: "The Greeks are so keen about their stadium that they leave it open to the general public, so we're trying to rehearse and the place is filling up with tourists saying 'Hi, what's going on here?'"

The apparently insane idea of trying to get a Fairlight to perform under these conditions led, not surprisingly, to its own subset of problems, ▷

◁ not the least of which was the worry about what would (or wouldn't) happen if the instrument suff red some catastrophe.

"To the best of my knowledge nobody's had a *Series III* in Greece before; I was stupidly under the impression that somebody must have one somewhere so if mine went down we could always borrow one somehow—but there isn't one."

But much sooner than this the real fun began when they left England: "Coming out through British Customs they insisted on putting my hard disk through their X-ray machine. I pleaded with them not to, but they simply were not going to let me on the plane. They were prepared to not put it through if I could take it apart, but I couldn't; it was big enough to blow the plane up as far as they were concerned, so it was either that or not get it through. Amazingly nothing was erased."

Greek Customs were much simpler. "The good thing about going to Greece with Tony Harrison is that since he did *The Oresteia* there, at Epidavros, he's become something of a folk hero; also the Greeks have a lot of respect for actors—over there an actor is somebody quite special. So we arrived at Delphi Customs and Tony said 'Tony Harrison—we've come to bring Sophocles back to Greece' and they just waved us straight through!"

The first potential technical difficulty which springs to mind is that of dodgy mains supplies,

but this only turned out to be a problem in one surprising place. "When everyone else went to bed I was still programming the Fairlight, still making samples at the hotel. The hotel people, to try and economise, would keep the air conditioning off for the first part of the morning, but when they threw the switch to turn it on of course the power dropped and crashed the Fairlight every time! In the end I had to ask them to tell me when they were about to throw the switch so I could beat them to it."

The biggest problem for the Fairlight was the operating environment—although naturally this had been thought of in advance and plans made accordingly. "When I arrived in March the first obvious thing was that if we were going to use the Fairlight live and it wasn't going to crash on us we were going to have to get it into a dust-free air-conditioned environment. We had a meeting with the Festival organisers and the Greek hire company and agreed on the PA system; I explained about the Fairlight, I drew it for them, gave them dimensions, and said the ideal thing would be a small Portakabin with an air conditioner, and we could put it in there and forget about it. We arrive four months later, 110 degrees, and—nothing! No gear; the only gear they'd supplied was totally useless—probably ideal for a small-scale rock band but not very good for playing your Fairlight samples through. Every

day it was the same thing; re-negotiate, go back to the original list I gave them, and in the end bits of gear began to arrive, but there was still no sign of the box for the Fairlight. (The promised lighting equipment never did arrive—the show was lit with whatever they could throw together locally.)

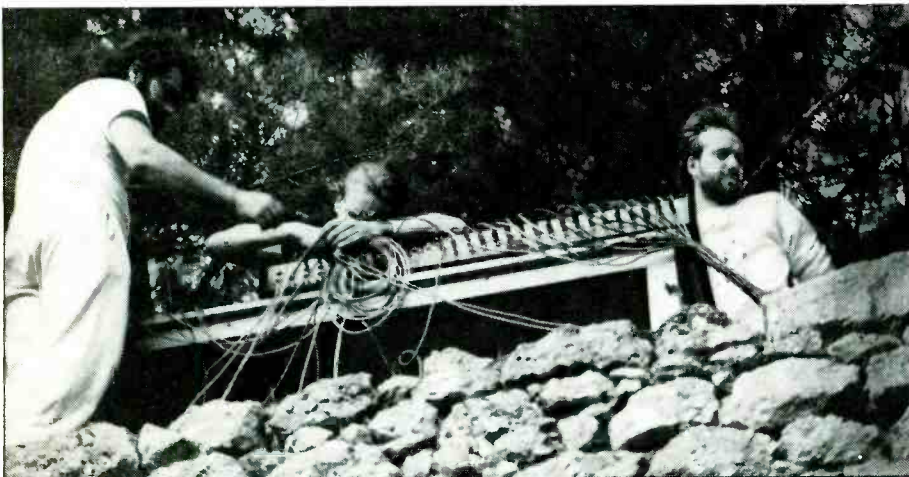
"They put a carpenter to work who built a wooden box for us—large enough, I have to say, to get the Fairlight in. Out of frustration, because we couldn't rehearse with the bloody thing and the whole show was not totally dependent on it, John [Rule, Edwards' colleague on the sound installation] and I took the Fairlight up to the stadium at four in the morning, thinking that's going to be the coolest time and we'll just see how it runs. We had the box that they provided; we stuck it in the box, wired it into the PA and turned it on—it worked, but within about two minutes you couldn't put your hand on it, so it was clearly not loving it. The box was just working like an oven. I have to say it was 95 degrees in the stadium even at that time. We just turned the thing off, realising we were on a total loser, and took it back to the hotel."

Even moving it was a problem, since the stadium was inaccessible to vehicles and it took six people to carry it up the last 400 metres over rough ground to the mixing position. Anyone who's ever had to carry a Fairlight will be wincing already.

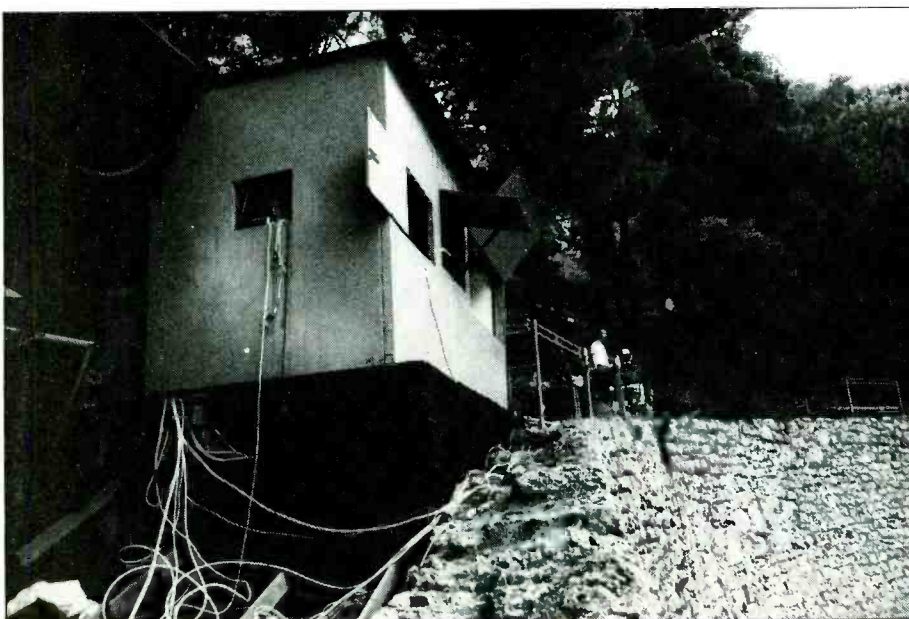
"We said look, we've tried it up at the stadium, and it overheated in two minutes; what are you going to do? I could hear them arguing with each other in Greek and in the end I almost stupidly said 'Even a fridge-freezer would be better than what we've got at the moment.' 'Fridge-freezer? Right!' they said. They phoned the Mayor of Delphi and said we must have a freezer for the English National Theatre—their performance won't go on without it. At that point I was prepared to try anything. I realised I wasn't going to get my nice air-conditioned box, we were two days off the performance and I hadn't even heard this thing work in the stadium yet! The Mayor's own chest freezer arrived, and we carried it up to the spot. We realised we were running huge risks with condensation so we lined it with hotel towels, turned it on full and lowered the Fairlight in. It just fitted within half a centimetre—we had to hacksaw the lid off to get it in. We laid the lid back on because I was worried about dust and mosquitoes getting in, but the Fairlight was too powerful for the freezer and it still didn't work—it was still overheating. The only way we could keep a constant 65-70 degrees was to take the lid off and put a mosquito net over it. It worked. And it stayed working, and it even worked when I got it back to London."

So at the end of the day the show went on (as it always must) and the performance—the one and only complete run through—went down well with its audience, no doubt unaware of the agonies endured in its preparation. Stephen Edwards seems to look back on it with a certain masochistic relish—how does he feel about it in retrospect? "It's not a thing I'd recommend to anybody—to try and do an open-air one-nighter in Delphi. It's one of those things it's great to tell people about but when it was actually happening it didn't seem like a lot of fun. We got away with it—we got out alive."

No doubt it's not something Fairlight would recommend either—to say nothing of the Mayor of Delphi. Next up for Edwards comes an operatic version of *The Tempest* (complete with Fairlight) on Seven Mile Beach in Australia—another time, another place, another freezer? □



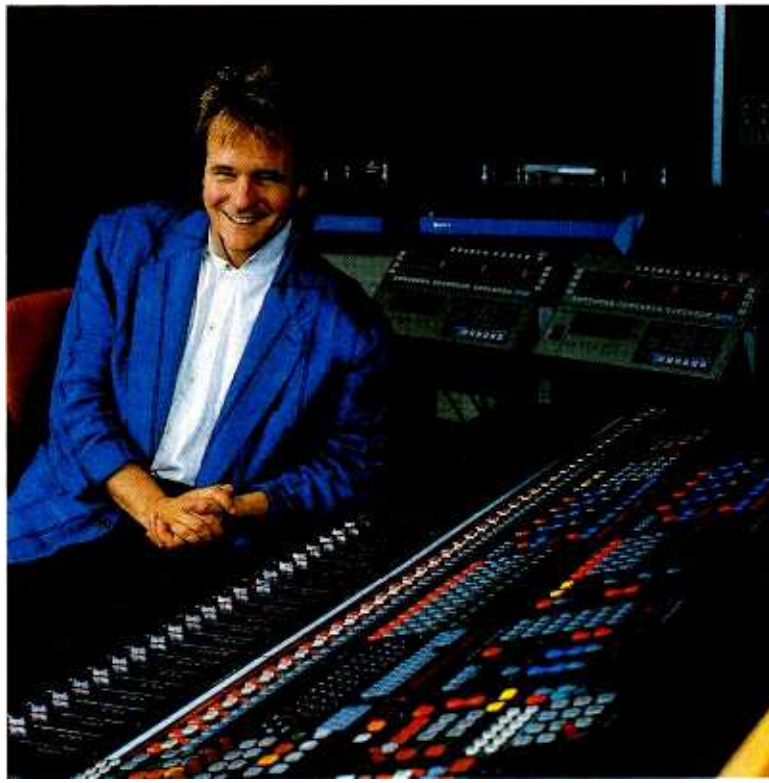
The console is installed as composer Stephen Edwards looks on



A Portakabin houses the sound and lighting control

■

G R E A T C O M P A N Y

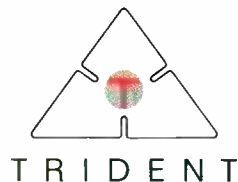


Since the early seventies, Keith Olsen has been creating for the best. He's produced for the likes of Fleetwood Mac, Foreigner, Pat Benatar, and Whitesnake. His efforts have sold over *65 Million records.*

After working on every console imaginable, his response to the DI-AN was "It's the best sounding and most advanced console ever." And for his own facility, he bought one.

After all, one must consider the company they keep...

The DI-AN from TRIDENT



TRIDENT AUDIO DEVELOPMENTS LTD
Trident House, Rodd Estate, Govett Avenue, Shepperton, Middlesex TW17 8AQ, England ♦ Phone 0932-224665 ♦ Fax 0932-226721 ♦ Telex 8813982 TRIMIX G
TRIDENT AUDIO USA
2720 Monterey Street, Suite 403 Torrance, California 90503, USA ♦ Phone 213-533-8900 ♦ Fax 213-533-7072 ♦ Telex 5106000019 TRIDENT USA



SYNCLAVIER ON THE ROAD

In an interview, programmer Christopher Currell and maintenance engineer Mitch Marcoulier discussed the trials and tribulations of taking a Synclavier on tour. Tom Miles reports

Surely there can be few people unaware of the outstandingly successful world tour this year by rock superstar Michael Jackson to promote his new album *Bad*. The amount of publicity this tour received from the tabloids in the UK alone is enough to guarantee its immortality in the annals of rock history. One fact that may not be so well-known is the live use of the *Synclavier* digital audio system. In an interview Christopher Currell, *Synclavier* player and programmer, and Mitch Marcoulier, the man in charge of its welfare on the tour, explained the uses of the system, and the care needed for life on the road.

"The system was so good that it is going to mean that a lot of PA companies are going to have to rethink their designs," said Marcoulier. "The *Synclavier* really does redefine sound system parameters, and shows up any limitations in

current PA systems all too clearly."

Already a number of PA companies in the States are working on new designs capable of handling the dynamics, response and range of the system.

On stage, Currell had two full blown *Synclaviers*, one 16- and one 32-channel, both with 32 Mbytes of on-board RAM and 64 voices. Each had 160 Mbyte Winchester drives, plus two more spares, both in specially designed flight cases with built-in floppy disk drives as well. There were two keyboards with eight MIDI ports, each sampling at 100 kHz and an 8-track *Direct-to-Disk*, although the *Optical Disc* system was not used on stage as it took too long to load up and download for a live performance. There was also a digital guitar interface available but it was rarely used on stage.

"Winchesters can be a bit of a problem if

they're not treated right," said Marcoulier, "and we had to build special road cases designed to cope with the situation. The cases now contain two 160 Mbyte Winchester drives, plus a Superfloppy also permanently mounted in the case. All we had to do with them was to wheel them on stage and plug them in. If one went down we just moved it away and wheeled in the spare—simplicity itself! Even the spares are in custom cases."

Currell added, "At the hotel I had Mitch's own system, plus the spare. That gave me 64 voices, 20 Mbytes of RAM, and sampling at 100 kHz. It also featured four MIDI ports and two 80 Mbyte hard disks in the same portable flight cases as before. The system was then connected to a load of recording gear that allowed me to alter the sequences and backing tracks used in the show as required. I also have my own system at home, which again has 64 voices, 32 Mbytes of RAM, two 160 Mbyte Winchesters, two Superflopys, the *Mac II* option, *Optical Disc* and an 8-track *Direct-to-Disk*, plus the *Digital Guitar*—so as you can see I'm well into *Synclavier*! I must say that I have been looking forward to getting to grips with the *Mac II* and the *Trakball*, as I've just bought them for the home system, and I haven't had a chance to play with them yet."

On stage the systems were triggered by either the keyboards or a *Synthaxe*, all the feeds went into a Yamaha mixer, which then supplied 36 feeds to the house board for mixing. This means that the whole live show was a mixture of live performance and *Synclavier* sequences and backing tracks.

"In the studio we only used one system," Currell explained, "and there was no *Direct-to-Disk*. The *Synclavier* was used almost every day for an entire year, and during that time we must have used it for everything it was ever designed to do—and then some!

"I mainly used the *Synclavier* for sequencing and manipulating feels, rhythms and background vocals, plus correcting errors," Currell continued.

"In the studio, it was linked to both a Studer and a Mitsubishi multitrack, and whenever Quincy (Jones) punched in on the multitracks, I had to try to punch in at the same time on the *Synclavier*. So to get rid of the problem, we designed an interface to connect to the autolocator for the multitracks. Then every time Quincy punched in, it automatically triggered the *Synclavier* sample memories so that I could then manipulate the incoming tracks within the hard disk system."

"It was quite an ingenious little device," explained Marcoulier, "and used an opto-isolator to trigger the system. It gave Chris the ability to fix errors and change colours without having to use tape. That way he was able to play around with ideas without taking up any extra time."

Obviously, on a world tour no piece of equipment could be expected to perform faultlessly the whole time. So how did something as sophisticated as the *Synclavier* hold up to the rigours of touring?

"Basically, every time we moved something we had to check to make sure there was no damage," said Marcoulier. "Moving such a large system around created its own brand of problems. After all, the *Synclavier* is generally thought of as a studio system, and very few people have taken them out on the road before—especially on such a demanding tour as that. Sure, guys like Pat Metheny had been using them live but never to quite the extent that we did."

Most problems could easily be predicted, and a little preventative maintenance went a long way. "One minor problem that we encountered in Europe is that the roads are quite rough compared to American freeways, and this meant that we had to employ a top class driver, who was not only conscientious but also became adept at avoiding some of the larger pot-holes! The other niggling problem concerned local stage hands who didn't understand what it was they were handling, even to the extent of letting one of the main racks fall off the back of the truck loading ramp! Mind you all that happened was the back of the flight case cracked—there was no damage to the *Synclavier*, as we now use flight cases with four inches of soft foam surround for every piece of equipment."

Due to the nature of the tour, and perhaps more importantly, the climate of the countries visited, the main problems with the system were caused by heat during outdoor concerts, and with temperatures of over 100°F (38°C) on stage it's not really surprising. This technical hitch was rapidly corrected, as both Currell and Marcoulier insisted that all the main racks were kept in a temperature-controlled cleanroom environment backstage. The cleanroom consisted of a tent-like structure with sealable doors and windows, fitted with a 5-ton air conditioning system to keep the immediate surroundings to a steady 60°F (16°C). This reduced the temperature and decreased the stress on the boards, allowing them to run at a cooler, more stable rate. Even the front intake vents on the equipment racks were fitted with filters to reduce the amount of airborne dust sucked into the system.

"Combine the dust with the very humid conditions we encountered," explained Currell, "and you can imagine that opening the machine up left you confronted with something like the consistency of a swamp, and when some of the boards looked like they were starting to rust we decided to insist on the air conditioning and filtering systems." The result was that the racks ran at about 68°F (20°C) and there were no more problems with the mud.

As another precaution, the system was fitted with a clean line power supply that allowed the complete set-up to be operated at 110 V/60 Hz anywhere in the world. The power supply was developed by Showpower for use with the separate hotel room system and featured a UPS manufactured by Toshiba that converted from 50 to 60 Hz and any voltage to 100 V. The 5 kVA system was capable of keeping the whole *Synclavier* system, plus outboard recording equipment, up and running for about 20 minutes, allowing time to download any samples or sequences before total shut off. Showpower has also developed systems for part of the Amnesty International tour, and a special 15 kVA rig that powered the entire Van Halen tour.

"The *Synclavier* had to be treated like it was in the studio," said Currell. "Originally people were

scared to death of taking something as 'fragile' as this on the road but this tour has very much set a precedent for future users. It takes a great degree of foresight to plan a tour like the *Bad* tour, and it was worth every penny of the money invested in the cleanroom technology." As Currell pointed out, "If the instrument was to go down then it wasn't just one instrument that disappeared but quite a large part of any song or arrangement."

The tour finished recently, but one thing is certain, the revolutionary approach to using a complicated and expensive piece of essentially studio equipment in such a tough touring environment will open the way for other bands to provide even better shows in the future. The only thing other bands will not be able to have on their tours is the remarkable Mr Jackson himself. □

GREAT NOW-MAKE



IDEA IT-WORK

The Summit Audio concept of hybrid signal processors was developed out of the demand from recording engineers and producers for original vacuum tube based equipment of more than a decade ago and has been put to work in a range of four products.

Refreshingly uncomplicated to operate, the Summit range offers the best sonic attributes of tube technology together with solid state dependability.



- EQP – 100
Mono Tube Equaliser
- TLA – 100A
Tube Compressor Limiter
- TPA – 200
Tube Microphone
Pre-Amplifier
- EQP – 200
Dual Tube Equaliser

AUTOGRAPH SALES  **Summit Audio Inc.**
P.O. Box 1678, Los Gatos, California 95031 U.S.A.
 Tel: (408) 395 2448

2 Spring Place, Kentish Town, LONDON NW5 3BA, England Tel: 01-485 3749 Fax: 01-485 0681

It's Time To Rack Up Another Hit.



It's hard to follow a great act. Expectations run high. The performance must be flawless. When we decided to carry the legacies of our LA-2A, LA-4 and 1176LN into the next generation, we knew exactly what we were getting into.

Our new 7110 Limiter/Compressor incorporates the characteristics of its predecessors, is the natural addition to a legendary line and has all the potential to become a major hit in its own right. The 7110 combines both peak and average limiting action, producing smooth, predictable RMS style performance like the LA-2A and LA-4 with the precise automatic peak control of the 1176LN.

The 7110, with our exclusive program dependent Smart-Slope,[™] gives you adjustable compression curves from 1.5:1 through infinity:1. You set

threshold, attack, release time and output level – the 7110 automatically rides the gain with split second response.

To make set-up as simple as possible, we've included an Automatic Preset function. Punch the button on the front panel – the 7110 automatically defaults to program dependent attack and release times, and presets the peak threshold and ratio to consistently used settings. Perhaps the best news of all, the 7110 produces crystal clean sound and is virtually transparent.

Just another limiter/compressor? We don't believe so. After you've heard it for yourself, we think you'll agree. Stop by your local JBL/UREI dealer and give it a listen. And, get ready to rack up another hit.



The 7110 combines the smooth predictable RMS style performance of the LA-4 with the precise automatic peak control of the 1176LN.



JBL Professional
8500 Balboa Boulevard, Northridge, CA 91329
© 1988 – JBL Incorporated A Harman International Company

WHICH AMPLIFIER TECHNOLOGY

PART TWO

Ben Duncan continues his survey of pro-audio power amplifiers techniques, with a look at more recent developments in Class A-B amplifiers

Until 1975, the vast majority of high transistor amplifiers were unadorned class A-B types, fitted with first generation bi-polar power transistors. They were prone to blow up, sometimes they'd scream off into oscillation (but only when the cables were cut to the right length) and most came in ridiculously large boxes, some black, some silver! The first of a series of notable proprietary techniques that uprooted the *status quo* appeared 13 years ago. When Quad's 405 arrived to replace the 303, it had something special, something called 'Current dumping' (today embodied in the 405/II, 501, etc).

Inside, a low power Class A amplifier drives the output directly at low levels (Fig 1). When the output current approaches the limits of the Class A stage, high current 'dumper' transistors switch in, to take charge of higher output levels. Conventional negative feedback is replaced by 'feedforward error-cancellation'. Quad's description is arguable^(1,2,3) but the technique itself is certainly more effective than negative feedback at deleting crossover distortion and associated thermal modulation. Current dumping meant that bias current could be reduced without compromise. Biasing required no pernickity setting up for a decently low distortion residual. And remains less fussy about drifting off the mark, something which happens inevitably over time, particularly when the output stage receives its first 'transplant' on the repairman's bench. By reducing bias current, Quad's technique saves a few watts of static dissipation. Otherwise, current

dumping is no more efficient than ordinary Class A-B amplifiers.

MOSFETs

The first MOSFET power amplifiers were introduced to the domestic scene by Yamaha in 1976. The FETs weren't perfect but power MOSFETs were developing fast. In 1979, the first pro-audio amplifiers to use Hitachi's lateral enhancement-mode MOSFETs were HH's V series. To this day, Toshiba and Hitachi are supplying most of the world demand for audio-grade power MOSFETs. The best known UK manufacturers with product ranges mostly based on MOSFETs today are C-Audio, HH and Rauch. The advantages of power MOSFETs over everyday bi-polar transistors should be well known by now.

- Wider bandwidth: among other things, it means MOSFETs aren't prone to oscillation at ultrasonic frequencies, unlike bi-polar transistors. They can, however, oscillate at higher frequencies (typically 1 to 10 MHz) but then the damage they do to themselves and loudspeakers, is much less.
- Broader SOA: there is no second-breakdown, only a limit on the package dissipation.
- High input impedance at low frequencies lightens the task of the driver stage.
- Easy paralleling: MOSFET's negative temperature coefficient forces balanced sharing under most conditions.
- Simpler biasing.

By and large, power MOSFETs slipped readily

into existing Class A-B circuit architectures, often with simplifications. In practice, their reliability has been higher than comparable bi-polar output stages—for a given degree of V & I limiting. And as predicted, properly configured MOSFET amplifiers have proved to be more tolerant of direct short-circuits and high junction temperatures.

On the whole, practical MOSFET amplifiers measure as well as the bi-polar types they replace. In some ways better, in others a little worse. As for the sonic results, critics are polarised. Some dislike certain qualities in the bass, characterised on the whole as being lightweight. Others love the bass but grimace at the 'gratey' treble of some (less than well-engineered) MOSFET designs. What about efficiency?

An easy bias

For amplifiers with lateral (audio-type) MOSFETs in a Class A-B output stage, quiescent current is higher than in a bi-polar amplifier, at between 50 and 100 mA per device. The reasons for it are twofold and subtly distinguished. First, in common with bi-polar transistors, enhancement MOSFETs need biasing to define minimum transconductance, for loop stability and linearity. Second, standing currents above 50 mA keep lateral MOSFETs in the upper reaches of their current scale where their temperature coefficient is negative. Under these conditions, MOSFETs are less fussy than bi-polar transistors about precise biasing, and instantaneous changes with temperature.

The high bias currents needed for individual MOSFETs leads to significant heat dissipation on standby, particularly in amplifiers that aim to deliver power into 8 Ω and therefore support high rail voltages. For example, with a nominal 500 W into 8 Ω amplifier, with ± 100 V rails and eight MOSFETs (four per 'half') biased at 80 mA, static dissipation totals 64 W. In this way, MOSFET amplifiers technically exhibit poor efficiency but only under small and no signal conditions, where it matters least.

What about the MOSFET's open-loop output resistance, which, thanks to the negative temperature coefficient, increases when high peak currents cause the junction temperature to soar? Well, added losses brought on by MOSFET's R_{on} scale in the opposite direction to static bias, being

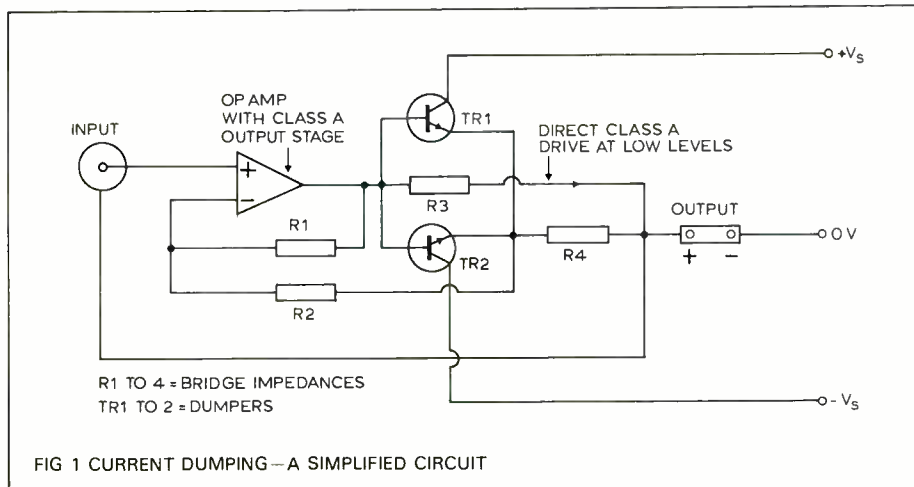


FIG 1 CURRENT DUMPING—A SIMPLIFIED CIRCUIT

AFTER 25 YEARS AT THE TOP THE SHURE SM58 HAS LOST ITS LEAD



The New Shure SM58 Wireless Mic

SHURE[®]

For full details contact: HW International,
3-5 Eden Grove, London N7 8EQ. Tel: 01-607 2717.

◁ highest when a low power amplifier (with minimum FET-count) is driven hard, into a low impedance. In serious high power designs, multiple paralleled MOSFETs can reduce I²R (resistance) losses to insignificance. Then at full power, the efficiency of MOSFETs working in Class A-B is essentially comparable to traditional bi-polar outputs, minus the extra static dissipation.

The high standing current in MOSFET amplifiers operating in Class A-B has a useful side effect, one that rarely gets attention. It's most relevant to critical audition on horn-loaded monitors. With four MOSFETs ticking over at 400 mA (for example), Class B operation only commences above 2½ W (into 8 Ω), meaning that Class A operation can embrace studio monitoring SPLs. Under the same conditions but with 40 mA quiescent current, a bi-polar output stage ceases to operate in Class A, above some 25 mW...

When the earth moved

In 1979, Crown's PSA-2 turned the classic amplifier topology on its head (Fig 2), calling it 'The low side of the bridge'. At the time, the refinement of output protection circuitry was stymied by a snag in the conventional amplifier topology: to 'read' the voltages and currents associated with the output transistors, any circuitry needed to be referenced to the output or to one of the supply rails. This leaves a gaping potential difference between the referencing of the protective monitoring circuitry and the remainder of the amplifier.

In one stroke, Crown moved the ground, floated the power supply and inverted the output socket's polarity (Fig 3). In the PSA-2, the grounded output simplifies the provision of sophisticated analogue computer which monitors the output voltages and currents, and emulates the thermal

Abbreviations and technical definitions

Feedforward: an alternative kind of error-correction, potentially superior to traditional negative feedback

MOSFET: Metal Oxide Semiconductor Field Effect Transistor

NFB: Negative Feedback

R_{on}: 'ON' resistance, minimum value measured across the main terminals (applies FETs only)

SOA: Safe Operating Area: a graphical representation of the maximum safe limits of voltage and current, subject to (i) temperature and (ii) duty cycle

V&I limiting: protection circuits set limits on the voltage (V) and current (I) seen by the output devices

response and hence the moment-by-moment SOA of the output transistors. A VCA then adjusts the amplifier's gain so the output is kept tightly within the true safety limits. This is achieved without holding back on the output unnecessarily into the reactive load presented by most loudspeakers. So much is a common shortcoming with the classic V+I limiter circuit, portrayed nude for the first time in Fig 4! It either over-reacts, clamping output down to a few watts, or otherwise fails to keep the transistors within their safe limits.

Aside from making the output stage more 'bombproof' than hitherto, the PSA-2's protection scheme means that a given number of power transistors are used more effectively. If one or two less are used as a result, a little weight, size and quiescent power consumption is saved. So ▷

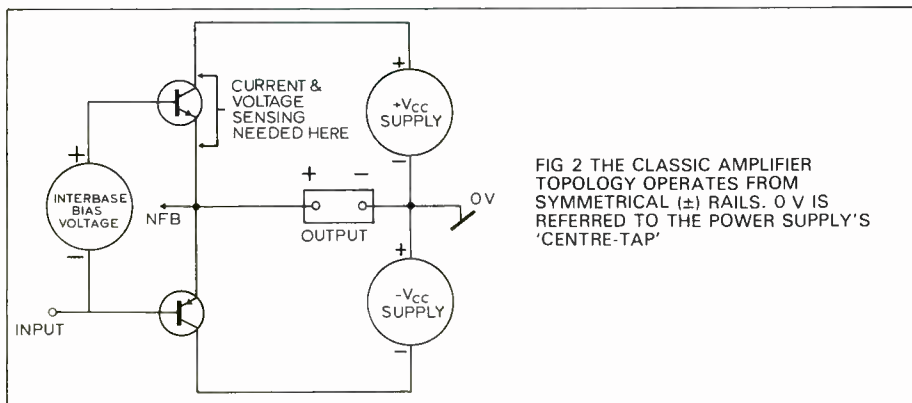


FIG 2 THE CLASSIC AMPLIFIER TOPOLOGY OPERATES FROM SYMMETRICAL (±) RAILS. 0 V IS REFERRED TO THE POWER SUPPLY'S 'CENTRE-TAP'

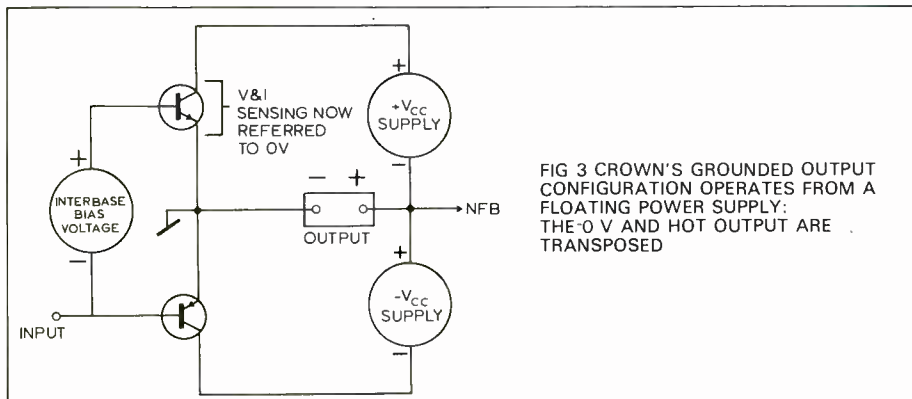


FIG 3 CROWN'S GROUNDED OUTPUT CONFIGURATION OPERATES FROM A FLOATING POWER SUPPLY: THE '0 V' AND HOT OUTPUT ARE TRANSPOSED

GOLD LINE LOFT

SIX CHANNEL HEADPHONE AMP with Talkback



6 distortion-free channels. Powerful and rugged enough for the most demanding applications.

HPA-2 (with Talkback)
HPA-1 (without Talkback)

PYRAMID BOUNDARY MICROPHONE

Designed for: Churches
Live Sound Studios
Conference Rooms

Clear Pick-up even at a distance!

LOFTECH TS-1 AUDIO TEST SET

Three Test Instruments in One!



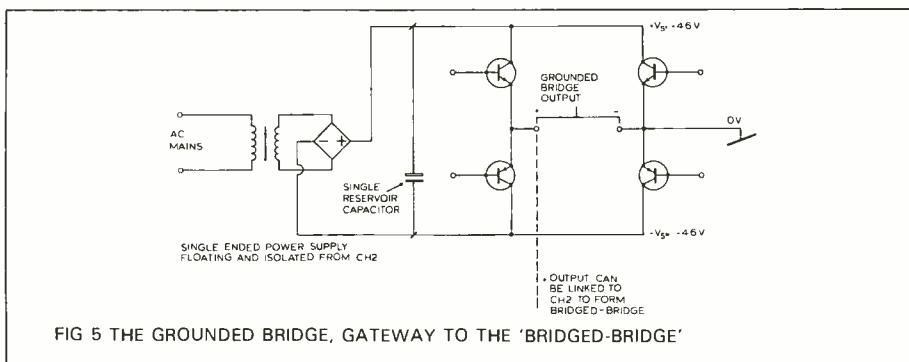
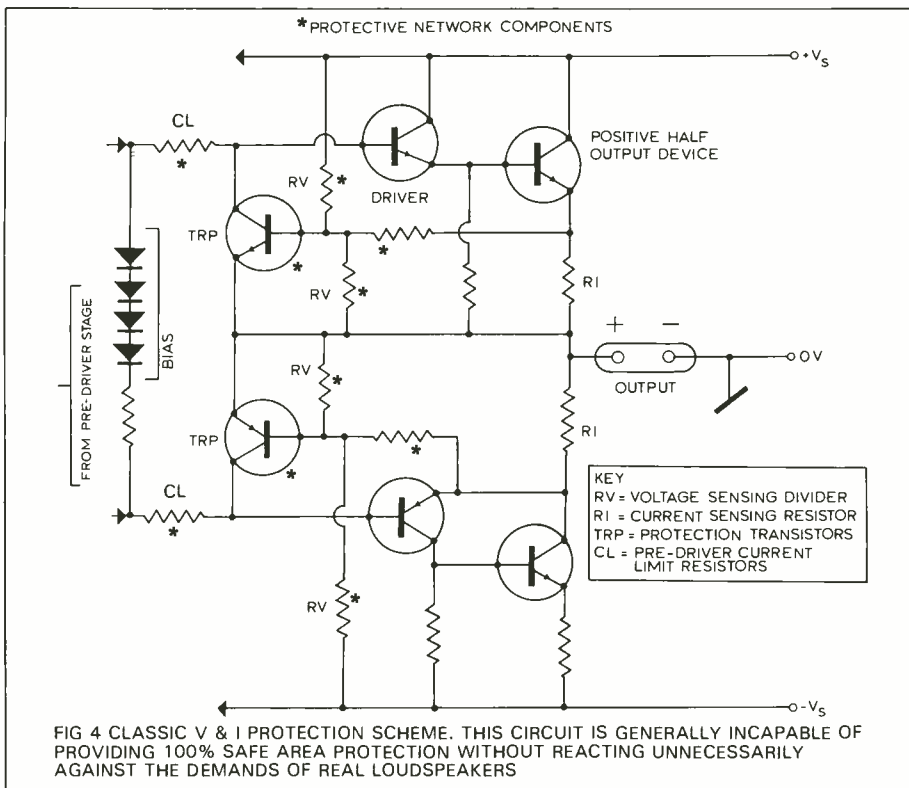
Audio Oscillator
dB Meter
Frequency Counter

Now available with balanced output plus fine tune adjust.

DISTRIBUTORS

AUSTRIA: Musichaus, Vienna
CANADA: Audiorova, Dorval, Quebec
DENMARK: Studio-Lydtectnic ATs, Vanlose
FINLAND: Studiotec, Helsinki
FRANCE: Publison, Paris
GREECE: Hellas Sound, Athens
HONG KONG: Jolly Sound
ITALY: Grisby Music, Ancona
JAPAN: Kawamura, Tokyo
SPAIN: Letusa, Alcoron, Madrid
SWEDEN: Creative Audio, Djursholm
SWITZERLAND: Gotham, Regensdorf
UNITED KINGDOM: Marquee, London
WEST GERMANY: Alphonon, Kalkholim-TS

P.O. Box 115, West Redding, CT 06896
Ph (203) 938-2588 FAX (203) 938-8740



efficiency at low levels is better but again, there's no first order improvement at high power levels.

Original bridging

In 1985, Crown introduced a development of the grounded output topology to the world of pro-audio. Each channel in the *MacroTech 1000* is bridged. Normally, a bridged output per channel is frowned upon. First, PA users feel cheated because usually bridged amplifier outputs are floating above a common ground. So they

wouldn't be able to bridge it twice—between channels—to drive useful power into a 15 Ω bass bin. Second, because of the laid-back manner in which bridging facilities are provided in the majority of amplifiers, distortion and SNR figures are commonly less than exemplary in bridge mode.

Setting these objections aside, a bridged output has its advantages because it can 'swing' output voltages that are double the voltage rating of individual transistors and the power rails. Although bridging employs double the number of transistors, the associated doubling of voltage

swing yields a potential fourfold increase in power output. Conversely, for a given power output and safety margin into a given impedance, bridging halves the transistors' minimum voltage rating.

Historically, the development of high power bi-polar amplifiers has been constrained by the snail's pace development of high-voltage power transistors combining high speed (>3 MHz) with adequate SOA, ie decent current rating while sustaining high voltage. Being able to use much lower voltage power transistors for a given voltage swing dramatically improves the maker's chances of sourcing a sensibly priced part with a high peak current capability and/or fat SOA. Altogether, bridging can make a generous safety margin possible at higher than average power ratings, without paying the earth.

The main snag with conventional bridge-derived outputs is that they're floating. Once again, Crown turned traditional amplifier topology on its head. By independently floating each channel's power supply, then grounding one side of the bridge output, two amplifier channels can be mutually bridged without equally Mutually Assured Destruction (MAD). The result (Fig 5) is Bongiorno's 'bridged-bridge'.

The *Microtech 1000s* power output in bridged-bridge mode is just 160% greater than the sum of each channel's individual rating into a given impedance, less than the potential fourfold increase in power output predicted by theory alone. "Ah," said the man from Crown, "it's arisen because we were keen for commercial reasons on a height of 2U, which set realistic limits on the capacity of the heat-exchanger and power supplies." In later models (eg *MT1200*), an improved core material in the mains transformer has increased bridged-bridge output power in the same 2U package. Also in the *MT1000* and the related *Micro/MacroTech* models that have followed it, the removal of waste heat from the output transistors has been made less of a bottleneck. The transistors are soldered directly to a copper bus, welded in turn to a convoluted metal wafer. The emphasis is on opening the thermal path out rapidly into a large surface area.

By itself, grounding the output of an amplifier (even if it's bridged) appears to have no direct influence on efficiency. The bridged-bridge's hidden contribution is one of making better use of the power supply's capacity, by abandoning the power supply's centre tap. In a conventional split-rail amplifier (Fig 2), one half of the power supply is idle for every other half cycle—for 50% of the time on average. With a grounded-bridge output (Fig 5), utilisation is 100%, since current is returned in full to the opposite rail—it has nowhere else to go. For this reason, AC power consumption is reduced and the transformer and reservoir capacitors can be half the accustomed size. □

Next month Part III—
Classes G and D

References

- 1 M McLoughlin: 'Current dumping review', *Wireless World*, Sep 1983
- 2 J Vanderkooy & S P Lipshitz: 'Current dumping—does it really work?' *Wireless World*, Jun 1978
- 3 P J Walker: 'Current dumping audio amplifiers', *Wireless World*, Dec 1975

Further reading

- A R Bailey: 'Output transistor protection', *Wireless World*, Jun 1968
 J Bongiorno: 'Ampzilla III', *Audio Amateur*, Apr 1984 (USA)
 R M Brady: 'The floating bridge', *Wireless World*, Sep 1980
 E Borbely: 'High power amplifier using MOSFETs', *Wireless World*, Mar 1982

STEREO VARIABLE EMPHASIS LIMITER 3



- As a protective limiter for live recording and broadcasting.
- For dynamic range reduction in professional to semi-pro format transfers.
- Incorporates independent flat limiters and variable emphasis limiters.
- Manufactured using BBC design information.

SURREY ELECTRONICS LTD
 THE FORGE, CRANLEIGH, SURREY GU6 7BG
 TEL: 0483-275997

An improvement on the MTR 90 Mk2? Who on earth could have managed that?



Many an envious glance has been cast in the direction of an MTR-90 Mk.2.

No wonder. With its pinch-rollerless transport, its user-friendly control and its faultless reliability, the MTR-90 Mk.2 has been known as the king of 2-inch multitrack.

But now, it shares its crown with a newcomer. A machine with all its advantages, plus faster wind and rewind, auto alignment on record and repro and frame-accurate mini-locator.

A machine that offers even better audio quality than the MTR-90 Mk.2, but retains all its vital portability.

A machine that even features an optional inboard Dolby* Rack, ready to accept your choice of SR cards or Otari's unique, switchable A/SR combination cards. As well as a host of detail features aimed at helping the skilled engineer to do a better, faster job.

The name of this marvel is the MTR-100A. And if you're still in the dark as to its maker, wonder no more.

Because there's only one machine that can top an Otari. Another Otari.



MTR-100A. The master of masters.

*Dolby and the DD are trademarks of the Dolby Laboratories Licensing Corporation.

For more information, phone or write:

Otari Electric (UK) Limited, 22 Church Street, Slough, SL1 1PT, Berkshire. Telephone: (0753) 822381. Telefax: (0753) 823707

Otari Corporation of America, 378 Vintage Park Drive, Foster City, CA 94404. Telephone: (415) 341 5900. Teletax: (415) 341 7200

Otari Electric Co Ltd, 4-29-18 Minami-Ogikubo, Suginami-ku, Tokyo 167. Telephone: (03) 333-9631. Telefax: (03) 331-5802

Otari Singapore Pte Ltd, 625 Aljunied Road, 07-05 Aljunied Ind. Complex, Singapore 1438. Telephone: 743-7711. Telefax: (743) 6430

Otari Electric Deutschland GmbH, Rudolf Diesel Strasse 12, D-4005 Meerbusch 2, West Germany. Telephone: 010 49/2159:50-861-862 or -863. Telefax: 010 49 2159 1778



many Swiss studios do in order to get clients. This means that we have always been able to run the studio as a business and were thus able to obtain the sympathetic ear of our bank manager.

"The advantage of already having a studio when planning a new one is that you are not so pressed for time, so we were able to go into details carefully before actually starting anything."

Being well-established in Nunningen meant planning permission was a formality and a site for the new studio was found near the entrance to the village on the hillside overlooking the road and across to the slopes beyond.

"Things in Switzerland tend to be standardised and the moment a house starts to deviate from the norm the price goes up. As isolation—both from the point of view of noise from the exterior and between rooms—had to be an important part of the design, I used the services of Hellmuth Kolbe for the design of the shell and interior structure of the house and when the architect saw the requirements this meant a further increase."

The new building provides room for two studios—one basement and one ground floor—with a second storey for office and accommodation space.

"With the majority of our clients coming in from abroad it was necessary that we have proper accommodation. We have four double bedrooms with full kitchen and toilet facilities with house cooks on call for the catering. We also have arrangements in the village for larger numbers."

The studio design incorporates an assortment of ideas. The basic building was the result of studies from Hellmuth Kolbe's Engineering Office for Acoustics and Constructional Physics. The exterior walls were to be a double wall construction; internally floating floors and walls would attenuate structure-borne vibrations between the two studios and upstairs.

"The floor areas for the two studios are basically the same; approx 7x5.5 m (23x18 ft) for the studios and 7x5 m (23x16½ ft) for the control rooms.

"The first studio to be finished had to be the one in the basement as this was going to be installed with the equipment from the previous studio. I had very definite ideas about what I wanted from the design of the studio and an English company, Morris Logic, came up with some preliminary drawings that looked interesting.

"However, previous commitments kept them pretty busy so it was up to Steve Dove to come up with the final plans and keep an eye on the realisation together with Morris Logic."

The basement studio—or Splash as it is now called—was basically conceived for tracking, though it is also capable of mixdowns. Access is through double sliding glass doors between the studio monitors into the studio itself.

The studio is large enough to hold seven or eight musicians and has a lively response. The surfaces are mainly wood and brick and there is a parquet floor. A selection of rolling isolation screens faced with Sonex is available to isolate drums, amplifiers, etc. The walls and ceiling have been angled to avoid

GREENWOOD/SPLASH

Different styles, different names, same site. Raymond de Lacy reports from this Swiss studio complex

Greenwood Studios are located in Nunningen, a small village in the pre-Alps (ie not too high up) about 20km (13 miles) from Basle. Heading the operation is Anglo-Swiss Glenn Mueller. He took this opportunity to explain the reasons for building new studios.

"I basically wanted to start living at home again! Greenwood Studios actually go back quite some time and were installed in the ground floor underneath my house. It was very convenient in that I didn't have far to go to work but in the end it does mean that you are never really in your own home and as business was very good. I realised that the only way out would be to have a purpose-built studio."

There seem to be new studios opening every day in Switzerland and rumour has it that soon there will be more studios than musicians.

"One area where we have been very lucky is that 90 to 95% of our work comes from abroad with a large percentage from Germany so we have never got into the price-cutting that so



The Greenwood control room

NEW PRODUCT PROFILE



AKG C1000 S
AUSTRIA

**A.K.G. C1000
Condenser Mic**



Drawmer M500 Dynamic Processor.

**WE DIDN'T REACH No.1 BY BEING
OUT OF STOCK OR EXPENSIVE!**

News Update

FAX your orders to **01-485 4168**

Sony 3.5inch floppy disks are now in stock. An independent report recently concluded the Sony disks had the lowest drop out rate of any tested. Good news when you are "SAVING" valuable sequences etc..

Express Cheque Clearance. We are now able to clear cash sale customers cheques within one minute to avoid any delays in processing Trade Counter or Mail Order sales.

AKG C1000 now in stock.

Save time - phone
STUDIO SPARES
first

61-63 Rochester Place, Camden Town, London NW1 9JU.
ORDERS: 01-482 1692 ADMIN: 01-485 4908
FAX: 01-485 4168 TELEX: 838705 TAPE UK G

Please send free 56 page catalogue
Please send account application form

NAME _____

ADDRESS _____



SS/1/89

BEFORE: AFTER:



12 BIT

Resolution:	12 Bit
Noise Level:	-86 dBV
Sampling Time:	11.7 sec. @ 16 kHz Bandwidth
Bandwidth:	80Hz - 16 kHz (-3dB)
Linearity:	20 dB @ 80Hz-16kHz



16 BIT

Resolution:	16 Bit
Noise Level:	-101 dBV
Sampling Time:	11.7 sec. @ 18kHz Bandwidth
Bandwidth:	18Hz - 18 kHz (-3dB)
Linearity:	7 dB @ 18Hz-18kHz

In a studio, 12-bit samplers are often just not good enough. The sampler that was a studio standard when you bought it a few years ago isn't up to what you or your clients demand.

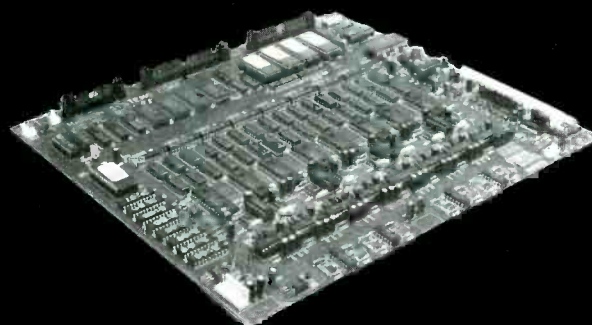
You've been thinking about getting a new sampler, but a 16-bit machine is still a big investment.

Also you don't want to throw away all the samples you made because the latest model doesn't accept the disks.

Tom Oberheim's new company took the Akai S-900* apart and designed an easy-to-install upgrade circuit, turning it into a stunning 16-bit sampler.

Now, the S-900* has better-than-CD sampling quality at an upgrade-price much lower than even an 8-bit machine.

And, if someone comes along with regular S-900* sounddisks, you can still play them. They will even sound better than before!



The Difference: MS 9-C from Marion Systems

Distributed in Europe by:
Synton Electronics B.V.
Computerweg 1
3606 AV Maarssen
Netherlands

Tel: 31-3465-67424 Fax: 31-3465-73330

* Akai and S-900 are registered trademarks of Akai

◁ resonances from standing waves though the appearance is deceptively square. The decor is light grey paint with bricks varying between light and dark grey.

"We find that already musicians like it because it feels more like the room where they rehearse rather than a studio and this seems to take some of the pressure away. The fact that it is live also means that they can hear each other better and get a good solid rhythm going."

Small car loudspeakers have been installed in the ceiling for talkback. This apparently works very well and provides some amusement.

Brickwork has been used around most of the lower walls in the control room and two corners in the studio. The outer bricks are arranged to provide cavities in a pattern that is both aesthetically pleasing and acts as absorber/diffusor for bass frequencies.

"I wanted a room that would sound similar to the majority of control rooms in England and America but with a fairly tight response."

The front of the control room follows a fairly traditional configuration with an essentially square rear half. The acoustic treatment is absorptive either side of the monitors above the brickwork with the rear half becoming more reflective with wooden panelling angling into the wall on either side to throw the sound up to the ceiling. The rear upper wall is absorptive to avoid flashback and motorised drapes can be used to cover the studio door between the monitors. The ceiling has been filled with absorptive material to give an interior height of about 210 cm (6¾ ft) and is alternately faced with wooden panelling and 'shot blue' fabric (as are all the soft surfaces). The main openings are behind and in front of the console with the centre panelled section being angled away from the console surface to avoid reflection problems.

Monitoring is by a pair of Tannoy *FSM* speakers powered by an *EAA Square 1000* amplifier. The cabinets have been installed horizontally and are completely decoupled from the surrounding structure. Secondary monitoring is a pair of *JBL Control 1s* with Accuphase amplifiers.

Recording centres around an automated *Alice Silk* console (which is in the process of being upgraded with P&G motorised faders for the automation) with 24 input modules, six stereo subgroups and 24-track output buses. The *Silk* is configured to house many facilities in a small space, such as an effects return per input strip and stereo returns to the subgroups. There are also four mono auxiliary sends and two stereo sends with pan, for a total of eight usable buses. The post position for the stereo sends is taken after the channel panpot, which means that the send can be used as a stereo follow for proper imaging with effects units. Metering is bargraphs with an NTP phase meter and small video monitor for the automation. A repeat video monitor has also been installed over the sliding doors to the studio.

The multitrack recorder is a Sony 3324 digital with a Sony 2500 DAT for mastering. These machines together with the console computer, Lexicon mainframes, etc, are installed in a machine room next to the control room.

Two Rebis racks are built into the console and a combined sloping rack/keyboard stands behind the console.

Splash also has a respectable keyboard/synthesiser set-up, which comprises a Kurzweil 250, three Akai *S900* samplers, a Linn *9000*, two *DX7s* and Roland *D-50*, Juno *106* and *MKS-50* rack module.

The final feature of Splash is the pool in the rear left-hand corner that houses a small tree and vegetation.

"This makes the place a little less clinical and the clients seem to find the sound of trickling water very restful."

Greenwood Studio is on the ground floor with separate access to the control room and studio. The doors are heavy steel frames with large glass windows. There is also plenty of daylight.

"I had to fight for windows with Kolbe as they are always a weak point as far as isolation is concerned and in the end I compromised, no outside window for the control room but two for the studio.

"I think its a bit of a myth that musicians like to shut themselves away from the outside world but they can always draw the curtains if they want to feel away from it all.

"I consider the room essentially for overdubs and tracklaying, though we can obviously record a group of musicians together if required. I wanted a room that would put a lot of space around drums, guitar amps, vocals, etc, in order to have a lot of natural presence."

The basic shape of the room is an offset rectangle with no parallel walls and an all-wood surface area. The ceiling drops down to a sharp V towards the control room window and thus eliminates resonant hotspots between the parquet floor and ceiling. The response is live but not peaky. The only exception to the wood panelling is a decorative inlaid star of plaster and a brick diffusor to smooth out the bass along the lower edge of the wall facing the control room, the upper part having three inset arches filled with rough plaster.

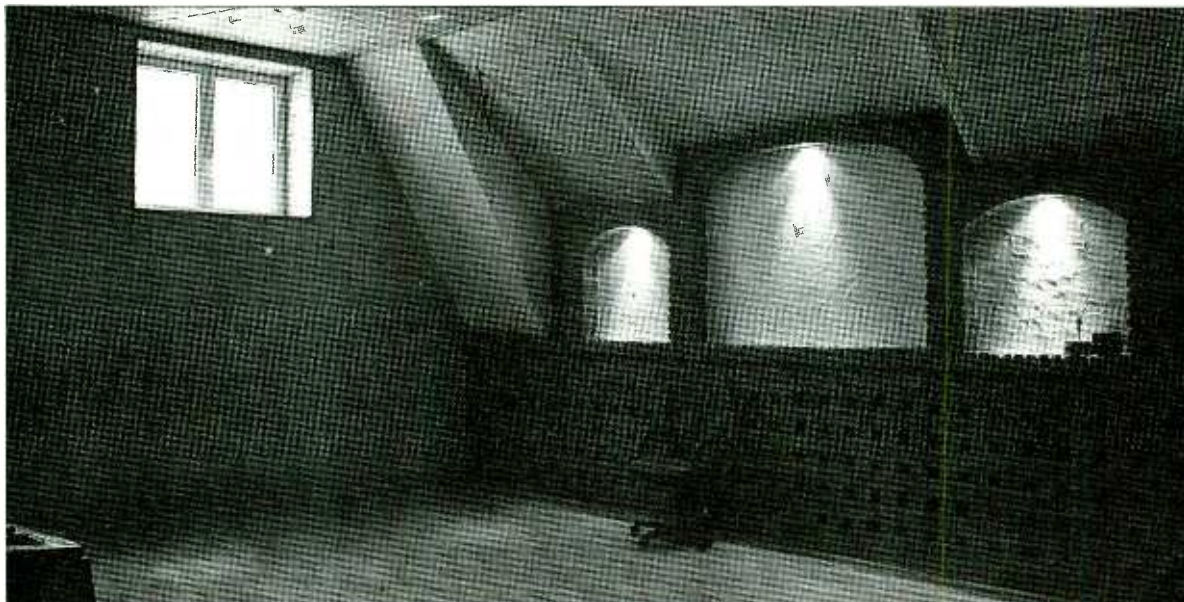
Microphones are a wide selection of the more popular names though Glenn does profess a particular liking for the *AKG 414*.

"It is the ultimate all-round microphone and I nearly always end up using them on almost everything if I can. We also use the Calrec *Soundfield* a lot, even if it is a bit expensive."

Rather than have fixed wall boxes for the microphone connections, there is a wooden rolling rack with snake so mic points can be placed where they are required. As well as the mic lines, the rack contains 24 headphone outlets—"you'd be amazed at the number of headphones mixes we can do"—tie lines and MIDI patching.

There is a pair of Genelec monitor speaker systems in the studio with integrated 3-way crossover and amplifiers.

The Greenwood control room features a different concept to ▷



Greenwood's main studio

◁ Splash and Mueller explains why: "The original idea was to have an overall design, however, going on the basis that two heads are better than one, I thought it would be a good idea to have two different rooms under the same roof, providing flexibility as well as a choice and point of comparison.

"The Greenwood control room is primarily a mix room and my criteria here were a flat response in order to avoid unpleasant surprises when the tape left the studio and a tight sound because that's what I like!"

The commission for the design went to Terry Nelson in consultation with Tom Hidley.

Though the room space for the Greenwood control room was adequate, the position of the door and the adjoining machine room meant that getting symmetry about the centre line without losing too much floor area would be a little tricky. As the room would be doing digital multitrack and masters, it would be necessary to have a monitor system capable of handling frequencies down to at least 30 Hz (the size of the room precluded usable listening further down). The choice was the Hidley/Kinoshita V3 system, with each cabinet to be powered by Mueller's Accuphase M-600 mono power amplifiers.

The second problem was the floor: a raised area at the rear of the room had already been laid to form a platform for keyboard stacks, etc, an effects rack/keyboard stand was to be built behind the console. It was felt that this would impose space limitations and be detrimental to the monitoring as well as restrict contact between the engineer and performer.

Finally the platform was raised to 20 cm (8 inches) above the main floor level and extended forward to carry the console, which is a Neve V series with 48 inputs and *Necam*. The area in front would be used for keyboards, etc. As it is completely floating, the platform decouples the console from the surrounding structure, though there are some other advantages as well.

"It was pointed out that by having the console on a platform, this would provide a psychological barrier to people coming up uninvited behind the desk. At the time I didn't take this very seriously but it has proved to be true—they do stay on the main floor or sit on the front of the step. The other advantage is that you feel more in the soundfield. We have had some important clients in already to look at the new facility and they have all been impressed by the monitoring. One interesting comment was that it felt like listening to nearfield monitors but with the whole frequency range."

As the construction of the house already included floating floors and inner walls, the treatment in the control room was mainly confined to the room acoustics. Apart from some layering on the walls, the only extra construction was the building of an isolation cap to contain the inner shell.

The acoustic treatment consists of active trapping around the walls and under the window system with horizontal trapping in the ceiling. The rear traps form the bulk of the low frequency control, together with the ceiling traps, and are designed to take this down to 25 Hz.

The experience gained by building the other rooms in the complex meant that the building team were able to come up with some ideas on the constructional side and though it could be termed as overkill in some places the increased solidity was effective.

An example of this was the mounting of the monitors. Originally specified to be encased in concrete on a solid pedestal, the V3s (28 Hz system) were installed in solid concrete blocks making a total weight of seven tons (after checking that the floor could stand it).

The final finish is light grey grille cloth over the traps and parquet floor with the latter extending up to include the monitor surround. Lighting is recessed spots with dimmer controls mounted into the console. Two motorised acoustic drapes close off the control room window for mixing. Two soffits have been built in the rear area to house effects racks although the larger of the two now provides a permanent home for a Fairlight III system.

There is an open trap underneath the control room window and a large trap tuned to the low mid-frequencies in front of the console to compensate for bass build-up between the console and facing wall. The latter trap is topped with wood and serves as a keyboard stand, as well as having a built-in rack space for synthesiser modules together with a distribution panel. For

mixdown a Sonex cover is placed over it to avoid any untoward reflections.

A Sony PCM-3324 sits in the adjoining machine room. There is also a 'floating' third 3324 so either studio can do 48-track recording/mixing. Mastering is on a Sony 1630 system and the machine room also contains a Sony 2500B DAT recorder, two Otari MTR-12 analogue recorders (¼ inch and ½ inch), Akai EX-912 cassette recorders, Adams-Smith synchroniser, the console computer and Lexicon mainframes.

For complete flexibility, all the audio lines into the machine room come up into XLR patchbays from where the various machines are connected up. Both studios are linked by tielines for dual operation, copying, etc.

The outboard equipment is housed in a similar fashion to Splash.

"We do have a lot of other effects that we can put in as the session requires and I am waiting to see what is really needed before filling the rack up completely at this stage. For instance, we have had two Eventide *Ultra Harmonizers (H-3000S)* on order since June and I am certain they are going to be very popular."



Splash synthesiser room

There is also a Lexicon LARC, which controls a 224XL and 480 mainframes that are in the machine room.

The synthesiser/MIDI system comprises a Fairlight III workstation, an Akai/Linn MPC60 MIDI production console and two Akai VX90 expander modules, two Roland D-550 modules and Digital Drums module together with an SBX-80 SMPTE synchroniser.

The two studios at Greenwood and Splash are run separately. Glenn Mueller is in charge of the former and Splash is leased to engineer Martin Richard. The two studios do share a common management, however, which is in the hands of studio manager, Christoph Berger, who also has ties with various publishing companies, thus broadening the scope of the organisation.

There is another house in which Studio Three is located together with the rest of the accommodation. Studio Three is principally for copy and transfer work and is linked through to both control rooms.

Though only just on line, the Greenwood complex is already enjoying considerable success with bookings well into next year. Mueller sums up the situation.

"The great thing is that I have what I wanted—two different studios under one roof that perform very well. The pattern that is already emerging is that clients want to record downstairs and come upstairs to mix. An innovation that I actively discourage is the use of nearfield monitors in the mix room and most people are conforming as they realise that what they are hearing is what they are getting. If they need to be reassured, they go up to the office with a cassette and play it on our 'typical domestic system' or in their car. So far, they have all come back with big smiles on their faces.

"Though the initial budget has been surpassed—which I knew it would be—the expense would appear to have been justified by the result and more importantly, by the reaction from existing and future clients. If you can please them, then you must have done something right." □

Greenwood Studio, Muslistrasse 10, 4208 Nunningen, Switzerland. Tel: 61 80 93 33.

Introducing the Model 363.



Auto Compare
Ref Tape



Dolby SR/A

Spectral Recording/
A-Type Noise Reduction
Cat. No. 300 Module

check tape

in out

rec

play

in out



SR

off

A

**Dolby SR Spectral Recording and A-type
noise reduction in one switchable, two channel unit.**

Dolby Laboratories Inc., 100 Potrero Avenue, San Francisco, CA 94103-4813, Phone 415-558-0200, Telex 34409, Facsimile 415-8E3-1373, 346 Clapham Road, London SW9 9AP, Phone 01-720-1111, Telex 919109, Facsimile 01-720-4118. Dolby and the Double-D symbol are trademarks of Dolby Licensing Corporation. ©Dolby Laboratories Inc. 1988 S88/8495.



THE SOUND AT DONINGTON

The UK *Monsters of Rock* Festival at Donington is a long established heavy metal tradition. Mike Lethby and Richard Vickers braved the weather and the world's biggest ever system

For Britain's dedicated army of heavy metal *aficionados*—or at least those 80-100,000 souls lucky or determined enough to make it on the day—the annual Donington festival is the established showpiece of unadulterated raunch.

Heavy metal may well be the last true underground movement of the '80s. Barely acknowledged and largely unloved by the world, the massive commercial successes of Iron Maiden, Judas Priest, Whitesnake *et al* have been followed by a 'new wave' of hard-edged high speed heroes—a marketing phenomenon significant enough for Bon Jovi, for example, to consistently outsell U2.

At Donington the audience—predominantly young, white, male and wildly enthusiastic despite the drizzle—worked up a fever of excitement through the day. Good humour prevailed, even though their favourite occupation involved drenching each other with containers full of liquids of dubious origin.

The day's only major problem stemmed from the sheer energy of the crowd itself. As people pressed forwards, and the 'slam dancing' and general hysteria increased, pressure at the front led to a

steady stream of casualties (including, tragically, the deaths of two youths), which severely taxed the otherwise well thought-out safety measures laid on by promoters MCP.

It's easy to be critical with the benefit of hindsight but the lessons have not been lost on the organisers, and a number of solutions are already in the pipeline for similar future events. Hopefully, too, bands will also appreciate that their responsibilities can go beyond requests (however well-meant) to 'move back a bit'.

The different tastes of the individual house engineers and, presumably, their respective bands were reflected in the variety of mix 'sounds' presented.

At one extreme, Matt Dowdle produced a crisp, open, dynamic mix that highlighted David Lee Roth's relaxed approach and versatile repertoire. At the other, R Czaykowski, for Kiss (on immediately after DLR), painted a much more traditional, subjectively louder-sounding, HM wall of graunch: much low/low-mid rhythm energy underpinning the guitar/vocal mids with a minimum of high end detail.

A total of 360 Turbosound cabinets offering a potential 523 kW of programme power brought to

Donington a system, which according to Turbosound's research, formed the largest front-of-house PA on record—a statistic that has duly earned it a place in next year's *Guinness Book of Records*. There was also an additional delay system, in the shape of an MSI 50 kW rig, sited directly behind the mix tower.

The result of all this, in raw figures, was an average SPL of around 118 dB at the mix tower, peaking (during Iron Maiden's set) at a maximum of 124 dB.

But if those figures suggest a hint of overkill, Iron Maiden engineer Doug Hall counters that the total capacity was specified with good reason: "I like a comfortable headroom, about 3/4 of the system's total output. That's why we're bringing in so much gear, simply for that extra headroom."

The choice of Turbosound—not often associated with heavy metal acts—stemmed initially from the presence of Iron Maiden as headliners, since the band's own 100 kW Turbosound rig provided a natural base on which to build the complete PA.

The system totalled 300 TMS-3s—142 a side, stacked in three levels—with a further 16 under the stage front as a nearfield vocal cluster. Each wing, some 72 ft wide, curved gently back to about 10 ft from the centre on either side; a complete full-size tier had been laid out in a warehouse earlier to test the design for practicality. Below each wing, 30 TSW-124 subwoofers were lined up at ground level.

Hall explains that the PA was designed not merely to project outwards but to throw the sound down into the audience—achieved by angling the main vertical axis of the PA slightly down.

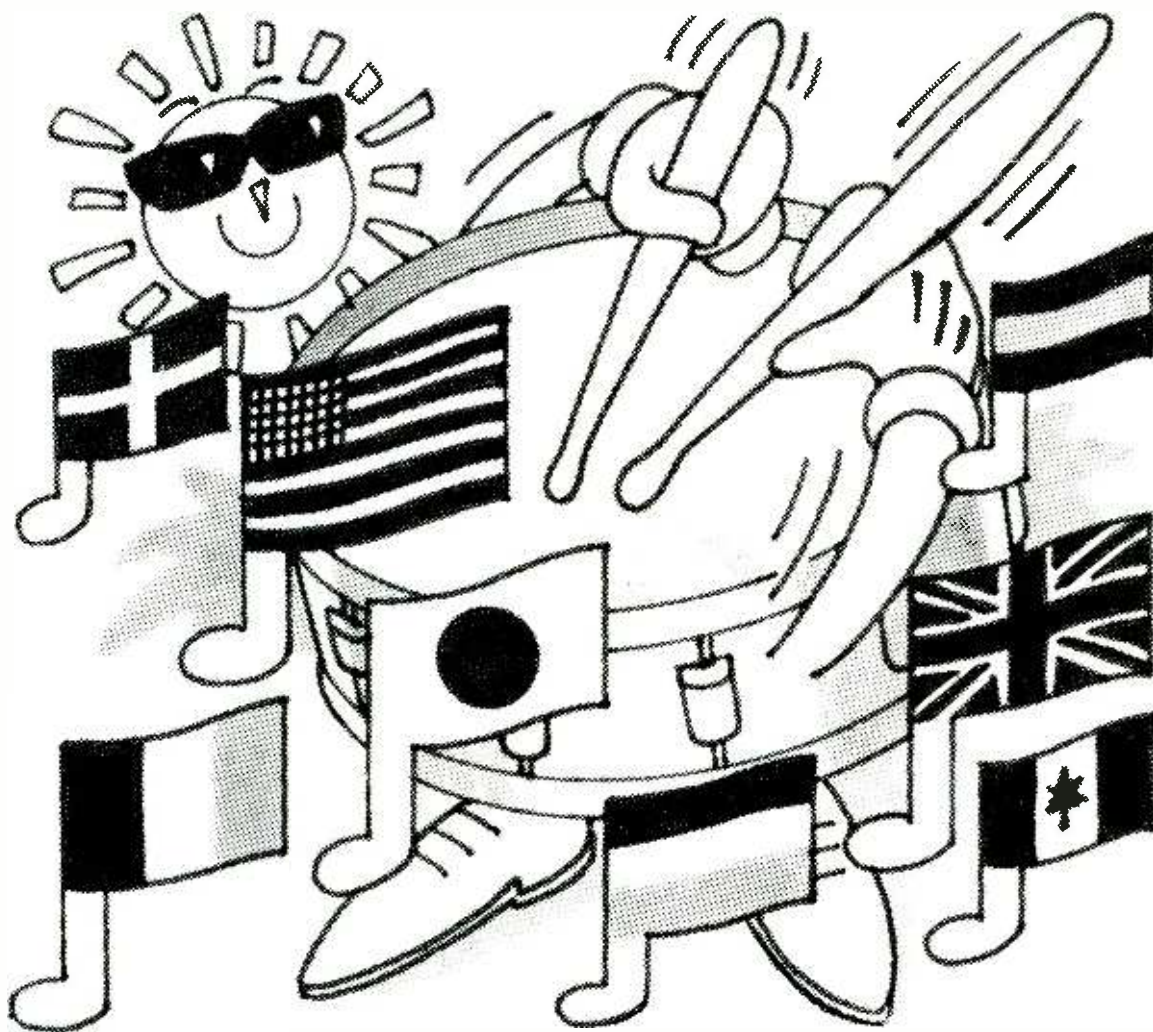
Production director Mike Lowe, of Britannia Row Productions: "We designed it in three tiers and coupled the 10 inch drivers of the TMS-3s

Drum up more business

At **MIDEM '89**

Music's International Marketplace.

Palais des Festivals, Cannes. Jan 21-25 1989



All the Big names will be exhibiting at MIDEM '89. So will many of the smaller companies who play such a vital role in the world's music industry. Why not join them? As an Exhibitor, you're not just part of MIDEM you are the show, ranking with the biggest names, and with all the business pull of the music industry's greatest international marketplace.

LIAISE. MIDEM is where global deals are struck that build company prosperity. It's where you'll find all the top producers, record companies, publishers and independents from over 50 countries.

LOOK. MIDEM is the place for viewing or screening the latest video promos. It's where you'll find out all about Compact Video Discs and be updated on state-of-the-art studio equipment and hardware. Nowhere else comes close for promoting records, catalogues, artistes and studio equipment.

LISTEN. And where else can you attend the famous MIDEM concerts or see so many top bands performing live? Or attend the MIDEM RADIO — the fifth great International Radio Programme Market?

The rest of the world always has a special welcome for MIDEM's British Exhibitors (and that includes the 700+ international press and TV journalists).

LEARN. Ring **Peter Rhodes** right now on LONDON 01-528 0086. He'll tell you all you need to know about exhibiting at MIDEM '89. Almost everything is done for you — including fully-equipped and furnished stands with phone and hi-fi equipment. British companies exhibiting at MIDEM also qualify for a BOTB subsidy resulting in a considerable saving providing your stand is booked by November 5th. All in all you will be surprised by how little it costs to exhibit at MIDEM '89.

MIDEM'89

I like the sound of MIDEM '89. Please rush me details.

Name _____ SS/1/89

Company _____

Title _____

Address _____

Phone _____

International Exhibition Organisation Ltd., Metropolis House, 22 Percy Street, London W1P 9FF. Tel: 01-528 0086. Telex: 920173
International Exhibition Organisation Inc., 845 Third Avenue, 19th Floor, New York, NY 10022. Tel: (212) 750-8899. Telex: 4979122

D

◀ together head-to-head to get a little more throw—most of the intelligibility information is in the 10s from 250 Hz to 3k7.

“We angled it down because on previous occasions, like the Wham! farewell gig, which was a really hot day, we lost highs through rising thermals from the front of the crowd, which lifted the top end. But when we angled the same system down later in similar conditions, the high end was fine. Ideally, we’d have flown the PA here but that would have meant a whole custom-made rigging system.”

Hall: “To keep it all phased correctly each tier was aligned about 6 inches forward of the one below, so that it made a good bowl with the top tier catching just below the ridge of the hill. We tilted the bottom cabinets on the lower and middle tiers forward by 2 inches at the back, with a ¼ inch bit of lumber—sorry, acoustic compensator—at the front to decouple the 10s slightly to prevent it getting beamy.”

Lowe: “The system design was very much Doug’s idea and in the run-up period, while he was in America with Iron Maiden, it was down to myself and Julian Tether, head technician on the

tour, to put his thoughts into action. Doug’s not a great fan of delay systems, so what happened here was a very different approach to the norm.”

Tony Andrews, joint UD of Turbosound: “Normally a PA is about 8 ft over the audience, minimum, so if you put a lot of it up it’s very high, and the sound goes over their heads but that seems to have been standard practice until recently.”

“Like a cluster array but on a larger scale. You’re still forming a section of a sphere, although you can alter the rate of change of the radius, up to a point, to suit the arena. The tighter you put the cabinets together, the more they couple and the more they throw. So we’ve gone to the max here—maximum coverage and maximum throw.

“In fact it’s got to the point where we can’t keep on multiplying the basic component of the TMS-3 given its size; we need something with an even tighter beam and greater projection and that’s a concept we have in the pipeline right now.”

A major design objective was that at any distance from the stage, everyone should hear a

constant level and frequency range.

Turbosound’s technical director John Newsham: “Because the system is arrayed in an arc and spaced vertically, as you walk closer to it you hear progressively fewer speakers—the TMS-3 has a ‘tight’ dispersion pattern; the sound is very even. If they’d used IB cabinets it would have been deafening at the front. And the design of the TMS-3 makes it easy to keep a rig of this size phase-coherent.”

By the same principle, according to Lowe, people standing close to the subwoofers were also not exposed to excessive levels.

Lowe: “We coupled the subwoofers acoustically by total mouth area, and they carried very well. For the engineers, that meant the problem of remembering that the sub bass sort of rolls up the hill; it could be fine at the mixer but be well over the top 100 yards behind it.

“One point is that some manufacturers term their cabinets ‘subs’, when in fact they’re really bass cabs but the TSW-124s, with the new 6 inch voicecoil and 12 inch magnets, cross over at 70 Hz and go down to 17 Hz. It’s a scary speaker! That’s why we didn’t need subs on the delay system; in fact, the ‘Low Packs’ on the delay were hardly ticking over.

“Also, a major thing we went for was that Doug Hall wanted everything running from one crossover; and I’m glad we did. It was a lot of effort but ultimately worth it.”

Atmospheric conditions inevitably played a significant, but only partially predictable, role in determining sound quality.

Hall: “As Mike said, the air temperature does make a difference but humidity is also a big factor. Indoors, Iron Maiden won’t play with air conditioning on, because (one) it causes a draught and (two) if it’s steamy it’s more atmospheric—the lights are more effective.”

Andrews: “And with more moisture in the air you get better transmission of sound, the highs travel further. At festivals when it’s been dry the wind always seems to drop around twilight but as soon as the air hits the dew point you can really hear the sound thicken up and get stronger.”

Logistics

Mike Lowe co-ordinated the assembly of an extra 200 TMS-3s and 60 TSW-124s to complement Iron Maiden’s rig, in an operation that drew on four UK and European rentals sources.

“We pulled in equipment from Regiscene in France, Ampco in Holland and TFA in the UK, as well as the Iron Maiden system.

“That meant dealing with a whole mishmash of amplifier input sensitivities—Iron Maiden’s QSCs, TFA’s C-Audios, H&H from Ampco and EAA 1000s from France. Everybody’s gear was configured in different ways.

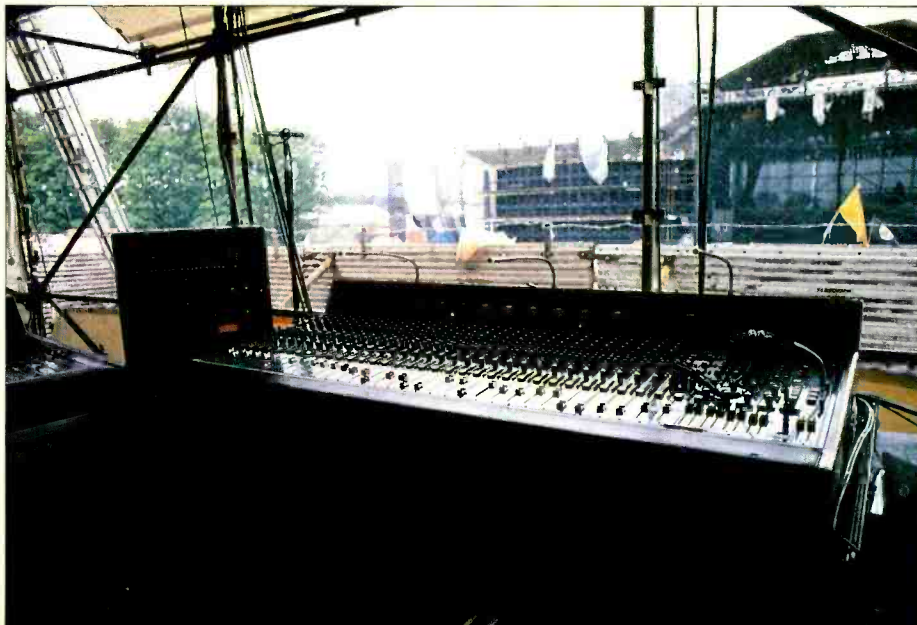
“We had a 12-man crew on the speaker systems, because I wanted all the supplying companies to provide a technician with their own gear. There were 12 people to get stuff in and out plus ‘equipment pushers’: in all, about 24 local people around the stage.

Tony Andrews adds: “We had 1500 units to phase-check and I think I did 80% of them, with John behind me writing down the problems—quite a session.

“The biggest disparity was on the top ends, because at one point in the TMS-3’s evolution we used JBLs, and the phasing of those is the opposite to everyone else’s, but not everybody knows that. So I used our little pulse clicker and I can remember thinking ‘I’ve done a quarter of it ▶



Under-stage TMS-3 vocal cluster



View from the desk: Doug Hall’s Amek M1000

Photo: Nik Milner

Photo: Nik Milner



Photo: Nik Milner

Control racks

△ and I'm already fed up with it'.

"Then when we ran the system up we thought something had gone terribly wrong—in fact the CD player was being modulated so heavily that it was going beyond its error-correction and screwing up the sound. When we went over to cassette, there were a lot of relieved people."

Lowe: "Our site sound included paging systems, a Renkus-Heinz PA for the artists' compound, foldback for the DJs and a backstage sound/video link-up so that bands could see what was happening out front. The ancillary 'electric string' around the site was almost as much work as the main system.

"For the BBC, on the two non-Iron Maiden systems we supplied a buffered output on each mic line and multis from the house desk to the BBC for effects returns and so on. We were in constant communication with them via radio and wired talkback."

Did the system's projection pose spillage problems, as regards the areas surrounding the site?

Lowe: "We were less plagued by that than at most festival sites, because of the deep bowl. It certainly does carry; we went down into Castle Donington and heard the PA clearly. But Maurice Jones, the promoter, put great emphasis on inconveniencing the locals as little as possible, with a 6 o'clock curfew. We also minimised the use of sound other than when we really needed it. Of course during the show it carried but being a one-day event it's nowhere near as bad as a weekend festival."

Delay system:

As natural amphitheatres go Donington's deep, broad bowl is as good as they come—apart from a geographical quirk of the site where the land rolls away sharply from stage-left into a small hollow, a slightly awkward annexe to the central arena. Providing delay sound in the arena was simple enough but creating a stereo image for the annexe called for a special solution.

The main 50 kW delay cluster, placed directly behind the mix tower, consisted of 30 MSI 'Hi Packs' and 16 'Low Packs', with Klark-Teknik DN700 delay lines and MSI crossovers. Its

function, Mike Lowe explained, was "not to start the sound all over again but just to give a gentle lift to the mids and highs."

For the annexe, a further eight JBL long throw delay horns were aimed across to stage-left, providing extra top end from the stage-right stereo mix.

Hall: "We created a stereo image over there using a combination of the stage-left PA and the delay tower, which we crossed over so that the JBL delay horns gave right hand information; even if you were way off-axis you could still hear stereo.

"I think it was Malcolm Hill who first tried that idea here. According to the promoters they had the best sound here before now."

How did they work out the delay times with such an awkwardly-shaped arena?

Lowe: "We started with the rule-of-thumb of a millisecond a foot, which turned out to be very close, and we went around the field with radios to fine-tune it by ear."

And did the sound of the MSI's and Turbosounds integrate well?

"They blended surprisingly well, but don't forget we were just creeping the delay in; it wasn't a full-blooded rock & roll delay."

Iron Maiden: a personal PA choice

It's somewhat unusual these days for a band to buy their own PA so what made Iron Maiden decide to do it?

Hall: "Because these guys are real cool! Seriously, for two reasons. One, they wanted quality which they could rely on to sound the same every day. Two, the economics: if they tour more than seven months a year, it's better financially to buy a rig than to rent one.

"Although Turbo isn't renowned as a 'hard rock' PA—you don't get the, er... subjectively 'blistering loud' sound out of it—I just like its coherence; most of the detail like vocal information is carried in one driver so it's real transparent-sounding. The PA sound should be an extension of the stage, like it's coming straight from the band; it can be loud but it also should be

clean. That's why I like to use so much gear, not to use the whole power but to get more headroom and a transparent sound.

"Originally the band wanted the old 5-way muscle PA: a real loud rig but not the kind of system to invest in. Then I heard a prototype of the TMS-3 at Ridge Farm and it was so coherent-sounding in such a small size package; that was the kind of PA I knew would travel well, the kind of thing to invest in."

Desks: mixing in triplicate

Three parallel sets of FOH and monitor console systems solved the perennial problem of minimising changeover times, allowing each band's engineers to re-configure their desks and control hardware during the preceding set.

Every act apart from Iron Maiden alternated between two Soundcraft series 4 40/16/2 house desks, each with its own complement of outboard gear and multicore runs. On stage—again with the exception of Iron Maiden—two series 4 monitor consoles were used along with duplicated control systems.

For the headliners, Doug Hall—Iron Maiden's FOH engineer since 1980—used a vintage personal set-up including an Amek M1000 48/8/2 desk, purchased from Turbosound in 1982, and his own control equipment and drive racks. None of it, remarkably, showed any sign of the usual scars of constant touring.

In fact, Hall's Amek has acquired a number of unique modifications over the years: "The solo-in-place was a mod, and I had a couple of extra effects buses added to it."

Andrews: "And we put in new Coutant power supplies and changed the grounding. It's a unique model."

The Amek is augmented by an 8-bus 16-input stretch console, purchased from HHB.

Hall: "It's a newer vintage than the M1000, which is a slight pain in the ass because the input modules are too long to put in the other one—plus the LEDs on the 'stretch' read about 15 dB higher. We've expanded it to accommodate a stereo tom group, and we added screens and new connectors and remoted the jackfield."

Looking ahead

"My M1000 is one of the first desks Amek made and it's starting to get a little old now—1981, I think it was made—but I'll put it up against most new desks anytime in terms of sound quality. It has a great equaliser and features that a lot of live consoles don't have.

"It cost about 10 grand in 1982; the stretch cost another 5 grand—15 grand invested in 48 inputs by eight. But I need more than just eight groups; I want more buses and I want VCAs, stuff like that."

What are his thoughts on today's live desks?

"The Amek works real well so my first choice will be a TAC SR9000; I've given them a few comments about it and I'm waiting to hear what they'll say.

"Besides that I've looked at the PM3000—a very good desk, very transparent—but again it doesn't have all the facilities I'd like. And the series 4 of course, although personally I prefer the sound of my Amek. I'd like to try the new Ramsa console too."

Would he perhaps like to see a more

THE AUDIO ENGINEER DIPLOMA
15 SCHOOLS WORLDWIDE

Audio Engineering
We offer 550 hours of training
All theoretical and practical requirements of
Audio Engineering defined by the ICAE
by awarded this

Diploma

Head Instructor
Director

SAE
School of Audio Engineering

We have spent the last 12 months training your next studio employee in our 24 track studios.

15 schools worldwide, major schools in:

London 16 Chillingworth Rd London N17 6CU Tel: 01-609 2653	Los Angeles 3000 S Robertson L.A. 90034 Tel: 213-559 0973	Sydney 68-72 Wentworth Ave Sydney NSW 2010 Tel: 02-221 3711	Munich Weissenburger Str 19 Munich 80 Tel: 089-48 7145	Viehrna Mayerhofgasse 6 Vienna A-1040 Tel: 222-65 2718
---	--	--	---	---

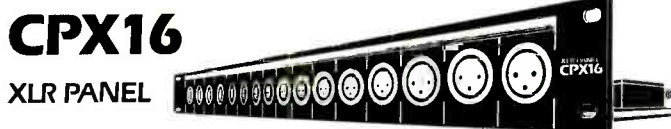
Privately associated with HYBRID ARTS AKG - EMT - NEVE - Audio Consoles

NEW SOLUTIONS FROM SIGNEX

These two new connector panels employ the same proven construction methods which have made the ISOPATCH so popular and versatile. They are hand-built to an exacting standard with all sockets mounted on a single PCB, providing not only reliability, but excellent panel rigidity and strength. Socket designation on the 1U front panels is simple to mark and can be easily changed using the slide-in Ident strips provided.



This panel offers a single row of 22 MIDI sockets which can be configured as required for MIDI IN/THRU/OUT connections. Primarily intended for MIDI connections between keyboards, expanders and outboard equipment, the CPM22 can be wired to MIDI splitters, mergers, etc., to form a complete patching system. Available with DIN or solder rear connections.



Designed for input/output connection of balanced microphone lines and other signals, the CPX16 is fitted with 16 male or female XLR connectors. Rear connections are directly soldered or via 1/4" stereo jacks. Tip can be wired to either pin 2 or 3 by bridging programming pads on the PCB.

Signex
PRO AUDIO PRODUCTS

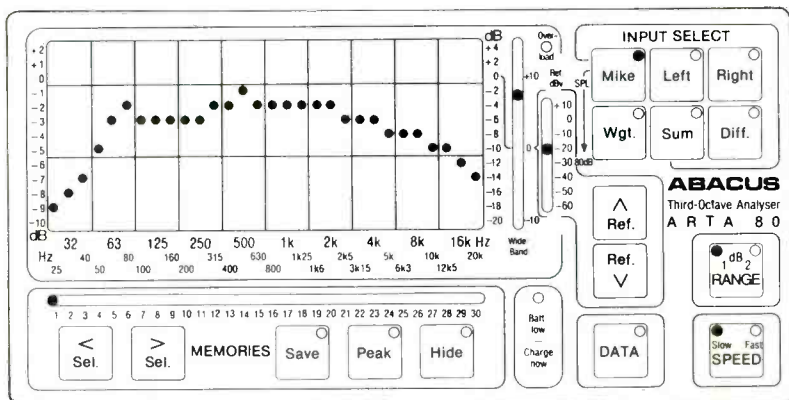
For further details contact:

MANUFACTURE AND UK SALES: ISOTRACK, PO Box 18, POOLE, BH14 8EA ☎ (0202) 747191
OVERSEAS SALES: KELSEY ACOUSTICS LTD., 28 Powis Terrace, LONDON, W11 1JH. ☎ 01-727-1046

ABACUS ELECTRICS

For exacting engineers, a precise instrument, the **ARTA 80** third-octave audio analyser.

- Incorporates precision pink-noise generator.
- Ultra-bright LEDs for clear display and battery power saving.
- Thirty non-volatile memories. View any memory simultaneously with "live" display.
- RS232 serial port for down-loading memory data to a personal computer.



Battery portable – size 24 x 16 x 8 cms. weighs only 1.5 kg.

Microphone plus two line inputs.

Parallel printer port for plotting spectrum graphs directly on dot-matrix printers.

12dB or 24dB display range, fast or slow response.

ABACUS ELECTRICS

10 Barley Mow Passage, Chiswick, London, W4 4PH, U.K.
Telephone (01) 994 6477 Telex 8811418 SPACES G

◁ sophisticated type of live desk, with more recallable facilities and so on?

"A studio-type recall system would be great if you have a lot of bands on one live bill; but for a one or two act bill it wouldn't make much difference. I guess it'll happen—if there's enough demand for it."

Stage monitoring

As noted earlier, the only departure from the dual series 4 monitor desk set-up was Iron Maiden's stage mix for which their monitor engineer Mick Tyas used a Midas *Pro-4* console.

Lowe: "For the support acts, since we're flipping between two monitor and two house systems, we have a team dedicated to each system—John Shearman and Nick Atkins for one, and Ian 'Anzac' Wilson with Pete McDowell for the other. They're effectively 'babysitting' for us: most bands have their own engineers."

Hall: "On the stage-left vocal sidefills we've got eight JBL 2441s... a mixture of 82s and 41s on JBL horns and Community M4 8 inch compression drivers—incredibly loud!—which belong to Iron Maiden. Plus a couple of old-style stacking double-15 inch Martin bins, and two more TMS-3s a side for the drum mix. And some 2x15 inch wedges, which Turbo originally built for their rentals company."

The total power on stage, according to Doug Hall, totalled some 28,000 W including 12 kW of vocal monitors—raising an appreciable volume at the mix tower even during line checks.

Such high levels must create problems?

"Well, yeah, it is pretty loud up there. When Iron Maiden's monitor engineer does his vocal line check it chases people right off the stage. You can't focus your eyes... keeps you regular, though: good for the digestion."

"There's a lot of backline leakage but I know the cues and the song lyrics and raps, so I keep all the backline mics in mute until they're needed, and I duck the vocal."

The 'multiple systems' approach also extended to separate backline gear and microphone systems.

"All the bands' stage set-ups were individually

soundchecked and then simply lined-up one in front of another, apart from the drum risers. In a changeover we'd just peel away a backline, roll in a drum riser, plug in the multicore and 'go'. So we had no problems meeting the allocated changeover times. Plus there's less cabling on stage with these acts than with synthesiser bands, of course.

Hall: "For Iron Maiden's backline, the two guitar players have just gone over to these new TC multiple effects units and the new Gellen Kreuger equipment, so for this show I've changed the mic'ing of their backline. Until now I'd always set up a separate amp and cabinet backstage and mic'd that up, because they used to use Marshalls and crank them up—fine onstage but a bit 'gratey' to mic up. But with their new gear I can mic up their own backline: it sounds sweet."

A rack inventory

As expected most of the instrument effects were provided by the musicians on stage, the FOH racks merely supplying overall control, some occasional echo effects and a touch of 'small room' reverb ambience to add some extra lushness to the complete mix.

Doug Hall outlined his rack line-up thus: "Eventide *SP2016*; 949 and 969 *Harmonizers*; four 160s; four 160xs; five 165s; two ADR *Compex* limiters; an ADR *Vocal Stressor*; two UREI *1176* compressor/limiters; an Aphex *Aural Exciter Type C*; an AMS *RMX.16*... and the kitchen sink has gotta be in there somewhere!"

"I don't use the Aphex much, it's a little out of calibration, but I'd like to get hold of the Aphex 2. I used one in Japan and it's brilliant for making acoustic things like vocals stand out a little from the mix without being louder."

"And for the drums, I use an Eventide *SP2016* on a stereo 'small room' with a 1 s pre-delay."

"Plus there's a Revox *B-77* for intro segues and voiceovers during the show, and Claude Lyons voltage stabilisers for all the house, monitor and backline control equipment; if you get troublesome power lines, even 160 V instead of 240 V, it corrects so fast it really saves you."

"For microphones we've got an *SM-7* for bass

guitar, AKG *D112s*, Shure *57s* for the guitars, Neumann *KMA 84s* over the drum kit, *57s* on the rest of the kit, one of those new Shure lectern-type mics for the tubular bells, and Sony wireless mics."

A total of some 120 mic lines came off stage—including a few massive drum mic set-ups—which were routed through passive stage DI boxes with splits for the monitors, the three parallel multicore systems to the house desks, and extra transformer splits for the BBC mobile.

Mixing metal

Does Doug Hall find it difficult to keep dynamics in the mix, given the overall levels in this type of music—does he use a lot of compression?

"No, with Iron Maiden I just compress the bass with a UREI *1176* followed by an ADR *Compex* limiter, post EQ, and I compress the vocals by about 5 dB, so when he goes berserk on the mic he doesn't kill people. That's all."

"I don't generally ride the guitar faders much. Instead, I mic them in stereo and pan the two signals a few dBs apart. Come a guitar solo I defeat the pan so that it comes up by about 3 dB in mono—a change in image and a subtle change in level."

"Otherwise, nothing's panned hard left and right; for live stuff you can't do real stereo because half your audience wouldn't be hearing the other side."

The care taken in pre-production to configure the PA to the peculiarities of the site, ultimately meant that the engineers could approach the mix much as they would for a typical stadium venue.

Hall: "The mix stays virtually the same but the outboard's set up slightly differently: since there's no natural ambience to speak of I just 'wet' things a little bit more."

But does he find differences between outdoor gigs in the UK and in the States?

"I think at festivals it's pretty much the same everywhere; people come to experience the event. At arena shows in the States though, people go a little bit wilder, whereas in the UK it's more of a listening audience... a bit more discerning."

A point proven?

For any PA supplier a major outdoor event represents a high-profile showcase. But along with the publicity comes the risk that sonic results depend ultimately on whose hands are on the faders. And Turbosound are not alone in noting a dearth of experienced live sound engineers who are ready to adapt to a more sophisticated system.

At its best, the Donington PA fulfilled its promise as a giant, coherent hi-fi system. Just occasionally, in less capable hands, the potential was carelessly cast to the winds—but it's a problem every PA company learns to live with.

As to the macho output levels, Doug Hall's aim of exploiting high power for maximum headroom was a more subtle success than the new world record suggests.

So while guardians of the nation's youth might argue that 124 dB was stretching the point somewhat (and old hands counter that if you think it's too loud, you're too old for this game anyway), it was clear that this unique application of a virtual point-source system worked exceedingly well.

The one question that remains unanswered is: come Donington '89, what will someone do to better it...? □



Studio Services

REPAIRS

Engineers Martin Leigh and Adrian Bowlas are at your "Service" in house or call out. State of the Art test equipment, friendly, efficient repairs.

CONSULTANCY SERVICE

We have over 15 years of experience in designing, building, installing and equipping recording studios in Universities, Schools, Colleges, people's homes as well as Commercial situations and Radio stations. We offer you by appointment, the opportunity to discuss your ideas.

equipment wanted equipment wanted equipment

SELLING SERVICE

Simply — we collect the equipment you have surplus and sell it for you. We are flexible on sales commission rates. And last but not least we will always pay instant cash for good condition equipment.

INSTANT CASH

equipment wanted equipment wanted equipment

NEW AND SECONDHAND EQUIPMENT

We have an extensive selection of New and Secondhand equipment available as well as knowing where to obtain the items you require. Don't hesitate to ring us, you never know we may have just what you're looking for. We pay cash for good Secondhand equipment. Studio clearances are our Speciality.

EXPORT A SPECIALITY

laundry list laundry list laundry list laundry list

SSL 4000 G Series, 2yrs. G. Computer, G.Eq, Total, 60F 48 fitted Avail. Spring '89 P.O.A.
 SSL 4000 E Series 4yrs, G. Computer, Pultec, 40F 32 fitted £118,000

SOUNDCRAFT TS24 28/24	£15,000	SONY PCM 2500 New	£2,295
SOUNDCRAFT 500 24/8/2	£2,995	SONY DTC 1000 ES New	£1,130
SOUNDCRAFT 200SR 24/4/2	£1,695	SONY PCM 501 New	£495
SOUNDRACCS PC Midi 24/16/16/2		SONY PCM 701 ADR I,II,III	£1,200
	£4,100	SONY PCM 701	£650
TAC MATCHLESS 26 8 24	£7,950	SONY PCM 501	£325
ALLEN HEATH Sigma 56 input in-line		SONY SLF 25UB	£325
	£12,995	AMS SDMX	£4,995
ALLEN HEATH Syncon "A" 28/24/4		AMS 1580S	£2,995
	£4,950	AMS 1580S	£3,500
ALICE 12/4/8	£595	AMS RMX16	£2,995
TEAC M2A 6/4	£150	YAMAHA REV 1	£1,495
STUDIO MASTER II 24/16/2	£3,500	LEXICON PCM 70	£1,195
CADAC 28/24	£13,500	KURZWEIL 250	£6,000
MCI JH800 12/4/2	£3,200	PROPHET 2002	£895
mitsubishi X850 32T	£85,000	MDB Window	offers
STUDER A820 24T	£33,500	KLARK TEKNIK DN780	£1,250
LYREC 532 24T	£8,500	TC 2290	£1,424
LYREC 532 24T	£7,200	EMT 240	£950
3M M79 24 track	£6,500	AKG BX20	£175
SOUNDCRAFT SCM 760 Mk III	£5,995	WHITE 4400	£695
STUDER A80 Mk I 16 track	£5,950	YAMAHA DMP7	£1,795
TASCAM 38	£1,150	KLARK TEKNIK DN27	£395
FOSTEX E16 "brand new"	negotiable	YAMAHA GC2020	£195
FOSTEX B16	£2,200	YAMAHA RX15	£150
OTARI MX5050 4 track	£895	YAMAHA SPX90 II	£495
TEAC A-3440	£595	ALESIS MIDIVERB II	£200
TEAC X 2000M	£695	IBANEZ DM1000	£100
TASCAM 32-2	£450	DRAWMER DS201	£250
TASCAM Porta-One	£250	VU SG2 New	£295
GRAFF HSCD2	£995	VU EX2 New	£395
MCI JH110B 2T	£1,850	ORBAN 536A	£195
NAGRA IVSJ	£2,250	AKAI S900	£995
REVOX PR99 I	£799	YAMAHA DX7	£750
REVOX PR99 II ASC	£750	ROLAND D50	£895
STUDER C37	£450	ROLAND MSQ-100	£125
STUDER A80 RC	£2,950	AKG D12E	£120
LYREC 2T	£1,200	AKG C451EB CK1	£175
STUDER B67	£2,500	AKG C24 Comb	£1,395
MCI JH110 8T	£2,200	STC 4038	£250
STUDER 710	£695	SCHOEPS CMT S 501U	£995
FOSTEX E22 New	£2,500		

Full description and details available on all the above equipment instantly by fax or next day by mail or verbally by phone, please call and ask for Alan Cheetham.



PHONE NOW!
0663
64244

High Lane Village,
 Nr. Stockport, SK6 8AA.
 Fax: 0663 62328

FOR COLLET KNOBS

The most extensive, most adaptable and best looking range of knobs in the industry.

Collet knobs, push-on knobs, slider knobs, pushbuttons.



PUSH-ON KNOBS



Short, standard or wing knobs. Knobs from 10mm to 38mm diameter in black, grey or red with many accessory and marking options — well over a million standard permutations.

SLIDER KNOBS

And if you can't find what you need among these, we'll make to your specification (if the quantity is right).



and PUSHBUTTONS



Printing on knobs? Sifam are unbeatable for high-definition printing of the finest detail.

A detailed and colourful catalogue is yours for the asking.

SPECIFY

SIFAM LIMITED - ACCESSORIES DIVISION
 WOODLAND ROAD TORQUAY
 DEVON TQ2 7AY ENGLAND
 Telephone: 0803 63822.
 Fax: 0803 63926, Telex: 42864



REALTIME MIXDOWN THE OPTIONS

Vic Lennard discusses some of the possibilities available with MIDI for computer-controlled mixdown

In many ways, musicians are at a crossroads the likes of which we may never see again. Digital technology has been laid within their grasp and now is the time to take stock of the situation.

If one can afford it, there are total console automation systems and the ability to record complete albums in the digital domain with editing facilities—the only other real problem is that of the high quality digital microphone. For while the tools of the trade continue to decrease in price in real terms, the market place gets proportionately smaller leaving less actual profit to be spent on new equipment, whatever the configuration of the studio. Less revenue leads to

more bank loans, which invariably leads to a downward spiral.

Given a reasonable length of time, however, all equipment becomes obsolete but the quality of said machines is still the same as when they were purchased, which leaves two options: first, sell it and buy an up-to-date replacement or second, re-appraise its uses. It is with regard to the latter that this article is based.

Ideology

Invariably, the weakest link in a studio is the analogue multitrack assuming that the desk is of

a similar quality to it; there would be little point in using a Neve or Harrison with an *E16*. Unless the number of tracks is limitless, certain compromises are always needed such as using stereo pairs of tracks to encompass a panning of drums or synths. Add to this the problems of crosstalk and unreliable frequency response and this all points to the idea of laying down as little as possible on tape.

Various accessory devices for mixing desks are available but unless a substantial financial outlay is made, these are usually limited to channel muting and possibly fading with the unsavoury aspect of passing signals through active VCAs of dubious quality in many cases. Most studios can hold their own when it comes to synth hardware, and nearly all now have a sequencer of one kind or another, so consider the idea of using it to control almost every aspect of mixdown.

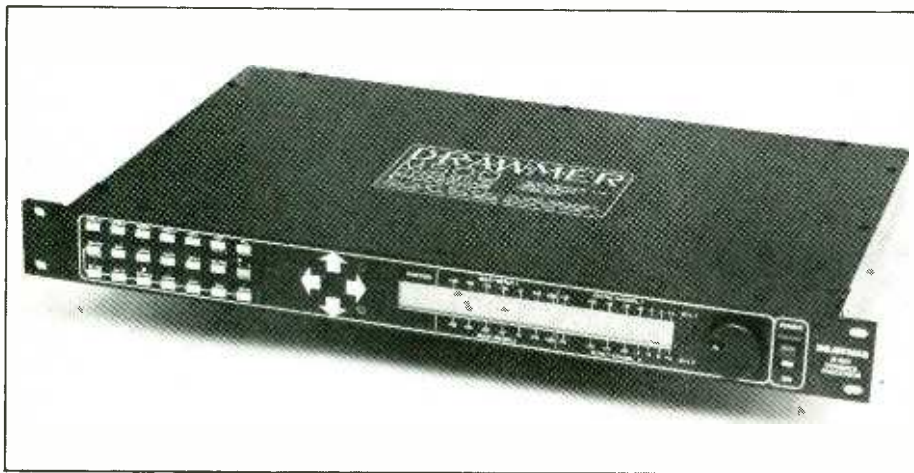
Sequencers hold the data necessary to dictate the note performance of each synth linked to it via MIDI cables. Pitch bend, aftertouch, modulation and the like can also be programmed along with the note information but how about system exclusive? Many sequencers can now record this data and some allow editing byte by byte—indeed, drawing of controller curves is also a reality given the correct piece of software.

In the UK, the Atari is still the principal music computer with Steinberg's *Pro-24* and *C-Lab's Creator/Notator* packages heading the market. My own experiences are on the Atari 1040 with Hybrid Arts, which is very well-known in the USA *SMPTE Track* is used exclusively by the School of Audio Engineering for educating students and *ADAP* is the standard 16 bit stereo sampler used by the Sound Editors' Union of Hollywood. Consequently, the methods mentioned here will be from *SMPTE Track* but will be possible to some extent on other sequencers.

Patch and parameter recall

Most studios have large libraries for their synths, sometimes coupled with visual editors, and load whichever bank has the closest approximation to the required sound, which is then fine edited. Due to the high cost of RAM cards/cartridges, the edited timbre is either saved internally and then erased when the next bank is loaded or not saved at all. Subsequent patch changing via the sequencer will only reproduce the identical timbre if it exists in an internal slot and has not been superseded by another sound. Another reason to steer clear of patch changing is the mechanics involved. Some machines mute the output momentarily at switching thus causing a glitch in the audio. So, why not record the programme data bytes on to the sequencer and save them along with the rest of the song information?

Few people realise that most synths designed and manufactured over the past three years or so exhibit the following trait: when a patch change button is pressed on the front panel, the voice edit buffer data (commonly called the temporary buffer) for the new patch is transmitted from the MIDI out socket. If a disable switch exists within



Drawmer M500



Yamaha TX802

The Studio Pre-amplifier

A new professional unit designed and built to the highest standards that economically interfaces all the semi-pro audio equipment used in the modern recording studio. The SPA-1 provides level matching, balancing, saves on jack field space, and prevents the hum loop problems normally associated with unbalanced equipment.

FEATURES

- ★ Professional quality electronics and spec.
- ★ Eight stereo channels including RIAA channel.
- ★ 20 turn gain trims on all channels.
- ★ Main output control calibrated in dB.
- ★ Stereo balanced input switched for recording feeds.
- ★ Balanced main output.
- ★ High output headphone amp with standard and mini jacks.
- ★ Auxiliary channel with connections on front panel.
- ★ All audio connectors gold plated.

£595

FOR DETAILS CONTACT US NOW

TOTALSYSTEMS

41 Windermere Avenue
Basingstoke, Hants RG22 5JH, UK
Phone: 0256-468555
Telex: 858893 FLETEL G
Fax: 0252-620729

STUDIO & BROADCAST

QUALITY PRINTED CIRCUIT BOARDS

PTH-Multilayer-Conventional

Delivery within 2/3 weeks for production batches or sooner on our fast prototype service.

For free quotation please telephone Angela on

Reading (0734) 596435

OR

Fax (0734) 393516

PRINTABORD PCB
LIMITED

PRINTED CIRCUIT MANUFACTURERS

64 Portman Road, Battle Farm Trading Estate, Reading, Berkshire, RG3 1ET
Telephone: Reading (0734) 596435/6
Telex: 848439 Fax: (0734) 393516

LET US INTRODUCE YOU TO A FRIEND

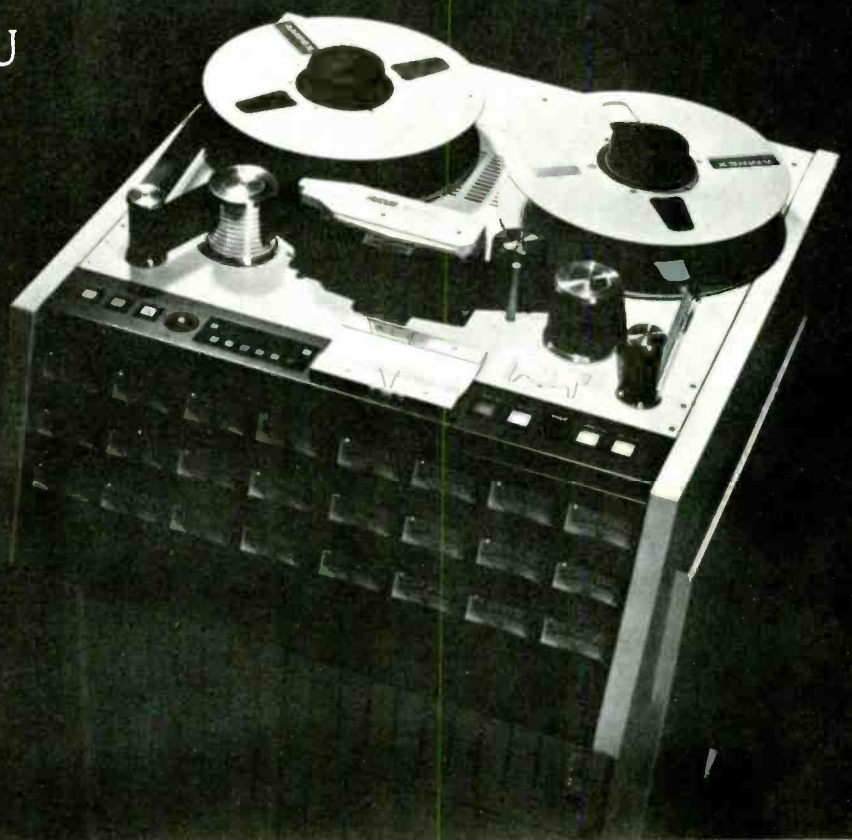
THE OTARI MX80

If you're considering upgrading to Otari, we'll be delighted to arrange a full demonstration, discuss the part exchange value of your existing equipment and even arrange finance if necessary.

Whether you're in the market for a complete studio package, or just the latest in signal processing — we'd like to talk to you.

KGM
studio specialists

18/42 Charlotte Street
Wakefield
West Yorkshire
WF1 1UH England
Telex: 556649
Fax: 0924 290460
Tel: 0924 371766



TOTAL AUDIO BRILLIANCE



- Up to four incredible studio sounds simultaneously!
 - Reverberation
 - Arpeggiated Effects
 - Reverse Gates
 - Pitch Transposition
 - Pitch Shift Doubling
 - Imaged Doubling
 - Digital Delays
 - Chorusing
 - EQ
- Easy to use front panel controls
- 200 user memory locations
- Over 100 studio-crafted presets
- Fully programmable
- Full parameter control
- Random access keypad
- Ultra-wide bandwidth
- Full midi with battery back-up
- Remote footswitch jack with preset increment



Total Audio Brilliance! ART takes digital processing into the 21st century. Four effects at the same time. Full parameter variability. Thirty-two character LCD for operational simplicity. Create custom programs. Stack multi-effects. Store them in 200 memory locations! ART's NEW ultra-high resolution circuitry yields audio performance unequaled at any price.



We Put It All Together...

Applied Research & Technology
 215 Tremont Street
 Rochester, NY 14608
 (716) 436-2720
 TELEX: 4949793 ARTROC
 FAX: (716) 436-3942

Export Distributors:

THE NETHERLANDS/Audioscript B.V./Soest/02155-20400/FINLAND/MS-Audiotron/Helsinki/90-5664644/SWEDEN/Muskantor & Co./MoIndal/031-878080/ FRANCE/High Fidelity Services SA/ Paris/(1) 42.85.00.40/CANADA/Yorkville Sound LTD./Scarborough/416-751-8481/ITALY/Ital C.I.D.A. SPA/Parma/0521 690158/ WEST GERMANY/PME Audio/Hauffweg/07136-6029/SWITZERLAND/ Musikeingros P. Gutter/Sissach/061-983757/HONG KONG/Audio Consultants LTD./Kowloon/ 3-7125251/JAPAN/Kanda Shokai Corp./Tokyo/(03) 254-3611/THAILAND/Beh Ngiep Seng Musical Instruments/Bangkok/222-5281/INDONESIA/PT Kirana Yudha Teknik/Jakarta/3806222/SINGAPORE/Lingtec PTE. LTD./7471951/SPAIN/Aplicaciones Electronicas Quasar SA/Madrid/6861300/ TURKEY/Kadri Cadmak/Istanbul/ (1) 1661672/AUSTRALIA/Hi-Phon Distrib. Pty. LTD./Chatswood NSW/024177088/DENMARK/M.I. Musik/Kobenhavn/1-854800/U.K./Harmon U.K./Slough/ 075376911/NEW ZEALAND/Maser Digitek/Auckland/444-3583/4/ISR/AEL/More Productions/Tel Aviv/03-454003-442697/ARGENTINA/Lagos Sarmiento/ Buenos Aires/40-6455

◁ the synth then this can be averted but only a few modern-day models have this implemented (eg Roland D50, Korg M1). Sequencers usually default to filtering system exclusive but once this has been changed, the data will be treated much like any other note data although the first 2 bytes, F0 followed by the manufacturer's ID code, will alert the sequencer to the fact that this is 'sys ex' information and the last byte, F7, signifies the end of the data block. Move the first 2 bytes and the rest should be shifted in a relative manner permitting the patch data to be glued into the correct places.

One immediate problem is that 'sys ex' can only be transmitted/received by a synth when no note information is being sent, leading to the quandary of how much time to allow before the note-on for a data block to be sent. The following formula can be used for purposes of calculation:

$$\text{No of clocks} = \frac{32 \times R \times T \times D}{6 \times 10^6}$$

where R = Resolution of sequencer (in clocks per beat), T = Tempo (in beats per minute), and D = number of Data bytes.

So, for example, consider a patch on the Roland D50, that has 451 data bytes of voice data in total using a sequencer with a resolution of 96ths per beat and a tempo of 120 b/m.

$$\text{No of clocks} = \frac{32 \times 96 \times 120 \times 451}{6 \times 10^6} \doteq 28$$

This is just greater than the time taken for a $\frac{1}{6}$ note and is a little untypical when compared with the Korg M1—148 or 170 bytes; Kawai K1—84 or 97 bytes; Yamaha TX802—220 bytes and so on. Also, the reaction time of a synth is an unknown parameter and so an addition of a small number of clocks may be necessary to take account of this. If an insufficient number is allowed for, the next note-on will be delayed and this fact can be used to check that the situation is correct.

Certain synths will not transmit 'sys ex' data in this fashion—eg Casio CZ101, Roland MT32—but send out the patch number of the new patch instead. Some will not transmit anything at all. In these cases, patch changing is the only solution.

One immediate advantage of using this method is that voice data is sent to the temporary buffer, which is not under memory protection and so the memory protect control can be left on at all times.

The other area of interest is that of individual parameter changes. The memory mapping for a synth can usually be found in the back of the user manual or occasionally obtained free from the manufacturer. Also useful is *The MIDI System Exclusive Book* by Steve de Furia and Joe Scacciaferro, published by IMP, which lists the 'sys ex' for almost every MIDI device up to 1987. The relevant command can be set up and edited on the sequencer allowing parameters such as filter and envelope to be changed virtually realtime—a string of 10 data bytes under the previous formula will take less than 1 clock to send.

To give an idea of future developments, the Akai S950 (replacement for the S900) allows its disk drive to be accessed via MIDI commands allowing samples to be loaded into memory while the machine continues to deliver its audio output. I suppose that this could be called having our cake and eating it several times over!

Dynamic shaping

The ability to draw controller curves, either free hand via the mouse or in straight lines using

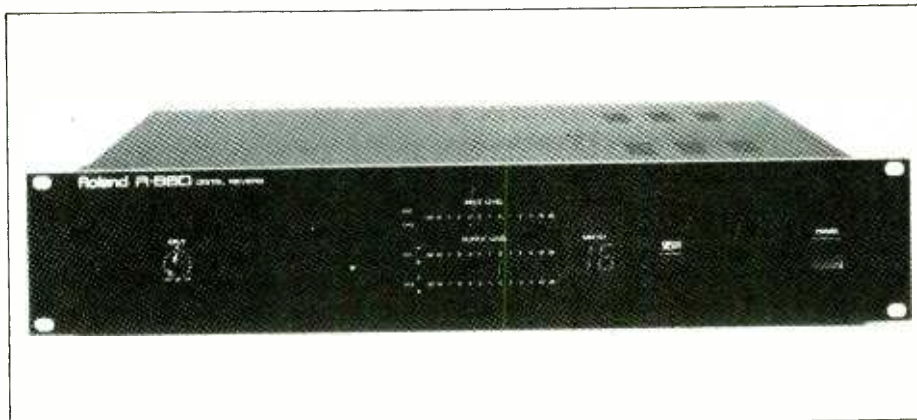
point-to-point construction, is one facet of a sequencer that should not be under-estimated. Knowledge of controller numbers allows a programmer to effectively preset the volume (#7) and pan (#10 if implemented) as well as setting all notes/controllers to reset if necessary. Fade-ins and outs using controller #7 are particularly effective as the actual played dynamics remain unaltered, a circumstance totally different from scaling the attack velocity especially if the MIDI track is a mix of instruments. For example, if bass drum, snare drum and hi-hat were recorded together, the level of the hi-hat may well be low in comparison with the drums but scaling the attack will bring them all to the same level. The only care needed is that controller #7 must be reset to its original value, after a fade is

Studiomaster's IDP 1 has 99 user memories along with maximum attack, hold and release times of 1 s, 1 s and 50 s respectively. The Drawmer M500 has maximum times of 10 s, 20 s, 10 s per 10 dB with 50 user programmes along with the likes of panning via MIDI note range, 256 point enveloping and an autofade option allowing a maximum fade of 100 minutes. Both units have full MIDI control including different MIDI channels for left and right sides as well as the ability to trigger from individual notes or groups. The audio spec of both is certainly close to that needed for CD mastering.

The memories can be set-up for a particular mix and then dumped via MIDI to the same disk as all the other data, to be sent to the gate at the beginning of the song.



Roland E660



Roland R880

completed otherwise the final value will be 'remembered' by affected synths and will be the first value when that synth next plays.

Audio control

So far, total control of the synth side has been achieved, but what of vocals and acoustic instrumentation on tape? Obviously, a MIDI functioning noise gate of sorts is necessary to allow tape levels to be set as required and to facilitate fades.

MIDI control of auxiliary equipment has questionably been with us for some years now. I say questionably because, until recently, there were only two areas in which this control had been used, namely patch changing and memory dumping.

Many of the new noise gates are effectively MIDI processors allowing attack, hold and release times to be controlled by note-on and note-off information on a dedicated MIDI channel.

Many reverb units are coming under MIDI control where the length of reverb is dictated by the note-on velocity. Also, digital interfaces are now starting to appear—Roland E660 and R880 to name but two. Of course using one MIDI channel per effects unit cuts down the number remaining for synths but many sequencers also have hardware add-ons, which expand the number of MIDI channels to 64, alleviating the problem.

Conclusion

The idea of this article is not to show the ease of using these techniques but the possibilities that exist. Also many sequencers will not touch some of the aspects, especially dynamic shaping, but that is down to the choice of the programmer. One has to grow along with one's equipment and grasp the opportunity to experiment.

A MIDI-based studio with a computer running practically all aspects of mixdown would have been a dream only two years ago—it is now a reality. □

Steinberg PRO-24

Used with *SMP24* or *Time-lock*, the *PRO-24 III* offers flexibility in recording and editing of MIDI sequenced or 'virtual' tracks in conjunction with music recorded on tape. Ralph Denyer tries out the latest features including the Drum Edit page and music keyboard remote control

Over the past couple of years Steinberg's *PRO-24* MIDI sequencing software has become widely used in the UK and other parts of Europe, being continuously upgraded to meet user requests. There is a UK Steinberg Hotline*, which users can phone for technical help in problem solving and for advice as they delve deeper and deeper into the possibilities of MIDI and timecode-orientated devices. New versions of the software have regularly been made available, complete with addendum sheets. This ongoing process of development has confused one or two people but any confusion has generally been outweighed by the creative applications that the products have made available to a wide group of users. *PRO-24 III* used in conjunction with a timecode synchronisation device and samplers brought sophisticated control that had only previously been possible with computer music systems way beyond the budget of the vast majority of studios, producers and musicians.

Early in 1988 Steinberg released *PRO-24 (Version) III*. As the company had responded to just about every sensible suggestion for additional routines and facilities in the past, their feeling was that merely a general tidying up of the program was appropriate. The release of *Version III* has been followed by a new manual, which is available to existing and new users. In the past the manual for *PRO-24* has been criticised for inaccessibility, however, it seems those with some hands-on experience of MIDI and a smattering of computer literacy have had few problems.

With the re-write of the manual, some tidying up, de-bugging and the addition of new features and pages, *PRO-24 III* is more than worthy of a re-assessment.

PRO-24 MIDI sequencing and editing system

PRO-24 III is a software package consisting of the program on a 3½ inch floppy disk, a protection key and a manual. The program runs on any *ST*

computer fitted with a 1 Mbyte memory. An Atari *SM124* or *SM125* high resolution monochrome monitor is generally regarded as preferable to a colour model as detail—particularly on the main page of *PRO-24 III* and the Score Edit page—is more easily legible.

PRO-24 III is extremely flexible, frequently offering several ways of achieving the same goal. Initially most operations can be carried out almost exclusively using the Atari mouse. Use of both the mouse and Atari QWERTY keyboard seems most practical once the user has gained some familiarity with the system. Also functions such as record and playback can now be controlled from a MIDI keyboard.

PRO-24 III enables the user to record a series of performances as MIDI data. These performances can be constructed by means of realtime or step-time input or a combination of both. A tempo is set for the length of the section of music over a number of bars; this section can be of any length. The most common method would be to record complete verse, chorus, middle-eight sections, which could then be repeated or set in various orders. *PRO-24 III* has 24 virtual MIDI tracks on to which separate MIDI performances can be recorded. The music can be edited, arranged mixed-down and quantised in almost any way the user wishes.

Once a MIDI system has been set up, most users should be able to carry out the basic operations described above quite quickly. The package is extremely powerful and initially users must familiarise themselves with basic operations.

A Song Definition is usually saved on a disk. As soon as the program is loaded the Song Definition can also be loaded and will set all MIDI channels, modes and other data so the system does not have to be configured every time it is switched on.

The first page display is based on the layout of a 24-track tape machine. Some sub-pages vary from simply requiring an OK? or Cancel response, to quite complex pages that take some getting used to before their full potential can be realised.

The user's depth of MIDI knowledge will dictate somewhat how fully editing and control functions might be employed. At one end of the scale *PRO-24 III* can be used simply as a MIDI sequence recorder storing parts input via a MIDI

keyboard or other controller device. At the other extreme the program can be used to painstakingly record complex arrangements, using realtime and step-time input, extensive quantisation options, mathematical operations, and cut-&-paste-type editing techniques.

The effectiveness of editing on the Score Edit page is totally reliant on the user's ability to read music and knowledge of the page operations.

It is the program's flexibility, comprehensiveness and practicality that have helped it become so popular with music enthusiasts, semi-professionals and professionals.

Steinberg offer a service whereby the payment of a small fee to cover costs puts you on a mailing list to receive future upgrades. The program will not run without the protection key, which slots into the side of the Atari. However, it is possible for users to upgrade by copying new disks. So you can in fact get upgrades through the grapevine though you'd have to also make photocopies of the addendum to the manual.

Atari 1040 STF

The *PRO-24 III* user only has to acquire the most basic knowledge of the Atari *1040 STF*. It is almost sufficient to say that this is a multi-tasking personal computer with a 1 Mbyte onboard memory capacity. Apart from when a new disk has to be formatted, or song data or program copies need to be made, the user will be in the *PRO-24 III* environment. The disk drive is built into the side of the keyboard unit. So essentially it is a question of plugging in, making a few connections, formatting and inserting disks and away you go.

Time-lock timecode interface

PRO-24 III has a page for syncing the program to tape and other devices via SMPTE and EBU timecodes. *Time-lock* is a small unit designed specifically for use with *PRO-24 III* and in default mode is simplicity itself to use. *Time-lock* plugs into the Atari *1040 STF* and generates SMPTE code, which is recorded on one track of a multitrack. The *Time-lock* then locks the *PRO-24 III* sequence to the timecode on tape and allows up to 16 Cue Times or drop-in points to be selected with any tape recording for use as and when required. *Time-lock* also allows MIDI events in *PRO-24 III* to be recorded more accurately in terms of timing due to *Time-lock* having a finer resolution clock rate than can be achieved with *PRO-24 III* alone—or indeed any sequencer reliant on the standard MIDI clock rate.

SMP24 SMPTE and MIDI processor

SMP24 is a 19 inch rackmounting SMPTE MIDI processor intended to meet the wider requirements of professional users and commercial

studios. The device can function as both a SMPTE generator/master synchroniser and as a MIDI patchbay and MIDI domain controller. The *SMP24* has been improved considerably since being launched in the UK some 18 months or so ago. An Editor is now supplied on 3½ inch disk to run on the Atari 1040 *ST* and *STF*. The vast amount of information handled by the device (see **Tables 1 and 2**) can only be accessed via the single parameter display on the front panel of the *SMP24* if used as a standalone unit without *PRO-24 III* or an Atari 1040 *ST*.

SMP24 performs all the basic timecode-based functions as the *Time-lock* unit with many additional facilities likely to be useful in professional studios. Like *Time-lock* the *SMP24* operates at 24, 25 (EBU), 30 non-drop and 30 drop f/s timecodes.

Looking at the *SMP24*'s other synchronisation capabilities, an understanding of the Trigger Source, Trigger Rate and Tap facilities gives an insight into the machine's versatility. Trigger Source allows one of the following input options to be selected:

- (0) Tap button
- (1) Footswitch
- (2) Clock/Trigger In
- (3) MIDI-Clock to MIDI In 1
- (4) MIDI-Clock to MIDI In 2
- (5) FSK
- (6) Note In to MIDI In 2

Various Trigger rate settings can be combined with the above Trigger Source setting to configure the *SMP24* to accept just about any type of input.

For the user to synchronise a new sequence to an existing section of live music on tape—with or without timing fluctuations—using the *SMP24* Tap routine options, 0, 1 or 6 can be selected. A practical choice would be Note In to MIDI In 2

via a control music keyboard, though if a drummer is doing the tapping, MIDI drum pads could be used. The Trigger rate then has to be set so that the system knows if the user is tapping in quarter notes four to the bar or whatever. Once a Song Table has been tapped in, it can be saved to *PRO-24 III* Mastertrack and stored on disk.

MIDI Timecode is sent on MIDI Out 4 only if required. As can be seen from the other Trigger Source and timecode f/s options, the *SMP24* could meet many of the day-by-day requirements of a professional studio's clients. **Table 2** shows the synchronisation parameters under the control of the *SMP24*.

The *SMP24* offers various suggestions for ways in which the MIDI capabilities of the unit can be used. A keyboard player could of course use the unit as an on-stage keyboard controller to achieve various combinations. Multiple MIDI data transmission allows different synth voices to be stacked together. The manual suggests constructing a chord made up of six separate MIDI voices playing the root, major 3rd, 5th, major 7th, major 9th and octave notes for a power chord effect.

The *SMP24* is an easier device to understand and use than its early reputation would indicate. The *SMP24* has the advantage over the *Time-lock* in that no matter if the starting point for a session is a MIDI sequence, recorded material on tape, or new material, the device should offer a satisfactory way of working. But equally, *Time-lock* and its manual are simple to understand and put into use.

When first confronted with the *SMP24* I did experience the 'Can't see the wood for the trees' syndrome but once working routines have been organised basic working to timecode is simple. Getting a handle on the MIDI possibilities of the

unit does take longer. A newcomer could probably cope with setting up the *Time-lock* but would probably have an anxiety attack after attempting to read the *SMP24* manual.

Fig 1 shows the type of basic home or personal budget system of the type useful to composers, arrangers, producers and musicians.

MIDI three is directed via a splitter box consisting of three 5-pin 180° DIN sockets wired in parallel. The four MIDI connections are *DX11* control keyboard MIDI Out to Atari MIDI In, Atari MIDI Out to the splitter box, splitter box to control keyboard MIDI In and drum machine MIDI In. The *Time-lock* is connected to the Atari Centronics port and right-hand joystick port. Audio leads then connect the *Time-lock* to the multitrack tape machine.

The use of a multitimbral *DX11* allows up to eight different voices to be used as desired in conjunction with those of a drum machine played from the *DX11* touch-sensitive keyboard.

One of the many MIDI patchbay units such as the Yamaha *MJC8* would then be all that was needed to expand the system to take in samplers, effects units, etc. However, the basic system shown can be used for pre-production development of basic ideas and save them as a sequence on disk that can then be taken to a studio with more extensive facilities. Then voices can be changed or replaced with samples as desired and the serious sonic production can begin. The use of any music recorded on tape at the pre-production stage would be reliant on tape machine compatibility.

Writing SMPTE or striping the tape may need a little experimentation. *Time-lock* is set to write SMPTE on the *PRO-24 III* SMPTE page with the tape machine set at 0 dB. A lower level of between -3 dB and -6 dB could be tried. A little fiddling around may be necessary to reduce

TABLE 1a SMP24 outputs

Output	Separately assignable MIDI device numbers					
MIDI Out 1	1.1	1.2	1.3	1.4	1.5	1.6
MIDI Out 2	2.1	2.2	2.3	2.4	2.5	2.6
MIDI Out 3	3.1	3.2	3.3	3.4	3.5	3.6
MIDI Out 4	4.1	4.2	4.3	4.4	4.5	4.6

TABLE 1b MIDI parameters assignable to above 24 outputs

Display	Range	Function
1 [1.1 in 01]	00 or 01	MIDI IN assignment
2 [1.1 ic 00]	00 to 16	Input channel
3 [1.1 oc 00]	00 to 16	Output channel
4 [1.1 Pc 00]	00 to 127	Program change
5 [1.1 LE 00]	00 to 127	MIDI volume (level)
6 [1.1 tr 00]	00 to 126	Transpose
7 [1.1 S1 00]	00 to 127	Split lower
8 [1.1 Sh 127]	00 to 127	Split higher
9 [1.1 no 0]	00 to 01	Note-off
10 [1.1 no 0]	00 to 01	Note-on
11 [1.1 AFt 0]	00 to 01	Aftertouch (ChanPres) (Filter)
12 [1.1 con 0]	00 to 01	Controller (Filter)
13 [1.1 Pch 0]	00 to 01	Program change (Filter)
14 [1.1 Pop 0]	00 to 01	Poly pressure (Filter)
15 [1.1 Pit 0]	00 to 01	Pitch wheel (Filter)
16 [1.1 SYS 0]	00 or 01	System exclusive (Filter)

TABLE 2a Sync parameters

Display	Range	Function
1 [tr ig 00]	00 to 06	Trigger source
2 [tr rt 00]	00 to 254	Trigger rate
3 [notE 60]	00 to 127	Note number
4 [co rt 04]	00 to 254	Clock rate
5 [T iNS 04]	00 to 254	Time signature
6 [mETro 01]	00 to 01	Metronome
7 [Mode 00]	00 01 02	Cue mode
8 [FRAME 01]	00 to 03	Frame mode
9 [Sb it 00]	00 to 79	Start bit
10 [cb it 00]	00 to 79	Cue bit
11 [oUt A 00]	00 or 01	MIDI pointer/clock out OUT-1
12 [oUt b 00]	00 or 01	MIDI pointer/clock out OUT-2
13 [oUt c 00]	00 or 01	MIDI pointer/clock out OUT-3
14 [oUt d 00]	00 or 01	MIDI pointer/clock out OUT-4
15 [Src 00]	00 01 02	SMPTE mode SRC/SBX
16 [Auto 00]	00 or 01	Auto frame

Locations 17 to 31 blank

TABLE 2b SMP parameters

Display	Range	Function
32 [Foot 00]	00 to 14	Footswitch setting
33 [Pc in 00]	00 01 02	MIDI In for program change
34 [Pc ch 00]	00 to 16	MIDI Chan for program change
35 [rSt A 01]	00 or 01	MIDI Out 1 to 4 running status
36 [rSt b 01]	00 or 01	MIDI Out 1 to 4 running status
37 [rSt c 01]	00 or 01	MIDI Out 1 to 4 running status
38 [rSt d 01]	00 or 01	MIDI Out 1 to 4 running status
39 [Mtc 00]	00 01 02	MIDI Timecode
40 [FPol 00]	00 or 01	Footswitch polarity
41 [SPol 00]	00 or 01	STOP/START clock out polarity
42 [bEEP 00]	00 or 01	Keyboard click
43 [SPEED 00]	00 or 01	MIDI transmission speed

Locations 44 to 63 blank

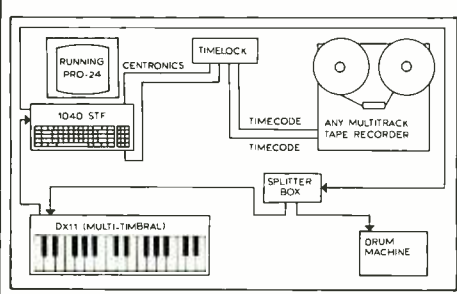


Fig 1

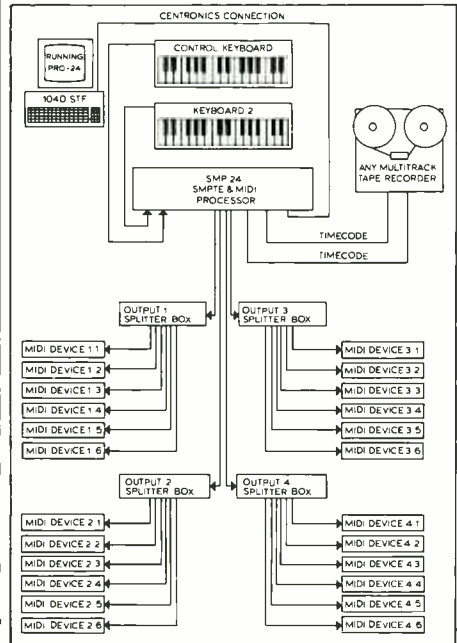


Fig 2

cross-talk between the SMPTE and adjacent tracks. But essentially, once the levels and track selection are made on the basis that the timecode should be recorded at the lowest level at which it will function, and Cue points set, working in sync is alarmingly simple. Once the user has reached the stage of working with a sequence in sync with live music on tape, setting Cues for drop-ins only requires the starting bar number to be input on the *PRO-24 III* SMPTE page, the *Time-lock* calculates and then finds the appropriate SMPTE time position on tape.

If the patch facility is used as in Fig 2, each of the 24 assignable outputs shown in Table 1 can have each of the MIDI parameters individually set. The *SMP24* manual states that because the 24 MIDI outs are paralleled, this gives capability for 64 MIDI outputs, though I did not have the necessary equipment to put this to the test.

Fig 2 is a schematic diagram showing *PRO-24 III* used in conjunction with *SMP24*. The arrangement with four separate MIDI splitter boxes is for clarity. I have seen professional applications where the *SMP24* is only used for synchronising the sequence to tape and a separate method of MIDI patching is used but this set-up makes use of the MIDI patching facilities.

The *SMP24* is connected to the Centronics port of the Atari *1040 STF* and to a tape machine via

the two audio connections. The Atari *1040 STF* MIDI ports are disabled when the *SMP24* is connected. The *SMP24* has two MIDI In inputs that can be merged if required.

Fig 2 has 24 separately controlled MIDI devices. With a normal MIDI set-up the user would be limited to 16 discrete outputs by the 16 MIDI channels. The *SMP24* has four MIDI Outs, each of which can be configured with a totally different set of MIDI parameters, as shown in Table 1.

Broadly speaking, *PRO-24 III* allows two forms of MIDI editing. Firstly, the sections of music recorded as named Patterns and consisting of a number of bars can be chained together into songs in the time honoured Verse 1, Chorus, Verse 2, Bridge 1 and Fade manner. These patterns can also be manipulated using Split, Append, Delete, Mixdown, Remix and Quantise options. Both patterns and songs can be saved to disk. Secondly, we have the Edit functions that allow edits within the patterns. In its original issues *PRO-24* offered only Grid Editing, which uses a graphic screen display with options to Quantise, Delete, Insert, etc. This was followed by the Score Edit with a similar display except that it is based on conventional musical notation. The program now also has a Drum Edit page and, for the mathematically minded, the sub-pages Logical Edit, MIDI Event Edit. Many of the quantising and editing functions can also be performed from the main page. Other main page operations allow drop-in recording and the ability to select a bar within a Pattern so as to drop-in and out at set points without the risk of recording over parts of the Pattern which the user wants to keep.

Main page general facilities

The main page of *PRO-24 III* remains visually much the same as ever but has various new facilities, some of which initially appear insignificant yet speed up work considerably.

The Atari *1040 STF* Gem Desktop display and operations will be familiar to many studio staff. At the top of the screen is the Menu Bar with a number of options shown in text. Input is all via the Atari QWERTY and numerical keyboards or the mouse. The mouse allows the pointer to be moved around quickly on the computer screen to pull down any menu from the Menu Bar and select an option by clicking one of the two mouse buttons. These buttons can also be used to insert some numerical values. The Gem facility to 'Drag' a box or icon is very useful. For example, on the Grid Edit page, the pointer can be moved to a block representing a note and, by holding down a mouse button, move it to change the timing of that note, change its length or delete it altogether without affecting other notes.

In *PRO-24 III* the Menu Bar on the main page offers the options Desk, File, Pattern, Track and Flags. Desk simply tells you you are running *PRO-24 III*.

File menu options: Load Pattern, Save Pattern, Load Song, Save Song, Import MIDI file, Export MIDI file, Delete Files, New and Quit.

Pattern menu options: Split, Cut, Append, Repeat,

Delete, Mix-Down, Extend, Create, Remix, Score Edit, Grid Edit and Drum Edit.

Track menu options: List, Mastertrack, Tempo-Recording, Multi-Copy, Mastertrack Copy, Free Copy, Erase Tracks, Where Am I, Print, Arrange Song, Global Transpose and Global Cut/Insert.

MIDI menu options: Definitions, Mode-Setting, Dump Utility and Text Input. When the *SMP24* or *Time-lock* are used, Out-Channel, SMPTE and Tape-Control options are also available.

Flags menu options: MIDI-Click, Beep, PreCount, Rec Channel, Reset On Stop, Running Status, Playback-Param, Warnings, Remote and Cycle: Multi-Record.

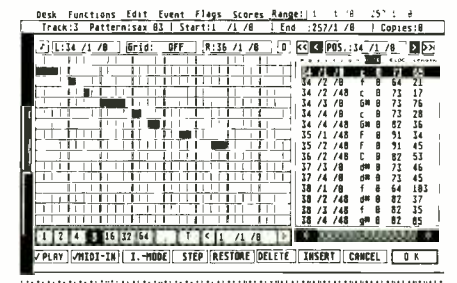
The main page of *PRO-24 III* remains based on the layout of a control panel of a 24-track tape machine. So just below the Menu bar we have 24 numbered boxes representing 24 tracks. Each track can be recorded on to, played back solo, muted and has a small box that displays the MIDI channel number of the instrument being recorded. A four-subtrack arrangement has been added. Numeric values can also be entered using a data fader display on the left of the screen. Various other boxes relate to MIDI information, Tempo, Time Signature and Pattern lengths, locations and names.

The Left and Right Locators are used to set the length of a section of music to be worked on in bars. Each locator has three sets of numbers. The first represents the bar number, the second the beat of the bar and the third the last beat divided into 96. For most practical purposes, the user will only input the bar number and press return. For example, a first verse is to be recorded that is eight bars long. Most obviously the pattern would be named Verse 1 or something similar. Set the Left Locator by pressing L, then 1, then RETURN. Set the Right Locator by pressing R, then 9, then RETURN.

PRO-24 III is operated by using the mouse to move the pointer and click on the tape machine controls on screen. The MIDI recorder will then record between the first beat of the first bar and the first beat of the ninth bar, thus the eight-bar verse.

Grid Edit

To enter Grid Edit page, press the Atari E key or select Grid Edit from the Edit menu. The Pattern displayed will be the one set on the Locators on the main page and from the *PRO-24* virtual track



selected. Two bars are displayed on the grid at any one time. If the pattern is longer than two bars, the user can set the range to display any two-bar section of the pattern.

Who says professional automation has to cost the earth?



No one with Reflex action

Introducing Reflex—a new generation of console automation that is cost effective but designed with total facilities and maximum flexibility to the highest standards of quality.

Reflex from Audio Kinetics—manufacturers of MasterMix, the industry standard console automation.



AUDIO KINETICS

AUDIO KINETICS UK LIMITED,

Kinetic Centre, Theobald Street,
Borehamwood, Hertfordshire, England, WD6 4PJ.

Tel: 01-953 8118
Tlx: 299961 KINTEK G
Fax: 01-953-1118



Stirling Audio,
Kimberley Road,
Kilburn, London NW6.
Tel: 01 624 6000.

Recently a few dealers have complained about our second-hand and ex-demo list—It seems they are losing too many customers. Being the largest single supplier of 8- and 16-track equipment in Britain we've decided we can afford to give away a few secrets! We simply tell customers that if any new equipment you purchase breaks down in the first two months, we won't fix it. We will replace it! RESULT—Yet another customer, who knows that Thatched Cottage can be relied on, and a secondhand list full of the latest gear, factory repaired in mint condition, and with full guarantee. SIMPLE? We didn't become the biggest without being the best.

Some of our secondhand & ex-demonstration stock

Otari ¼ inch MX 50/50 mint — 2 track.....	£799
Dbx 150 noise reduction units (12 available)	£150 each
Roland D50.....	£925
Tascam 38, mint.....	£1,299
Slapback scintillator (exciter) (new).....	£125
Drawmer DS221 compressor/limiter.....	£275
24 channels Bel Noise Reduction.....	£1,000
Drawmer DL201 Gates.....	£255
Symetrix 511 Noise Reduction.....	£399
Aphex Dominator.....	£699
Seck 18/8/2.....	£1,100
Yamaha RX5.....	£599
Midiverb 2 (Alesis).....	£225
Neumann U87 ex demo (2 available).....	£750
TAC Matchless 26:24:8:2 plus patchbay.....	£799
Yamaha Rev 5.....	£850
Aphex Compeller.....	£699
Lexicon PCM 70.....	£1,199
Tannoy active crossover (for little golds/reds).....	£299
Symetrix 522 comp/lim, EXP, Gate, Ducker.....	£250
TAC Scorpion 24:16:2.....	£3,999
Akai S900 New Models.....	£899
Drawmer DL231.....	£299
Revox PR99 with stand.....	£1,299
Yamaha Rev 7.....	£499
Soundcraft 381 16 track 1 inch tape recorder.....	£3,500 including remote
Symetrix 522.....	£299

Plus loads more — give us a ring!
All prices exclude VAT

CASIO DAT MACHINE

It's finally happened! Casio have brought out a fully professional DAT machine at their usual silly price — for the machine and power supply and battery pack (Yes — it's portable as well!) only **£652 + VAT**. Get your orders in quickly, strictly first come first served. (We even throw in a free tape!) In addition we have designed an exclusive rack mount kit with space for tapes and full sized connectors worth £35.00 free with every R DAT. Only at T.C.A.

Due to overwhelming demand, we have finally produced a Thatched Cottage Newsletter. As well as giving details on some VERY special offers, it contains a complete secondhand and demonstration list. (The list we advertise represents only a fraction of actual stock). There are also details of courses and classes we briefly introduce ourselves! Why not go on our mailing list and write or telephone for your copy? We also have a free 40-page colour magazine due out in January full of bargains, up to the minute product news and articles. Give us a call for your free copy.

STOP PRESS

We are now capable of modifying E16's for 30 ips! The difference in quality has to be heard to be believed — If you are serious about your music then you should be serious about checking this out.

We have been appointed sole agents for the amazing Allen & Heath Sigma 24 track MIDI recording console. If you require any information or would like a comprehensive demonstration in our own 24 track studios, why not give us a call? — we think you'd be surprised!

We have a few new Soundcraft 760 MkIII 24-track machines at the bargain price of£11,000 + VAT (ring for details)

ALLEN & HEATH SABRE 16 & 24 CONSOLES

At this year's APRS, Allen & Heath launched a revolutionary new professional mixing console — The Sabre offering the quality of a Soundcraft and the durability of a TAC. It has comprehensive MIDI facilities as standard offered only as options by other manufacturers.

Demand has been so great, every month we sell the entire UK production run in advance!

If you're considering spending around £5000 on a high quality multi-track console then you owe it to yourself to check this one out. Give us a call and we will send you full details and arrange a demonstration.

SPECIAL OFFERS

Fostex E16 + 4050 remote/SMPT/autolocate
£3600 + VAT (including 30 ips modification)
Atari 1040 + monitor + Steinberg Pro 24 Version III or C-Labs
£675 + VAT

An early Christmas Present! Fancy a high quality Compact Disc Player for a stunning price of £125 + VAT? All you have to do is telephone and order one. We have them in stock.

• EXPORT • FULL CREDIT FACILITIES AVAILABLE • MAIL ORDER •



Thatched
Cottage Audio

Tel: Cambridge (0223) 207979 (3 lines)
Thatched Cottage Audio
North Road, Wendy, Nr. Royston, Herts.



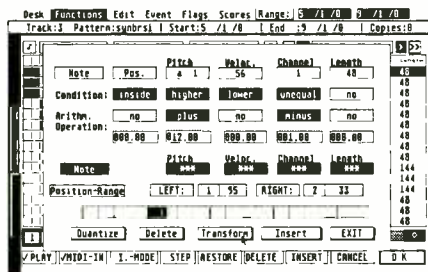
To the left of the Grid itself, on which blocks representing the individual notes are displayed, is an Event List giving each note's position in the bar, MIDI note number, velocity and length. The Functions menu gives the quantise options Over-Q, Note-on/off Q, Length-size, Fixed-length, Minimum-size, Maximum-size, Reverse, Fill, Fixed note, Logical Edit, Delete/Keep and Dyn Velocity. Quantise note values can be set between a whole note and a 1/64 note. Along the bottom of the screen there are boxes giving options to hear the music being edited, accept input from a MIDI source, enter in Step Time and Restore the music to the pre-edited form. Options such as Hear All Tracks or just the one being edited can also be selected. So virtually any form of edit can be performed from this page. Select the Swap Edit Page option on the Scores Menu or simply press/on the Atari keyboard to toggle between the Grid Edit and Note Edit pages. Quite useful.

Score Edit

Users with some knowledge of standard musical notation will find Score Edit useful for Step Time input or correcting or adding to a Real Time section of music. Many of the editing functions available on Grid Edit are available here also. Quantise values are selected by clicking on one of a row of boxes displaying the appropriate notation symbol and selecting the option for a dotted or triplet note if required. A bar below each note indicates velocity, which can be adjusted via the mouse or by input of numerical values. Score Edit can be used to print out music notation on a dot matrix printer and is a useful learning tool.

Logical Edit and Logical Event Edit

Steinberg describe Logical Edit as offering the user the ability to perform changes on music that are based on logical or mathematical criteria. The page opens what appears to be an infinite number of possibilities but could involve hours of tinkling

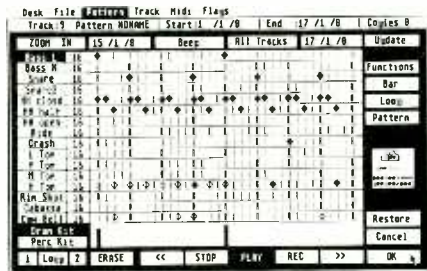


around to build an understanding of the potential. Conditions must be set and then mathematical operations set to act upon the conditions. This facility looks fascinating if used creatively as an orchestration tool rather than inputting random values and hoping for the best. A user with a good knowledge of music theory and mathematics could have fun with this one. Logical Event Edit

operates in a similar way but acting upon MIDI events as opposed to notes.

Drum Edit

PRO-24 users tend to use drum machines for their voices combined with those of samplers and synths, inputting rhythms from a music keyboard and bringing it all together with PRO-24. So any given 'drum kit' is often built up from several MIDI sources.



Notes are displayed on a grid area with a Zoom function. The Loop function allows one or more bars to be looped. Each note appears on the grid as a diamond. The shading of the diamond—from white through shades of grey to black—give an indication of velocity. This page allows the user to configure up to three separate drum kits each with up to 32 voices or sounds. The page displays 16 voices at a time and toggles between Drum Kit and Percussion Kit to give the total of up to 32 voices or sounds. Each is named on the left of the grid and has its own quantise value displayed also. The three kits are set on a separate sub-page that displays configuration details for all 32 voices of any one of the three kits. Kits 1, 2 and 3 are selected on this page. The voice or instrument name, MIDI Channel number, note number and note length are set here. Realtime and Steptime can be input from the Drum Edit page.

Remote Control

Another simple, practical and useful facility added to the MIDI Definitions page is the Remote Control. Sixteen major PRO-24 commands can be accessed from a MIDI music keyboard. The principle is similar to SHIFT/BREAK on a computer. Press and hold note C0 while at the same time pressing and releasing note D# and PRO-24 III will start recording. The remote operations that can be carried out from the music keyboard by pressing different notes include Stop, Play, Record, Left Locator (back to start of pattern), Cycle and Quantise.

Summary

PRO-24 III has over 25,000 users in the UK and parts of Europe. Various other systems—many running on Apple computers—are of course also popular in these areas but seem to have a stronger foothold in the USA. It has been known for extensive music and the theme for a television series to be composed, recorded with a vast array

of synths and samplers, and synchronised to picture on video, all under the control of PRO-24 III in conjunction with SMP24.

Some simple get-you-started diagrammatic material and simple routines can be written out, or explained in order to help new users get started and the new manual is much more accessible than previous issues. The fact that the various upgrades are now well documented represents a major improvement.

A bug in previous PRO-24 issues that caused the entire program to lock now appears to have been well and truly been dealt with. While I have been working with the new PRO-24 III the message 'Fatal Error—Try to Save Your Work' popped up a couple of times. But the Atari keyboard and mouse were not locked up so I was able to save my work, restart the program and reload the work within a couple of minutes.

I encountered a small bug problem in relation to using the Remote function to operate PRO-24 III from the music keyboard. Though the necessary tick beside Remote on the Flags Menu was correctly in place, the Remote facility would not operate. I clicked the tick off and then on again and the Remote worked.

Although other systems are initially easier to use because the displays allow more sections of music to be viewed at a time as users become familiar this is balanced against the sheer computing power and versatility of PRO-24 III. Once the system is set up and most of the running options saved to disk as a Song Definition which is automatically booted up when the program is first loaded at the beginning of a session, the system becomes less daunting.

For most musical applications when a MIDI sequence is synchronised to live music on tape, essentially you want to be able to stop and start the equipment together and to be able to select cue of drop-in points. The PRO-24 III and Time-lock combination does this very simply and efficiently and seems to be ideal for the personal user working in this way. Also those heavily involved in achieving precise feels when MIDI sequencing will certainly appreciate the improved resolution of both Time-lock and SMP24.

The PRO-24 III and SMP24 combination is designed to cope with the wider synchronisation requirements of professional multitrack and demo studios. Judging by advertisements placed by studios, particularly in the budget 16- to 24-track bracket, the PRO-24 III and SMP24 combination has proved immensely popular and useful. This is leaving aside the MIDI matrix and patchbay applications of SMP24. I can see the possibilities but as previously mentioned, my experience in talking to studio and music people is that the sync facilities of SMP24 are more often used than the MIDI patchbay and matrix.

The relatively low cost of Atari 1040 STF, PRO-24 III and SMP24 or Time-lock is a major factor in the success of the products to date. With vast amounts of budget music software now available, which can also run on the Atari, the increased professionalism of PRO-24 III and the substantial user group, the equipment should continue to attract many new users. □

*Steinberg Hotline: 01-792 0720, weekdays 1pm to 4pm (London).

CLASSIFIEDS

Advertisements for this section must be pre-paid. The rate is 70p+VAT per word, minimum £17.00+VAT. Box Nos. £6.00+VAT. VAT (UK only) \$ rate \$2.00 per word, minimum \$50.00, Box No. \$10.00 extra. Semi-display rates on application. Copy and remittance for advertisements in MARCH issue must reach these offices by 6th JANUARY addressed to: The Advertisement Manager, Studio Sound, Link House, Dingwall Avenue, Croydon CR9 2TA. Cheques made payable to Link House Publications (Croydon) Ltd. Note: Advertisement copy must be clearly printed in block capitals or typewritten.

Replies to Box Nos. should be addressed to the Advertisement Manager, Studio Sound, Link House, Dingwall Avenue, Croydon CR9 2TA, and the Box No. quoted on the outside of the envelope. The district after Box No. indicates its locality. **SEX DISCRIMINATION ACT 1975:** No job advertisement which indicates or can reasonably be understood as indicating an intention to discriminate on grounds of sex (e.g. by inviting applications only from males or only from females) may be accepted, unless (1) the job is for the purpose of a private householder or (2) it is in a business employing less than six persons or (3) it is otherwise excepted from the requirements of the Sex Discrimination Act. A statement must be made at the time the advertisement is placed saying which of the exceptions in the Act is considered to apply.

The attention of advertisers is drawn to "The Business Advertisements (Disclosure) Order 1977", which requires that, from 1st January 1978, all advertisements by persons who seek to sell goods in the course of business must make that fact clear. From the above date consumers therefore should know whether an advertisement relates to a sale by a trader or a private seller.

SERVICES

SOUNDS GOOD

CASSETTE DUPLICATING
Stereo, Mono, Dolby, "On Body"
Printing, Editing and Mastering
Fast service on small quantities
READING 0734 302600



HIGH QUALITY REAL TIME CASSETTE DUPLICATING

From 1/4" reel, cassette or PCM F1 digital masters
Telephone: 0268 794386

jbs records

MUSIC-SPEECH-DATA
REAL-TIME/HIGHER-SPEED Quality Cassette
Duplication and Blanks from 1-1000. Computer printed
Labels. Solo, 1/4" reel, Sony Betamax recording.
Fast Security Delivery service.
FILTERBOND LTD. jbs records div. FREEPOST
19 SADLERS WAY, HERTFORD, SG14 2BR. 0992-500101.



THE CASSETTE DUPLICATING SPECIALISTS

Real time & high speed loop bin duplication,
printing & packaging. Blanks wound to length
TEL: 061-973 1884

HIGH SPEED HIGH QUALITY LOOP-BIN DUPLICATING BY SRL TAPE SERVICES

REEL-REEL	DOLBY A NAB IEC	IN...OUT	QUALITY CASSETTES
F1 PCM DIGITAL			QUALITY CASSETTES
AUDIO CASSETTE	DOLBY C DOLBY B		QUALITY CASSETTES

THE BETTER THE MASTER, THE BETTER THE COPY!
HOW MANY WOULD YOU LIKE? 100 5000
01-868 5555 01-866 5555 PHONE FOR PRICE CHECK

TAPELINE

Blank & Duplicated Cassettes
• Real time cassette duplication
• From 1/4" reel, PCM Beta digital, DAT or cassette masters
• Custom Wound Ferric or Chrome Cassettes
• Labels & Inlays • Shrinkwrapping
Telephone (anytime)
061-336 5438

High Quality, Low Cost, Express Service
53-55 CORPORATION ROAD, AUDENSHAW, MANCHESTER M34 5LY

Check It Out...

DIRECT FROM OUR MODERN U.K. PRESSING PLANT

- CUTTING · PRESSING
 - TEST PRESSING
 - LABELS · SLEEVES
 - CASSETTES
 - ARTWORK
 - COMPETITIVE PRICES
- MARKET LEADERS



01-446 3218

REAL-TIME CASSETTE DUPLICATING
C1-C120 BLANK CASSETTES
LABEL & INLAY PRINTING
FAST, PROFESSIONAL SERVICE
PHONE 025 125-4253 NOW!

keynote
CASSETTES



CASSETTE DUPLICATING:

GAUSS Loop-Bin / TELEX In-Cassette
High Quality Blanks / Label Printing
OPEN REEL DUPLICATING
(ANY SPEED - ALSO TO BROADCAST SPEC.)
SPEECH RECORDING
(VOICE-OVERS; LANGUAGES; AUDIO-VISUALS)
SPEECH-PLUS RECORDINGS LTD.
UNIT 32, NO. 19, PAGES WALK, LONDON SE1 4SB. TEL: 01-231 0961

AA Tape Winders
0268 765010

For rapid supply of exact length
Audio Cassette + Tape Duplicating

CASSETTE DUPLICATORS

The established specialists in the supply and servicing of cassette duplicators, and accessories.

BULK CUSTOM-WOUND CASSETTES
GRAFF SONY TELEX WOLLENSAK
SOUND CASSETTE SERVICES LTD
Boden Street, Chard, Somerset TA20 2DD

0460-67237



THE COMPLETE SERVICE includes:

BLANK CASSETTES (C1 - C100 incl. Chrome)
HIGH-SPEED LOOP-BIN CASSETTE COPYING
OPEN-REEL COPYING
CASSETTE LABELS & INLAY CARDS
EMPTY TAPE SPOOLS & TAPE BOXES
LEADER TAPE & SPLICING TAPE
AMPEX MAGNETIC TAPE

and is available from -
MEDIATAPE LIMITED

Unit 32, Bookham Industrial Park, Church Road,
Bookham, Surrey KT23 3ET * Tel: (0372) 54899

THE COMPLETE SERVICE. Disc cutting, pressings, duplicated cassettes and blanks. Bin Masters. Location Recording. Free Brochure. Tam Studio, 13a Hamilton Way, London N3 1AN. Tel: 01-346 0033. (X)

QUALITY CASSETTE MASTERING AND COPYING. any quantity. Video duplication PAL/NTSC/SECAM transfers. 24 hour, seven days a week service. G.W.B.B. Audiovision, 42 Lancaster Gate, London W2 2NA. Tel: 01-723 5190.

CLASSIFIEDS

SITUATIONS VACANT

STUDIO ENGINEER

Two Counties Radio Ltd — the successful ILR contractor for the Bournemouth area — operates one of the largest studios in the Commercial Radio industry.

Our busy 16-track studio requires an experienced sound technician to operate and control this studio. He or she must be able to deal direct with clients, and work without supervision. Location recordings will form a major part of this function.

Send c.v. to:

STAN HOROBIN
CHIEF ENGINEER
TWO COUNTIES RADIO
SOUTHCOTE ROAD
BOURNEMOUTH BH1 3LR

SENIOR APPOINTMENTS

Applications are invited for the following

SALES MANAGER c. £20K

Previous sales experience essential for this key position with reputable Tape Machine manufacturer operating throughout the UK.

SENIOR PROJECT ENGINEER — AUDIO SYSTEMS £18K+

Leading a small project team responsible for specification, design manufacture, installation and commissioning of audio systems for the radio and television broadcast industry

SENIOR TECHNICAL SERVICES ENGINEER £15K-£16K+car

Experienced engineer required by leading manufacturer of sophisticated audio control and mixing systems

Professional & Technical Appointments

BROADCAST DIVISION

For further information contact
 Mike Jones or Jean Pinder at
 Professional & Technical Appointments
 (0256) 470704

MAINTENANCE ENGINEER REQUIRED for 24/48 digital mobile recording company. Salary negotiable. Please send c.v. Box No. 975.

RECORDING ENGINEER

Leading sound studios in West End require top Recording Engineer who can work to picture and has experience with A.V.'s. Salary negotiable. Please send CV, quoting ref. SS1 to Box No.

MUSIC BUSINESS APPOINTMENTS

STAMP!
 MAINTENANCE ENGINEERS
 MARKETING AND SALES
 PERSONNEL
 MANAGEMENT AND ADMINISTRATORS
 TECHNICIANS AND MORE...
 CALL: **SOUND TECHNOLOGY AND MUSIC PERSONNEL**
 on **01-691 3896**

SHORT-RUN service for the discriminating professional. Printed audio cassette labels from as little as £1.67 for 10. SAE for price list and sample. **FIRST IMPRESSIONS**, 34 Roxholme Avenue, Leeds LS7 4JF.

MOVE TO SCOTLAND

Audio visual engineer used to working with music to video/synchronisers/Fairlight Series 111 is required to take charge of a new studio opening in the new year. The position would suit someone with energy who wishes to be in at the start of an exciting new project.

Please send CV to:

2 WEST FERRYFIELD
EDINBURGH EH5 2PU
SCOTLAND

VIDEO TRANSFER ENGINEER

Top Recording Studios in Central London require Video Transfer Engineer able to work 1 inch Betamax and VHS formats. Salary negotiable. Please send CV, quoting ref. LH1 to Box No.

FOR SALE TRADE

WOULD YOU BUY A CAR WITHOUT A TEST DRIVE? THEN WHY BUY A MIXER WITHOUT A TEST DRIVE?

Thinking about a new project — from a small Mixer to a large studio complex — come and talk over ideas with the people who offer manufacturing and user experience at our new premises:

Unit D, 318 High Road, Benfleet, Essex SS7 5HB

TO TAKE THAT TEST DRIVE — PHONE 0268-793381

(Weekend Committee visits welcome by prior arrangement)



PARTRIDGE ELECTRONICS

A. C. PARTRIDGE LTD.

Head Office: 56 Fleet Road, Benfleet, Essex SS7 5JN
Telephone 0268-793256

LOCKWOOD, TANNOY, etc., new and used equipment always available and wanted. Lockwood Audio Sales 01-866 0671. (X)
3M M79 with XT24 autolocator, new heads, good condition £6,900. Tel: 01-749 6133.
TASCAM/SENN/BEYER, trade counter. Erricks VCD, Brighthouse 722121. (X)
SCHEOPS Music studio designers. Pro audio supplies unbeatable prices. For example guaranteed floppy discs 3.5" double density, double sided per 10 £14.95, per 100 £139.95, with a trade card £119.95. Scheops Music 0223 249889.

STUDIOS FOR SALE

LONDON TOWN HOUSE with 3 bedrooms, office and separate 24-track recording studio apartment. Freehold. £240,000. 01-521 2040.
COMPLETE VIDEO STUDIO. Cameras, lights, machines etc. £15-£20,000. 01-521 2040.

FOR SALE PRIVATE

TECHNICS PS10 MkII professional turntables with arm/cart, fader start, new condition £900 pair; Studer A62 stereo £800; B62 stereo £1,200; A7HS £425, all near factory condition. Call 0246 275479.
NEVE CONSOLE — 80 Series. Pristine condition, 28/8/24. 60 Line channels on remix, 10 FX sends, room for extra EQ extras, £23,500. Plus Elite MICROPHONES, Video colour monitors, etc. Full list — 01-521 2040.

To advertise in
 this space
 Phone
01-686 2599
 and ask for
David or Shane

FOR SALE PRIVATE

SONY 701ES digital audio processor, mint condition £550. Tel: 01-876 6445.

FOSTEX B16. Boxed, one owner, serviced, excellent machine, plus £1000's worth tape, nearly new £2,600 inc. VAT. 041 848 1332.

TASCAM 48 MULTI-TRACK TAPE MACHINE. Professional eight track with Timecode control facility. 2x DX4D noise reduction units included. Only six months old, as new condition (bought for £3,700), must sell for £2,850 (offers considered). Contact Mark: 01-439 4944.

FAIRLIGHT IIX. Fitted with MIDI, SMPTE. Analogue interface. Comprehensive library, all software, documentation, many spares. Mint condition. £4500 o.n.o. for quick sale. Box no. 974.

WANTED

WANTED NEVE EQUIPMENT of all types. We buy and sell valve microphones, outboard gear and consoles. Dan Alexander Audio, 2944 San Pablo, Berkeley CA, USA 94702. (415) 644-2362/Telex (650) 291-8567 MCI. Fax 415 644 1848.

CLASSIFIEDS

SITUATIONS VACANT

SENIOR SALESMAN – USA/UK



Amek Systems and Controls Limited



AMEK/TAC invite applications for the position of Senior Salesman in their established US office.

After an initial training period in the UK factory you will be based in Los Angeles, where your responsibilities will include an element of direct selling in addition to providing a high standard of support to our dealer network. You will work as part of a team to achieve sales objectives set by the UK office.

The successful applicant will be a self starter, a skilled communicator, and have a good understanding of audio mixing consoles. Applicants without prior sales experience will only be considered if they show comparable and relevant work experience.

Salary depends on experience but includes company accommodation while in Los Angeles. Promotion prospects are excellent.

Please send application, including C.V.:

**ATTN: LISA SANDERS, AMEK/TAC, UNIT 17, BAR LANE INDUSTRIAL PARK, BAR LANE
BASFORD, NOTTINGHAM NG6 0HU**



FULL TIME EXPERIENCED

MAINTENANCE ENGINEER

Required for Studio Complex in NW8. SSL/MCI

Tel: 01-402 9111

FOR SALE TRADE

By Order of the Liquidator
N. Cowan Esq.
Re: Studio World Ltd

FOR SALE BY
PRIVATE TREATY

PROFESSIONAL RECORDING STUDIO EQUIPMENT

Including:
3M M79 24 Track Recorder with XT24
Auto Locator, ATC SCM250 Studio
Monitors with 2 white Model 4400
graphic equalisers with crossover,
Yamaha REV7 digital reverberator,
Yamaha PC2602M professional power
amp, Yamaha NS10 studio monitors,
Alesis S15Q graphic & Midi Flex, Cutec
and AKG microphones, Turner power
amp etc.

For further details please contact the
Auctioneers:

HAWBERY KING
Rowlandson House
289 / 293 Ballards Lane, Finchley,
London N12 8NP
Tel: 01-446 8431 / 6477

FOR SALE TRADE

STUDIO EQUIPMENT FOR SALE

- Studer A800 Mk2, 1981, perfect condition, 6,000 hours **£19,750**
- Package offer with rack of Dolby **£21,750**
- Mitsubishi X850, 1986, 1,800 hours, lowest error correction of any machine
we have observed. Shock mount travel case. SSL interface. V. 7A SW **£78,000**
- Soundtracs CP6800 32/12/24 1988 demo model. The condition of this
desk is absolutely perfect **£19,750**
- Package price on Soundtracs desk and Studer with Dolby A..... **£38,500**

All prices ex-VAT

CALL ROGER KNAPP 01-891 1266 for details and viewing

EQUIPMENT FOR SALE

FOR SALE

- OTARI MTR90 Mk II plus autolocate plus extra audio card. 4½ years old.....** **£19,500**
- OTARI MTR12 ½" and ¼" timecode kit, full autolocate plus two extra audio cards. 17 months old.....** **£7,000**
- FOSTEX 4030 synchroniser, 4035 controller, 8750 Umatic interface, 8780 MTR90 interface** **£1,400**
- CROWN DC300A power amp.....** **£350**
- ELECTROVOICE Sentry 500 monitors (pair) plus Electrovoice EQ unit.....** **£450**
- ORBAN 622 stereo graphic EQ.....** **£300**
- KLARK-TEKNIK DN60 spectrum analyser plus mic** **£1,300**
- SUNDHOLM 31-band graphic EQ.....** **£180**
- JVC 90PSN multisystem 10" colour monitor.....** **£300**

01-794 1033

INDEX TO ADVERTISERS

Abacus	59
AKG	IBC
Amek	36
Ampex	12
AMS	55, 25
Applied Research & Technology	64
Audio Kinetics	69
Autograph Sales	41
Barcus Berry	23
D & B Audiotechnik	33
D & R Electronica	6
Dolby	53
Drawmer	10
Focusrite	19
FWO Bauch	OBC
Genelec	20
Goldline	45
Hill Audio	17
HW International	44
Isotrack	59
JBL	42
KGM	63
Midem '89	50
Mitsubishi	34
Otari	47
Playback	10
Printaboard PCB	63
Saturn Research	11
Sony	4
Soundcraft	IFC
Soundtracs	27
Studio House Audio	61
Studio Spares	49
Sunkyong	28
Surrey	46
Symetrix	55
Synton	56
Thatched Cottage Audio	69
Total Systems	63

STUDIO SOUND

AND BROADCAST ENGINEERING

CIRCULATION DETAILS

STUDIO SOUND is available without charge to directors, managers, executives and key personnel actively engaged in sound recording in any part of the world. Copies must be individually requested. Non-qualifying readers will be notified in writing and invited to take out a subscription (see below for details)

NEW READER ENQUIRIES: Link House Publications plc, Link House, Dingwall Avenue, Croydon CR9 2TA, UK. Tel: 01-686 2599

EXISTING READER ENQUIRIES: Circulation Dept, Studio Sound, Link House Magazines Ltd, Central House, 27 Park Street, Croydon CRO 1YD, UK
Changes of address should be notified in writing to this address and the label containing the old address and reference number should be enclosed to ensure accuracy

SUBSCRIPTION ENQUIRIES: Subscription Dept, Studio Sound, Link House Magazines Ltd, 120-126 Lavender Avenue, Mitcham, Surrey CR4 3HP, UK

The cost of an annual subscription to **Studio Sound** is:
UK: £24.00
Overseas surface mail: £30.50/US\$52
Overseas air mail: £52.50/US\$89
USA airspeeded delivery \$70

The publishers reserve the right to refuse applications considered inappropriate and restrict the number of free copies sent to any one company or organisation

AKG

ACOUSTICS

THE C414 B-ULS
UNPARRED SOUND + TECHNOLOGY FOR YEARS TO COME



ADV 355/1/E



Digital recording techniques call for
high quality microphones and audio
processors.

We supply the microphones.

Get more information from your dealer or directly from

AKG AKUSTISCHE U. KINO-GERÄTE GESELLSCHAFT M.B.H. Brunhildengasse 1, A-1150 Vienna/AUSTRIA Tel. (222) 95 65 17-0, Tx: 131839 akgac o, Fax: (222) 92 34 58
AKG ACOUSTICS LTD., Cotteshall Wharf, Cotteshall Lane, Godalming, Surrey GU7 1JG/GB Tel: (4868) 25 702, Tx: 859013 akgmic g, Fax: (4868) 28 967

www.americanradiohistory.com



TIME ON YOUR HANDS

In an average 48 track analogue studio, it can take a good engineer up to 2 hours a day to line up the multi-track recorders. (Half an hour per machine, twice in the day).

Now consider this: The Studer A820 multi-track recorder, after automatically optimising its bias setting, takes less than 2 minutes to create a complete record alignment. This alignment is accurate to 0.1 dB resolution, which is about half the width of the needle in a conventional VU meter. In the noise reduction alignment mode, the 50 segment

meters become noise reduction reference meters and bring into force special Studer-created algorithms.

The A820 was already a Capital Investment offering the realistic cost effective alternative to the digital problem. Automatic alignment merely adds strength to the argument. After all, in a studio environment, time really is money.



STUDER
INTERNATIONAL AG
CH-8105 Regensdorf Telephone (01) 840 29 60

STUDER REVOX AMERICA INC Nashville Telephone (615) 254-5651
STUDER REVOX S A R L Paris Telephone 533 5858
STUDER REVOX CANADA LTD Toronto Telephone (416) 423-2831

BAUCH

F.W.O. Bauch Limited, 49 Theobald Street, Boreham Wood, Herts. WD6 4RZ. Tel: 01-953 0091. Fax: 01-207 5970.

www.americanradiohistory.com