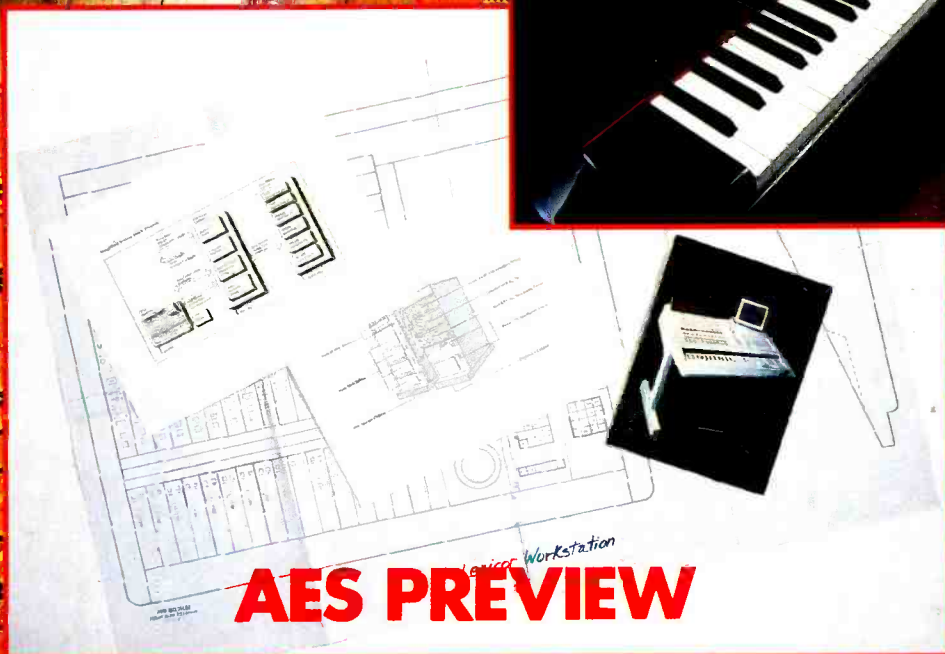
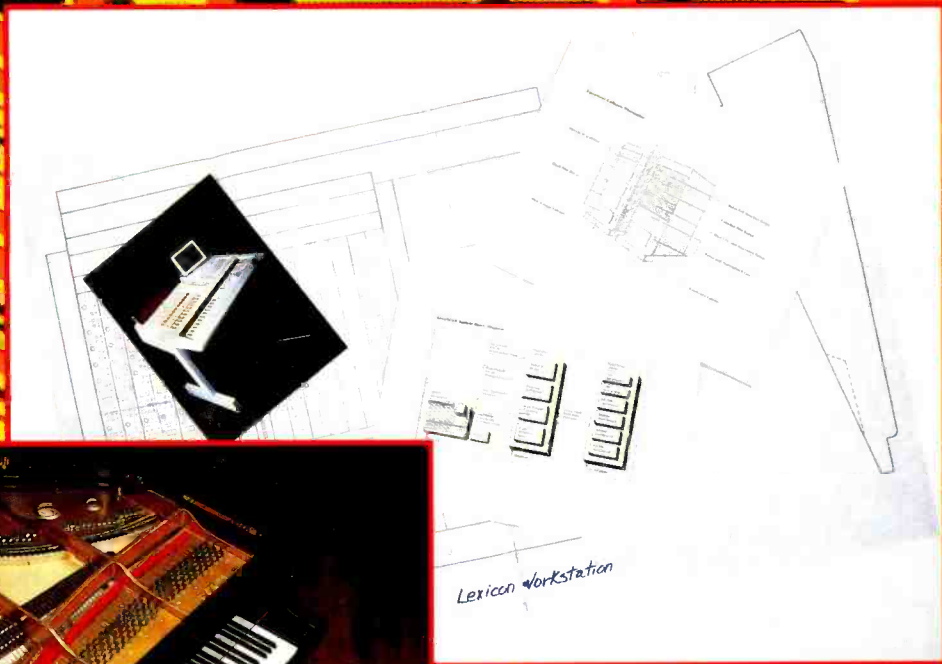


March 1987

£1.50

# STUDIO SOUND

AND BROADCAST ENGINEERING



**AES PREVIEW**

1974

The launch of the first  
internationally successful  
live sound console

1976

The first commercially available  
8-buss recording console

1979

The first Queen's Award For  
Export to a Pro Audio company

1981

The launch of the world's  
best-selling studio console

1982

The world's most successful  
live sound console unveiled

1983

The première of the  
most technologically advanced  
live sound console

1984

A second Queen's Award  
For Export Achievement

1986

The world's first fully  
remote-controlled  
multitrack recorder launched

1987

The next chapter in this  
success story:  
Room 202. Queen Elizabeth II  
Conference Centre at AES London.



?

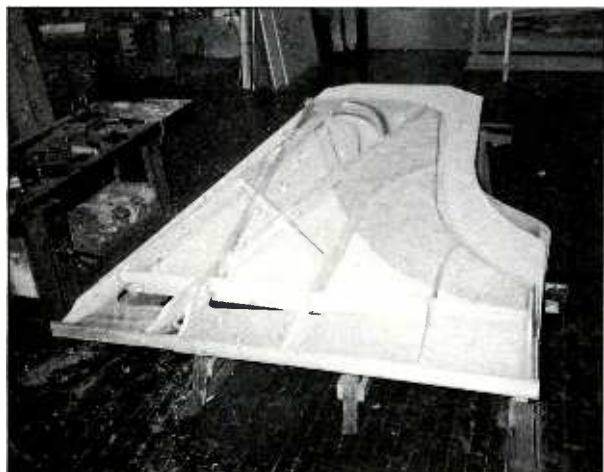




- 5 Editorial:** Keith Spencer-Allen asks can our instruments match the clarity attainable with digital equipment?
- 20 General news:** Beatles CDs... IBS lectures... Address changes... People... Agencies... Stolen equipment... Contracts... In brief... Audio+Design/SWA US joint venture... Literature received... Increased training facilities at Salford College... Gateway courses
- 28 Product news:** Nemesis parametric equalisers... Teldec DMM-CD... AMB cable tester... New TAC products... Tascam ES-50 synchroniser... Logitek Crossfire... Servisound spool flanges... AKG DSP 610 delta stereo processor... Quantec QRS/XL digital effects processor
- 34 Music news:** Hohner MIDI rack... Korg DSS-1 club... Sequential Studio 440... Gig stands... Casio keyboards. By Mark Jenkins
- 36 More general news:** SSL French office... Lockwood correction... Terry Nelson reports on Sound reinforcement at AES Los Angeles... Keith Spencer-Allen visits the Fazioli piano factory in Italy
- 48 AES Convention preview:** A list of exhibitors and summary of products to be shown
- 62 Lifting a digit for art's sake:** Producer Alan Parsons on the subject of digital multitrack recording
- 68 Chipping Norton:** Janet Angus reporting from Oxfordshire
- 78 Perspective:** US correspondent Martin Polon on DAT
- 80 Business:** Barry Fox investigates the facts behind the industry news

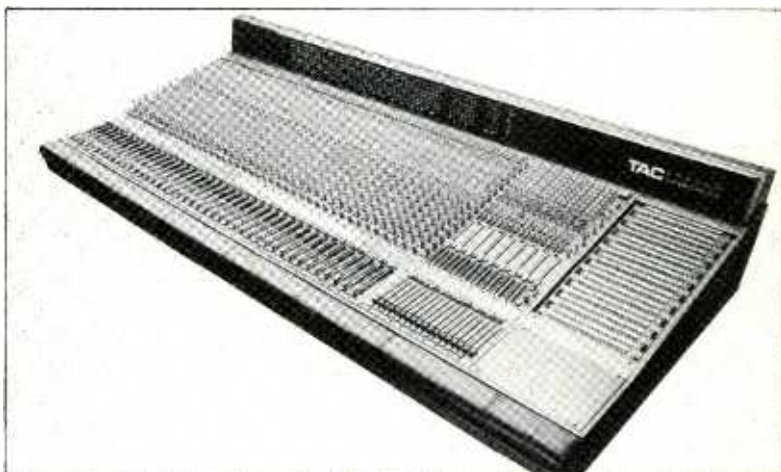
# CONTENTS

- 82 Inside the National Sound Archive:** Over 100 years' worth of recorded sound takes a lot of looking after as Tim Leigh Smith found out when he visited the NSA in London
- 88 NEP Productions:** Terry Nelson from this New York A/V, post-production and music mix room facility
- 92 A speaker connector—some response:** Ken Dibble's article in December on a possible standard provoked a number of replies
- 96 Bob Auger:** Janet Angus interviews a specialist in classical recording
- 110 Review:** Neil Grant's technical evaluation of the UREI 813C monitor speaker
- 120 Review:** Hugh Ford reviews the Fostex E-22 twin-track ½ in tape machine



See page 40

See page 30



## EDITORIAL

**Editor:**  
Keith Spencer-Allen  
**Deputy Editor:**  
Carl Anthony Snape  
**Staff Writer:**  
Jonathan Kaye  
**Production Editor:**  
Ann Horan  
**Production Assistant:**  
Carrie Love  
**US Commentator:**  
Martin Polon  
**Secretary:**  
Cecilia Farrelly

## ADVERTISEMENTS

**Sales Manager:**  
Mark Walsh  
**Display Sales:**  
Damian Dowling  
**Secretary:**  
Jane Everist  
**Production Manager:**  
Jacky Pearce  
  
**Japan and Far East Agent:**  
Media Sales Japan Inc, Tamuracho  
Bldg 3 3 14, Shimbashi Minato-Ku  
Tokyo, Japan  
**USA Agent:** Joe Statuto, Rt 1, Box  
40A, Montague, TX 76251, USA.  
Tel: (817) 894-6923.

**Commercial Manager:**  
Phil Guy  
**Director:**  
Douglas G Shuard



Editorial and advertising offices:  
LINK HOUSE, DINGWALL  
AVENUE, CROYDON CR9 2TA,  
GREAT BRITAIN  
Phone: 01-686 2599  
International: +44 1 686 2599  
Telex: 947709  
E-mail: 78:DGS1071  
IMC: STUDIO SOUND—UK/US  
Fax: 01-760 0973  
© Link House Publications  
PLC 1987. All rights reserved.



A LINK HOUSE  
PUBLICATION

Publisher and consultant to  
APRS for Studio Sound's  
Producer's Guide to APRS  
Members 1984/85  
March 1987 Number 3  
Volume 29 ISSN 0144-5944

Cover: Photography by Roger  
Phillips and Tony Butler

# THE ADVANTAGES OF A STUDIO CONDENSER WITHOUT A SOUND OF ITS OWN



For all of its virtues, the typical studio condenser imparts a definite character to any recording. These impositions are often considered inevitable technical imperfections: accepted, ignored or tolerated by audio engineers.

Characteristic anomalies of condenser performance such as exaggerated high end response or distortion have even been rationalized as compensation for the high frequency losses inherent in typical analog formats. Nowadays, however, they are increasingly viewed as unnecessary intrusions in critical analog and digital recording situations.

**A Condenser For The Digital Era: The Difference is Nothing.** The increased dynamic range of digital recording is perfectly complemented by the self-effacing nature of the MC 740. The microphone is virtually inaudible. No coloration, no self-noise — no sonic footprint, not even a fingerprint. All

five of its pickup patterns are equally uniform, identically transparent. We feel your prior experience with large diaphragm condensers will confirm this as a unique achievement.

**An Atypical Approach To Condenser Sound.** Beyer has never relied on conventional technical solutions. A manifestation of this kind of thinking, the MC 740 eliminates the icy, strident quality typical of most condensers to reproduce voices and instruments with warmth and intimacy. It's no coincidence that these are characteristics often ascribed to our ribbon microphones.

The MC 740's freedom from exaggerated sibilance or graininess and its greatly reduced distortion are immediately apparent to critical listeners. European and American engineers have already commented on the startling accuracy of the 740, and the way it reveals the subtle differences between instru-

ments and ambient environments.

**Accuracy And Versatility Without Compromise.** Uniform (<2 dB: from actual machine specs, not just published specs) frequency response curves for all five polar patterns may seem a remarkable breakthrough. To Beyer, this is simply a design criterion for the microphone. Similarly, there is no contradiction in the fact that the 740 is exceptionally sensitive, yet also withstands extreme SPLs (up to 144 dB with the 10 dB attenuator in circuit).

**Hear What You Could Be Missing.** The MC 740's unconventional design offers a clear alternative. The best way to evaluate the difference the MC 740 can make is to work with it in your studio. To arrange a hands-on audition of this remarkable new audio instrument, contact your Beyer dealer or write to us: Beyer Dynamic (GB) Ltd., Unit 14, Cliffe Industrial Estate, Lewes, East Sussex BN8 6JL.

## ACCURACY IN AUDIO

Canada: ELNOVA 4190 rue Sere, St. Laurent, Quebec H4T 1A6  
Tel: (514) 3 41 69 33 Telex: 5824086  
Australia: Rank Electronics Pty. Ltd., 16 Suakin Street, P.O. Box 42  
Pymble N.S.W. 2073 Tel: (2) 4 49 56 66 Telex: 71289

Great Britain: beyerdynamic Ltd., Unit 14, Cliffe Industrial Estate  
Lewes, Sussex BN8 6JL Tel: 0273-479411

Germany: Eugen Beyer Elektrotechnische Fabrik GmbH & Co., Theresienstrasse 8,  
Postfach 13 20, D-7100 Heilbronn Tel: (07131) 617-0 Telex: 728771

beyerdynamic 



If there is an ability to edit a trade publication such as this magazine then it has to be a working knowledge of what your readership *wants* to read. There has to be a secondary element also that allows you to publish articles and information on topics that you feel your readers *ought* to know about. This means that the editor has to keep his ear to the ground (not really an apt place in this case) and try to identify trends and future needs. Sometimes you think you have found an important lead but you are not completely certain. Here's one.

While decorating I had the radio on. BBC Radio 4 is good decorating radio for a few hours with its mixture of news, documentary and drama helping to free your thoughts from the mind numbing aspects of painting. One programme was about how classical music performed today often sounds quite unlike the original sounds in the mind of the composer due to the dramatic changes that have taken place in instrument design and performance, tunings, playing ability and interpretation. Quite naturally, the earlier composers 'suffer' most. There was nothing very new in this programme it was just presented in an informative way.

A few hours later, still decorating, I was listening to a rock music channel and what struck me was that several tracks featured an instrument that had largely disappeared from a rock context—the acoustic guitar—and amongst the multitudinous examples of the synth programmer's art, they stuck out in the extreme.

Back in the office a few days later I had a phone call from a small production company asking if we had a list of studios in London with a piano suitable for recording serious classical music (at the time we did not)—they said that so far they had drawn a blank with a large number of studios not having any piano at all. This did not surprise them, or me, but the difficulty was that, yes, they could hire in a piano for the recording but firstly, they felt that as far as recording goes the piano would probably be something of an unknown quantity; secondly if the selected studio did not have an even half way decent piano in the studio to start with, there was little chance of knowing how the room would record; thirdly if the studio were not used to recording piano there was high risk factor over the sonic success of the complete venture. Further they were of the opinion that for the type of work they were to record they were not aware of locations outside studios that would be quiet enough.

If we then take these disconnected points. More acoustic instruments being used in successful rock recordings; an apparent shortage of suitable pianos and locations for recording classical piano music in London; if development of musical instruments changes the way that we perform and hear live classical music then there was a possibility that developments in recording technology affect the way we hear recorded classical music. The answer to this last point is, of course, yes but looking further than this, could it be that the acoustic instruments of today are not of a suitable quality for recording to the standard that is now possible: a horrid phrase but are they 'digital-ready'? For example most manufacturers of pianos have seen the piano as a performance instrument rather than a recording tool and you have to question the suitability for recording of many examples of piano from the major names. The requirements of performance are different from recording where the buzzes and rattles, clarity of notes and evenness of intonation become so

# EDITORIAL

very obvious particularly without an analogue noise floor.

If there were a shortage of suitable pianos and recording locations, an increase in interest in acoustic instruments, perhaps we should look at what any musical instrument manufacturers might be doing in this area. In some ways this might be seen as an extension of the recording chain. Recording engineers and producers have always had a hand in the choice of instruments for recording but with closer attention being paid to sound than ever before as the signal chain gets progressively better we have to look at all areas. The introduction of digital recording and superior noise performance led us to listening more closely to consoles and, more importantly, to some of the mics we were using and their suitability. If we have reason to maintain high standards it might be that we have to look beyond the microphone and study the recording abilities of the instrument in a way that is similar to a piece of the recording chain proper, ie noise floor, dynamic range, acoustic distortion, spurious noise, etc.

Well we found one manufacturer of pianos taking this aspect seriously and we have given coverage to them and their ideas which I think are to be highly commended. I hope they are not alone and should there be any other musical instrument manufacturers who have something worthwhile to say in this area I would urge them to contact us.

Oh yes, there is one other ability that is useful to an editor of a magazine such as this—the ability to find the most obscure reasons for doing something you wanted to all along. □

**Keith Spencer-Allen**

**STUDIO  
SOUND**  
AND BROADCAST ENGINEERING

STUDIO SOUND is published on the second Friday of the preceding month. The magazine is available on a rigidly controlled requested

basis only to qualified personnel (see back page for terms) or for an annual cost of **£18.00 UK, £24.50** overseas surface mail or **£46.50** overseas airmail to non-qualifying readers or where more than two copies are required in a studio or small organisation.

**Circulation enquiries.**

**New readers:** Link House Publications plc, Link House, Dingwall Avenue, Croydon CR9 2TA, UK. Tel: 01-686 2599.

**Free subscriptions:** Controlled

Circulation Dept, Studio Sound, Link House Magazines Ltd, Central House, 27 Park Street, Croydon CR0 1YD, UK. Tel: 01-760 0054.

**Paid subscriptions:** Subscription Dept, Studio Sound, Link House Magazines Ltd, 120-126 Lavender Avenue, Mitcham, Surrey CR4 3HP, UK.

**US mailing agents:** Postmaster please send address corrections to Studio Sound, c/o Expeditors of the Printed Word Ltd. 515 Madison

Avenue, New York, NY 10022. Total average net circulation of 14,240 per issue during 1985 UK: 6,335. Overseas: 7,905. \*ABC audited).

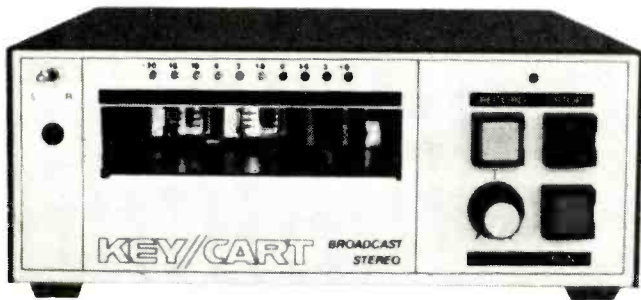
Studio Sound and Broadcast Engineering incorporates Sound International and Beat Instrumental. Printed in England.

**ABC**

MEMBER OF "THE AUDIT" NATIONAL PUBLICATIONS

# ARE YOU COST CONSCIOUS? THEN WE HAVE THE SOLUTION!

## KEYCART CARTRIDGE MACHINES OFFER YOU



- ☆ *Excellent frequency response*
- ☆ *Quiet operation*
- ☆ *Easy maintenance*
- ☆ *Remote facilities*
- ☆ *Compact size*

*For further information contact:*

### KEYDIAL LIMITED

Units 2 & 3, Enterprise Estate, Moorfield Road, Slyfield Green, Guildford, Surrey GU1 1RB.  
Tel: (0483) 573221. Telex: 8955137 BCI UKG.

## ASONA for Complete Cassette Production

The new semi-automatic WINDER 2015 compliments the ASONA line of loop-bin/slave duplication systems.

Approximately 950 C-60 cassettes can be produced per shift with one winder.

The winding and splicing phases are fully automated, enabling two winders to be operated by one person, or five machines by two persons.

Length preselection is provided for blank tape, automatic cue-tone detection for recorded tape.

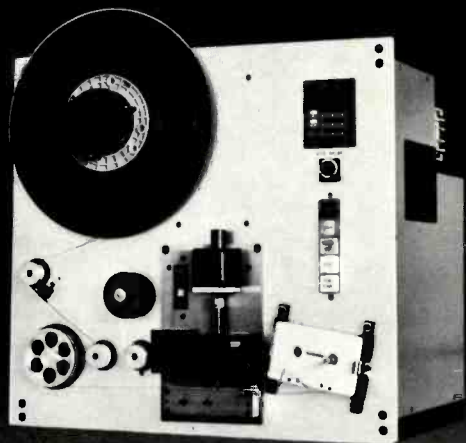
Robust construction, with a minimum of moving parts.

Low maintenance requirements, low personnel costs.

Economically priced.

### ASONA Winder 2015

The WINDER 2015 is designed for universal installation. Completely self-contained; may be plugged in wherever needed. No compressed air or external vacuum required. Compact size; easily transported with integrated carrying handles.



**We can tailor a cassette production system to your needs.  
Write or call for a proposal.**

ASONA is manufactured in West Germany by AUVIS ASONA GmbH & Co. KG, Bahnhofstraße 60, D-7634 Kippenheim  
Tel.: (0)7825-1068, Telex: 754 325 auvis d



# STOP DREAMING START WORKING HIRE A SONY FROM STESCO DIGITAL RECORDING EQUIPMENT

We bring you the world's most popular digital multitrack recorder (PCM 3324) wherever you want it

**STESCO . . . service with a difference**

CONTACT: Marc Van Ginneken, Wanmolclaan 17, B-1970 Wezembeek-Oppen, Brussels, Belgium  
Phone: 32/2/731.61.75 ★ Telex: 83040 (Stesco) ★ Fax: 2/640.93.28



# STESCO

CD mastering studio

 32 . . 2/731.61.75



Stereo

Broadcast

Mixer

# SBM



EELA AUDIO SBM:  
a complete, fully modular  
on air radiodesk with flexible layout  
and all necessary functions and  
facilities.  
Extreme reliable by intensive use of  
solid-state switching and VCA faders.

## eela audio

Hondsruglaan 83a, 5628 DB Eindhoven Holland, Tel: 040 -424455, Telex: 59281 BOLLE NL.

Audio and Design U.K. Tel.: (0734) 861088



# Buy one, get four free.

## Symetrix

*They say you get what you pay for. Indeed, the 528 Voice Processor proves the point. Five high performance signal processors in a single rack space, for about what you'd expect to pay for each. Mic Preamp, De-esser, Compressor/Limiter, Downward Expander, Parametric EQ/Notch Filter. Even 48v phantom powering and a balanced line input. No compromises, nothing left out.*

*The 528 Voice Processor is the ideal mic input system for sophisticated recording and high level sound reinforcement systems. Control annoying sibilance, optimize spectral balance. Set overall signal levels. Reduce noise. And, eliminate resonances and ring frequencies with the 528's extremely selective EQ and filtering.*

*Get what you pay for, and then some. Get the 528 Voice Processor. Call or write for a detailed spec sheet.*

**In the UK:**  
SOUND TECHNOLOGY, LTD.  
6 Letchworth Business Centre  
Avenue One, Letchworth  
Herts SG6 2HR  
Telephone: 0462 675675

**Exclusive International Representation:**  
E & E INSTRUMENTS INTERNATIONAL, INC.  
PO Box 1313  
Laguna Beach, CA 92653, USA  
Telephone (714) 494-0231  
Telex 182291 EASTMAN LGNH

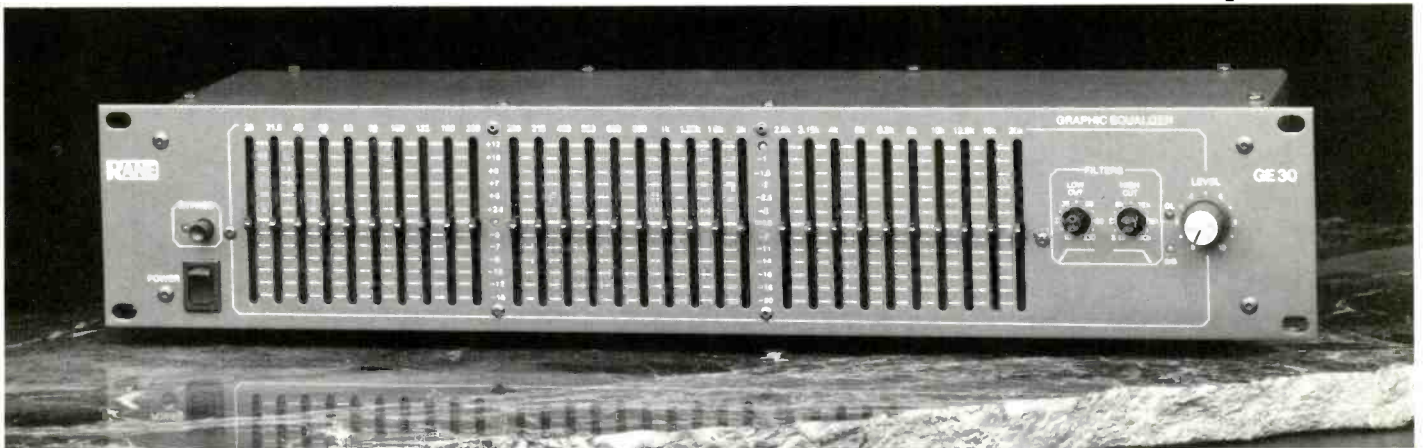
Signal processing at its best



# INTER-POL-LATE

in-ter-po-late (in tur' pə lāt) vt. [L. <inter-between + polire, to polish>] 2. to insert between or among others.

## INTRODUCING THE GE 30 INTERPOLATING CONSTANT-Q GRAPHIC EQUALIZER.



Rane has taken the graphic equalizer format to yet another new level of performance capability, and we're demonstrating it for the first time here in L.A.

In response to valuable input from leading acoustical engineers, Rane has redesigned the GE 30 to enable Constant-Q bandpass response ON OR ANYWHERE IN BETWEEN THE ISO 1/3 OCTAVE CENTERS, for precise normalization of acoustical nodes, with minimal adverse effect on surrounding frequency response.

Through the use of dual alternating summing amplifiers and precise computer-optimized Constant-Q filter characteristics, the combined use of two adjacent ISO filters on the GE 30 results in a well-behaved "interpolated" bandpass response BETWEEN THE ISO CENTERS with only slight degradation in Q and a minimal increase in boost/cut. The exact center frequency of

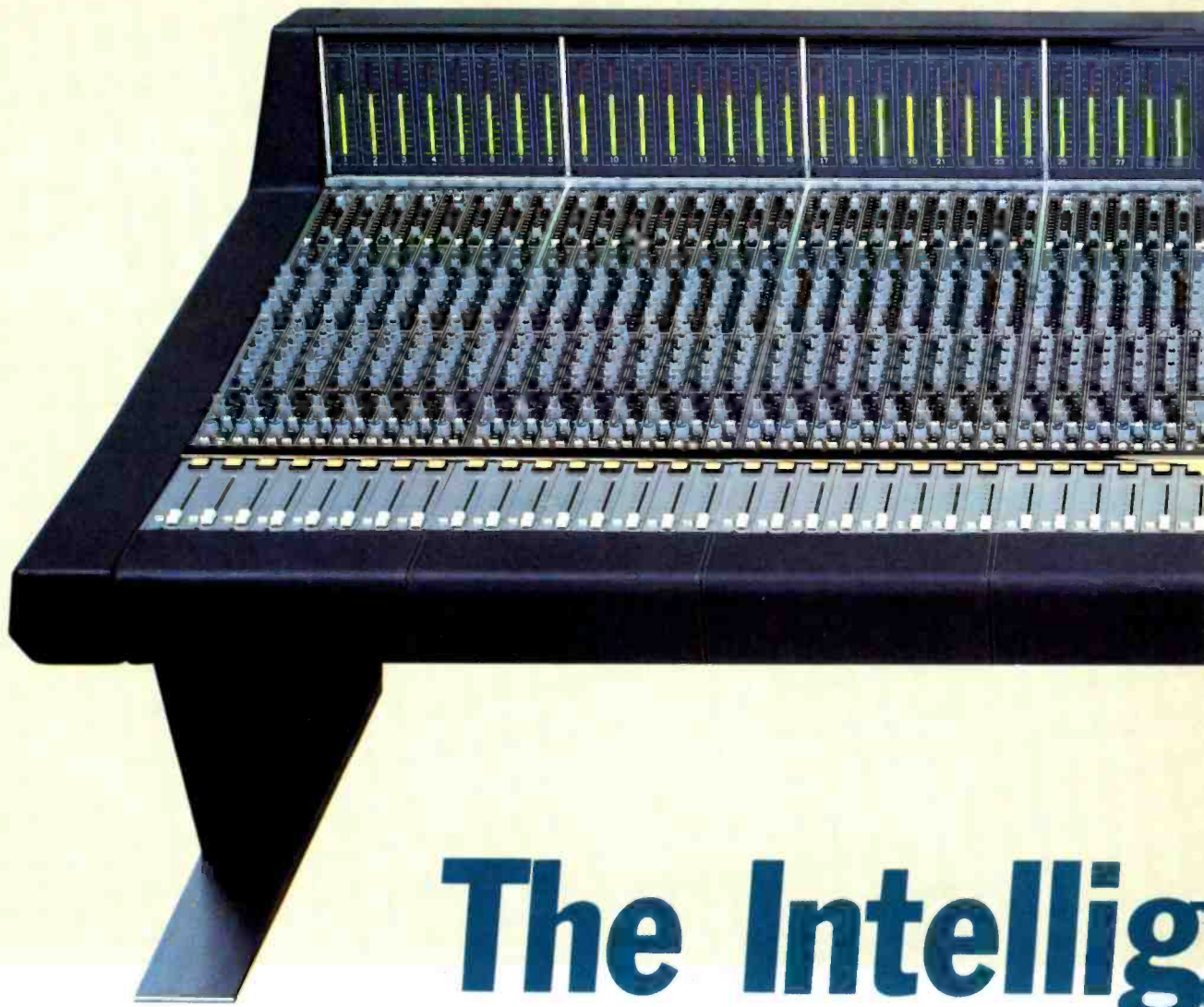
the combined filters can be "tuned" in either direction by simply adjusting the level of one of the two sliders, shifting the "nose" of the filter's response towards the slider with greater boost/cut. This allows precise alignment of the filter center frequency with that of the acoustical node for optimum end results.

The accuracy and sophistication of today's computerized acoustical analysis systems has put increasing pressure on signal processors to solve a myriad of acoustical phenomena that are now precisely identifiable. By combining interpolating capability with the already proven Constant-Q performance, the GE 30 provides an unprecedented degree of control with consistent precision, yielding optimum sound quality in complex acoustical environments with a minimum of effort and hardware.

**RANE**  
CORPORATION

**UK Distributor:**

**Music Lab Sales, 72-74 Eversholt Street, London NW1 1BY. Tel: 01-388 5392 Telex 28159—See us at the AES London**



# The Intellig

## **Westar Outperforms That Well-Known Console.**

Compare features, specifications, sonic performance and dynamic automation options, and you'll agree. Exclusive features are: Fully parametric EQ on all 4 bands, eight echo/cue sends, dual stereo mix buses, 60 segment LED meters with spectrum analyzer, up to 64 track monitor, from 20 to 60 inputs, field expandable frame, and three levels of automation options. And excellence in performance: Transformerless +28dBm outputs, EIN at -129dBm, Output noise at -86dB, IM distortion at 0.02% with VCAs, Crosstalk at -80dB, Wide band frequency response and high RF immunity.

## **Westar Is The Only Truly Modular Console.**

The Westar is a totally modular console using air frame design concepts for strength and rigidity. Individual frame sections are in groups of 8 I/O

modules, with plug-in frame wiring for true field expandability. New sophisticated limiter/compressor/gate modules may be fitted, wired either in-line with the input module or peripheral. Plug in interchangeable equalizers and preamplifiers in each I/O module give instant user selectability and allow the addition of new technology at any time. Automated EQs are scheduled to be available in 1987, with retrofit possible on all previously delivered Westar Consoles.

## **Compumix PC Hard Disk Automation.**

Compumix PC is a powerful and technically advanced automation system, providing storage on floppy diskettes of an unlimited number of mixes and off line editing of mix data. The Compumix PC comes complete with IBM XT compatible PC (with Dual Floppy and 20 MB Hard Disk Drives), Mitsubishi 13"





# ent Choice.

color graphics monitor, custom and standard keyboard, and all cables and software. Compumix PC is probably the most cost-effective high-performance automation system available today, and a perfect fit for Westar. As a bonus, the new AMP (Assistant Mixer Program) software provides the mixing engineer and the producer with time saving and practical features like track sheets, telephone auto dialing, timers, and quick-find reference tables.



## Westar— The Best Console Buy Around.

With cost-effective digital processing consoles scheduled to be available by 1990, the profit-oriented studio today needs a reliable high-performance analog console to match the sonic qualities of the new digital recorders like the Mitsubishi X-850. The Westar is such a console system, at a price the studio can pay back by the time digital consoles become reality. It all adds up to a professional studio console system offering the most attractive performance/price ratio. Call or write for our comprehensive brochure.



## MITSUBISHI PRO AUDIO GROUP

DIGITAL ENTERTAINMENT CORPORATION

Headquarters: 225 Parkside Drive, San Fernando, CA 91340 • Phone (818) 898-2341 • Telex: 311786  
 New York: Suite 1321, 555 W. 57th Street, New York, N.Y. 10019 • Phone (212) 713-1600 • Telex: 703547  
 Tennessee: 104 Eastpark Drive, Suite 306, Brentwood, TN 37027 • Phone (615) 371-6602 • Telex: 510617477  
 Canada: 260 The Esplanade, Toronto, ONT. M5A 1J2 • Phone (416) 365-3363 • Telex: 06219839  
 United Kingdom: Unit 13, Alban Park, Hatfield Road, St. Albans, Hertfordshire • Phone 0727-40584

 **Diamond Leasing  
AVAILABLE**



## MASTER CLASS FOR CLASS MASTERS

Analogue it may be, performance it most definitely has, with lower noise than 16 bit digital playback, having a dynamic range in excess of 100dB, packed with features, and looks to match.

- Fully modular ● 24 Bus ● Split and in-line configurations ● Capacity for 60 modules, + producers desk option ● Fader automation ready ● Dual operating levels on separate connectors ● SSR Remote as standard, giving MIDI synced muting ● Balanced inputs and outputs ● Silent FET mute switching ● Gold on gold edge connector system

The list of well designed, and expertly engineered features goes on and on. For complete information on the SIGMA 24 console range, make contact NOW.

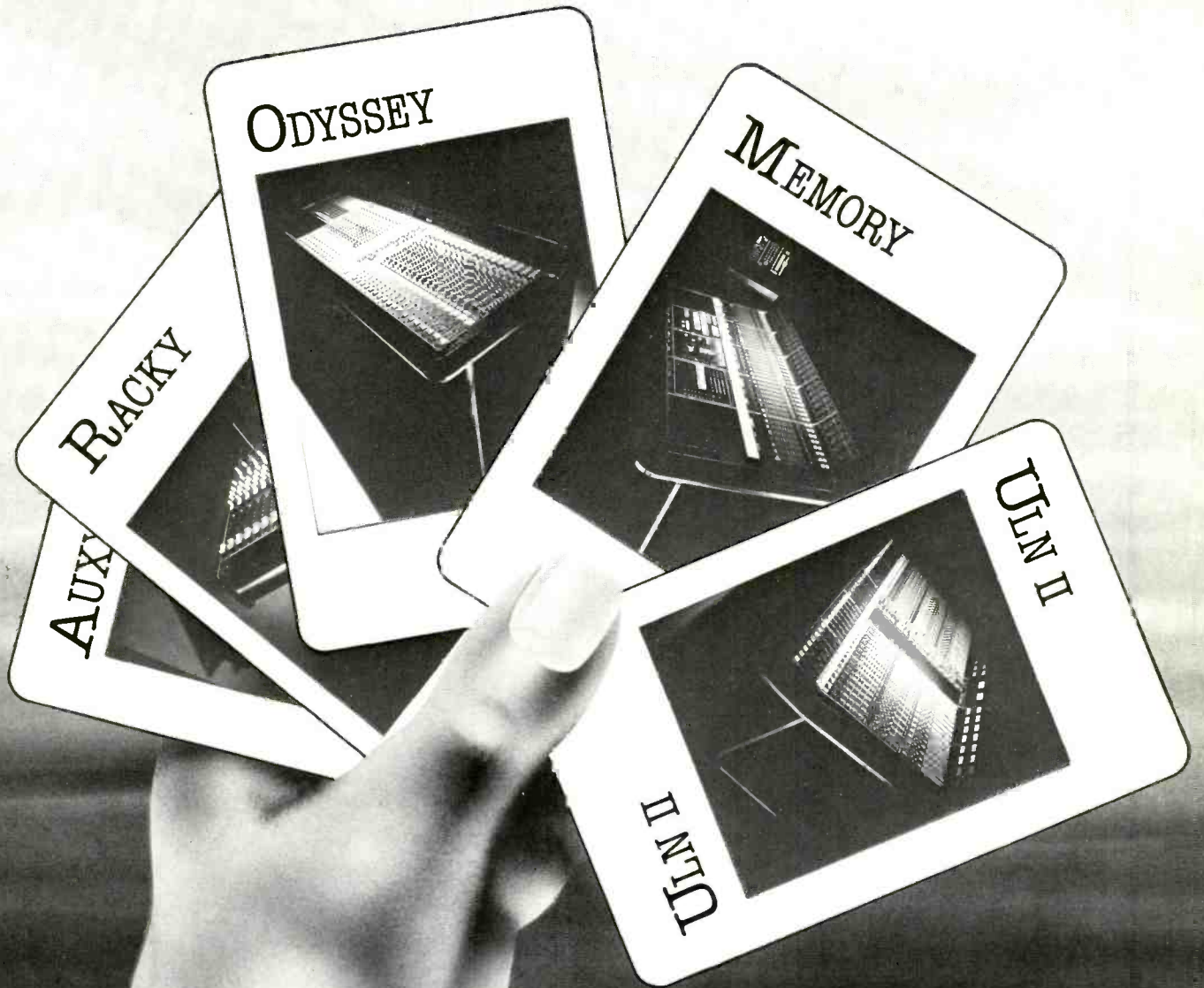
**AHB** *Mixing Art with Science*

Allen & Heath Brenell Ltd, 69 Ship Street, Brighton. BN1 1AE. UK Tel: (0273) 24928. Telex: 878235 MBI AHB G.

AHB USA. 5 Connair Road, Orange, Connecticut 06477 USA. Tel: (203) 795 3594.



# SAJE DEALS THE WINNING HAND!



**SAJE** AUDIO CONSOLES

*"Leaders of the Pack"*

3 Rue Verte 95100 Argenteuil France. Telephone: (1) 39.61.15.62 Telex: 699672F SAJE.

# THE LANGUAGE OF OTARI

SPOKEN AS ONLY  
WE KNOW HOW

**When we speak Otari, we mean business. Because for a busy studio it would be hard to find a better multitrack proposition.**

**Especially when you add the expertise of the UK's top Otari specialists – backed by Service Director Rod Thear and his team, with over 15 years' Otari experience between them.**

**The MX-80 multitrack brings Otari's high performance, precision handling and reliability within reach.**

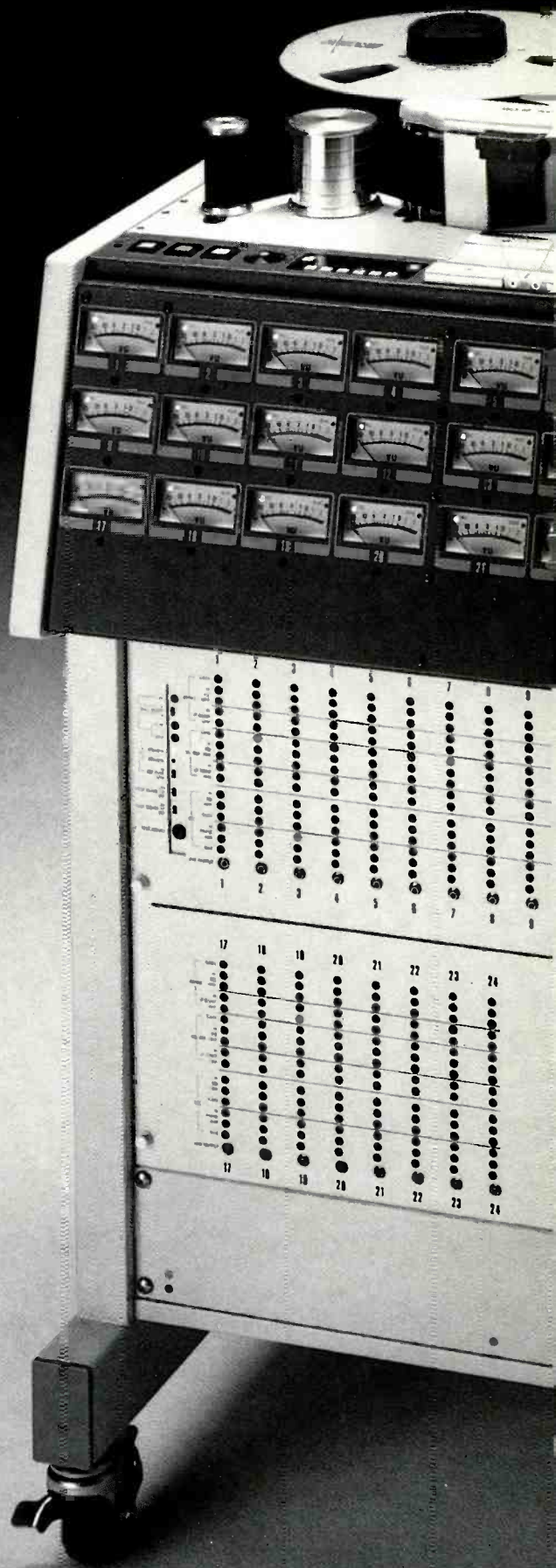
**Sound quality is remarkable; with the Dolby rack it's outstanding. Outmoded or secondhand machines are no longer the only options.**

**The MTR-90 needs no introduction; its tape handling is flawless and with our new, custom Dolby SR' overbridge its status as the world's most successful multitrack is assured.**

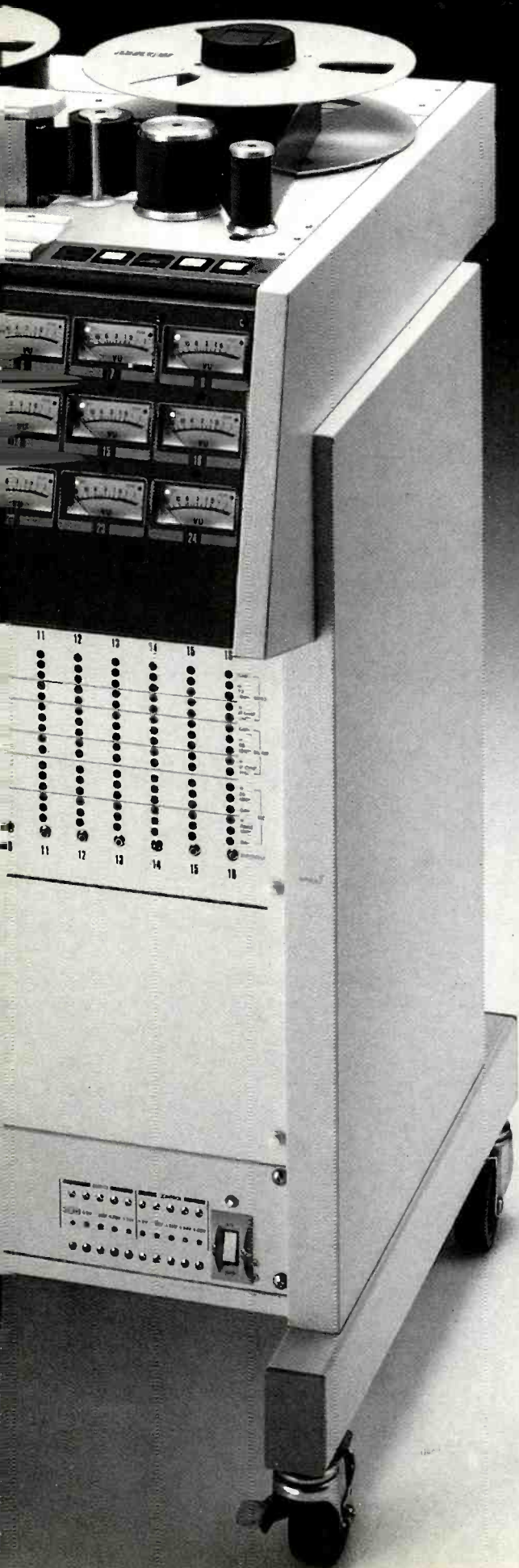
**Finally, the new MTR-20 – the ultimate analogue mastering recorder. Its sophisticated electronics, engineering quality and operational flexibility set standards others will aspire to.**

**Whichever one suits your needs, you'll find our back-up as solid and reliable as Otari machines themselves.**

**And that's great news in any language. Call Garry Robson or Mick Boggis for details.**







◀ **MX-80** New multitrack in 2" 16/24/32 track versions.

Features closed-loop constant tension transport with 30/15/7.5 ips speeds, each with gapless punch in/out. Integral facilities include Dolby HX-Pro\*, synchroniser interface, switchable EQ curves and 4-cue autolocator. Full remote provided; Dolby SR\* overbridge, timecode-based autolocator and chase synchroniser optional.



▲ **MTR-90** Top quality multitrack in 1" 8 track and 2" 16 or 24

track versions. Pinchrollerless PLL capstan transport under electronic control with fast lock-up, digitally timed gapless punch in/out's and 14" max reel size. Facilities include spot erase, bidirectional cue, elapsed-time indicators and easy-access tilting deckplate. Interfaces provided for transformerless audio I/O (or transformer option), RS232C I/O and SMPTE. Optional: Dolby SR\* overbridge.



▲ **MTR-20** New stereo mastering recorder with quartz-PLL

capstan and closed-loop Optimum Tape Guidance System with electronic control. Full auto-align plus 2 memory set-ups per speed/EQ, 4-point autolocator, optional broadcast I/O including fader start, gapless punch in/out, reverse play/erase, library wind mode and tape time/timecode display. Options: full autolocator, 1 or 2-button punch in/out, variable wind speed and many more.

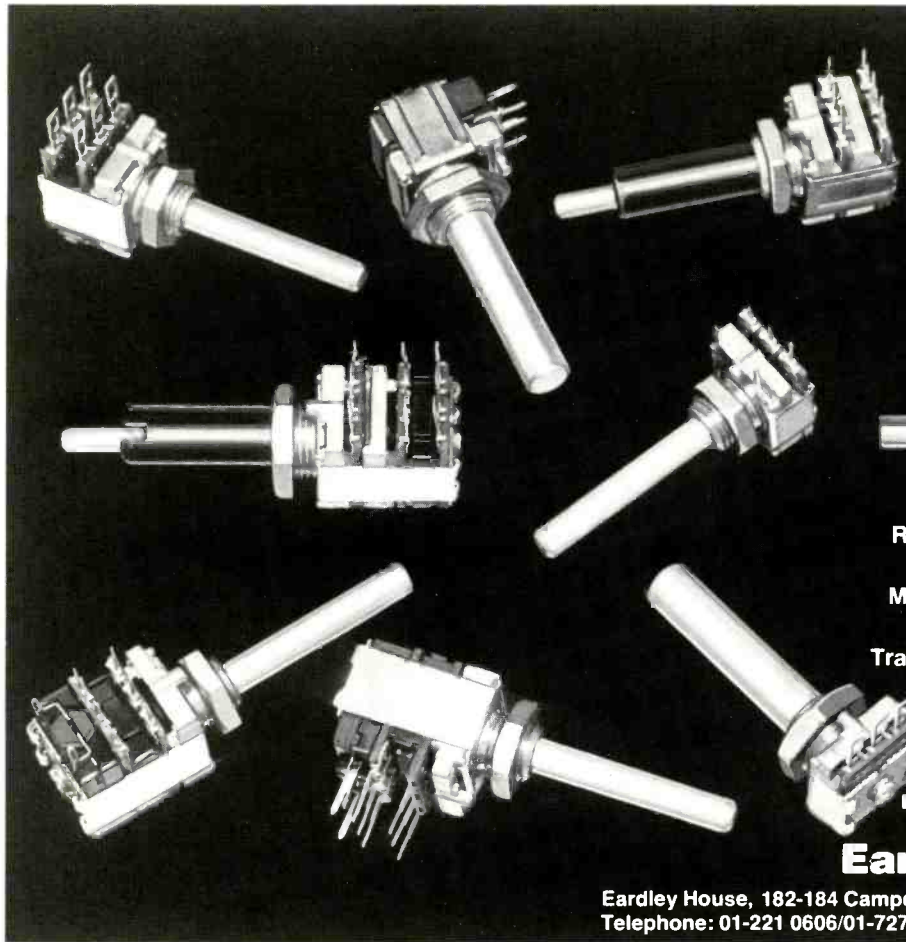
**OTARI**<sup>®</sup>

AT

**Stirling** **ITA**

1 Canfield Place, London NW6 3BT. Telephone 01-625 4515  
Fax. 01-372 6370. Tlx. 946240 CWEASY G Ref No. 19014280

\*Dolby SR and HX-Pro are trademarks of Dolby Laboratories Ltd.



## Preh 12mm potentiometers

Long term rotational life with no back lash:- > 10,000 cycles  
Power rating:- 0.15W (lin) 0.08W (log)

**Resistance:-** 100 Ohms to 10 MOhms (lin)  
1 KOhm to 10 MOhms (log)

**Max operating voltage:-** 250V AC/DC (lin)  
180V AC/DC (log)

**Tracking:-** (lin 2dB to 20dB) (log 2dB to 40dB)

**Switch rating:-** 3A/16V DC

For further information or our  
**Exclusive Components** catalogue contact:  
Sole Agent U.K.  
**Eardley Electronics Ltd**

Eardley House, 182-184 Campden Hill Road, Kensington, London W8 7AS  
Telephone: 01-221 0606/01-727 0711 Telex: 23894 Telefax: 01-727 9556

# JAPANESE TAPE ★ 5-SCREW SHELL CUSTOM WOUND AUDIO CASSETTES

Competitive rates ★ Rapid service ★ Full guarantee

LENGTH	STUDIO FERRIC			MASTER FERRIC			MASTER CHROME			PROFESSIONAL SERIES - FULLY PACKAGED			
	50-249	249-999	1000+	50-249	249-999	1000+	50-249	249-999	1000+	10-99	100-249	250-999	
C1-C5	20p	19p	18p	30p	28p	26p	32p	31p	30p	C7	34p	32p	30p
C6-C9	22p	20p	19p	31p	30p	29p	34p	33p	32p	C10	35p	33p	31p
C10-C19	26p	24p	22p	33p	31p	30p	36p	35p	34p	C15	36p	34p	32p
C20-C29	28p	27p	25p	35p	34p	33p	42p	41p	40p	C20	38p	37p	36p
C30-C39	31p	29p	27p	38p	35p	34p	46p	45p	44p	C30	44p	40p	38p
C40-C49	33p	31p	29p	42p	40p	39p	52p	51p	50p	C45	46p	42p	40p
C50-C59	36p	35p	34p	50p	48p	46p	60p	59p	58p	C60	52p	46p	44p
C60-C69	38p	37p	35p	54p	53p	52p	66p	65p	64p	C90	60p	56p	52p
C70-C89	46p	42p	41p	72p	70p	68p	84p	82p	80p	C120	76p	72p	70p
C90-C95	48p	43p	42p	74p	72p	70p	90p	88p	86p				
Library Cases	6½p	6p	5p	6½p	6p	5p	6½p	6p	5p				

Above prices include Inlay Cards, Side Labels, Library Case.  
The product is supplied overwrapped

*All prices exclude VAT. Orders of £80 (ex VAT) Carriage Paid. Small orders add £4 P&P*



**LONDON SALES:** Battersea Wharf,  
Queenstown Road, London SW8 4NP  
Tel: 01-627 3760

**NATIONAL SALES:** PO Box 19,  
Stratford-on-Avon, Warwickshire CV37 6SA  
Tel: (0789) 68579

**PANCAKES AVAILABLE FOR LOADERS AND DUPLICATORS (TRY TURNING JAPANESE!)**





Connectors by

**NEUTRIK**

**DISTRIBUTION  
NATIONWIDE**



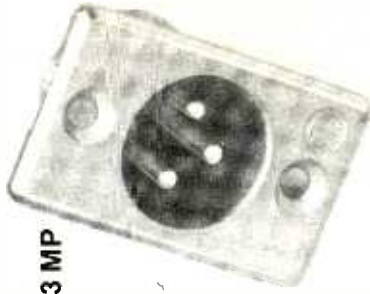
NC3 MP-B



NC3 FP



NC3 FP-B



NC3 MP



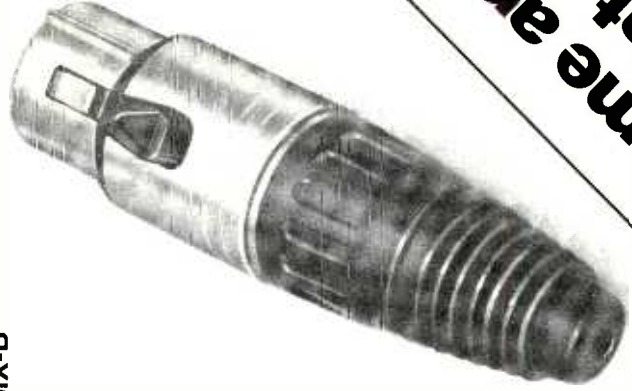
NC3 FX-B



NC3 MX



NC3 MX-B



NC3 FX

**Come and see  
the latest from  
NEUTRIK  
at AES '87**

Sole Agent U.K.

**Eardley Electronics Ltd.**

Telephone: 01-221 0606/01-727 0711 Telex: 23894 Telefax: 01-727 9556

# PPX AMPLIFIERS

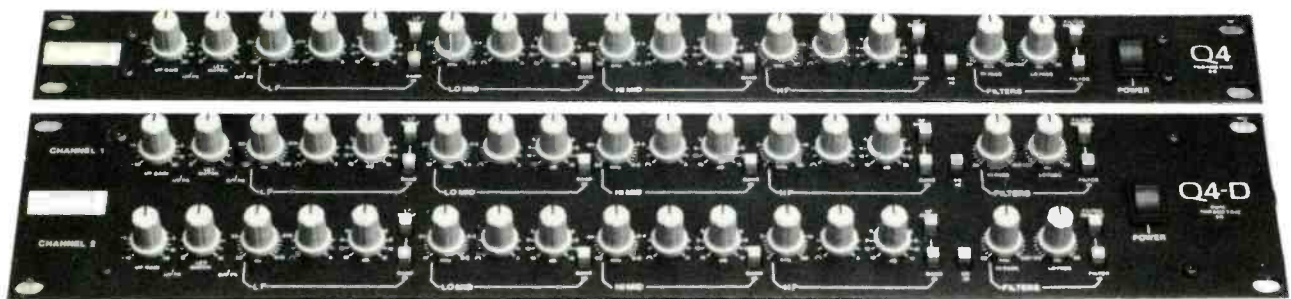
# CITRONIC

A SIGN  
OF  
QUALITY



Technically superior and totally dependable high quality power amplifiers.  
**PPX, better performance.**

Citronic Ltd, Bowerhill, Melksham, Wilts, SN12 6UB, Telephone (0225) 705600, Telex 444181



## NO-COMPROMISE DESIGN UNCOMPROMISING PERFORMANCE

★  
THE NEW Q4 AND Q4-D  
PARAMETRIC EQUALISERS  
FROM

# Nemesis Electronics

At Nemesis we are dedicated to Quality. Quality of Design, Performance and Reliability. That is why we are able to offer, on all of our products, a 3-year UNCONDITIONAL GUARANTEE

If you are a Dealer why not contact us? We are constantly looking for new outlets to improve distribution.

- ★ 4 bands of fully parametric EQ
- ★ Each band switchable in or out of circuit
- ★ Hi and Lo pass filters
- ★ Filters switchable pre or post EQ
- ★ Filters switchable in or out of circuit
- ★ LF and HF switchable between Bell/Shelf
- ★ Electronically balanced inputs and outputs
- ★ Fail-safe bypass circuit and many other features
- ★ For further information or a demonstration Contact Chris Gardner at Nemesis on (0268) 286668

Nemesis Electronics Ltd · Cornwallis House · Howard Chase · Basildon · Essex · SS14 3BB · Tel (0268) 286668 · Tlx 99502 CRS BC



# ECHO TIMES

## Calrec by AMS

### AMS and Calrec merge. Calrec by AMS emerges



Probably the most noteworthy piece of news since the publication of the last Echo Times is the merging of Advanced Music Systems and Calrec. The two companies have independently addressed the professional audio industry for over 10 years and are now determined to use their joint experiences to enhance their separate product lines as well as jointly introducing new products.

AMS and Calrec are only 14 miles apart and are located approximately 20 miles north of Manchester. The merger is not a mere financial exercise and building work is now underway at the new AMS headquarters in Burnley to provide extra room for the Calrec workforce and staff. Although the move is not intended to be completed until sometime in mid 1987, Calrec digital R & D staff moved into the new AMS office complex the day following the signing of the Calrec purchase agreement.

### THE CALREC COMPANY

Calrec began life as a manufacturer by designing and building microphones culminating in the world's highest quality microphone system, the Soundfield. More recently, Calrec have become recognised for their expertise in the custom design and build of broadcast consoles. These consoles range from small portable systems like the Minimixer, to the most recently developed digitally assignable system. The one common factor amongst the entire range of consoles built by Calrec is the transparent nature of the electronics and the resultant high audio quality when following any signal path through the console.

### THE UA 8000 MUSIC CONSOLE

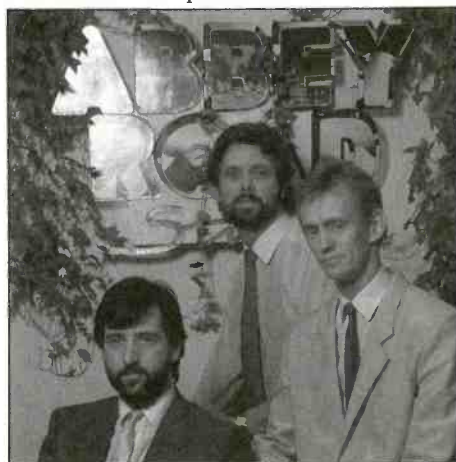
The UA 8000 is a music recording console, the specifications for which were identified during many years of custom building. Although the marketplace for large 'flagship' consoles is very competitive, 1986 has seen a great deal of success for this no compromise console. The first UA 8000 was sold to the Abba studios in Stockholm, but the most talked about location of the UA



UA8000 installed at Puk Studios Denmark.

8000 has been, until recently, the excellent 'no expense spared' PUK facility in Denmark.

At the same time as the AMS Calrec merger, probably the most famous recording studio in the world, EMI Abbey Road announced their decision to install a UA 8000. The choice was made by Abbey Road because of the exceptional audio fidelity of the console. At the November AES in Los Angeles a document was presented to one of the



Steve Jagger, Stuart Nevison and George Waddington following Abbey Road decision to purchase UA8000 console.

directors of Calrec which detailed a year long search by Master Mix Recording Studios of Nashville for a new console. The

conclusions of the document resulted in the first North American sale for the UA 8000. There is now considerable interest in the UA 8000 as it seems to offer a unique choice in this very exclusive area.

Only a limited number of UA 8000 consoles can be manufactured during 1987 compared with the number of orders and the amount of serious interest being shown. There is no doubt that the UA 8000, in the short term at least, will remain a unique and in demand piece of equipment available at only a few exclusive locations throughout the world.

### THE DIGITALLY ASSIGNABLE CONSOLE

At the same time as the evolution of the UA 8000 music console, digital research was channelled into an assignable console. Again, although pursued by many of the leading console manufacturers Calrec have taken great pride in designing, manufacturing, commissioning and accepting payment for two complete digitally assignable installations. The first of these consoles was supplied to Thames Television and at the time of writing, the second was undergoing final acceptance tests by the British Broadcasting Corporation. The desk supplied to the BBC is a 112 input console fitting across the width





Digitally assignable Calrec console installed in BBC Master sound control vehicle.

of the BBC's Master Sound Control Vehicle which is used for all the major outside broadcast recordings made by the BBC. The success of these two installations is not only measured by the fact that many other broadcasters are now also interested in the technology, but that both Thames Television and the BBC are looking to repeat orders for the systems they are now working with.

## THE FUTURE

The announcement of the AMS Calrec merger has been greeted with enthusiasm by the professional audio industry. The two companies exhibit both strong similarities and radical differences. On the one hand Calrec have an expertise in custom manufacture of mixing consoles for the British marketplace, on the other AMS's experience lies in the production-build audioprocessors for an international marketplace. From these differences and from the strength associated with two companies adopting a parallel approach to digital research, must come an interesting future.

# AMS AUDIOFILE ON THE UP AND UPDATE

## AMS AUDIOFILE

### THE NEXT STEP

AMS announced before the end of 1986 that it had been over 12 months since the first AudioFile was sold and that there were now over 50 systems in the field. These facts alone must make AMS AudioFile the world's most popular tapeless audio recording system. The past twelve months have provided AMS with a database of user requirements, some of which have already been incorporated in AudioFile and some of which are soon to come. Each AudioFile owner seems to have been more than pleased to participate in providing operational feedback which has been vital in making AudioFile fast, easy to use and a desirable, essential piece of studio equipment for anyone wishing to manipulate audio.

## AMS AUDIOFILE

### THE CURRENT POSITION

A CUE on AudioFile represents any recorded piece of information and an EVENT LIST is a series of cues for sequential or simultaneous playback. Once one understands this popular terminology takes over and everyone should then understand 'AudioFilese'.

The last standard issue of software for AudioFile in 1986 was Version 4. Some of the system enhancements included in that issue are described here as well as some additional features that have been made available since then.

## AMS AUDIOFILE

### THE 'RECORD PAGE'

An update to the Record Page on

AudioFile now allows Cues to be recorded either into the Cue Library or directly into an Events List. Recording may be manually implemented or programmed against incoming timecode.

The new record page includes Insert Record which equates to drop-in on a tape based system. Insert Record is initially non-destructive of any original Cues and the facility also exists to audition an Insert before commitment to it or retrying.

The Record Page now permits the selection of the audio standard to be recorded, be it analogue, digital - PCM 1610 format which includes direct input from 1630, 3324 digital tape recorders and the Sony CDP 3000 compact disc player, or finally F1 / 701 format.



AMS AudioFile putting sound to picture.

## AMS AUDIOFILE

### BACK UP AND DISK ARCHIVING

Although there is a great deal of talk concerning various optical media and digital tape streamers for backing up audio material stored on Winchester type hard disks, AMS have not yet committed their AudioFile users to any of this current technology. Hooks have been designed into the AudioFile hardware which will allow connection immediately to most of the systems that are being speculated about. However, AMS believe none of these systems currently offer the correct combination of data transfer rates, mass storage or cost effectiveness.

As an interim, AMS have developed a system which utilises a piece of equipment common to many recording studios - the Sony F1 or 701. Raw Cues from AudioFile's hard disks may be transferred digitally along with edit points and timecode information onto a VHS, Betamax or U-Matic video tape. By keeping the relevant AudioFile system disc associated with the Cues, any Events Lists created may be re assembled rapidly on reloading AudioFile's hard disks from the digital audio cassette.

This back up is accessed and controlled via the Filing System page. Also new to the filing system page is the ability to select frame-rate. 24, 25, 30 and 29.97 (Drop Frame) are available with a default condition stored on the system floppy disk.

## AMS AUDIOFILE

### MACHINE CONTROL

Also full machine control including rewind, play, stop, fast forward, shuttle, jog and locate is now offered from the dedicated controls and digipots on the AudioFile control surface. The current list of machines capable of being controlled is as follows:

Sony BVU 800/850 series

Sony DMR 2000 VCR

JVC Professional series of VHS machines

Sony 5800 series in conjunction with an IF 500 converter.



# AMS OUTBOARD STILL OUT FRONT



## AUDIOPROCESSORS STILL REPRESENT THE BEST VALUE PROFESSIONAL SYSTEMS ON THE MARKET



1986 will be remembered as the year of the cheap digital reverb. It seemed that each month a different manufacturer introduced a new product aimed at the semi-professional, for a price half the cost of the previous month's new introduction.

Many recording studios have seen the advantage of these budget systems and today, it is unusual not to see a wide and varied selection of these systems slotted into studio control rooms.

Distributors worldwide reported a period of obvious confusion as all sorts of lower and lower-priced digital audio processors appeared, which seemingly promised everything offered by a professional system at a fraction of the cost.

A recent survey of North American dealers revealed that AMS had come through this period of industry uncertainty with flying colours and that whatever people's views may be on budget audio processors, the best value for money in a system designed purely for the professional remains an AMS system. Some quotes made early in 1987 explain why:



“After 5 years of selling AMS products, sales are as strong as ever – which points to demand for quality updatable equipment. Investment in AMS holds over a long period of time which is highlighted by how little, if any, used equipment ever appears for sale. After working with AudioFile we expect the same to hold true with that as well.”

... *Harris Sound, Los Angeles.*



“Audio quality and construction is the primary reason for AMS's good sales record. Certain key producers, engineers and musicians latch on to these products because of these facts.”

... *Martin Audio, New York.*



“The RMX 16 offers excellent preset programs – most other reverbs have so-so parameters but the RMX offers good sounds more easily and more quickly and still at a good price. The DMX is still the leading product of its type offering dual channel delay, sampling and pitch change.”

... *Studio Supply, Nashville.*



“AMS has become the accepted thing. 85% of AMS units are sold to record companies because it takes an AMS to make a hit record and they don't object to that. More note is taken when an engineer doesn't request AMS for a mixdown.”

... *Harris Audio, Florida.*



“We feel AMS is the finest product we can offer to our customers. We have high end customers who only want to buy one time and not fool around.”

... *Indy Pro Audio, Indiana.*



“AMS has such a good name and reputation and is so reliable, as well as being good both sonically and very quiet. There are a lot of other systems out there but without full bandwidth and noisier.”

... *Profound Sound, Kansas.*



“Simply because the quality is so superior.”

... *Lake Systems, Massachusetts.*



“The one consistent thing that turns customers on is the fact they really do everything that they are supposed to do – good solid products and of course the DMX 15-80S is unique.”

... *Veneman Music, Maryland.*



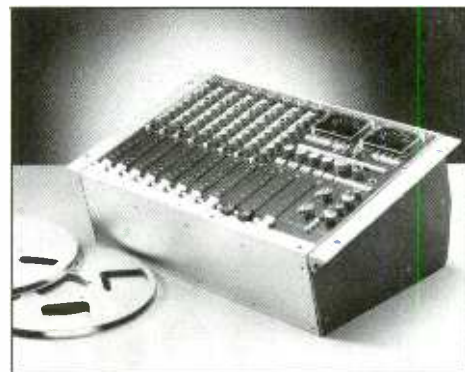
# A/V SYNC FOR US ARMED FORCES NETWORK

In January an order was received from the USA to supply 19 A/V Sync digital audio synchronisers for supply to the US Armed Forces Network. The A/V Sync is a specialist dual or triple channel audio delay compensator for use with video synchronisers.

The A/V Sync can automatically prevent loss of lip-sync which is introduced by varying amounts of video signal delay associated with passage of vision through a field or frame store. The system can also be programmed manually, allowing fixed offsets to be introduced to accommodate situations where synchronisation is lost again when vision has been transmitted via a satellite and sound by landline.

The A/V Sync has proved a popular system with broadcasters worldwide and in the U.K. alone systems are in daily use with the BBC, Thames Television, London Weekend Television, Television South, Yorkshire Television and HTV.

## GRT ORDER 11 MINIMIXERS



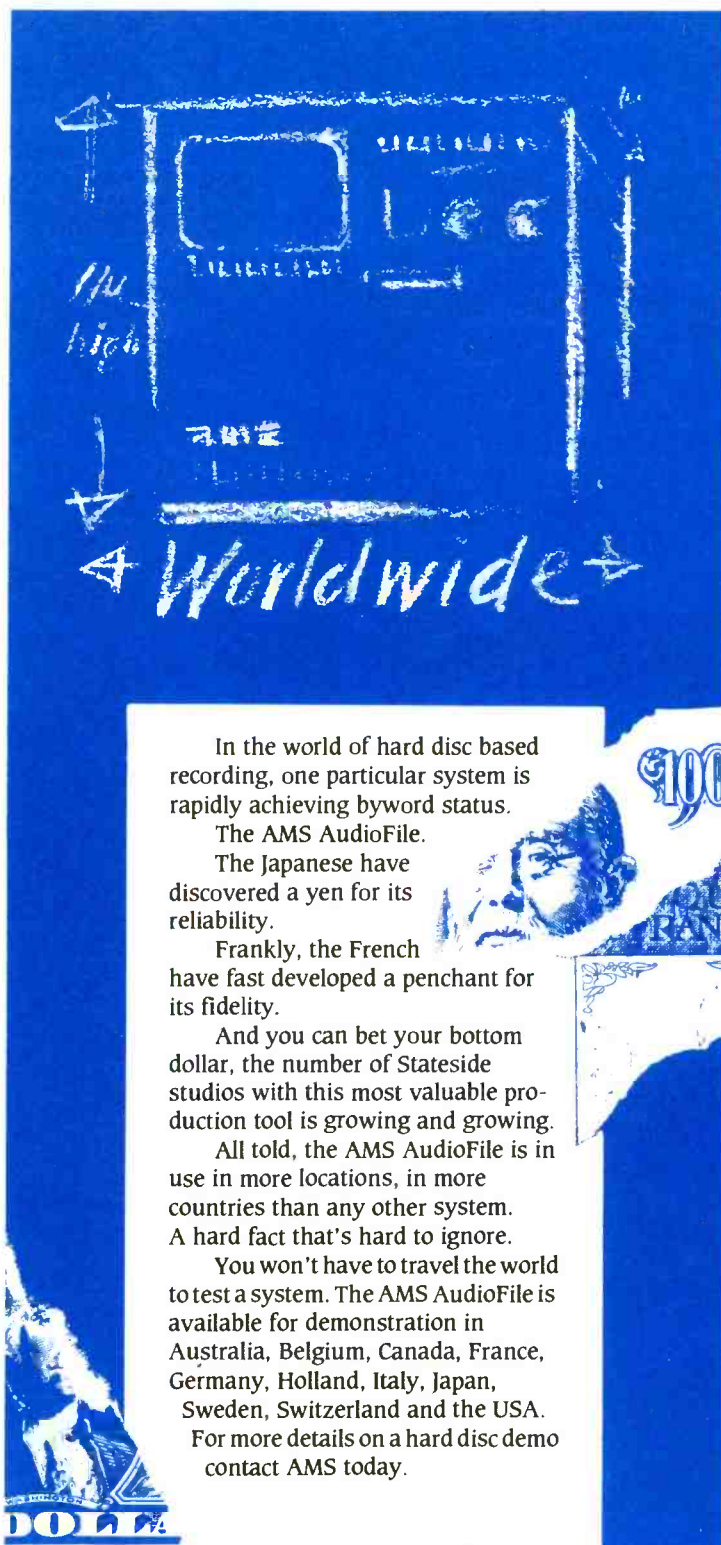
Greek Radio and Television have taken delivery of the first six of a total order of eleven Minimixers. The Calrec Minimixer was chosen because it offered more facilities than any other for the size and price. The 19" rack mount mixers have been supplied with rechargeable battery packs capable of powering each system for up to ten hours.

## ECHO TIMES CHANGE OF STYLE

This issue of Echo Times has had a slight change of style due to the large amount of news items reported. Echo Times 10 will return to the more familiar format and two excellent interviews are already on file for inclusion in future editions.

# Distributors

- Australia:** Syntec International PTY Limited, 60 Gibbes Street, Chatswood, NSW 2067. Tel: 406 4700/4557/4627. Telex: AA70570 CONTACT: Robert Sloss.
- **Heaton Communications Pty Ltd**, 26 Ridge St, North Sydney, New South Wales 2060. Tel: (02) 428 3430. Telex: 20149. Ref. ST281. CONTACT: Paul Heaton.
  - **Austria:** Studer Revox Wien, Ludwiggasse 4, A-1180 Wien. Tel: (0222) 47 33 09. CONTACT: Ing H. Mussmann.
  - **Canada:** Manta Electronics Group, 204 King Street East, Toronto, Ontario. M5A 1J7. Tel: (416) 868 0513. Telex: 06218665. CONTACT: Marshall Freund.
  - **Denmark:** SlT Studie & Lydteknik Aps, Skjulhoej Alle 57, DK-2720 Vanlose. Tel: (0) 1-71 33 44. Telex: 22924 slt dk. CONTACT: Ole Lund Christensen.
  - **Finland:** MS-Audiotron, Laitilantie 10, 00420 Helsinki 42. Tel: 566 4644. Telex: 125778 msa sf. CONTACT: Jarmo Roivas.
  - **France:** High Fidelity Services SA, 4 Rue Pierre Semard, 75009 Paris. Tel: 285 00 40. Telex: 290585. CONTACT: Jean Noel Kendirgi.
  - **West Germany:** Elmus GmbH., Hohenzollerndamm 58, 1000 Berlin 33. Tel: 030 823 99 61. CONTACT: Henri Keinert.
  - **Greece:** KEM Electronics O.E., 28 Papadiamadi Str., 14452 Metamorfofis, Attkis. Tel: 2819151/2811626. Telex: 222700 fimigr. CONTACT: Thimios Koliokotsis.
  - **Hong Kong:** Audio Consultants Co. Limited, 9th Floor, Kai It Building, 58 Pak Tai Street, Kowloon. Tel: 3-7125251. Telex: 54640. CONTACT: John Ho.
  - **India:** Katonix, C-15 Greater Kailash 1, New Delhi - 110048. Tel: 641-1369. Telex: 3163145 ktnx. CONTACT: Manjal Prabhat.
  - **Italy:** Audio International SRL, Via Santa Maria 100, San Maurizio AL Lambro, Milan. Tel: 0039-2-25390121. Telex: 322251 AUDINT. CONTACT: Roberto Beppato.
  - **Japan:** Continental Far East Inc., Sa Saki Building 18-9, Roppongi 3, Chome, Minato Ku, Tokyo. Tel: 583 8451. Fax: 5890272. CONTACT: Shingo Araki.
  - **Netherlands/Belgium:** Audioscript BV, Nijverheidsweg 13, 3762 EP SOEST. Tel: 2155-20302. Telex: 49353. Fax: 2155-22806. CONTACT: Jan Slooter.
  - **Norway:** Pro-Technic A/S, Lyder Sagens Gate - 19, Oslo 3. Tel: 02 460554 Telex: 72580. CONTACT: Martin Viktorin.
  - **New Zealand:** Maser Communications Limited, 3/7 Marken Place, Glenfield, Auckland. Tel: 444 3583/4. Telex: 63100. CONTACT: Gareth Jones.
  - **South Africa:** Tru-fi Electronics S.A. (Pty) Limited, P.O. Box 84444, Greenside 2034, Republic of South Africa. Tel: (011) 786-7177/8. Telex: 4-28708. CONTACT: Fleming Ravn.
  - **Spain:** Fading S.A. Servando Batanero 8, Madrid 17. Tel: 408 67 00/408 68 08. Telex: 44330. CONTACT: Felix Mayor.
  - **Cash Productions**, Agastia 20, Madrid 27. Tel: 267 52 22. CONTACT: Jim Kashishian.
  - **Sweden:** Soundtrade AB, Rasundavagen 45, S 17152 Solna. Tel: 08-7300400. Telex: 10551. CONTACT: Carl Langeskiold.
  - **Switzerland:** BVS AG, Neuhof, CH 8164 Bachs. Tel: 010 411 858 13 13. Telex: 56857 ABQCH. CONTACT: Rolf Jauch/Mark Ofner.
  - **U.S.A.:** **AMS** - Harris Sound Inc., 6640 Sunset Blvd., Suite 110, Hollywood. CA 90028. Tel: (800) 233-1580. Telex: 265871 MONREF G. Quoting: 84:DGS1547. CONTACT: Harry Harris.
  - **U.S.A.:** **Calrec by AMS** - Calrec by AMS, P.O. Box 31864, Seattle, WA 98103 - 1864, Canada. Tel: (206) 633 1956. CONTACT: Nigel Branwell.
- Distributors currently with AudioFile Demonstration System.



In the world of hard disc based recording, one particular system is rapidly achieving byword status. The AMS AudioFile. The Japanese have discovered a yen for its reliability. Frankly, the French have fast developed a penchant for its fidelity. And you can bet your bottom dollar, the number of Stateside studios with this most valuable production tool is growing and growing. All told, the AMS AudioFile is in use in more locations, in more countries than any other system. A hard fact that's hard to ignore. You won't have to travel the world to test a system. The AMS AudioFile is available for demonstration in Australia, Belgium, Canada, France, Germany, Holland, Italy, Japan, Sweden, Switzerland and the USA. For more details on a hard disc demo contact AMS today.

**ams**  
**audiofile**

Advanced Music Systems,  
AMS Industries plc, Burnley, Lancs.  
BB11 5ES. Tel: (0282) 57011.  
Telex: 63108 AMS-G. Fax: (0282) 39542.



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.



# AMPEREX

RECORDS  
RECORDS  
RECORDS  
RECORDS

STUDIO SPARES

STUDIO SPARES 16 Stucley Place, Hawley Crescent, Camden Town, London NW1 8NS TELEPHONE ORDERS: 01-482 1692 ADMIN: 01-485 4908

# NEWS



JBL installation at Yellowstone County Fair

## Contracts

## Obituary

It is with great sadness that we have to announce the death of Hugh Ford.

Hugh had been closely associated with *Studio Sound* for many years both as a consultant and reviewer. His first review appeared in 1971 and since that time he had acquired a worldwide reputation as an authority on virtually all aspects of professional audio equipment. Hugh's reviews were accepted in many areas as the definitive judgement on technical merit, and with the emphasis that he placed on electrical safety he set standards that would cause consternation amongst some manufacturers, but he was not one to compromise his standards for an

easy life.

Aside from his involvement with this magazine, Hugh ran a successful consultancy and was heavily involved with numerous industry associations and societies. During the 1985 European AES Convention, Hugh was given an AES Fellowship Award for his years of forthright equipment evaluation and his contribution to membership education via technical articles and journals.

Hugh Ford died in his sleep on January 1st, 1987. He will be sadly missed by a large section of our industry. On behalf of those who knew him through this magazine, we would like to send our condolences to his family.

## Agencies

- Soundcraft Electronics have announced the appointment of Jands Electronics Pty as sole Australian distributors for their entire range of equipment.
- Gauss have announced the appointment of Philips AKG Acoustics as its exclusive representative for Canada. AKG will act as a stocking distributor for all Gauss loudspeakers, high frequency drivers, horns and systems. AKG Acoustics, 601 Milner Avenue, Scarborough, Ontario M1B 1M6, Canada. Tel: (416) 292-5161. Telex: 0655100 PHILIND TOR.
- California-based Versadyne International have announced the appointment of Leo Young of The

Video People in Hong Kong as their representative in China. Further west, Serge Doubine of SAAV in Paris will handle all European sales, service and installations, while in the UK, Versadyne will be represented by Tony Costello of The Professional Recording Equipment Co Ltd.

- Gexco International have been appointed export agents for both TimeLine Inc and Kintek.
- FM Music Studio Division in Middlesex have announced that they have taken over the pro-audio UK distribution of Wellard Research. FM Music, Penton House, 64 High Street, Harrow-on-the-Hill, Middx HA1 3LL, UK.

## Stolen equipment

On Sunday February 1st, the following items were stolen from Denmark Street Studio in London: AMS *RMX-16*, serial no 2950; AMS *DMX 15-80S*, serial no 2941; Quantec Room Simulator, serial no 727; Sony

701-ES, serial no 600324.

Any information on the whereabouts of any of this equipment can be relayed to the studio on 01-836 6061 or 01-836 4623, or to Holborn CID on 01-725 2283.

- Ampex have announced an agreement with Otari in which all analogue and digital recorders will now be tested exclusively with Ampex tape. Included in the deal is an agreement by Otari to supply all recorders shipped to the USA, Mexico, Central America or South America with either 456 analogue or 467 digital mastering tape.

- Sonifex Ltd (UK) have received an order to equip 23 local BBC radio stations with NAB cartridge machines and associated equipment. A total of 207 *micro HS* series recorders and replay machines are to be delivered within the first half of this year.

- Abbey Road Studios have placed orders with DDA for a third *D series* console, a custom 10/2/2 for CD remastering. And London-based Snake Ranch studios have placed an order for a 36/24/2 *AMR24*.

- Michael Stevens & Partners have just completed work on an in-house studio for HMV's new Oxford Street Branch in London. Housing all the presentation hardware, the circular studio has at its heart a Soundtech console, from which programme material is sent to five different music areas in the shop, via specially modified Quad 520 power amps. Ninety Rogers *LS2* speakers provide the sound distribution.

- Advanced Music Systems have announced the installation of two Calrec 24-channel recording consoles at the Central Office of Information Studios in London. This addition upgrades the studio to a complete video post-production and radio presentation training facility.

- Coach Audio Sales of West Germany have announced the recent supply of *MCI JH24s* to Rail Recording Studio in Konstanz and to AFC Film Studios in Cologne. This follows their installation of Soundcraft 2400 consoles in Hansahaudio Studio, Bonn, and J Fritz Studio, Cologne; and the completion of a 16-track recording studio installation for MAG Music. Coach have also been appointed as exclusive dealer in West Germany and

Luxembourg of Quedstedt monitoring systems.

- FWO Bauch (UK) have announced an order to supply seven more Albrecht *MB51* sepomag machines to the BBC. These are destined for the new film post-production area, schedule to be installed in London this summer.

- More than \$150,000 worth of JBL's *Concert* series equipment has been bought by Morgan Sound Inc in order to meet the sound reinforcement requirements of the Yellowstone County Fair in Montana.

- Allen and Heath Brenell's *CMC 32* mixer has been installed in Sweden's largest studio facility, Stockholm-based Sonet Studios, and will be used for synthesiser recording using the mixer's MIDI facility.

- Munro Associates of London have signed several new design contracts for studios due for completion in '87. These include Markant Studios in Eindhoven, Holland, who will be building a new control room to full Munro specifications, and similar projects at: Sweet Silence Studios, Copenhagen; Eggars Hill Studios in Aldershot, UK; Leroy Street Studios in London; Solid State Logic in Oxford; Berwick Street Studios and San Souci Studios both in London.

- Soundcraft Electronics (UK) have announced the delivery of the 200th *SCM 760* multitrack tape machine to be sold in the UK. Producer Tony Clark was the recipient, and the machine will find its home in Clark's studio on board his ocean-going power boat 'Tao Princess'.

- Pro-audio rental company Hilton Sound have announced an investment in Sony DASH format *PCM-3324* machines, which will complement their stock of Mitsubishi digital recorders.

- Benchmark Associates, recording studio designers, have joined with architects Downtown Design to specialise in the design and construction of complete recording facilities. Benchmark Associates with Downtown Design, 425 East 63rd Street, New York, NY 10021, USA. Tel: (212) 688-6262.



# Low-cost digital audio comes of age.

The Sony PCM series has now been available for several years. In this time recording and broadcast organisations, government, educational and industrial establishments, as well as individual users have all acknowledged the unique value of these units, and made them a new standard. It is the superlative quality of Sony PCM digital, coupled with extremely low cost that has brought about this professional acceptance of the range. This is borne out by the number of new ancilliary products from other manufacturers, that have further increased the flexibility and versatility of the range. Examples of these products are the 'CLUE' logging and editing system from HHB, as well as various interfaces which allow digital communication with the PCM 1610.

Sony has acknowledged that this acceptance by professional users necessitates a change of

policy towards these products. Accordingly they have upgraded them from the domestic catalogue, and, realising the need for professional support and all that that entails, have appointed HHB as specialist dealers to represent them in the pro-audio market.

We are proud to announce this appointment, and happy to assure our customers of continued availability of the PCM range. The re-instatement of the PCM production line has been very largely due to pressure from end-users, who are after all the motivating force in the audio world. So if you are involved with audio recording and are still unfamiliar with Sony digital, then you owe it to yourself to call HHB - the No. 1 name in Digital Audio.

**SONY** FROM **HHB**

HHB HIRE & SALES, 73-75 SCRUBS LANE, LONDON NW10 6QU. TEL: 01-960 2144. TELEX 923393



THE SONY PCMF1 AND PCM701ES DIGITAL AUDIO PROCESSORS

# Address changes

## NEWS

### Beatles CDs

EMI are poised to start releasing the first Beatles albums on CD in the UK on February 26th (this excludes the Abbey Road album available for a short period from Toshiba/EMI). These will be the first four albums of chronological UK release — *With The Beatles*, *Please Please Me*, *Hard Day's Night* and *Beatles For Sale*. This is the beginning of the full catalogue the UK originated masters are the basis of worldwide release.

As one of the major acts whose albums are not yet available on CD there is bound to be considerable interest particularly from the recording industry, perhaps looking to a standard for transfer of old material to CD and with so many of us having been weaned on the albums anyway.

Abbey Road studios have been keeping very close control over the selection and mastering of tracks but I was able to attend a preview recently. The basic philosophy has been to take the masters used for original vinyl release and transfer to 1610 using the same EQ as was used for the original less any EQ which

was added purely for vinyl problems. The mastering concept was to treat the master as unalterable and just transfer. To this end all the CDs are mono—the stereo was never right(?).

The original tapes were apparently in good condition and transferred in this way the results are far better than one might expect. The first two albums sound rather rough in their original recording although *Love Me Do* sounds like it could have been recorded at a far later date. The *Hard Day's Night* album is a vast improvement with the drums and bass recorded with far more subtle use of compression. I think what will be surprising is the general subtlety of production and some of the little touches that you will hear for the first time. On the negative side it is perhaps arguable that a little more could have been done to remove LF noise in the quieter passages but this would involve tampering beyond their philosophy.

With the influence of The Beatles still quite strong, those of us Beatles 'Weanies' have some instructive and enjoyable treats coming. KSA

### People

● Gexco International Inc have announced a number of new appointments. Edwin Cohen has been named as operations manager, while Patricia Kynes moves to

administrative assistant. Michael Fleyzer, with experience in international financial transactions, has been appointed controller.

### IBS lectures

The Institute of Broadcasting Sound have announced further details of big names to bolster their 1987 series of lectures. On March 13th, Ray Dolby will describe and demonstrate the new *Spectral Recording* noise reduction system, while on May 14th, Rupert Neve will talk on his pioneering achievements and his

latest work. In between, on March 19th, a *Light Entertainment Forum* will be held, which aims to foster mutual exchanges within the industry. All will be held in Central London, and for information contact Elaine Thorpe, 6 Greenfields, Maidenhead, Berks SL6 1BA. Tel: 0628 74355.

● Reflexion Arts have moved from south London to Bruton, Somerset. The building is an old chapel and there are plans to use the main hall for concerts; this is linked to an upstairs recording studio which will additionally serve for development and demonstration use. The basement area will provide laboratory and test facilities. Manufacture will, however, remain at the other location. The full address is now Atlantis Buildings, High Street, Bruton, Somerset BA10 0AE, UK. Tel: 0749 812260.

● London based Arup Acoustics, consultants in acoustics and noise control, have opened a satellite office in Winchester, Hants. Newly appointed Richard Bussell now heads the London office, coming from Sandy Brown Associates with seven years work on architectural, building and electro-acoustics. Arup Acoustics, 30 Percy Street, London W1P 4FF, UK. Tel: 01-636 2853. Arup Acoustics, Radley House, St Cross Road, Winchester, Hants SO23 9HX, UK. Tel: 0962 69111.

● Swiss-based Electro-Voice SA have moved into new headquarters in Ipsach. The 22,000 ft<sup>2</sup> facility includes the company's European headquarters and administration department, assembly facilities, operations, service and warehouse

sections. The address is Keltenstrasse 5, CH-2563 Ipsach/Switzerland. Tel: 032 51 68 33. Telex: 934 045. Fax: 032 51 12 21.

● Total Systems have moved to Weller Eggar House, High Street, Hartly Wintney, Hants RG27 8NY, UK. Tel: 025 126 4757.

● Sue Graham Associates, business and travel consultants, have moved to 24 Lambolle Place, London NW3 4HP, UK. Tel: 01-722 3394/586 1057. Fax: 01 722 4969.

● Following the recent move to St Albans, Herts, Mitsubishi Pro-Audio Group's new telephone number is 0727 40584.

● Teac UK have moved to Victoria House, 28-38 Desborough Street, High Wycombe, Bucks HP11 2NF, UK. Tel: 0494 26211. Fax: 0494 459540. Telex: 83389.

● Martin Audio Ltd have moved to Cressex Industrial Estate, 19 Lincoln Road, High Wycombe, Bucks HP12 3RD, UK. Tel: 0494 35312. Telex: 838048 Maudio G.

● Audio FX Ltd is moving from their Belsize Park location to AFX House, 5-7 Buck Street, London NW1 8NJ, UK. Tel: 01-482 1440.

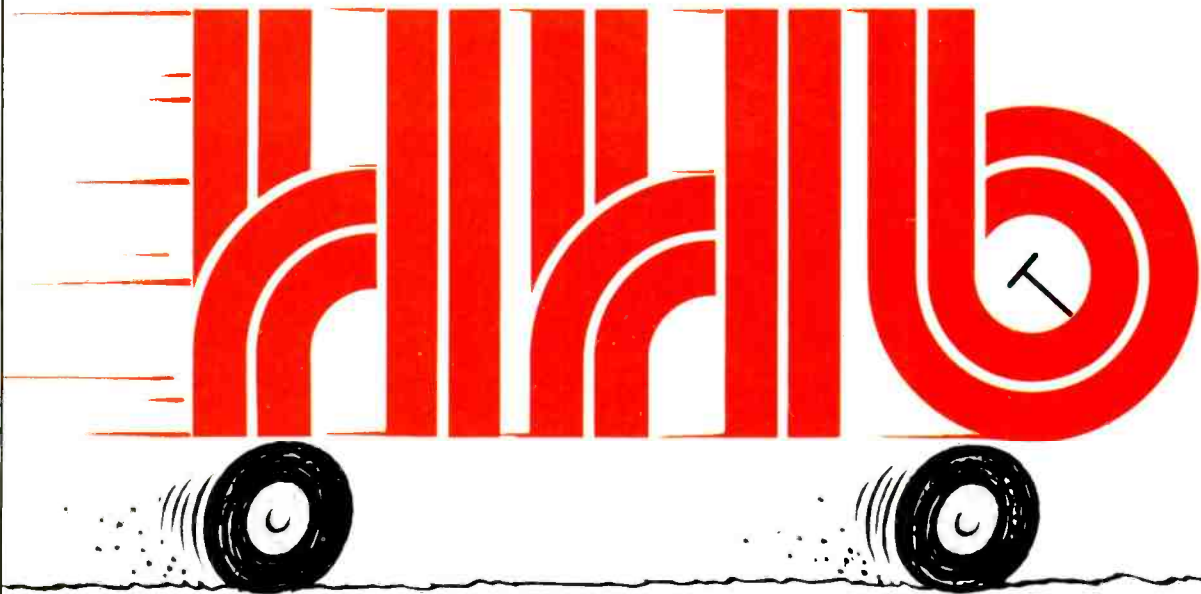
● Chromatix have moved from Ealing, to 73 Princedale Road, Holland Park, London W11 4NS, UK. Tel: 01-229 2041/5131.



The new Electro-Voice headquarters in Switzerland and (below) the assembly room







## We're on the move

We've all come a long way in ten years... And while many of you have enjoyed successful projects and opened up bigger and better studios, we've had an increasing struggle against decreasing space, landlords, motor traders, rag traders and so forth in our delightful premises in New Crescent Works.

At last we've found a new home – not half a mile down the road from where we are now, but infinitely more salubrious and easier to find.

From **3rd November 1986** we shall be trading from our new headquarters in Scrubs Lane offering expanded facilities for both demonstrations and servicing, a much larger digital editing

suite, as well as far greater levels of comfort for staff and visitors alike.

Our enormous new showroom will allow us to demonstrate complete 24 track studio systems, 16 track audio-visual packages and the very latest in digital recording technology. Additionally we will have our usual permanent demonstrations of the very best in home studio recording systems, video equipment, amplifiers, CD players, signal processors, mics, monitors – in fact everything you might need.

So to make sure you don't lose us and we don't lose you, please make a note of

**our new address and telephone number.**

Here's to the next ten...

HHB Hire & Sales,  
73-75 Scrubs Lane, London NW10 6QU  
Tel: 01-960 2144 Telex: 923393

# NEWS

## In brief

*Queen Magic*, the rock group's film documenting their successful concert at the People's Stadium in Budapest, has become the first to be mixed in **Dolby Stereo** in an Eastern bloc country. The special encoding equipment was sent from London to the Mafilm studios in Hungary, where the music tracks were mixed with atmospheres, special effects and narrative... The first **Dolby SR** modules are now in use in preparing digital masters for VHD videodisc production at JVC's Video-Tech in Tokyo. Digital soundtracks for transfer are copied to ¼ in SR-encoded analogue tape, cut and splice edited then copied back to digital for the master... The British Library's **National Sound Archive** has now reopened. An enlarged and more comfortable reference library of printed materials augments an increase from seven to 20 individual listening areas, all free of charge. The commercial search and copy service provides soundtrack material for a variety of uses. For more information and the 1987 events programme, contact National Sound Archive, 29 Exhibition Road, London SW7 2AS. Tel: 01-589 6603... **Alpha Electronics** (Scotland) have opened a shop to cater for customers throughout Scotland and the north of England. As well as supplying a comprehensive range of test and measurement products, Alpha will also offer a full repair and calibration service. Alpha Electronics, 73 Wester Broom Drive, Corstorphine, Edinburgh EH12 7RG. Tel: 031-334 5107... Of interest to those involved in spoken word recording is K-Tek in Surrey, a 16-track studio equipped with an *M&A 24/8/2* console, *Revox B77 HS* and an *AKG C414*. Seven-hour weekdays and nine-hour weekends are available. Peter Kunzler, PO Box 172A, Surbiton, Surrey KT6 6HN, UK. Tel: 01-399 3990... **3M** and **Nagra** Magnetic Recorders have announced jointly that all new US-targeted Nagra recorders will be standardised to use

3M's latest *3M 808* tape, and that one reel of the tape will be included with each new recorder shipped to the US... UK-based **Whiteley Electronics** have bought the assets of Audio Music Manufacturing Ltd, makers of *Ram* and *Dynamix* mixing equipment. Whiteley have created, especially for these products, a new Audio Manufacturing Division... **Fairlight Instruments** (Australia) have announced the acquisition of a controlling interest in their US sales and service outpost, Fairlight Instruments Inc. Paul Broucek has been appointed as the new chief executive officer in the US... **Canford Audio** (UK) have announced the opening of a new factory in Washington, Tyne and Wear. The 23,000 ft<sup>2</sup> facility will employ over 30 staff, which the company expects to rise to 40 by the end of the year... **Apogee Sound Inc** of California have announced the expansion of their Northern California production facility and the establishment of their Southern California sales branch, headed by newly appointed vice president of sales, Joe Manning... UK company **GM Technical Services** have announced an extension to their product range of nameplates, labels and front panels. They are now available in a wider range of photo-anodised aluminium, and photo-etched and filled stainless steel, at thicknesses between 0.125 and 1.65 mm. A large range of colours is offered, as is a choice of equipped fixing holes or self-adhesive backing. Tooling facilities are offered to suit individual control/fascia and instrument panels... January marked the opening of Nashville's newest studio entry, **Sixteenth Avenue Sound**. Designed and built by engineer Mike Poston, it was christened with the recording of Steve Winwood's latest single... **KEF Electronics**, **Bang & Olufsen** of Denmark and the **Danish Technical University's Acoustics Laboratory**, have announced plans

for a five-year co-operative research project under the EEC's EUREKA programme. The aim of the project is to gain a greater understanding of physical and psychological aspects of listening in rooms, so that with new techniques in sound reproduction, sonic illusion can be greatly enhanced and controlled...

**JRF/Magnetic Sciences** and **Globe Precision Products PTE Ltd** are to associate to establish the first Asian company outside Japan to sell and service audio magnetic heads. Based in Singapore, the new company will be known as **Globe Magnetic Sciences PTE Ltd**... The **AES Educational Foundation** have announced the opening of their 1987 educational grant programme. The annual awards are for university graduates only. Details from: AES Educational Foundation, 60 East 42nd Street, New York, NY 10165, USA. Tel: (212) 661 5528... **AB International** have announced the acquisition of all product assets of AB Systems Inc. AB International Electronics Inc, 1830-6 Vernon Street, PO Box 1105, Roseville, CA 95678, USA. Tel: (916) 783-7800... **Springboard** in Hackney, part of London's two-year Youth Training Scheme, is looking for placements for their second year students. The nine-part curriculum includes: using the *Postex X15*,

studio layout, tape operating and editing, sound engineering on the *AHB CMC 24*, microphones, sound processors, drum machines and synthesisers, and computer operation.

**Springboard**, 1 Stamford Hill, London N16 5TU. Tel: 01-800 1230... **Air Studios** have announced the opening of their new Studio 5, a MIDI programming facility based around the *Fairlight Series III* and *Apple Macintosh*. This provides a total of 216 tracks controlling a variety of synthesisers and samplers. In Monserrat, Air have refurbished their studios with a new 60-channel console incorporating 48 channels by *Solid State Logic*, fully integrated with 12 more channels by *Focusrite*... London-based **Gateway** have announced a nationwide tour of UK cities in conjunction with *Postex*. Following the success of the *Turnkey Hands on Shows*, 1987's tour will include a day of seminars on recording techniques, backed by demonstration of the *Postex* equipment. The tour expects to visit Bristol, Cardiff, Birmingham, Manchester, Glasgow, Newcastle, Dublin and Belfast, and the lectures will be held on weekends with a 200 limit at each. Information is available from *Atlantex*, Brent View Road, London NW9 7EL.



The pro-audio sound room at Yamaha Music Pulse

## Contracts

- Recent contracts for Amek have included customised *BCII* to WMRS, London, who provide radio studio facilities; a post-production console for Cheshire based video facility *Viewplan Facilities*; a large six-group *BCII* and an *Angela* console for the new London video post-production facility of Paul Headland (ex operations director *Molinare*); and a further *BCII* to Granada TV to be installed in a new VTR editing suite in Manchester.
- *Tecniche Del Suono* (TDS) of Milan

have recently supplied a *JH24/24* to Il Parco Studios, Naples, a *JH24/24* to TransEuropa Studios in Turin; and 24 channels of *telcom c4* to Titania Recording in Rome.

- Yamaha have announced the opening of a new London retail shop aimed specifically at users of computer based musical instruments and pro-audio hardware. Opened by *Kemble Music Ltd*, at 58-60 Conduit St, London W1, Yamaha Music Pulse makes use of product specialists for each range of product.





## IT MAKES TAPE MORE FLEXIBLE

Otari would like to draw your attention to a remarkable new recorder. The MX70.

The MX70's microprocessor-controlled tape transport, closed-loop tension control and real-time tape counters give you instant, accurate tape control. And that gives you more time to do a better job.

The MX70 is designed for ease of use with machine controllers and synchronisers, meeting a variety of standards, including SMPTE. This makes it as valuable in video

post-production and broadcast studios as it is in audio recording.

Features like these, and many others, make the MX70 one of the most flexible tools any growing studio could wish for.

But there's one area where Otari's MX70 really does offer the kind of flexibility that no other machine can match. In formats.

The MX70's option list lets you choose between 1" 8-track and 1" 16-track formats. Convert to 1/2" 8-track. Or even switch between all three options on the same machine.

But while the MX70 sets new standards for flexibility, the men at Otari have stuck rigidly to tradition.

They haven't budged an inch on quality.



# OTARI<sup>®</sup>

For more information on the MX70 or other Otari products, contact  
 Industrial Tape Applications, 1 Felgate Mews, Studland Street, London W6 9JT Telephone: 01-7489009  
 Sterling Audio Systems Ltd., 1 Canfield Place, London NW6 3BT Telephone: 01-6254515

Otari Corporation  
 2 Davis Drive  
 Belmont, California 94002  
 Telephone: (415) 592-8311  
 Telefax: (415) 591-3377  
 Telex: 910-376-4890 OTARICORP BLMT

Otari Electric Co. Ltd.  
 4-29-18 Minami-Ogikubo,  
 Suginami-ku,  
 Tokyo 167  
 Telephone: (03) 333-9631  
 Telefax: (03) 331-5802  
 Telex: J26604 OTRDENKI

Otari Singapore Pte Ltd.,  
 625 Aljunied Road,  
 07-05 Aljunied Ind.,  
 Complex Singapore 1438  
 Telephone: 743-7711  
 Telefax: (743) 6430  
 Telex: RS36935 OTARI

Otari Electric Deutschland GmbH  
 Gielen Strasse 9,  
 4040 Neuss 1  
 Telephone: 02101-274011  
 Telefax: (02101) 222478  
 Telex: 8517691 OTEL D

# NEWS

## Agencies

- Kelsey Acoustics Ltd have been appointed sole UK importer and distributor for the products of the Carver Corporation including professional power amplifiers and hi-fi products.
- Uher Sales & Services have ceased trading. The company has made the following arrangements for the continued supply and support of distributed products. Sole distribution and service of professional Uher products within the UK will be the responsibility of Telecommunications Information Systems Ltd, 223

- Twickenham Road, Isleworth, Middlesex TW7 6TG, UK. Tel: 01-847 3033. Distribution and service of Bruns, Visonic and ASC products in the UK will be handled by: R J Education Supplies Co Ltd, Unit 2, Westham Trading Estate, London Road, Westham, Kent TN6 3BR, UK. Tel: 0959 62255.
- EMT-Franz GmbH, manufacturers of studio digital electronics and turntables, are to be MBI's exclusive West German representative for the UK company's radio station design, installation and commissioning services.
- Fairlight Instruments have announced Canadian and Spanish

- distributors for their *CMI series III*. Toronto-based Computer Music International will also be handling all after sales support and service in Canada. In Barcelona, Sistemas Midi, a division of Ventamatic, will be handling Spanish distribution.
- Surrey-based Soundtracs plc have announced the appointment of AKG Acoustics Inc, Stamford, CT, distributors for their products in the USA.
- Executive Audio Ltd have announced that they are the European distributors for Samson Products, 159 Park Road, Kingston-upon-Thames, Surrey KT2 6BX, UK. Tel: 01-541 0180. Telex: 889294.
- UK-based McKenzie Acoustics have appointed sales agent Dave Martin International to handle all its overseas orders and sales.
- Millbank Electronics Group (UK) have given licensing rights to Motwane Private Ltd of Bombay to manufacture Millbank *PAC-System* equipment exclusively for the Indian sub-continent.
- Syco Systems have been appointed by Neotek of Chicago as exclusive distributors in the UK of all Neotek products. Syco have also agreed to handle exclusive UK distribution of PPG's *HDU*.
- Audio Kinetics (UK) have appointed Grothusen GmbH to represent and distribute their products in Austria.
- Philip Drake Electronics Ltd of

- Hertfordshire have announced plans to appoint RTS Systems Inc of California as exclusive Drake distributor for the USA.
- Britannia Row Equipment Ltd have been appointed the European distributor for the range of Summit valve limiters and remote controlled mic amps. The London company now also distributes BGW amplifiers in Germany as well as in the UK and will soon be appointing dealers. Additionally, they are now responsible for marketing Electrospace products throughout Europe, and in their role as Westlake distributors in Europe, have appointed Interstage as sole dealer for Denmark.
- DDA Ltd have announced the appointments of official agents in the Far East. In Japan, Studer Revox Japan will exclusively handle the *AMR24*. All other DDA products will be handled by Unicus International (importers) and Atlantic Audio (distributors). Studer Revox (Far East) has been chosen to represent DDA in Hong Kong, as well as in the Chinese market. Studer Revox Audio will represent DDA in Singapore, as well as covering Indonesia and Malaysia. Studer Revox Japan, 1-22-2 Yoyogi, Shibuya Ku, Tokyo 151. Tel: (03) 320 1101. Studer Revox (Far East) Ltd, 25th Floor, Arion Commercial Centre, 2-12 Queen's Road West, Hong Kong. Tel: 5-412050.

# CLEAR REASON

For the music studio owner, no decision is more critical than choosing a console. Both financially and creatively, the success of your operation may well depend on the capabilities and quality of the system you select, and the company that supports it. Clear reason, we suggest, to consider the SL 4000 E Series Master Studio System from Solid State Logic. But certainly not the only reason.



plus switchable phantom power, patchfree audio subgrouping, AFL and PFL monitoring, fader start for external devices,

Consider, for instance, that only SSL has built-in track remotes on every channel, integrated with the industry's most versatile monitor fader and foldback facilities. Or that SSL alone provides pushbutton signal processor routing for each channel's noise gate and expander, compressor/limiter, high and low pass filters, and parametric equaliser —

and stereo modules with balance and Image Width controls.

Consider that SSL makes the industry's only comprehensive studio control system — with integral synchronisation of up to five audio/video machines,



concise English commands, tape location by timecode, foot/frames, cue numbers or key words, and complete session list management. And that SSL alone offers extensive fader, group and mute automation and mix manipulation plus optional programmable parametric equalisation and panning, multi-repeatable Events Control, and Automatic Dialogue Replacement.



Studer Revox Audio PTE, 173 Goldhill Centre, Singapore 1130. Tel: 250 7222.

Unicus International, Room 307, Aoyama Kyodo Building 3F, 3-6-18 Kita-Aoyama, Minato-Ku, Tokyo 107. Tel: (03) 407 8195.

Atlantic Audio, Room 101, Sun Hatsu, Koenjminami, Sugunami-Ku, Tokyo 166. Tel: (03) 316 1120.

## People

● Beyer Dynamic UK have announced the appointment of Phillip Neighbour to their outside sales team with special responsibility for London and the South east. He was previously with Court Acoustics.

● There have been a number of promotions in Sony Broadcast's Basingstoke headquarters. General manager of Pro-Audio Osamu Tamura takes on the additional role of co-ordinating the marketing services programme for the entire Sony Broadcast product range. Chris Hollebome becomes senior manager, Pro-Audio Sales, John Frazer takes on the newly created role of UK sales manager, and Clive Lorton becomes senior sales engineer with emphasis on broadcast. Richard Salter becomes senior manager,

Product Management, and will be co-ordinating close liaisons with the company's European customers in developing new products. A new RF product group has been created, and will be headed by Chris Walden as RF manager. And coming from the BBC is new product engineer for audio tape recorders, Andy Tait, who will be working with newly promoted senior product engineer, Digital Audio, Phil Wilton.

● Torquil Dearden has joined post-production company Video Tape Recording Ltd of London as an editor, joining Phil Stone and Ant Frend. Dearden comes from Carlton Television where he specialised in pop promos, and before that he designed and built the editing studio at Island Records.

● Sony Corporation of America have announced the promotion of Jason Farrow to vice president, Corporate Communications, from Director of corporate communications.

● Neve Electronics have appointed Alistair Bullock as sales manager, UK Recording Studios, joining recently acquired Roger Cameron who becomes sales executive for Recording Studios.

● John Romer has been appointed financial director and Stuart Goward production director within Whiteley Electronics in Nottingham. This follows the recent appointment of Steve Radford as engineering director.

● Editor Mark Alchin from VTR Ltd and Steve Turner, Ewart TV's head of sound, have joined Molinare in London to strengthen the company's commercial and promotional markets.

● Photomag Recording Studios of New York have announced the appointment of Terry Mader as post-production mixer, and Dominick Tavella as recording engineer.

● Soundcraft Electronics Ltd have announced the appointment of Philip Hart to the position of managing director. He comes from Thorn EMI Datatech, where he was manufacturing director.

● Jon Ridel has been appointed to manage and develop the recently

established Syco Studio Division in London. Ridel moves from Turnkey after six years in the development of studio sales.

● Audio Kinetics Inc, New Jersey, have appointed Iain Roche as vice president of sales.

● JBL Professional of California have appointed David Kimm as sales manager for Soundcraft USA. Coming from Morgan Sound in Washington state where he was involved in sound system design and installation, Kimm's new responsibilities will include overseeing the sales management and distribution of his company's products in America and Mexico.



Then consider that SSL's Studio Computer alone goes beyond mixing automation to provide Total Recall™ — a unique system, completely independent of the audio path, which stores all I/O module settings after each session. The new TR AutoScan function makes

it faster than ever to recreate headphone and monitor mixes, equalisation, or entire console setups with quarter dB accuracy and rapid verification. And SSL alone offers data-compatibility with more than 300 installations — in over 80 cities around the world.

Finally, consider a company whose record of practical innovation, ongoing development and in-depth technical support has earned repeat orders from many of the world's toughest customers — a company that other manufacturers use as a standard for comparison. We join them in urging you to compare. Our 40 page colour brochure on the SL 4000 E Series is a good place to start. It's yours for the asking, and it just might make your difficult decision a whole lot easier. Clear reason, may we suggest, to write or call us today.

## Solid State Logic

Begbroke, Oxford, England OX5 1RU • (08675) 4353  
200 West 57th Street • New York, New York 10019 • (212) 315-1111  
6255 Sunset Boulevard • Los Angeles, California 90028 • (213) 463-4444

# Increased training facilities at Salford College

The Salford College of Technology have announced the opening of their new 16-track studio, an addition that complements the already existing 8-track and electro-acoustic studios of its Department of Performing Arts and Media Studies. Salford expect

this to greatly enhance their higher diploma course in popular music with recording. During 1987 Salford is also offering a course in music recording and technology, designed in consultation with APRS.

## NEWS

### Audio+Design/SWA US joint venture

Audio+Design Recording and Straight Wire Audio Inc have announced a joint venture for the distribution and manufacture of Audio+Design products in the US. Audio Design's US distribution company will be moving with SWA into new manufacturing premises at 4611 Columbia Pike, Arlington, VA 22204. Also the two companies will be pursuing joint development of

digitally orientated products. The first result of this is a stereo image enhancer utilising UHJ transcoder technology to be known as the *SoundScape SpreadBox* and will be launched at the NAB Convention. Telephone numbers for the venture are (800) 368-2081 for product info and orders; repairs and after sale service will be on (703) 522-7780.

### Gateway courses

Gateway have announced new courses for '87, which include comprehensive looks at MIDI, as well as MIDI mixer technologies as they appear on the market. Linked to the MIDI courses is one on sampling, which will be based on the Akai

S900 but others are hoped to be studied as they appear. Gateway's primary and advanced multitrack courses are available to tie all the latest information together. Gateway, 1a Salcott Road, London SW11 6DQ, UK. Tel: 01-350 0340.

### Literature received

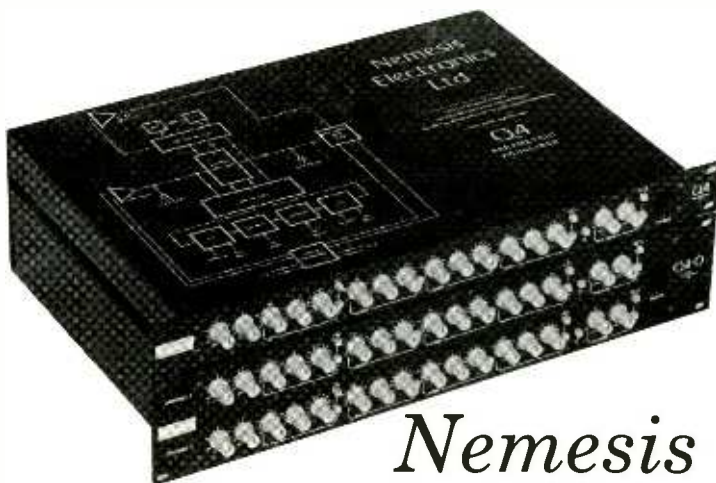
• A new full-colour, technical booklet from Fabritrak details how studio wall covering can be given that professional looking finish, despite whatever odd angles or curves there may be. Fabric is stretched over wall surfaces and neatly tucked away at the edges thanks to a tracking system fixed to the existing wall. A layer of 9 mm thick subsurface is used between the wall and fabric, the choice of which depends on insulating requirements. Fabric used can be just about anything though cotton linen variations seem to be the most popular. Fabritrak offers an extensive range of colours and patterns.

Fabritrak, 20a Pimlico Road, London SW1W 8LJ, UK: Tel: 01-730 9087/9439.

• Communique Systems have issued *The Used Equipment Price Guide*, aimed at anyone interested in the sale or purchase of used medical and audio processing equipment. Published quarterly, the Guide has been compiled as a cross-Britain computerised survey of asking prices

for a comprehensive range of equipment. There will be no classified advertisements, although the guide will list used equipment retailers, repair/overhaul companies, and provide free space for lost or stolen equipment. A heavy duty cover and quick reference layout have been incorporated with constant use in mind. Single issues cost £3.95 and annual subscriptions are £14.00. Communique Systems, Unit 104, 5-10 Eastman Road, Acton, London W3 7YG, UK. Tel: 01-749 5295.

• Telecommunications cable manufacturer Dauratube & Wire Ltd have published their *1987 Cable Catalogue*, which lists in 24 pages of full colour their entire range of products. Full specs are included, there is an easy colour coding guide feature and the company now uses brand names for each group of cable. Free copies are available from: Duratube and Wire Ltd, Feltham, Middlesex TW14 0XD, UK. Tel: 01-890 3453. Telex: 934316. Fax: 751 4518.



### Nemesis parametric equalisers

Nemesis have recently introduced the Q4, a 4-band parametric equaliser with Q, centre frequency and 15 dB cut and boost. Each band can be individually switched in and out of circuit. Input gain is -10 dB to +20 dB with 0 dB at the detented centre position. Level matching is provided to enable the matching of processed and direct signal levels.

The four bands comprise LF, 30 to 500 Hz; LM, 170 Hz to 2.8 kHz; HM, 550 Hz to 9 kHz; and HF, 1 to 20 kHz. The HF and LF bands are normally bell-shaped but can be individually switched to shelving response. High and low pass filters are included. These are normally post-EQ but can be switched pre-EQ.

In addition, it is possible to switch the entire filter section in and out as a block.

Electronic balancing is standard (transformer balancing is available as an option) and automatic bypass—in case of power failure—is also provided. Male and female IEC connections enable several units to be linked to a single mains feed. In addition to the standard model (and options) Nemesis also offer a more extensive customising service on all their products.

**Nemesis Electronics Ltd,**  
Cornwallis House, Howard Chase,  
Basildon, Essex SS14 3BB, UK.  
Tel: 0268 286668.



# Neve DSP—The digital experience.

Many audio console manufacturers tell you that they are 'ready for digital' – some even claim that their control technology is fully developed for digital audio processing 'when the hardware is ready'.

Only one manufacturer has a range of fully operational digital audio consoles – including tape transfer units, a unique disc-mastering system, and stereo broadcasting and multi-track recording consoles.

The Neve DSP console at CTS Studios in London is the world's first truly automated console, with levels, dynamics, equalizers and routing all resettable by the Necam automation system.

The BBC Digital Control Vehicle is

in constant demand for live broadcasts and recording, and recently won a Sony Broadcast Award.

Westdeutscher Rundfunk demonstrated their confidence in Neve's digital experience by ordering a second DSP before their first one – commissioned ahead of schedule – was officially in service.

Neve's digital experience – today's reality.



## Capturing sound at its purest

NEVE ELECTRONICS INTERNATIONAL LIMITED, CAMBRIDGE HOUSE,  
MELBOURN, ROYSTON, HERTS. SG8 6AU. TELEPHONE: 0763 60776  
TELEX: 81381 FACSIMILE: 0763 61886. CABLES: NEVE CAMBRIDGE





# NEWS

## Teldec DMM-CD

Teldec have recently announced a new mastering system for CDs. The new technique is based on earlier video disc research and uses a cutting technique somewhat similar to the analogue DMM (Direct Metal Mastering) process.

In the new technique a signal from a U-matic master is fed directly to a diamond 'cutting' stylus (having been converted into a suitable data stream) and the signal is embossed directly into a specially prepared, copper-coated CD master blank. After embossing, the blank can be processed with conventional galvanic equipment to produce a metal negative (which can be used as a stamper) or further processed to provide additional mother and stampers.

In the conventional CD mastering system, special clean room facilities,

laser cutting equipment and photo-etching techniques are needed to produce the master disc. The Teldec DMM-CD process, however, can be used in a normal cutting room environment, is considerably cheaper and, because it cuts metal master directly, less processing steps are required, thus making the system faster and reducing the risk of damage during plating.

Availability is expected to be later this year but no firm plans have been announced as yet.

**Teldec Schallplatten GmbH, Finckensteinallee 38, 1000 Berlin 45, East Germany. Tel: 030/8 30 00 50.**

**UK: FWO Bauch Ltd, 49 Theobald Street, Boreham Wood, Herts WD6 4RZ. Tel: 01-953 0091.**

**USA: Gotham Audio Corp, 1790 Broadway, New York, NY 1001 9-1412. Tel: (212) 765-3410.**

## New TAC products



TAC recently released a number of new consoles. The major new product is the *SR9000 Superconsole* designed for the sound reinforcement market. TAC say that the console is the result of over a year's research into the needs of the world's major hire companies. Features include a standard 40 input mainframe with 16 audio groups, 16 aux sends, eight VCA groups (optional and with bypass), eight mute groups, 16x8 output matrix, 4-band parametric EQ, and on-board jackfield. An optional 16 module input expander will be available as a stand alone unit enabling configurations of 56 and 72 inputs. A stereo line input module will be available at a later date.

In the *Scorpion* range, TAC have added a third frame size available in

two options. The *PB* has 45 module positions with on-board TT jackfield and three input/bus configurations available as standard; the *XL* holds 53 modules allowing configurations from 40/8/2 with eight aux sends and appropriate master modules and many other variants. There have also been a number of new modules added to the *Scorpion* range and the option of VU meters for the stereo bus and PFL.

**Total Audio Concepts Ltd, Unit 17, Bar Lane Industrial Park, Bar Lane, Basford, Nottingham NG6 0HU, UK. Tel: 0602 783306.**

**USA: TAC c/o Amek Consoles Inc, 10815 Burbank Boulevard, North Hollywood, CA 91601. Tel: (818) 508-9788.**

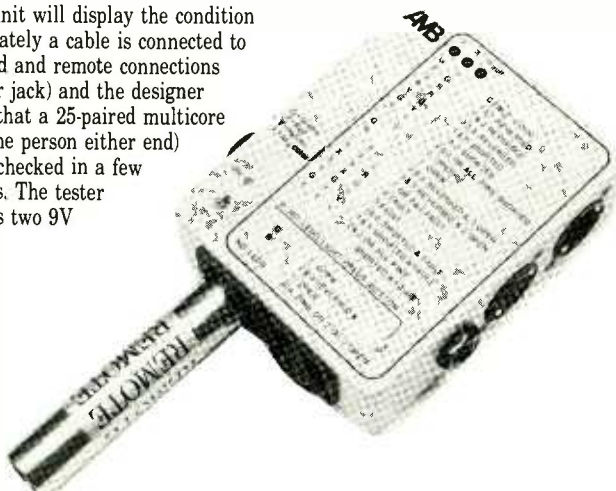
## AMB cable tester

Designed for testing either long cable runs (including multicores) or short lengths of cable, balanced or unbalanced, the AMB cable tester provides a comprehensive visual indication of most commonly found faults.

The unit will display the condition immediately a cable is connected to the send and remote connections (*XLR* or jack) and the designer claims that a 25-paired multicore (with one person either end) can be checked in a few minutes. The tester requires two 9V

batteries and comes with adapters for checking leads fitted with RCA phono connectors.

**Wolfram Altenhovel, Hustadring 63, 4630 Bochum, West Germany. Tel: 0234 702190.**



## Tascam ES-50 synchroniser

Tascam have developed a new synchroniser, the *ES-50* and a matching control unit, the *ES-501*. The unit includes a locator, synchroniser, event controller and timecode generator and is claimed to be compatible with all popular tape machines and VTRs.

Main features include multi-CPU system with digital circuitry to remove the need for daily calibration; sync accuracy to within  $\pm 50 \mu\text{s}$  for the majority of tape machines;  $\frac{1}{10}$  to  $\times 100$  speed reading of timecode via custom LSI, synchronises to 24, 25, 29.97 or 30 frames timecode and composite video sync lock to frame pulse with generator and slave.

Synchroniser features include chase capability using timecode, subframe accuracy in  $\frac{1}{100}$  frame steps, frame sync with timecode pulse or video V pulse, slow sync function and

auto/manual machine interface calibration.

The event section includes five relays with latching or momentary modes activated by preprogrammed timecode addresses. Preview, edit and review functions are available for slave punch in/out.

SMPTE, EBU and film standards are provided by the internal generator which also has jam sync capability, and the wide band timecode reader permits timecode only synchronisation.

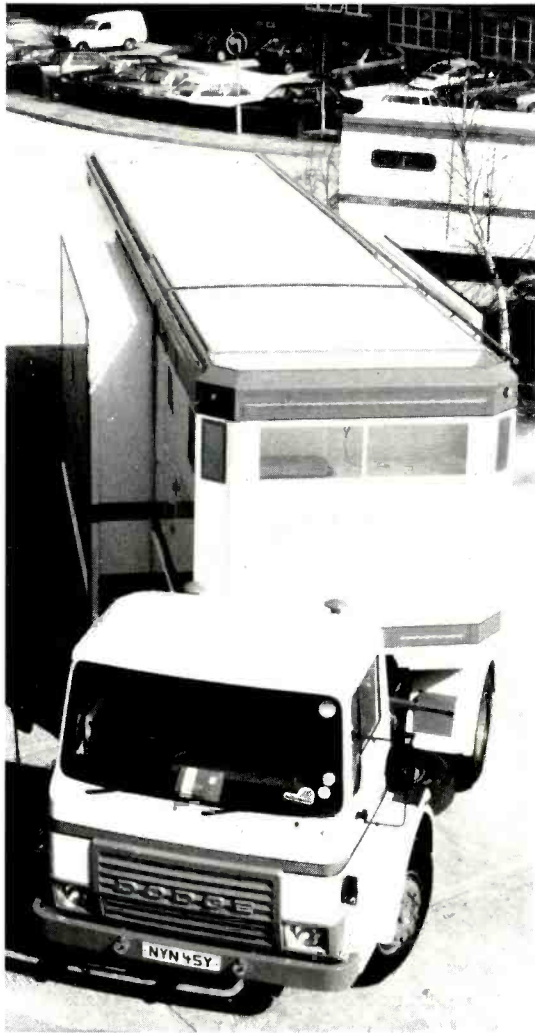
**Teac Corp, 3-7-3 Naka-Cho, Musashino, Tokyo. Tel: 0422 53-1111.**

**UK: Harman Audio (UK) Ltd, Mill Street, Slough, Berks SL2 5DD. Tel: 0753 76911.**

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



# Mosses & Mitchell Jacks & Jackfields *used in Broadcast Systems Worldwide*



Plasmec Systems, a member of Plasmec plc are a leading manufacturer of Jack Sockets and Jackfields with a well earned reputation for excellent engineering standards.

Plasmec's range of Jacks and Jackfields are marketed to Broadcasting and Telecommunications industries throughout the world under the trade name of Mosses & Mitchell.

Using the latest engineering techniques Mosses & Mitchell Jacks and Jackfields are manufactured from the highest quality materials, to meet the most exacting specifications for quality and reliability that our customers demand.

For more details of the Plasmec range of products send for our new brochure.

**PLASMEC**  
Systems Limited

Weydon Lane, Farnham  
Surrey GU9 8QL  
Tel: (0252) 721236  
Telex: 858820

For enquiries in the U.S.A. contact:  
Penny & Giles Inc.  
2716 Ocean Park Boulevard  
Suite 1005, Santa Monica 90405  
California. Tel: 2133 930014



# Servisound spool flanges

Danish sound engineer Marcel Buttrup is currently producing plastic spool flange kits for protecting flangeless tape stored on NAB hubs. Two versions are currently available—one white, one grey.

The white plastic flanges fit all Zonal and BASF hubs and the two flanges interlock completely through the hub to make the complete spool. A red locking cap inserted into the mouldings provides extra security.

The grey version fits Ampex and most tapes that do not include hubs with the two larger holes. Ideally this version should be glued with a

little polystyrene cement to make a secure spool. According to the manufacturer, provided the spool isn't dropped on the floor the push fit should provide a reasonably good spool.

In some instances, only one half of the spool may be required, in which case one part can be used to provide a supporting flange for the tape.

**Servisound, Hestkøbevej 1, DK 3460 Birkerød, Denmark.**

**Tel: 02-81 81 10.**

**UK: Canford Audio Ltd, Stargate Works, Ryton, Tyne & Wear NE40 3EX. Tel: 091413 7171.**

## NEWS

### Logitek Crossfire

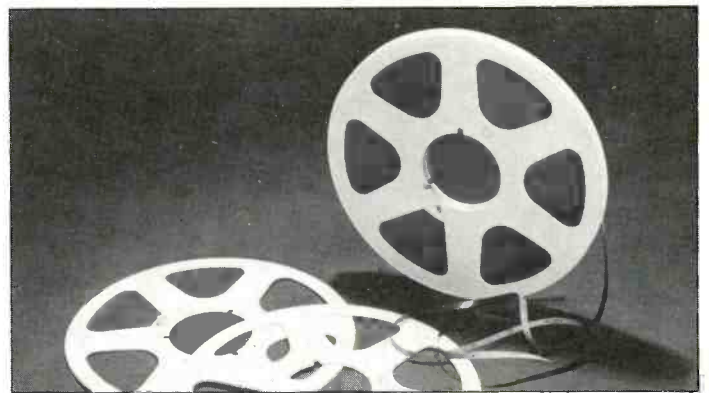
Texas-based Logitek have developed what they believe is the first 'stand alone' automatic audio crossfader designed to be controlled directly from contact closure outputs on A/B roll edit systems. The Crossfire fades between two sets of dual channel inputs controlled by contact closure (GPI outputs) or audio control ramps.

Three fade options are available—direct crossfade, 'fade to off' and fade down background for voice-overs. Fade rates are variable in 0.1 s increments anywhere from instant

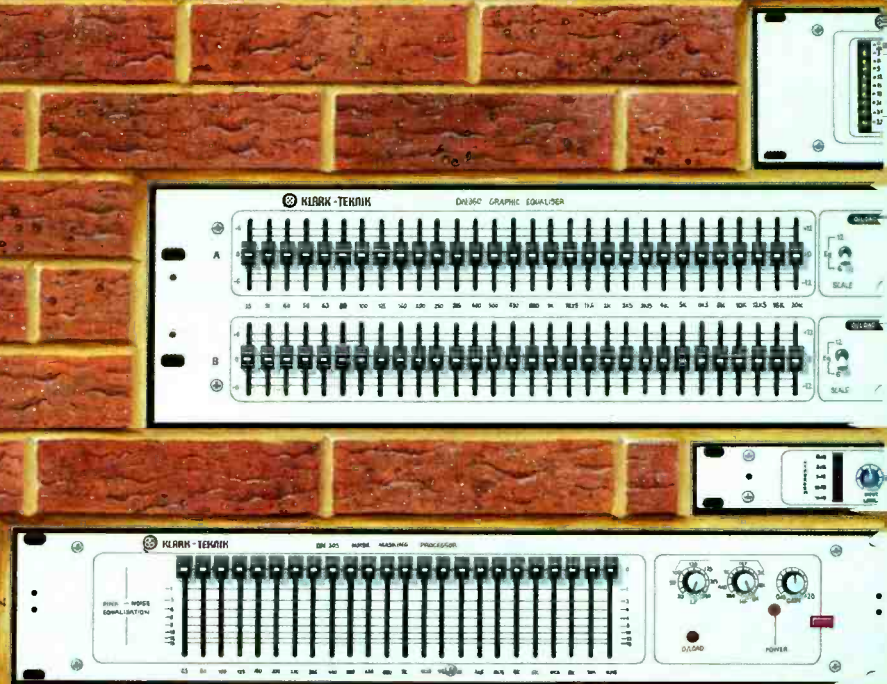
(cut) to 9.9 s. Levels can also be set with either edit controller ramp signals or external pots (using the unit as a 4-channel VCA).

Input/output levels are 600  $\Omega$  balanced (0 dBm normal, +21 dBm max) or 100 k $\Omega$  if the input resistor is removed. All connections are via wire clamping terminal blocks and all inputs can be connected to balanced or unbalanced lines.

**Logitek Electronic Systems Inc, 3320 Bering Drive, Houston, TX 77057, USA. Tel: (713) 782-4592.**



# Sound archite



EQUALISATION/SPECTRUM ANALYSIS/SOUND CONDITIONING/DIGITAL REVERBERATION/DIGITAL DELAY



# AKG DSP 610 delta stereo processor

The AKG DSP 610 is a multichannel, controllable delay with integrated digital signal processing. It provides the vital link in the Delta Stereophony System, a new patented sound reinforcement technique designed, essentially, to provide a precise stereo picture for every seat in the audience and at equal listening levels. The complete system requires a suitable loudspeaker array and the insertion of the DSP 610 in the mixer/power amplifier feeds.

The unit provides digital matrix routing of six delayed inputs (from the mixing desk) to 10 outputs (feeding the power amplifiers). Additionally there are four (non-delayed) aux inputs. All the attenuation, input/output connections, digital processing and delays are contained within the 610.

The DSP 610, however, is controlled through the RS232 interface of an IBM compatible computer. The computer provides a display of all input/output levels plus the delay settings. Also displayed on the monitor is the entire stage area

and this can be used to effectively follow moving sound sources (with a mouse). The software calculates the delays, controls the delay time values and attenuation levels, stores all data sets for stage layouts and switches one or more matrix connections or individual input or output channels on or off.

**AKG GmbH, Brunhildengasse 1, A-1150, Vienna, Austria. Tel: (43222) 95.65.17-0.**

**UK: AKG Acoustics, Catteshall Wharf, Catteshall Lane, Godalming, Surrey GU7 1JG. Tel: 4868 25702.**

**USA: AKG Acoustics Inc, 77 Selleck Street, Stamford, CT 06902. Tel: (203) 348-2121.**



Quantec QRS/XL

# Quantec QRS/XL digital effects processor

Quantec have developed a 1U high digital effects unit that offers delay, chorus, flanging, reverb, filtering and the QRS room simulation algorithms all in the one unit. Up to 120 pre-stored programs are available with the internal processing capability. Two controls (Effects Level and Select) and a backlit liquid crystal display of title and parameter information provides simplified setting up for 'standard' selections.

The XL uses a 32 bit signal processor with specially designed 16 bit oversampling A/D converters, x4 oversampling 16 bit D/A's and linear phase filtering. This provides two 15 kHz channels which can be used

either for stereo effects or the fully independent processing of two separate channels. The unit also features a fully floating I/O section, non-volatile program storage and MIDI control capability.

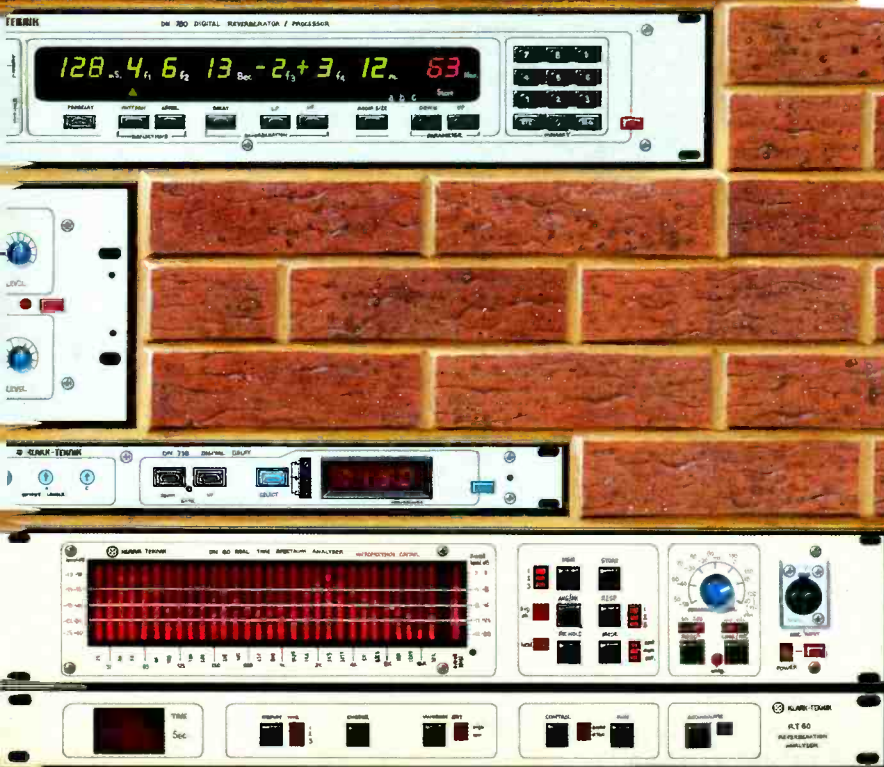
The QRS/XL also features a RS232 interface which allows various personal computers control of the unit's full processing power, eg changing parameters 'on the fly', creating custom programs or controlling multiple unit setups.

Quantec also provide support in the form of program libraries, PC compiler/assembler software and the Quantec data network. This latter service enables users to access Quantec's VAX computer in Munich in order to obtain the latest Quantec-developed software, obtain technical assistance and exchange programs for distribution via electronic mail.

**Quantec Tonstudietechnik GmbH, Postfach 440253, D-8000 Munich 44, West Germany. Tel: 4989-089 333034.**

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

# cture.



## The first name with sound system designers

Whether it's for Concert Sound, Broadcast, Public Address Sound Reinforcement, or the staging of a complex theatre spectacular, sound system designers who rely on equipment performing to specification have come to trust Klark-Teknik's commitment to the professional sound engineering industry.

Klark-Teknik's Graphic Equalisers, Digital Audio Delay Lines and Spectrum Analysers are living up to their reputation for reliable and dependable standards of operation in sound systems throughout the world.

Klark-Teknik's progressive electronic design and industrial grade engineering practices, have given these products an unrivalled price/performance ratio and meet specifications as accurately as they reflect the professional intentions of those who use them.

Klark-Teknik.....products you can specify and build into your sound systems with confidence.

**Klark-Teknik Plc**  
Klark Industrial Park, Walter Nash Road  
West, Kidderminster, Worcestershire  
DY11 7HJ, England.  
Telephone: (0562) 741515 Telex: 339821  
Fax: (0562) 745371



# MUSIC NEWS



## Hohner MIDI rack

MIDI synthesisers or keyboards can be expanded using Hohner's new *MR250* MIDI rack instrument. A 1U 19 in rack mounting device, it has digitally generated sounds in six groups, full MIDI control and an optional *MRC250* controller which allows pushbutton access to all functions for control from simpler MIDI instruments such as accordions.

Function groups are rhythm, bass, group I, group II, preset I and preset II; there are 16 rhythms with intro/ending, 12 monophonic bass sounds, 20 4-voice polyphonic accompaniment sounds in group I including four pianos and four guitars; 12 4-voice polyphonic accompaniment sounds in group II including trombone and synth organ; 14 preset I polyphonic sounds, six of

which including piano, clarinet and vibes are velocity sensitive; and 14 polyphonic preset II sounds ranging from trumpet to cello and including control over brilliance, portamento, auto chords and mono mode.

Twenty-one percussion sounds can be accessed from the keys of a connected MIDI keyboard (with accents if velocity is transmitted) and there are individual volume controls for the six sound groups. A cartridge port is used to expand the on-board voices and store complex arrangements.

**Hohner, Hohnerstrasse, Postfach 160, D-7218 Trossingen, West Germany.**

**UK: M Hohner UK, 39/45 Coldharbour Lane, London SE5 9NR. Tel: 01-733 4411. MJ**

## Korg DSS-1 club

UK purchasers of the *DSS-1* sampling synthesiser are entitled to free membership of Korg's new *DSS-1* Owners' Club. The company are now producing a regular newsletter for its users.

Specific uses and functions of the machine are covered, together with tips and ideas from musicians and programmers. The first newsletter gives an overview of the *DSS-1*, information on how to produce 30 samples on the keyboard at one time,

and details of Korg's own sound library, which includes discs for pianos, guitars, chorus, Japanese instruments, sax and brass, orchestra, Indian, drums, etc, and will include 50 discs soon. A sampling CD will also be available soon while the *STP-2000* sampling cassette with 165 sounds is available now.

**UK: Korg DSS Owners' Club, 32 Gordon House Road, London NW5. Tel: 01-267 5151. MJ**

## Sequential Studio 440

An unfinished Studio 440 was previewed at the 1986 British Music Fair but the design is now complete. The 440 is a powerful sampler/sequencer/drum machine along the lines of the Linn 9000 but cheaper; it has eight velocity and pressure sensitive programming pads which can memorise four 'kits' at a time, and the 8-track MIDI sequencer has 50,000 note capacity and real or step time composition and keeps MIDI channel data independently editable.

Auto-looping aids the creation of 12 bit sampled sounds; 32 samples can be stored in memory at any one time. The 440 has stereo outputs and eight individual outputs plus the SCSI (Small Computer Systems) interface to dump information to a computer or

hard disk drive, and a built-in 3½ in disk drive on the front panel. Each voice has 32 programmable pan positions, fully sweepable filters and VCAs, and sample monitoring to show the effect of different sample rates. The sequencer holds 999 measures per sequence and 99 sequences with song build, programmable tempo or tap tempo, two MIDI outputs for 32-channel control and all MIDI channel information retained per track. **Sequential Circuits Inc, 3051 North First Street, San Jose, CA 95134, USA. Tel: (408) 946-5240. Europe: Sequential Circuits/Europe, Nijverheidsweg 11c, 3641 RP Mijdrecht, The Netherlands. Telex: 12721. MJ**

## Gig Stands

John Hornby Skewes have announced new additions to the *Gig Stands* range. Model *KS438* is a 3-tier keyboard stand with a height of 60 in and a width of 48 in. It features large locking nuts for easy assembly.

Model *RS110U* is for 19 in rack mounting units such as delays, reverbs, synth modules and samplers. It takes up to 12 units of equipment

and has a height of 60 in and a width of 54 in. Both stands are manufactured from lightweight alloy tubing, are supplied in a fold-away carrying bag and can use a matching microphone boom, Model *KA10*. **John Hornby Skewes, Salem House, Garforth, Leeds LS25 1PX, UK. Tel: 0532 865381. MJ**

## Casio keyboards

Casio's launches for the Frankfurt Music Fair are largely based on the success of their £99 *SK-1* Sampler. The new *SK100* model has polyphonic sampling with loop, reverse, key transpose and envelope settings, with PCM sampling at a maximum rate of 10 kHz for 0.81 s samples or a lower rate for long samples up to 1.6 s. There's a PCM percussion section and built-in mic but external mic or line inputs can be used, while the keyboard has four octaves of miniature keys.

The *SK200* has a similar specification with power off memory, 4×0.8 s sampling, a multichannel memory function holding up to 1024 steps for one melody using a preset sound and one using a sample, 16 presets and four samples for the upper keyboard, 10 presets for the lower keyboard, 20 preset rhythms and two programmable rhythms, PCM percussion sounds and battery power option.

The *SK2100* has a similar specification to the *SK200* but has

four octaves of full sized keys and battery operation.

Also available will be the *DZ1* pads-to-MIDI converter which has eight inputs for Casio *DZS* or similar drum pads. The converter can be used to control the Casio *RZ-1* or any other MIDI drum machine. It has a pedal footswitch input for open/closed hi-hat, and MIDI channel (0-16), program (1-128) and patch (1-128) can be set for each pad input. Synthesisers or multitimbral samplers such as the *Mirage* can also be connected.

Four pad settings to define different 'kits' can be stored and selected by footswitch and a sensitivity control allows you to set the detection level from 003-127 for each pad input. Battery power is available, and the *DZ20S* drum pad and *DZ-30B* bass pad are available now.

**UK: Casio UK, Unit 6, 1000 North Circular Road, Staples Corner, London NW2 7JD. Tel: 01-450 9131. USA: Casio Inc, 15 Gardener Road, Fairfield, NJ 07006. MJ**



# ***WHAT'S HAPPENED HERE?***

***....A COMET CRASH?  
....A MOLE INVASION?***

***....ALIENS?***

***....OR WAS IT SUPERMAN?***





# NEWS

## SSL French office

Solid State Logic have announced the creation of a subsidiary in France, Solid State Logic SARL. The new office is located near Paris and will become the centre of the sales and service operation in France. It will be

headed by Frederic Coeffin. SSL SARL, 1 Rue Michael Faraday, 78180 Montigny le Bretonneux, France. Tel: 3045 3747. Fax: 3045 2920. Telex: 695073 F.

## Correction

In our monitor update on page 40 of the December 1986 issue, we inadvertently listed the wrong address for Lockwood Audio Sales.

The address is: 51 High Road, Bushey Heath, Herts WD2 1EE. Tel: 01-950 2209/866 0671.

## Sound reinforcement at Los Angeles

The size of the Convention Centre in Los Angeles prompted some exhibitors to make almost life size installations. JBL, for instance, were able to fly a complete cluster system comprising their *Concert* series, though some thought that the competition had been able to install one of their systems over the JBL stand. (Like cars, modern 'all-in-one' speaker enclosures are tending to look similar these days.)

Joking apart, the 81st AES convention did not appear to offer any world shattering product launches as far as sound reinforcement was concerned but closer investigation revealed quite a few items of interest and the continuing trend to try to bring studio quality reproduction to live sound.

Apex introduced the model 303 *Compellor/Aural Exciter* which combines compression, peak limiting

and psychoacoustic enhancement for one channel in a 1 U rack package. It features an RF-filtered instrumentation differential balanced input amplifier with electronically balanced transformerless output. Immediate applications include solo vocals, etc, where increased clarity and presence are required.

Audio Digital Inc showed a range of interesting products, many of which could be used for live sound. The *TC-2* digital delay processor features 1140 ms delay over a full 16 kHz bandwidth as standard, or 2280 ms delay as an option. A flexible control system offers such effects as deep 'analogue-sound' flanging, simultaneous positive and negative flanging, a new effect in the form of pitch controlled flanging and chorusing (caused by the relative pitch of the incoming signal controlling the delay time), triple tracking via the *TC-2*'s auxiliary (or

second) delay output, independent control of first echo and repeat delay times and real time display of delay times in all operating modes. Apart from the effects it offers, the *TC-2* features very high audio quality together with silent operation (as demonstrated in a quiet demo room verified).

Also from Audio Digital were a series of delay lines: the *TC-3* is intended as a pre-delay unit for mechanical reverb systems with a delay time of 540 ms—expandable to 1040 ms but the 20 Hz to 20 kHz bandwidth and 90 dB dynamic range make it useful as a stand alone delay unit. This is enhanced by the inclusion of mix (delay/dry) and regeneration controls, the latter turning the *TC-3* into a high quality echo unit. The *ADD-2* and *ADD-3* are high quality delay lines with two and three outputs respectively. Delay range is 0 to 490 ms in 15  $\mu$ s increments to 10 ms and thereafter in 1 ms increments, thus allowing both driver alignment in clusters and synchronisation of staggered arrays. An alphanumeric LED display on the front panel shows channel, delay time and diagnostics. The *ADX-2000* is a microprocessor-controlled modular delay system with a maximum configuration of six input modules and 40 output modules. Delay range is 1 to 261 ms in 1 ms steps. Designed for sophisticated permanent or touring installations, the *ADX-2000* features 12 pages of non-volatile memory for the setting and storing of multiple configurations with an option of expansion to 24 pages. Remote terminal control can be accessed through an RS-232 port.

Biamp Systems have gone through various corporate changes recently and now find themselves in a stronger position to take on the pro-audio market. The company showed an interesting range of graphic equalisers plus a 4-band fully parametric equaliser, all with balanced inputs and outputs and new circuitry to ensure smooth operation. New were two ranges of MOSFET power amplifiers, the *XA* and the *T* series, and a rack mount mixer, the *Rackmax*. The *XA* series comprises *XA100*, *XA300*, *XA600* and *XA1000*, with power outputs of 2x50 W into 4  $\Omega$ , 2x150 W into 4  $\Omega$ , 2x300 W into 4  $\Omega$  and 2x500 W into 4  $\Omega$ , respectively. The *XA300/600/1000* feature variable speed fans that pump air through an enclosed heatsink tunnel for dust-free cooling, Biamp 'Auto Limit' circuit that provides a smooth sound even when the amplifier is being driven hard, mono switch for bridge operation and LED indicators for temperature, signal presence and clipping. Input connectors are jack and *XLR* with 5-way binding post output connector.

The *T500* and *T1000* produce 2x240 and 2x510 W respectively into 4  $\Omega$  for uninhibited 2  $\Omega$  operation.

Specifications are similar to the *XA* series though mono bridge operation is also suitable for 70 V line use.

The *Rackmax* is a 16/2 rack mount mixer for stand alone use or as a submixer. Each channel features 40 dB input gain control plus 20 dB pad switch, mic/line switch, 48 V phantom switch, 3-band EQ, indicator LEDs for peak and signal present and three auxiliary sends that can be preset by internal jumpers to be pre-fade (pre or post EQ) or post-fader.

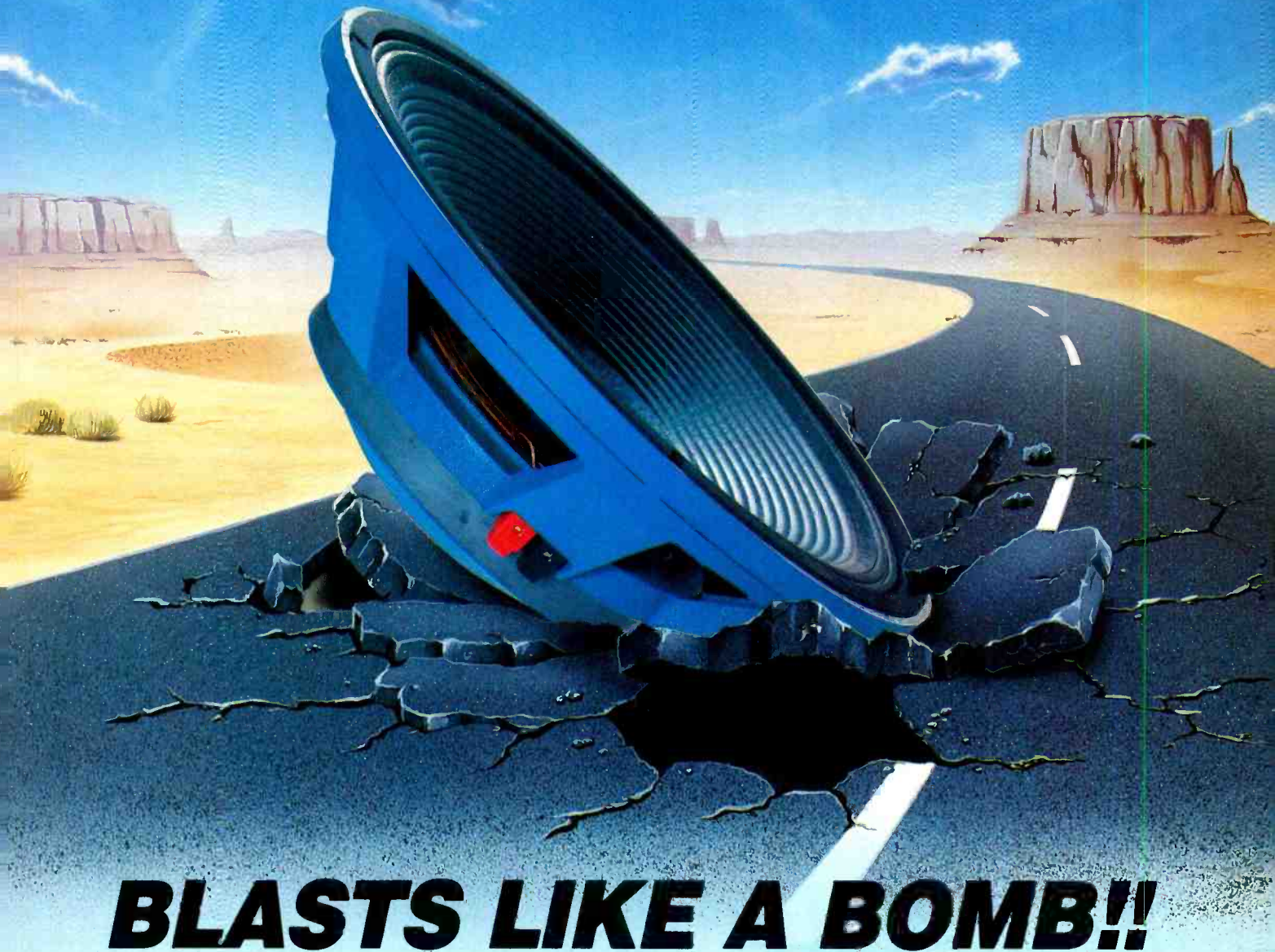
Carver showed their range of power amplifiers now finding success with touring companies such as Clair Brothers. Announced at the show was the *PM 2.0t* which uses much the same technology as the *PM 1.5* and weighs 10 lb (as opposed to the *PM 1.5*'s 21 lb) for 465 W/channel into 8  $\Omega$  and 600 W/channel into 4  $\Omega$ . Bridge operation provides 625 and 1000 W into 8 and 4  $\Omega$  respectively. Cerwin-Vega showed a variety of systems intended for PA, keyboard and playback of recorded music.

The *Dual Spruce Moose* is a mid-treble horn loaded system with two *M-162* compression drivers for the mid frequencies 200 Hz to 3 kHz and a *TI-1* 1 in throat compression driver with 90°x40° Controlled Coverage horn. The *TI-1* is specified with a usable frequency range up to 20 kHz and features an aluminium diaphragm and surround with an edgewound copperclad aluminium wire voice coil on a titanium former. The *M-162* driver is a 2 in compression driver with 4½ in nodally driven phenolic dome, 4:1 transformation ratio, stepped pole piece and front plate together with an aluminium flux stabilising ring. The design is said to result in high efficiency, better bandwidth and considerably lower distortion compared to comparable 2 in drivers. Sensitivity in the mid range is 111 dB/1 W/1 m which Cerwin-Vega claim offers superior performance over multiple cone midbass systems. The two *M-162* units feed a single Controlled Coverage horn via a 90° bend midway through the flare, this bent horn design allowing a 3 ft path length for a depth of 17 in. The *DSM-200* has an EIA power handling capacity of 300 W and is intended for use with Cerwin-Vega *L-36* bass horns.

The *SW-18* is a direct radiator for use in subwoofer systems and uses the *189SC* Stroker woofer. The loudspeaker features an adjustable dual-spider alignment system for precise longitudinal stabilisation of the voice coil in the gap as well as an additional spider attached to the inside surface of the cone that is coupled to a centrally located stainless steel rod. This assembly is designed to produce optimum performance at very low frequencies. The enclosure is designed to be used with the *DB-10* bass equaliser and high pass filter which provides for



# SA's NEW LOUDSPEAKER



## BLASTS LIKE A BOMB!!

### *No-compromise design*

The new SA 1503 is a 15" low-frequency loudspeaker, primarily designed to match the exceptional quality of the SA Compact Drivers. Since the basis of our design philosophy is to continue where the competition leaves off, we have assembled the good points of contemporary market-leaders in one design. And then we improved upon them! The result is a loudspeaker that is exceptionally reliable and has extremely low harmonic distortion

### *Indestructible construction*

If you take a close look at our loudspeaker, you'll see that it has a die cast chassis just as thick and solid as the chassis of an 18" woofer, but with a 15" diameter. On top of that, clever design eliminates the risk of gradual loosening and moving of the magnet structure. The 'top-plate' is completely enclosed by the chassis and fixed to it with an exotic heavy-duty two-component adhesive that was originally developed for use in the space and aeronautics industries. Unfortunately we have to disappoint those who think that it will come loose. The strength of this assembly method was severely tried in heavy tests such as dropping the chassis onto a solid

concrete floor from a height of nine feet. Although the loudspeaker was damaged, the adhesive bonds were never broken.

### *Superior voice coils*

Unlike many other loudspeaker manufacturers, we make our own voice coils. A custom designed winding machine, with an integrated unit to produce the edge-wound ribbon, was built to meet our specific needs. In combination with the use of copper thread exhibiting extremely high heat resistance, this machine has enabled us to develop very strong and reliable voice coils. The strength of these superior voice coils was further improved by the application of the latest adhesive techniques. The power rating of 150 W RMS and 300 W continuous program for the SA 1503 is therefore rather conservative.

We strongly believe that with our 1503 we have not added "just another loudspeaker" to the market, but have considerably improved the performance of low-frequency loudspeakers to match the demanding standards of the digital sound era. Whatever your requirements for high power HiFi sound quality are, put the SA 1503 to the test! Hearing is believing!!



stage company

For more information, please fill in coupon completely and send it to:

### **Stage Company**

Anodeweg 4  
1627 LJ Hoorn  
The Netherlands - Tel: 02290 - 12542

Yes, I would like to receive more information. I am:

Studio Owner  Sound Engineer  Musician  Distributor  Dealer  Discjockey

Name: .....

Address: ..... Zip: .....

City: ..... Country: .....



ss 3-87



# NEWS

maximally flat bass response while protecting the speaker from potentially destructive subsonic components. Usable response of the *SW-18* is 28 to 500 Hz with a recommended range of 30 to 100 Hz for most sub-base applications. Maximum input is 500 W for a total SPL of 125 dB.

Countryman Associates Inc showed their *Isomax* range of precision electret microphones with the *Isomax II* being the most interesting for sound reinforcement applications. The *Isomax* is available in four polar patterns—omni, cardioid, super cardioid, fig-of-eight—and features a very linear frequency response, together with a wide dynamic range (120 to 125 dB) which makes overload almost impossible. Due to its small size (8×16×4 mm/ $\frac{3}{8}$ × $\frac{1}{2}$ × $\frac{1}{8}$  in) the *Isomax* finds applications in almost all areas and is equally at home with acoustic guitar, sax, flute, etc, as it is with a full kit of drums. As well as a standard shock-isolated clip, various accessory clips are available for mounting the microphone on flute, saxophone and horns.

The *Isomax* can operate from 15 to 50 V of phantom power or from an optional battery power module that provides 100 hours of use, with a red LED that flashes continuously during the last 10 hours of battery life. Apart from being unobtrusive on instruments, the *Isomax* offers an elegant solution to multimitic techniques on drums, at once allowing optimum positioning and doing away with a forest of microphone stands.

A new real time analysis system was introduced by dbx. The instrument on show was one of several prototypes and feedback was invited from the audio community in order to finalise the final version and its options.

As it stands the analyser is a self-contained rack mount unit with CRT display, though the video output can also be connected to an external colour monitor for enhanced graphics. The frequency range is on  $\frac{1}{3}$ -octave ISO centres from 20 Hz to 20 kHz with 32 vertical bargraph readout, 31

frequencies and broadband SPL. In addition to the bar display, the analyser can also show graphic curves which can be superimposed over the main display. Similarly, when the analyser is in peak hold mode, different bar shadings (and colours) show peak values together with real time values. The analyser is PC interfaceable through multiple RS-232 ports together with a parallel port for a printer that also includes screen dump capability. All necessary functions of real time analysis are to be found including averaging, normalising and inverting. The unit has built-in pink noise generator, true RMS level detection, 3rd order filters and two high quality microphone preamps with 48 V phantom. The last feature is extremely useful as it enables analysis to be made of, say, left and right stacks without having the roadie running around with a single microphone.

Probably one of its most useful features is a new technology which allows the music or signal source to be used to analyse frequency response. This means that in a concert situation the system can be adjusted as required during setup and tweaked to the changes in response caused by the audience. The screen will show the curve for the empty hall together with the new response and thus allow changes to system equalisation to be accurately made.

Various options, such as RT60, are under consideration and the analyser should be available during the second half of 1987. Because the unit is essentially software driven, programs can be created to suit demands offering flexibility for the future.

Eastern Acoustic Works Inc showed some product updates as well as new systems. The *KF550* horn loaded full range system now comes fitted with the new RCF *H9040* constant coverage high frequency horn and TAD *4001 2* in compression driver. The new design of the horn is said to eliminate the harshness sometimes found on similar types of horn and the throat has been computer

optimised in the design for lower distortion at high pressure levels. If required, the *KF550* can be supplied without driver for the new horn and user components installed with EAW mounting kits. Other new features include vinyl dipped perforated steel grilles, slant back design with heavy duty castors and optional *MX800* electronic processor for use with or without the new *SB550* subwoofer. The *SB550* is identical in size to the *KF550* and features four RCF 15 in drivers capable of handling a total power of 3000 W, with a recommended frequency range of 20 to 100 Hz. The *FR253* nearfield system has now been upgraded to the *FR253B* and EAW refer to it as a 'high definition system'. Intended for high output nearfield use, the *FR253B* houses two 15 in drivers, two midrange drivers and high frequency horn and compression driver. In keeping with the trend towards wide band mid range response in order to avoid crossover anomalies, the *FR253B* features two poly-laminated 170 mm cone drivers operating in the 450 Hz to 3.5 kHz band in order to offer a flat power response over the bandwidth of the system, thus making it eminently suitable for use in sidefill and stage systems as well as for smaller house PAs.

The *KF850* is a new horn loaded modular system comprising a mid bass unit in a constant coverage enclosure and a separate constant coverage bass horn with a constant coverage high frequency horn mounted in its mouth. The system is designed for proper phase alignment and features a response of  $\pm 2$  dB from 35 Hz to 20 kHz when used with the *MX800* crossover and *SB528* subwoofer. The trademark of the system is Virtual Array Design and the cabinets are built trapezoidally in order to build up precise horizontal configurations. Each cabinet provides constant coverage over 55° and adding on systems increases coverage in 55° increments. Vertical coverage is 50° and for very long throw and short throw situations, systems can be vertically stacked and played between 20° and 40°. Normal use would require the main system being flown with the subwoofers on the floor for better coupling. The *SB528* subwoofer houses to RCF 18 in drivers operating between 25 and 80 or 100 Hz and has a power capacity of 2000 W. The *MX800* electronic crossover provides three stereo outputs and a mono sub-bass output. In addition to normal crossover functions it also provides time/phase correction, asymmetrical equalised crossover slopes, low frequency enhancement and distortion protection.

Also new from EAW was the *SM222* monitor wedge. Developed to be a smaller version of the *SM600* monitor, the new speaker features

two 12 in drivers with a centrally mounted high frequency horn using either a TAD *4001* or RCF 2 in compression driver. Coverage angles are 100×40 with a power handling capacity of 750 W (AES standard). The very smooth frequency response ( $\pm 1.4$  dB from 200 Hz to 10 kHz) makes for very high gain before feedback and provides 131 dB SPL at 1 m in an ultra compact package.

Electro-Voice introduced the *MTH-4* 3-way horn loaded system using 'Manifold Technology' which now completes the system started by the *MTL-4* subwoofer cabinet shown earlier this year. The *MTH-4* uses four drivers for each of the three frequency bands manifolded to single constant directivity horns; the mid-bass section covers the 150 Hz to 2 kHz range and uses four *DLX 10* in drivers feeding a 60×40 horn via proprietary phase plugs. The mid range coverage is from 1.6 to 8 kHz (recommended crossover points) and uses four *DH2* compression drivers feeding an *HP64* 60×40 horn; the high frequency section consists of four *DH2010* drivers feeding an *HP64* horn and provides a smooth frequency response up to 20 kHz. The *MTH-4* is designed to be used with the Electro-Voice *XEQ-3* crossover which provides the proper equalisation, time delay and crossover points for the system, resulting in a very even response. E-V are putting the final touches to a dedicated crossover system which will eliminate time in setting up systems, since all the necessary adjustments and calibrations are preset in the unit itself.

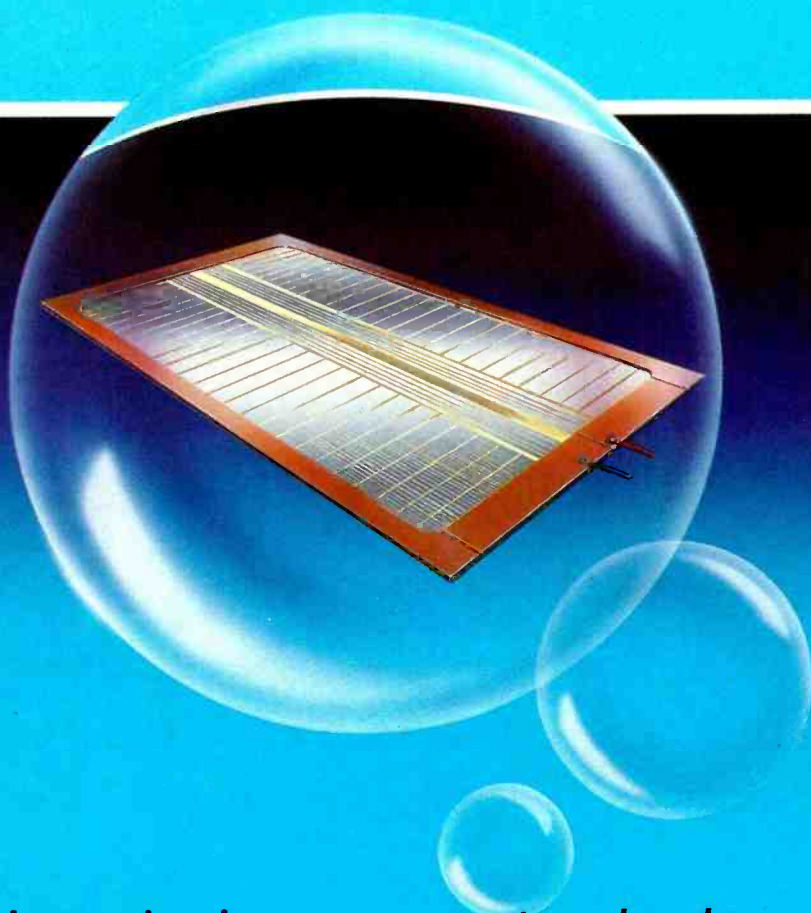
The advantages of the manifold technology are quite considerable, providing increased output (360 acoustic watts average mid-band), reduced space, and approach to theoretical point source coverage by the use of single horns. (An equivalent system would use four horns each for the high and mid bands with two or four for the mid-bass, with all the attendant problems.) As a result, the sound is not only louder but a lot cleaner with better definition. The *MTH-4* may also be ordered with optional two-point flying hardware that permits a wide range of angle adjustments.

Hot on the heels of the *SH-1810* 3-way all horn loaded system is the *SH-1810S*. Basically an *1810*, this configuration provides the 18 in bass speaker in a separate cabinet that combines horn loading and vented box principles together with a mid/high frequency section that houses a *DLX 10* in speaker feeding a 60×40 constant directivity horn via a proprietary phase plug (250 Hz to 2.5 kHz) and a 1 in titanium diaphragm HF driver feeding a 60×40 constant directivity horn.

● See these pages next month for more sound reinforcement news.



# LIGHT AS AIR!



## Introducing a new standard: the **COMPACT DRIVER**®

**“The first real innovation since the compression driver”**

### **Extremely light diaphragm**

The unique, voice coil-less diaphragm of the SA 8520 Compact Driver has a moving mass of only 0.2 grams (this is less than one sixth of the moving mass of competitors' diaphragms). It is part of an exclusive, patented driver, intended for mid- and high-frequency reproduction in high power professional sound systems.

Due to this extremely low mass, it not only has a flat frequency response beyond 30 kHz, but also an amazingly short attack and decay time. In combination with the carefully damped, computer designed rear chamber, it provides superb transient response, giving the driver unmatched clarity and reproduction of dynamics.

### **Super HiFi quality in high power sound systems**

Many studios and big hiring companies have experimented in using HiFi components in their speaker systems. They invariably came to the same conclusion: in spite of improved sound quality, power handling and reliability were unacceptable.

With the SA 8520 & 8525 Compact Drivers, it is now possible to have super HiFi quality in high power sound systems, without the constant

danger of damaging mid- and high-frequency drivers. Power rating is 30 W RMS for the 8520, 60 W RMS for the 8525, for a continuous period of one hundred hours! And they can safely handle transients of more than 400 W.

### **One driver instead of two**

Because the Compact Driver is capable of reproducing frequencies from 1000 Hz beyond 30 kHz, it makes using extra tweeters unnecessary. Besides saving money and space, the obvious advantage is having a 'one point sound source'. This gives considerable improvement in transient response and stereo imaging.

### **Incredible distortion figures**

Top quality compression drivers have typical THD figures of at least 2% at 1 W, rapidly going up to an incredible 25% at 30 W.

The Compact Drivers have a THD of a mere 0.4% at 1 W, but, more incredibly, this remains well under 1% at 30 W!! And that's no printing error!

Loud is beautiful... if it's clean. The SA Compact Drivers can be loud and very clean indeed! If these figures don't impress you, their superior sound quality certainly will. Hearing is believing!!



stage accompany

## **Stage Accompany..... the name for quality**

For more information contact: Holland: Stage Accompany, Anodeweg 4, 1627 LJ Hoorn, tel:(0)2290-12542, telex:37989 Stage nl  
Australia: East Coast Audio, P.O.Box 6494, Victoria 3004, tel: (0)3-2412244 Austria: Kühnl & Würzer, Waldeggstraße 68, 4020 Linz, tel: (0)732-688125 Belgium: Stage Accompany,  
Hendriklei 50, 2020 Antwerpen, tel: (0)3-2160352 France: Stage Accompany, 3 Rue Vieille, 59160 Lomme, tel: (0)20-925091 Germany: Stage Accompany, Marienburger Straße  
29, 4460 Nordhorn, tel: (0)59211-6196 Hong Kong: Studer Revox (far east) ltd, 25<sup>th</sup> floor Arion commercial centre, 2-12 Queens Road West, Hong Kong, tel: 5-412050 Israel: Killim  
& sons ltd., 10 Helez street, Haifa, tel: (0)4-640222 Italy: Kennel snc, 324 Corso Unione Sovietica, 10135 Torino, tel: (0)11-612148 Japan: Sakata engineering co ltd, 2-6-8 Ohjima  
Koto-Ku, Tokyo, tel: (0)3-682-8411 Spain: Laboratorio de Electro-Acustica S.A., Verdi 273, 08024 Barcelona, tel: (93)- 214 14 12 United Kingdom: S.E.D., 27 Guildford street, Luton  
LU1 2NQ, Beds, tel: (0)582-452495



# NEWS

## *Fazioli pianos*

Over the last five years we have seen considerable improvement in the quality of the recording signal chain almost to the point where we now have to look beyond the audio equipment itself, past the microphone and study the instruments making the sounds themselves. In some cases they are quite simply not up to the quality of the rest of the recording chain and if we are looking to maintain recording quality then we have to be more selective about which instrument we record.

Being more specific, the acoustic grand piano has almost always been a compromise. I have only ever come across very few pianos that were worth taking seriously as a recording instrument and these were odd examples rather than instruments from specific makers. There is quite plainly room for development of the grand piano as a recording instrument. At the end of last year I was given the opportunity to visit a small Italian piano manufacturer that is continuing development on the grand piano as well as beginning to address the problems of pianos for recording. I promise to refrain from references to the 'digital-ready' piano.

Fazioli Pianoforte are a small company based in Sacile just outside Pordenone which in turn is about 50 miles north of Venice. Paulo Fazioli

started developing a piano about seven years ago. So far only about 170 instruments have been made but they are beginning to appear in small numbers in concert halls around the world. The fact that they have made such rapid progress in so short a time is really a tribute to Paulo himself and how he has

managed to combine scientific research data with the use of his ear as the final arbiter of design. Because of this approach, he makes an ideal focus for discussion of the problems and possibilities facing a maker of pianos who is really only interested in improving piano quality while the cost of the instrument remains largely secondary.

Paulo Fazioli studied music from the age of 10 continuing through to take exams at the conservatory in Pesaro while studying mechanical engineering at university. After a year in industry his family asked him to work for the family furniture company. It was while looking after one of the family factories in Turin manufacturing steel furniture he began to think about making a piano. He felt it was possible to make a better piano using the resources of the family—the woodworking craftsmen, the technology of manufacture and the contacts they had in scientific areas outside the company. The family were happy to back him as long as he was sure it would work and so a corner of the wooden furniture factory in Sacile was set aside to make pianos.

It took three years to produce the first piano although right from the

beginning they were liaising with a technical institute in Turin specialising in acoustic problems. Founder Pietro Righini worked on many aspects of the project preparing detailed research on all aspects of the piano. The advantage of this kind of back-up reduces the number of piano making experiments as predictions of response can be made.

Paulo describes the process of designing a piano as 'first the man with the intuition, then comes the verification of the idea' and with this technical back-up you can go straight to the heart of the problem. The design of a piano begins and ends with the use of ears.

Anyone who has had the opportunity to look round a small piano factory will be amazed by the processes involved. Fazioli make about 50 pianos a year and they are largely all made by hand. The items such as the frame, the action and keyboard are all designed to their specification and bought in. Most of the time at Fazioli is spent on the areas of working with wood and the aspects that alter the sound on the instrument. There are so many variables in construction that it is seemingly impossible to consider the piano as a precision instrument to be calibrated against a standard ideal. Any products depending so heavily on selection of natural materials will differ in some way and therefore no two pianos will be absolutely identical. But what are the major areas of the piano that determine the sound character?

Obviously the materials of the hammers and the size of the piano are critical factors but perhaps the most important is the soundboard and the positioning of the ribs that cross it. The frame and the wooden casing do not directly affect the sound although they may cause changes. For example the soundboard is glued to the wooden frame and if it is not rigid then the soundboard loses curvature and the sound changes. The strength of the structure is therefore important. The coating finish of the piano is only an aesthetic consideration as due to the nature of the soundboard it moves air above and below it and the casing plays little part in modifying that.



*Complete soundboard showing ribs*



*Basic metal frame*



*Shaping and binding soundboard to ribs*



# WE'VE LAUNCHED IT!



## A spectacular new concept: **THE BLUE BOX**®

*“The sound system that won't disappear in the sands of time”*

### **The perfect match**

Designed around our revolutionary Compact Driver and superior 15" low-frequency loudspeaker, the Blue Box offers the perfect match between exceptional acoustic performance and high-tech electronics. Featuring superb sound quality, maximum flexibility and ease of operation, the Blue Box is a very compact active full-range cabinet that's ideally suited for a multitude of applications.

### **Unrivalled versatility**

As a studio monitor, the Blue Box is the ultimate performer, unequalled by any of today's existing monitor systems. On stage, stacks of Blue Boxes form the ideal monitor system. A partly slanting rear panel also facilitates use as a floor monitor. In small and medium sized venues, matched stacks of 4 or 8 Blue Boxes make a very powerful HiFi PA system. And, in large venues, Blue Boxes are really dynamite in massive flying sound systems.

### **High-tech electronics improve performance**

The PMS-5000 is a built-in active 2-way system that consists of a Bessel crossover, two power amplifiers and a microprocessor to operate all control

functions. It also features many unique innovations like DDC (Dynamic Damping Control), AEC (Auto Energy Control) and DC servo control.

DDC circuitry measures loudspeaker cone movement and compares it with the amplifier's input signal. If discrepancies are found, extremely fast corrections are made, giving the amplifier almost infinite damping. This results in exceptionally precise sound reproduction.

AEC measures output power during a specific time period and slowly reduces the input signal if the danger of loudspeaker damage arises. Short transients pass unhindered, while heavy overloading is prevented. When overloading disappears, the original gain is automatically restored. Therefore, AEC is much more effective against loudspeaker damage than a limiter and has the advantage that sound quality is not influenced at all.

### **PC for user-friendly remote control**

Top of the bill is the sophisticated Personal Computer Remote Control facility (optional), which offers ultimate control of large quantities of Blue Boxes. Imagine how easily extensive sound effects can be realized. This powerful new concept creates unlimited possibilities and offers total control and recall for complex set-ups of large sound systems.



stage accompany

## **Stage Accompany..... the name for quality**

For more information contact: Holland: Stage Accompany, Anodeweg 4, 1627 LJ Hoorn, tel:(0)2290-12542, telex37989 Stage nl  
Australia: East Coast Audio, P.O.Box 6494, Victoria 3004, tel: (0)3-2412244 Austria: Kühnl & Würzer, Waldeggstraße 68, 4020 Linz, tel: (0)732-688125 Belgium: Stage Accompany,  
Hendriklei 50, 2020 Antwerpen, tel: (0)3-2160352 France: Stage Accompany, 3 Rue Vieille, 59160 Lomme, tel: (0)20-925091 Germany: Stage Accompany, Marienburger Straße  
29, 4460 Nordhorn, tel: (0)59211-6196 Hong Kong: Sluder Revox (far east) Ltd, 25<sup>th</sup> floor Arion commercial centre, 2-12 Queens Road West, Hong Kong, tel: 5-412050 Israel:  
Kilim & sons Ltd., 10 Helez street, Haifa, tel: (0)4-640222 Italy: Kennel snc, 324 Corso Unione Sovietica, 10135 Torino, tel: (0)11-612148 Japan: Sakata engineering co Ltd, 2-6-8  
Ohjima Koto-Ku, Tokyo, tel: (0)3-682-8411 Spain: Laboratorio de Electro-Acústica S.A., Verdi 273, 08024 Barcelona, tel: (93)- 214 14 12 United Kingdom: S.E.D., 27 Guildford street,  
Luton LU1 2NQ, Beds, tel: (0)582-452495

# NEWS

The lid, however, is important as it acts as a sound reflector although it affects the sound mainly, of course, by its position rather than its construction.

The soundboard is one of the first parts of the piano to be made and probably the most critical. Fazioli use red spruce timber that they get from the same forest that Stradivarius used to obtain his timber. Selection of the timber is a critical process and a number of measurements are made on the timber to assess its rightness for the job. The ideal is a light timber with a fast transmission of sound within it. One test used is to calculate the specific gravity of the timber in question and then measure the speed of transmission within it by use of an elasticity meter. Speed/specific gravity gives a reference number which should be a figure greater than 120. The selected timber is used in strips of about 2 in wide and these are glued together to form a large sheet. When this is completed it is glued to ribs that cross it and the curvature in the soundboard is created. It is the position of these ribs, their number and angle that is possibly the most important aspect of piano sound. The distribution of sound within the soundboard will be controlled by the ribs as will the sustain and many other factors.

Fazioli have tried to produce a

piano with a clear sound. It is quite noticeable when standing beside one being played and looking into the string area. Unlike most other pianos, the sound seems to develop in specific areas and the sections of the keyboard range remain distinct. For recording purposes this retains a clarity and also a spread of sound in the stereo when close miking. Paulo says that they don't know precisely what aspect of their soundboard design gives those features but they *do* know how to control it. Although clarity is good for recording, in the concert hall it gives the impression that a piano lacks power. At this point in time Paulo describes all their pianos as compromises in that they try to balance the needs of the concert hall and the recording studio within the one instrument. There are

plans afoot to produce a piano for recording where the clarity aspects can be optimised.

The design criteria of Fazioli are optimising the 'dynamic range or power' of the instrument, its speed of response and length of sustain. Some of these factors are occasionally contradictory. For example, trying to increase the 'power' of the piano may increase distortion in the form of inharmonicity, ie the uneven spacing of the harmonics of the fundamental developing from a struck string. The easiest solution to this is to increase the size of the piano—which largely has the effect of lengthening the bass strings and the soundboard in that area with a smaller increase in the treble areas. With the longer strings and larger soundboard the sound is cleaner and louder.

Fazioli are about to take this one step further with work on a 3.8 m piano which their research suggests would offer even greater improvement in dynamics. At the time of my visit a wooden model of the metal frame for this piano was under construction so the instrument should be developed a few months after this article is published.

What about the mechanical aspects of the piano—the action? The noise created by the hammers lifting can be a problem on a very quiet piece of music but it looks like there is little that can be done at present in this area. Fazioli are looking at using different materials for the roller aspect of the action where they say the noise mainly originates from. It

is possible that selection of certain materials may reduce the noise but elimination of it appears not to be possible with the standard piano action. Optimisation of these felts for the action would be another aspect of any piano designed for recording use. The type of felts used on the hammers can alter the sound but when using good quality materials the sound is just different rather than necessarily better or worse.

Just optimising the design and construction of a piano is no guarantee that it will perform optimally all the time. The conditions it is kept in will also be important although there is a range of acceptable parameters. The most dangerous condition is low humidity. Humidity must remain between 40% and 80%. Low temperature is also a bad condition with an acceptable range being between 10° and 35°C. There is, however, a relationship between temperature and humidity—high temperature with high humidity is acceptable (within limits) and so is low temperature with low humidity. Low temperature and high humidity, however, is a real problem. Other problems include unequal heating of the piano itself and air conditioning which changes the humidity in areas that it passes over. On pianos this can cause movement of the soundboard and at best you lose the tuning. The humidity can also change the sound of the piano, ie in high humidity the soundboard rises lessening power. The felts of the hammers can also take up the humidity and retain it softening the surface with a loss of sound quality.

Next year Fazioli open a new factory and production should hopefully reach the 100 a year mark. For myself I look forward to hearing the new 3.8 m instrument which possibly may be the ultimate recording piano.

KSA

Fazioli Pianoforti srl, 33077  
Sacile—Pordenone, Via Ronche 47,  
Italy. Tel: (0434) 72026.  
UK: Cristofori Pianos, 20 Conduit  
Place, London W2. Tel: 01-402 4304.



*Fixing soundboard to wooden inner frame*



*Unique machine for breaking-in pianos—it plays all notes at once till turned off*



*Construction of wooden template frame for new 3.8 m model*



# YOU CONTROL IT!



## Powerful software offers unique **PC REMOTE CONTROL** of today's most comprehensive and efficient sound system!

### Custom network communication

Data communication between the PC and Blue Bcx systems is realized through a specially designed network, the SA-net. This universal network uses ultra-high speed serial data transmission and can easily be used at distances up to 500 metres. It is totally unsusceptible to unwanted external interferences and much faster than MIDI. Operating speed, however, will depend on the type of PC that's used to control the system.

Every IBM® and IBM compatible computer can easily be prepared for use with an SA-net by inserting a single PC board. However, our own SA PC is a sturdy AT-type computer, installed in a custom designed flight-case that will therefore easily withstand the heavy abuse of a life "on the road".

### Dedicated software for easy operation

The powerful software incorporated in the unique PC control facility allows for individual control or grouping of an unlimited number of Blue Boxes. Presets of complicated settings for numerous groups can be controlled, stored and instantly recalled for routine comparison, including all significant control functions. The PC screen displays their status, as well as important warning messages concerning protection modes.

### Revolutionary system link-up

For the first time, complicated system link-up configurations such as Bessel-functions can be defined and activated from the keyboard. To attain equal sound distribution at all points in the venue, Bessel-function link-up allows dispersion and directional patterns to be varied without moving the system. No other system is capable of this.

### Easy hoisting and quick set-up

Major disadvantages inherent in conventional flying sound systems like loss of output-power and loudspeaker damping are relegated to the stonage. Cable connections are radically simplified, reducing set-up times even further. The ingeniously constructed flight-case offers optimal protection and has a removable wheeled cover for convenient transportation. The built-in snap-locks surpass all required safety standards and facilitate easy hoisting. A number of preset snap-lock positions allow the cabinets to be suspended at specific angles.

Ask for a demonstration of today's most comprehensive and efficient sound system: if this list of features doesn't impress you, the superior sound quality certainly will. Hearing is believing!



© IBM is a registered trade mark of International Business Machines corp.

For more information, please fill in coupon completely and send it to:

**Stage Company**

Anodeweg 4  
1627 LJ Hoorn  
The Netherlands - Tel: 02290 - 12542

Yes, I would like to receive more information. I am:

Studio Owner  Rental Company  Sound Engineer  Distributor  Dealer  DJ

Name: .....

Address: ..... Zip: .....

City: ..... Country: .....



SS 3-87





# PROFESSIONAL RECORDING SYSTEMS

29 GUILDFORD STREET, LUTON, BEDG LU1 2NR TELEPHONE 0582 450 066.

*To get people into your studio you need to make it inspiring and enjoyable to work in.*

*Enter the Fairlight Series III. The perfect catalyst.*

*Only with a Series III will you create an environment that is both creative and productive for the band and their producer.*

#### START WITH A RASPBERRY

*No matter what is sampled, it will surprise you.*

*With 14 megabytes of waveform RAM (Random Access Memory) you can sample over two and a half minutes of sound at 44.1kHz. (With stereo also a standard feature.)*

*The sound is stored in 16 bit linear format (exactly the same as compact disc) with a sample rate of up to 96kHz, so the sound quality is startling. Existing sounds can be moulded into as many variations as you want. Use them on their own or combine them with others. Either way, the permutations are endless.*

*And the sampling facility itself is so easy to use, building up your own collection of custom made sounds to add to the Series III library is simple.*

#### AN ORCHESTRA OF ONE

*You don't have to be Brahms and Liszt to be staggered by the Series III's vast library of sound samples.*

*The Series III's major sections of the orchestra, such as strings, woodwinds, brass and percussion really wouldn't seem out of place at The Proms.*

*Together with an array of specialised sounds, aural textures and sound effects, the Series III's library is unmatched.*

*But don't be fooled into thinking it's just a cold computer. It's full of sensitive human musical feelings.*

*It has the unique ability to respond with the same range of expressions you might expect from an acoustic instrument. Attack, decay, dynamics, vibrato are just a few that can be set individually for every single key on the keyboard.*

#### COMPLETE CREATIVE CONTROL

*Full control of composition, arrangement and performance within one software suite has never been*



*available before until CAPS. Designed by musicians, CAPS (Composer, Arranger, Performer Sequencer), is an ingenious tool giving you the freedom to build up songs from any other of the machines facilities.*

*Along with the Page R sequencer, a complete composition can be quickly built up by inserting, copying, merging, reversing, rotating and deleting notes and patterns (measures) in real or step time.*





FILLS PEOPLE WITH IDEAS AND A STUDIO WITH PEOPLE.

*Another unique method of music input is the MCL (Music Composition Language) where 'unplayable' poly-rhythms and poly-tonalities can simply be typed in.*

*The Series III also forms the heart of any audio and video post production, with four MIDI ports to control external equipment and a powerful SMPTE 'Eventsync' cue page.*

*Altogether, the most powerful creative and pro-*

*ductive tool in the music industry today.*

*Could you handle a busy studio? Call SYCO today for a demonstration and to be included on the exclusive list of Fairlight Series III equipped studios.*



THE COMPANY BEHIND YOUR SUCCESS

Syco, Conduit Pl London W2 Tel 01-724 2451 Tlx 22278 Fax 01-262 6081

ITALY: CEM ELETTRONICA (0321) 95151; JAPAN: MATSUSHITA ELECTRIC TRADING CO (06) 282 5600; NEW ZEALAND: TEKRAM AGENCIES LTD (3) 792 111; NORWAY: LYDROMMET A/S (02) 114085; SCANDINAVIA: SLT STUDIO OG LYDTEKNIK (01) 71 3344 (DENMARK); SINGAPORE: IT MUSIC 473 4586; SPAIN: VENTAMATIC (93) 230 9790; SWITZERLAND: EMM STUDIO AG (061) 54 2045; USA: FAIRLIGHT INSTRUMENTS INC LOS ANGELES (213) 470 6280; NEW YORK (212) 219 2656

## AES CONVENTION PREVIEW

*The 82nd Convention of the Audio Engineering Society will be held at the Queen Elizabeth II Convention Halls, Westminster, London, March 10th to 13th, 1987. As usual the convention will consist of a wide range of technical papers with an associated exhibition. In this preview we have concentrated on the new items on show from details available to us at the time of writing.*

### A

● **a&a Systemes:** broadcast equipment including *EL20* RIAA preamp; *MM74* passive switching matrix; ident units; standard cassette jingle machines; telephone interfaces and the Cora broadcasting console. ● **Adams-Smith:** timecode, tape synchronisation and audio-for-video products for production and post-production use. ● **AEG:** analogue tape machines from ¼ in to multitrack as well as the PD format digital multitrack. ● **Agfa-Gevaert:** audio, video and duplicating tape and cassette products. ● **Akai:** signal processing devices, MIDI equipment, keyboard controllers and sampling units. ● **AKG:** full product range including microphones, headphones, delay and reverb systems, mic stands and phono cartridges. Featured products will include the *ADR68K* digital signal processing unit and the *Delta Stereo* processing system. ● **Alpha Automation:** *BOSS* audio editing and machine management system that combines high level synchroniser control with sophisticated software routines for track building, looping and event triggering. ● **Altec Lansing:** audio products including microphones, mixers, signal processors, amplifiers, loudspeaker components and systems, and accessories. ● **Amcron:** Amcron/Crown microphones, amplifiers and the *TEF-12* analyser. ● **Amek Systems & Controls:** products on display will include the *APC1000* assignable console, the *BCH* broadcast console system and the *Classic* console. Featured new product will be the *G2520* multitrack mixdown console. ● **Ampco:** no information available. ● **Ampex Mag Tape:** analogue and digital mastering tapes. Featured will be a new ¼ in precision reel for 467

digital tape available in three reel sizes. ● **AMS:** featured will be the *AudioFile* hard disk based digital recording system with latest software developments including sync recording, punch in/punch out, remote machine control, digital interfaces for other PCM equipment and many additions to previous software. The full range of other AMS processors will also be on display. For Calrec by AMS see the Calrec entry.

● **Anchor/ROH:** Anchor will be showing their line of self-powered and battery powered monitor speakers for the first time in Europe. ROH, a division of Anchor Audio, will be showing their series 300 intercoms, series 200 modular audio systems which include wide separate modules, and the series 100 audio line monitor available in both mono or stereo formats. ● **ANT:** a selection of items from their wide product range. Featured will be the *telcom c4e* noise reduction system.

● **Apex:** hand and semi-automated equipment for label printing directly on to cassette. ● **Asona:** range of duplicating equipment and accessories. Of special interest will be the recently introduced 2015 winder and the 301 twin slave unit. ● **ATB:** will be providing details of their audio and video cassette components for the duplicating industry.

● **Audio & Design:** full range of *Scamp*, Ambisonic Surround Sound and other A+D signal processors. Featured will be the professionalised digital 701-ES with 1610/1630 interface and Ad-Mix coupled with the SoundStreamer card for use with a microprocessor for the transfer of stereo 16-bit audio to computer on hard disk. Also on display will be the Davis 810 studio monitors and *telcom c4e* cards in a demonstration using 16-bit digital recorders enabling enhancement to 20-bit performance. ● **Audio Developments:** portable battery powered mixers including the *AD160*

ENG mixer, *AD260* ENG mixer, *AD145* with 4, 6 or 8 inputs, and the *AD062* with 4 to 16 inputs with optional modules. Also featured will be the *Port-a-Flex* range of battery powered units which include compressor/limiter, distribution amp, 2-channel monitor, filter, interfaces, mono headphone splitter and a 2-channel splitter.

● **Audio Kinetics:** synchroniser systems and timecode equipment including the low cost *Pacer* two machine synchroniser; the *Eclipse* audio editor; the *Q.Lock 4.10*; and *MasterMix* console automation. New products include the *Striper*, a timecode generator with normal facilities of reading timecode or user bits and the ability to stripe tape at 1x, 2x or 4x play speed; and the new version of the *Timelink*, now upgraded and known as the *Gearbox*. ● **Audio Precision:** *System One* IBM PC based audio test system with full range of accessories and latest software. To be introduced at the show will be two new testing modules—one for measuring DC voltage and resistance, providing variable DC output voltages and digital input and output; and the second module for generating tone bursts, square waves, pink and narrowband noise. Also the first public showing of the 'A-version' *System One* which has the capability of measuring amplitude on both stereo channels simultaneously. ● **Audio**

**Technica:** selection of wide product range. Featured new products will include the *AT4462* stereo field production mixer designed for broadcast or location recording; and the *AT871 UniPlate* boundary mic. ● **Audiomatic:** international distributors for Electro Sound duplicating equipment. ● **Auditem:** no information available. ● **Audix:** featured products will include the *AAT3000* digital control mixer, and *Access*, the all digital studio talkback system. On show for first time will be first of series of digital audio sampling rate converters. Three converters developed by the ITCA and manufactured by Audix will become available during this year, each dedicated to a single conversion ratio—44.1 to 48 kHz, 48 to 32 kHz and 32 to 48 kHz. ● **AVS:** will be demonstrating high speed cassette duplication systems, cassette to cassette copiers and a microprocessor controlled receiver for measuring broadcast antennae.

### B

● **B&W:** three new models using B&W's recently introduced *Matrix* technology. The *MM1* is a miniature speaker system with a moulded enclosure and totally new drive units; the *MM2* uses the *MM1* as a mid range treble 'head' assembly over a 14 litre bass section; and an entirely new professional monitor using *Matrix* technology model on the established *801*.

● **BASF:** full range of professional audio and video tapes, cassettes, magnetic film and calibration test tapes. ● **Bel Marketing:** full range of condenser and dynamic microphones delay lines and sampling systems. ● **Beyer:** full range of condenser and dynamic microphones, studio headphones, wireless mic systems and headphones. New products will include the *MCE 10* miniature electret condenser mic and the *MPC 60* boundary mic with exchangeable capsules. ● **BNS:** will be showing their monitor speakers that have been developed in conjunction with NOS, the Dutch Broadcasting Foundation. The *Professional Monitor 1* is an active 2-way system developed for smaller control rooms and OB vans. Newly introduced is the active *Mini Monitor* which is intended for nearfield monitoring applications and can be powered from



# Post production is a race against time.

# And now there's a faster way to finish.



You can't afford to use equipment that slows you down. Because the competition is waiting to pass you by.

In a unique response to this situation, Tascam's engineers have created the first racing machine for audio post production.

## Introducing the 24 Track Tascam ATR-80 Recorder/Reproducer.

The ATR-80 is built for speed. The kind of speed that makes post production a lot more productive.

For example, it shuttles at 380 IPS. Which means you'll never have to wait for the audiotape to catch up with the videotape.

It cuts editing time too, because unlike other audio recorders, the ATR-80 allows edit previews. In other words, it eliminates retakes and ruined tracks.

It also accelerates the overdubbing process. Tascam's unique heads are so uniformly responsive, you can make final EQing decisions right in the Sync Mode. Without ever having to rewind and check the sound from the Repro head.

The ATR-80 even accepts 14 inch reels—a complete, uninterrupted one hour show's worth of tape.

The fact is, no other post production recorder keeps you competitive in so many ways.

So take a look at an ATR-80 and put it through its paces. It'll be first past the post.



# TASCAM

A 32-Track version of the ATR-80 will be available soon. ©1986 TEAC Corporation, Tokyo.  
Harman (Audio) UK, LTD, Mill St, Slough, Berks, SL2 5DD.

## AES PREVIEW

the mains of a 12 V car battery. ● **Brady:** will be introducing a new splicing tape which is 1.2 mm thick with an acrylic based adhesive designed to solve problems caused in loading equipment with current thicker types of splicing tape. Also on display will be master splicing tape *DR-10109*.

● **Bruel & Kjaer:** selection of units from their wide range of audio test equipment and precision measurement microphones. Also featured will be the range of music recording mics. ● **Brooke Siren:** see Edge Technology entry.

### C

● **Calrec:** centre piece will be the Assignable '86 Broadcast Console—a comprehensively equipped assignable console offering the user the ability to control up to 128 channels and 12 stereo groups from a small control surface. Console offers fully assignable channel controls, routing and faders with instant reset and floppy disk back-up of system status memories. Also on show will be the *Minimixer* and the range of Calrec microphones.

● **Canford Audio:** details of company's distributed and manufactured line and catalogues of products including studio fittings and furnishings, and a wide range of interfacing and interconnecting products. ● **Capitol Magnetics:** range of tape and disc cutting products. ● **Cetec Gauss:** drive units and loudspeakers for professional monitoring and PA applications and a range of high speed duplicating equipment

including the latest 2400 high speed duplicator. New products include the model 2480 master reproducer and the model 7228 coax studio monitor. ● **Clear-Com:** wide range of intercom systems. ● **SJ Court Associates:** monitor systems from the new Court *Signature* series of which the studio monitor series comprises the *SN20* nearfield compact monitor, the *SN30* middle sized monitor and the *SN60* biamplified top of the range monitor. There will also be examples of Court speaker systems for sound reinforcement. ● **Crest:** selection of models from the Crest range of power amplifiers.

### D

● **D&B Audiotechnik:** wide range of sound reinforcement systems. ● **D&R Electronica:** complete range of mixing consoles including the *Discom*, 200 series, 300 series, 700 series, 900



*Dayner from D&R*



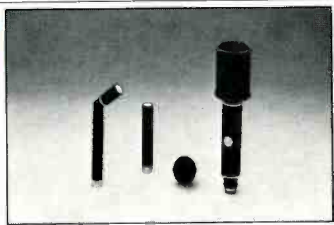


# AUDIO DESIGN

## THE PROFESSIONALS' CHOICE

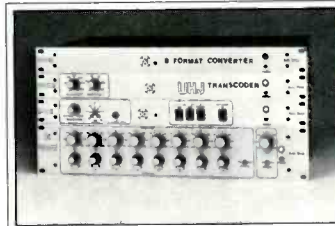
### MICROPHONES

**CALREC Condenser Microphones.**  
1000 series – cost effective, fixed head, 48V range.  
2000/2100 series – the studio standard, 7.5-56V. Comprehensive range of extensions, adaptors and accessories.  
Sound Field Microphones – The most versatile and accurate microphone in the World.



### AMBISONICS

**A + D Mastering Package** for B-Format four channel and UHJ Surround Sound encoding and decoding.



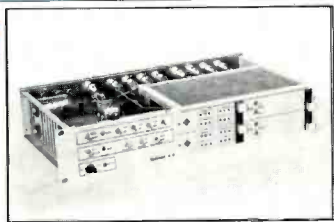
### DIGITAL

**A + D PCM701ES Professional.**  
AD-MIX Digital Mixing.  
1610/30-3324 Interfaces.  
DIGI-4 Four Channel Recording.



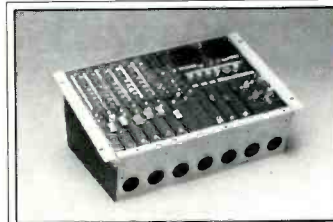
### NOISE REDUCTION

**New telcom c4.**  
Up to 118dB dynamic range.  
18 bit noise performance on analogue 24 track.  
20 bit digital performance on 16 bit digital recordings.



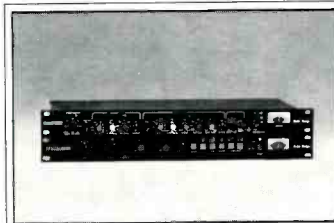
### MINI MIXER

The **CALREC MiniMixer**. 8-16 channels in three frame sizes; 3 band EQ + filters. 4 auxiliaries; insert system; internal and external TB; built-in DA's. Meets BBC, IBA and ITCA specifications.



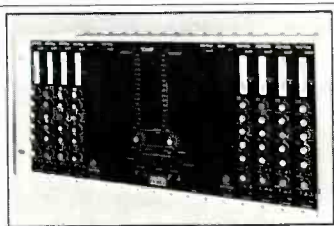
### SIGNAL PROCESSING

**A + D Rack Units:**  
Vocal Stresser, Compex, Superdynamic, Express, Easy Rider dynamic processors, and PANSCAN Autopanner.



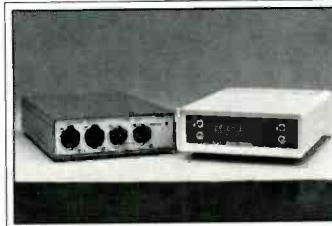
### SCAMP

**A + D Modular Signal Processors:**  
Limiters, Compressors, Expanders, Gates, Equalisers, Distribution Amps, Special Effects.  
FILMEX Noise Reduction.  
Video Post-Production Processing.



### LITTLE BOXES

**A + D PROPAP** professional domestic interface; plus CTC correction.  
**AMPAK**, **DI-Box**, **Time Code Reader**, **TONEMASTER** auto-generator.



UK AGENTS FOR RTW LIGHT METRES · ANT/telecom NOISE REDUCTION · EELA AUDIO PRODUCTS

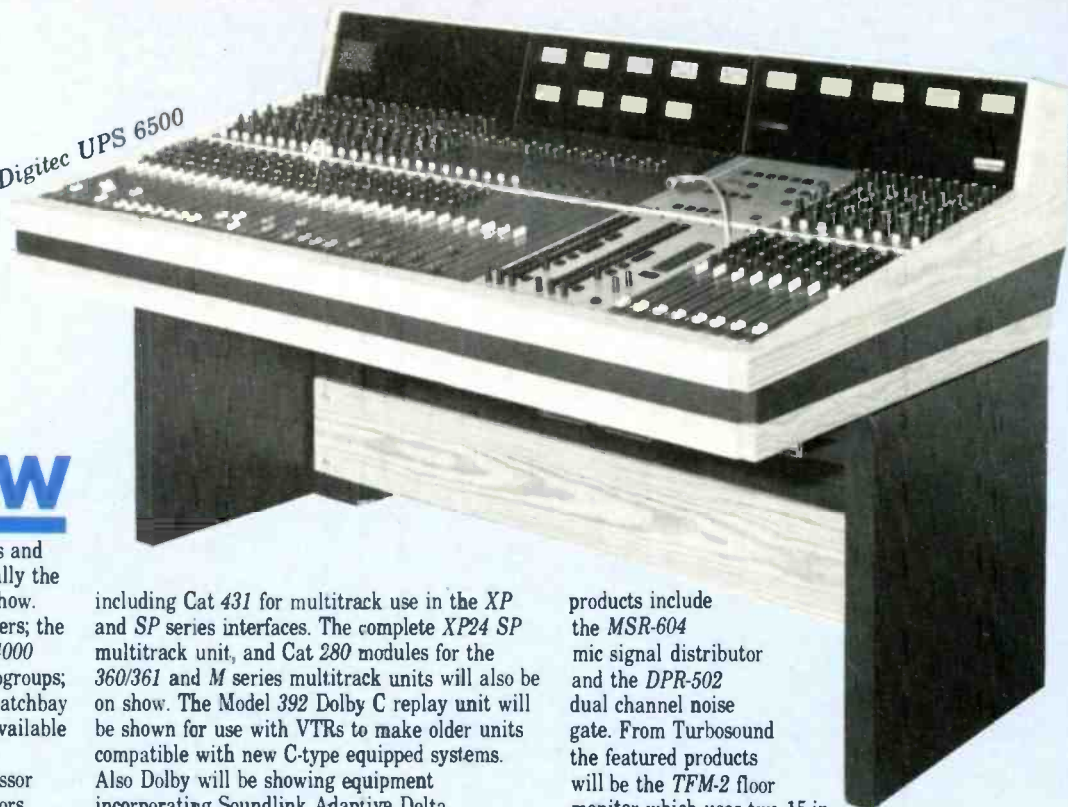
WORLDWIDE

Audio Design Ltd, Unit 3, Horseshoe Park, Pangbourne, Berks. Tel: (07357) 4545. Telex: 848722 ADR UK.

USA

Audio Design USA, 4611 Columbia Pike Arlington, VA 22204. Telephone (703) 522 7780.

Digitec UPS 6500



## AES PREVIEW

series, 1500 series, 2000 series, 4000 series and the top of the range 8000 series. Additionally the full range of signal processors will be on show. The 300 series now has 100 mm travel faders; the 700 series is now a modular console. The 4000 series is redesigned with eight floating subgroups; the 8000 series is redesigned with a new patchbay and the Score automation system is now available with motorised faders. ● **dbx**: full line of products including noise reduction, compressor limiters, 900 series modular signal processors, model 700 digital audio processor, dbx OEM products and the new RTA system. ● **Digital Creations Corp**: DiskMix second generation disk-based audio console automation storage/editing system which interfaces with ARMS/JH-50 console computer systems. ● **Digitec**: is the new name for the Enertec professional audio department which has been purchased by private investors. New products include the F550 and F600 tape machines; the UPS 6000 series of mixing consoles in both 10- and 16-channel versions; the UPS 6500 designed for radio/TV broadcasting use with a computer controlled switching matrix. Other products include the Europe series of amplifiers, the 10x10 and 10x1 range of audio matrices, the GCE 5000 electronic switching system and the Dynamax CTR 10 and CTR 100 series from Fidelipac. ● **Dolby**: full range of Dolby products with featured items including modules for the new Dolby SR process

including Cat 431 for multitrack use in the XP and SP series interfaces. The complete XP24 SP multitrack unit, and Cat 280 modules for the 360/361 and M series multitrack units will also be on show. The Model 392 Dolby C replay unit will be shown for use with VTRs to make older units compatible with new C-type equipped systems. Also Dolby will be showing equipment incorporating Soundlink Adaptive Delta Modulation principles. ● **Dorrough**: full range of Dorrough products including the loudness monitor LED-type meter. A bargraph function shows average material level and a separate dot mode shows peaks. Designed to help user adjust for uniform levels from variety of source materials. ● **Dynaudio**: professional monitoring system Accent 3 which is an active three-way monitor.

### E

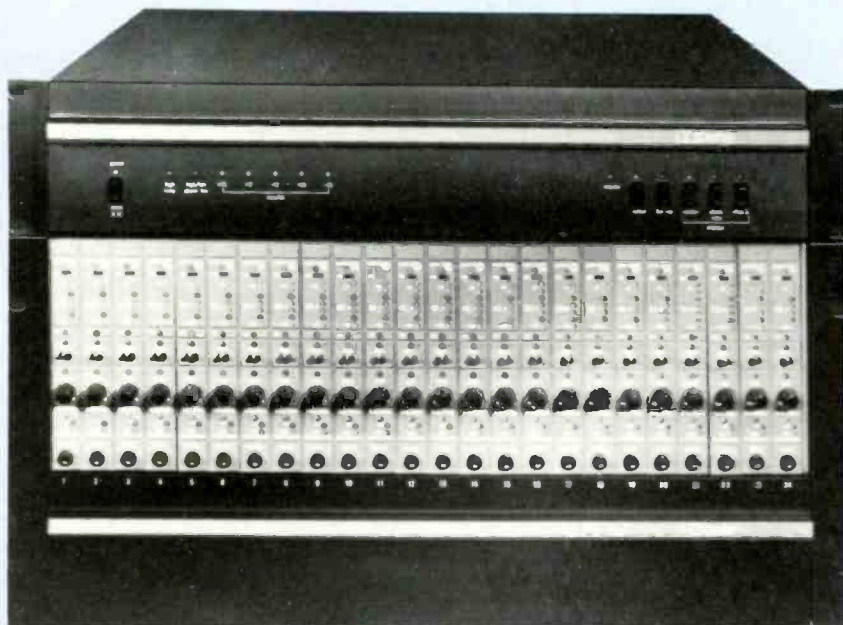
- **Eastlake Audio**: examples of past and future studio and acoustics design projects. Will be available to discuss possible new projects.
- **Edge Technology**: full range of products from its subsidiaries BSS and Turbosound. BSS products will include the FDS-360 frequency divider, DPR-402 dynamic processor range and MCS frequencing dividing network. Featured new

products include the MSR-604 mic signal distributor and the DPR-502 dual channel noise gate. From Turbosound the featured products will be the TFM-2 floor monitor which uses two 15 in speakers combined with a 2 in HF driver in a very compact enclosure. Other new products include the V-2, a HF device designed to couple two 1 in compression drivers; and the LS-2403 24 in speaker available mounted in the TSW-124 enclosure. ● **Editron**: range of timecode synchronisation equipment. ● **Eela Audio**: products include portable ENG mixer together with consoles for broadcast and general audio use. Feature product will be the new digital mixer. ● **Electro Sound**: high speed duplication equipment including the ES4800 digital slave, 4300 automated quality control equipment and the 8000 high speed duplicating system. ● **ElectroVoice**: selection of products including microphones, monitor speakers, signal processors, sound reinforcement systems, drive units etc. A featured item will be the Manifold system. ● **Electroimpex**: items include studio tape machines of all sizes, mixing consoles, broadcast studio systems and studio monitors. ● **EMT**: wide range of products including EMT 455 digital audio delay with optional remote; EMT 448 Unimatic digital audio spot recorder with remote; Multioutput-Mixsystem transportable mixer for multiple uses; EMT Multioutput-Mix system 40 Mixer expandable to 40 channels; range of EMT broadcast turntables; EMT 266X transient limiter; and the range of modules including compact limiter, noise filter, compact filter/limiter, compact compressor/limiter and a rack mount frame for the modules. ● **Ensoniq**: range of keyboard based synthesiser musical instrument systems. ● **Etelac**: will be showing the Amix CS-AV modular broadcast mixers; SCOOP-9 portable field production mixer; RMC-53 rack mounted production mixer; Master-MC turntable; CR-10 phase correlator. Also on display will be the Milab range of microphones.

### F

- **Fairlight**: CMI series III show with latest software and peripheral equipment. Also on display will be the CVI. ● **Fane Acoustics**: selection from the very large number of new

Dolby XP24 series







The fact that we don't want to mention digital recording in this advert is no reflection on its undoubted merits, or the merits of Brüel & Kjær Series 4000 Professional Microphones.

The thing is, we've seen enough adverts claiming that the ultimate microphone for digital recording has arrived; too many in fact. To paraphrase Shakespeare, "methinks they do protest too much". And he was acknowledged as a genius without mentioning digital recording once....

All we'd like to say is: don't listen to us, listen to our microphones. They speak for themselves.

Contact **turnkey** at 01 202 4366 and ask **Ralph Dunlop** for a demo microphone and make your own evaluation.

#### SERIES 4000 PROFESSIONAL MICROPHONES

**Brüel & Kjær** 

**Brüel & Kjær (UK) Ltd**

Harrow Weald Lodge · 92 Uxbridge Road · Harrow · Middlesex · HA3 6BZ · Telephone: 01 954 2366

Australia (02) 736-1755 · Austria 02235/563 0 · Belgium 02/241-8982 · Brazil 11-2468149 · Canada (514) 695-8225 · Finland (90) 8017044  
France (1) 64 57 20 10 · Federal Republic of Germany (04106) 4055 · Great Britain (01) 954-2366 · Holland 03 402-39994 · Italy (02) 52 44 141  
Japan 03-435-4813 · Republic of Korea 02-793-6886 · Norway 02-84 63 60 · Spain (91) 268 1000 · Sweden (08) 711 27 30  
Switzerland (01) 8606705 · Taiwan (02) 7139303 · USA (617) 481-7000 · Local representatives and service organisations world-wide



## AES PREVIEW

speaker products that they have introduced including full range professional co-axial units together with special versions for live applications; crossover units; industrial speakers; bullet tweeters; LF drive units and musical instrument speakers. ● **Future Film Developments:** comprehensive variety of cables, cords, connectors, jackfields, wiring aids and associated components plus a wide range of audio accessories. New products on show include Noriyuki timecode products, RTS programmable tone generator and Shintron timecode products.

● **Fidelipac:** range of NAB cartridges and cart machines. ● **FM Acoustics:** full product range of power amplifiers, crossovers and Forceline high energy transfer cables. New products will include the FM236/4 linear phase crossover, the FM214 precision balanced line driver and the FM216 precision line driver. ● **For.A:** showing the Sirius-100 digital audio memory, a hard disk-based recording/replay system with the possibility of multiple work stations and up to 1000 minutes of recording time. ● **Fostex:** full range of Fostex products including audio/video synchronisers, compact multitracks, mixers, mics, headphones and speakers.

### G

● **Genelec:** will be demonstrating the full range of five active monitoring systems. This includes the biamp 1019A nearfield monitor; the triamp S30 broadcast monitor; the triamp 1022A music monitor; the triamp 1024B studio monitor; and the 1025A control room monitor. ● **Gexco:** Gexco will show products from Lexicon, Alpha Automation, Switchcraft, MRL, TimeLine, Kintek and Valley People in their role as international distributor. For full details see under company names. ● **Ghielmetti:** matrix programming equipment for routing/switching audio and video signals. ● **Giese:** range of synchronisers and timecode equipment including the TAKER 1000 ADR system. ● **Graff Electronic:** Gem range of high speed cassette duplicators including the Sapphire, Ruby and Diamond models. The Sapphire and Ruby are stereo and mono systems respectively with designs that minimise number of moving parts for increased reliability. The Diamond is a sophisticated expandable stereo copier system with no limit on slave numbers.

### H

● **Harmonia Mundi:** showing the bw 102 digital processor and interface with capabilities including

direct digital transfer between different formats for each of two sampling frequencies and level control, polarity or channel assignment reversal, filtering, EQ, compression, time delay, etc.

● **Harrison Information Technology:** full range of power amplifiers and crossover units. ● **Harrison Systems:** selection of consoles from their range for sound reinforcement and recording. Featured will be the Series 10 fully automated console system. ● **Heyna:** range of duplication systems. ● **HBB:** smaller Sony digital products in the form of the PCM-F1/701; the CLUE editing logging unit; EVC de-glitcher; digital interfaces from A+D and RTW; the AMS AudioFide; EVC replacement oversampling chips for the Sony 3324, 1630 and 701; replacement filters for the 3324 and 1630 from Apogee; Sontec cutting EQs and delays, mic preamps and preamps for 701; Sony products including 3324, 3402, 1630, DTA2000 and DMR 2000; consoles from Amek and including other products from Yamaha, AMS, Drawmer, UREI, BSS, Amcron and Fostex.

### I

● **Industrial Acoustics:** range of systems for acoustic control treatment and complete installations. ● **ICM:** representatives from the CD pressing plant will be in attendance. Also on the stand will be audio cassette C-Os, library boxes and various products for the tape duplication industry. ● **Ilsemann:** cassette manufacturing equipment including wrapping, packaging and sorting equipment for the CD, video and tape duplicating industry. ● **ITC:** full line of cartridge machines and accessories including Performance System, Economy System, 99B series with ELSA cartridge preparation system, Delta and Omega series cartridge

machines; and will feature the ESL V eraser/splice locator.

### J

● **JBL/UREI:** JBL 4400 series studio monitors, the UREI Time-Align studio monitors, JBL concert series speaker systems, individual speaker components, UREI signal processing and the JBL Control One Mini monitors. ● **JVC:** VP-900 digital audio processor, AE900V editor, CR850U U-matic video recorders, FC900 and the FC901 format converters. New will be prototype PQ editor and error checker.

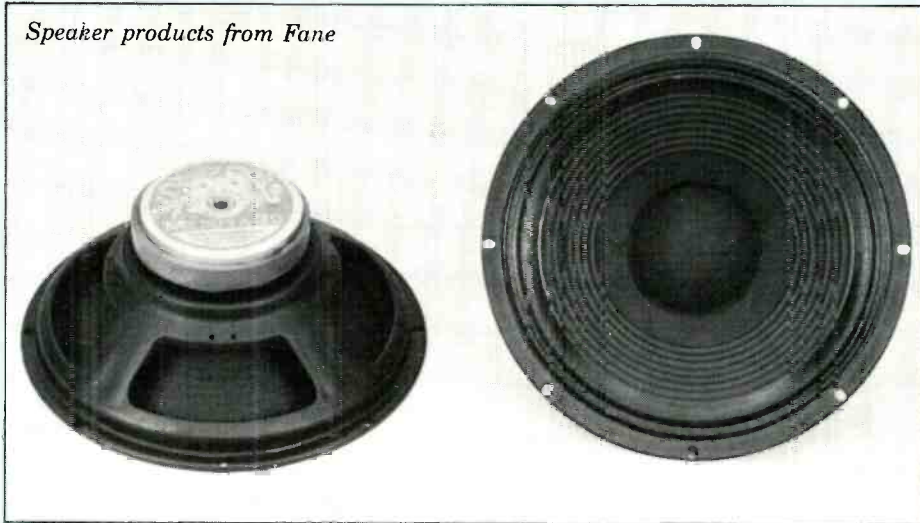
### K

● **KEF:** selection of speaker systems designed for professional use. ● **Kenwood:** test equipment and quality control systems. ● **King Instrument:** tape loading equipment for the audio and video duplicating industries. ● **Kintek:** television stereo audio system with metering, compensating and synthesising products. ● **Klotz:** comprehensive range of studio/broadcast cables, including multicore, loudspeaker, microphone and single screen cables. ● **Kudelski:** range of portable and studio based-tape machines with latest introductions of centre track SMPTE/EBU timecode developments.

### L

● **Leonhard:** range of modular and multipurpose amplifiers and power supplies. ● **Lexicon:** Lexicon products will be situated on two separate stands. Lexicon products on the Gexco stand will include the PCM-70 digital effects processor now with an additional software package V3.00 with over 40 different programs including MIDI

Speaker products from Fane





# AUTOMATIC AUDIO POST-PRODUCTION



## SYSTEMS FOR ALL APPLICATIONS

Audio Kinetics has the highest reputation for post-production synchronizers and mix-down automation which are reliable, cost-effective and user-orientated.

**MASTERMIX:** Automatic Automation. Disc-Based, which can be fitted to almost any console. Easy to use, with the highest quality VCA faders available on the market.

**ECLIPSE:** Tomorrow's Audio Editor Today. Multi-machine, Dual Tasking, and user programmable keys. A really powerful machine-control editing system.

**PACER:** New. The low-cost solution to two-machine synchronizing, but with no sacrifice in performance. Built-in time code generator.

Come and talk to the experts.



AUDIO KINETICS LIMITED  
Kinetic Centre, Theobald Street,  
Borehamwood, Herts. WD6 4PJ, England  
Tel: 01-953 8118 Tlx: 299951 Fax: 01-953 1118

  
AUDIO KINETICS

AUDIO KINETICS INC  
1650 Highway 35, Suite 5, Middletown,  
New Jersey 07748, U.S.A. 201-671 8668  
Fax: 201 671 6902

library cases, boxes and blank cassette tapes.  
 ● **Music Produktiv**: no information available.

## N

● **Neumann**: range of professional microphones, consoles and disc cutting equipment. Also to be featured is the autonomous microprocessor controlled equaliser, fader and microphone amplifier system. ● **Neutrik**: full range of plugs, sockets and connectors in addition to the Audiograph 3300 measuring system with the latest modules added to the unit. ● **Neve**: fully working automated multi-channel DSP console for the first time at any exhibition. Also on show will be the V Series analogue multitrack console and a 48-channel *Necam 96* system in TV audio post-production demonstration. ● **New England Digital**: Synclavier hard disk recording system along with the latest software and updates. ● **Nexo**: on display will be the integrated and mini-integrated loudspeaker systems for sound reinforcement. New to the show will be the *PC-LINE* range of cabinets which currently consists of five cabinets and two dedicated signal processors. The two 3-way systems can easily be expanded to 4-way with the addition of the *PC-SUB* bass unit. ● **NTP Elektronik**: new stereo monitoring unit featuring a stereo phase scope with fixed or automatic gain control, a dual PPM with selectable integration time and a compatibility meter. Other products will include the full range of PPMs and VUs, multichannel metering unit, compressor/expander and limiting amps, automatic telephone balancing units, audio routing switchers and remote controlled pre-mix system for OB use.

## O

● **Orban**: extensive range of signal processing equipment. New to the show will be the Co-Operator level control system and a programmable mic processor. ● **Ortiplás/Gema**

**Socimag**: wide selection of audio and video cassettes and magnetic tapes. ● **Otari**: on show will be the *DTR-900* 24- or 32-track digital multitrack; *MX-80* 24-32-track analogue multitrack; *CTM-10* cartridge tape machine; *MTR-90II* 24-track multitrack; *BTR-5* broadcast 2-track; *MTR-20* 2-track top end analogue machine; *MTR-12II-CT* 2-track machine with centre track timecode; *MX-70* 1 in 8- or 16-track multitrack; *MX-5050* tape machines; *DP-80* 64:1 high speed duplicator systems and the *DP-4050* 8:1 speed cassette copiers.

## P

● **Pearl Mic Labs**: range of microphones. ● **P&G**: full range of studio faders, servo controlled audio faders, quadrant faders and T-bar types. ● **Pro-Bel**: new products include the digital *TDM* audio router which is suited for larger program routing requirements and will be demonstrated using mixed analogue and digital inputs and outputs; and the BBC digital audio Waveform Generator. Additionally on display will be the *6410* 16x4 compact audio switcher and the range of audio switchers and control panels. ● **Publison**: will be showing the *Infernal Machine 90* and the current range of software options, SMPTE and hard disk interfaces. ● **Pyral**: magnetic tape products and disc cutting lacquers.

## Q

● **Quad**: will be displaying the 500 series of professional power amplifiers. The 510 is a single channel amplifier with isolated ins and outs giving 135 W into any impedance between 2 and 75  $\Omega$ . The 520 is a 2-channel amp delivering 100 W into 8  $\Omega$ . ● **Quantec**: in addition to the QRS simulator on show will be the new *QRS/XL*, a 1U high digital effects unit with several effects including the QRS room simulation algorithms.

# AES PREVIEW

autotempo, inverse room, combinations and dynamic decay; the *480L* digital effects system with latest software; and the *2400* stereo audio time compressor/expander. The Lexicon stand will feature the *Opus* audio production system which consists of a workstation, electronics cabinet and disk storage cabinet. Up to 8 hours of audio can be stored and accessed from hard disk. The workstation includes full digital editing, time slip, panning, overdubbing, signal processing etc.

● **Lipsner Smith**: no information available.  
 ● **Lyrec**: on show will be three product lines — the model *TR533* 16-24-track tape machine which accepts 14 in reels and is particularly suited for audio-video synchronising; the complete duplication line with equipment for mastering, duplicating and quality control with 64:1 ratio capability with Dolby *HX Pro*; and *FRED* editing tape deck for handling  $\frac{1}{4}$  in tape.

## M

● **Marquee Electronics**: will be featuring the new Eventide *BD980* broadcast delay line with a full bandwidth, 10 s delay and ramp to zero facility. The Eventide *SP2106* will also be on show with the latest programs including First Order Effects, MIDI effects etc. Also on the stand will be a range of professional products from Adams-Smith, JBL, Goldline along with other professional products. ● **Martin Audio**: will feature various loudspeaker arrays and cabinets suitable for a variety of differing PA applications. ● **Meyer**: full range of professional speakers and associated audio products. In addition to the *UPA-1A* and *MSL-3* sound reinforcement systems and the *833* studio monitors, the complete range of 500 series products will be shown which now includes road box versions and stage monitors. The system features a common integrated stereo controller/amplifier. Featured will be the new *MS-1000* stereo power amp rated at 1000 W continuous sine wave into 4 ohms with both channels driven and 1200 W peak. ● **Mitsubishi**: range of digital audio recorders and mixing consoles. Featured products will include the *X-86* 2-track digital recorder which is available in three different versions suited for broadcast, music recording and film; the *X-850* 32-track digital multitrack; the *X-400* 16-track digital multitrack; and the Westar console in a redesigned format. ● **MRL**: selection from range of formatted and custom audio test tapes. ● **Music Lab Hire**: will be providing details of a wide variety of professional digital and analogue sound recording equipment currently available for hire. ● **Musicbox**: wide range of C-O cassette shells,



*Shure SM89 condenser and accessories*



Our priority: engineering not  
for its own sake, but for music.

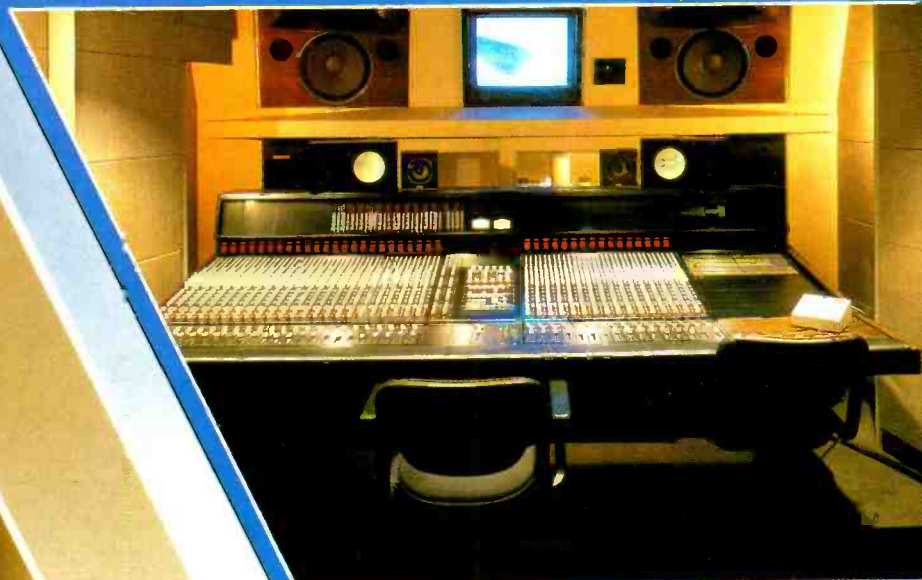
The result: further advances in  
the art and science of console  
design and desirability.

Experience the seductions of  
AMEK's G 2520. Treat yourself  
to unrestrained access to the  
recognized finest-sounding  
equalizer in the world · Prestige ·  
Performance · Creativity in your  
hands · Delivered by the new  
one from AMEK that no-one  
expected. Not even we thought  
it would be this good. For  
Today, Tomorrow and the Future.

# AMEK

## G 2520

The world's first G 2520 installation at Studio Impulse, Tokyo



Head Office, Factory and Sales:  
AMEK Systems and Controls Ltd, Islington Mill,  
James Street, Salford M3 5HW, England.  
Tel: 061-834 6747. Telex: 668127  
AMEK G E-MAIL: AMEK-UK.  
Fax: 061-834 0593.

In the USA: AMEK Controls Inc.  
10815 Burbank Blvd, North Hollywood,  
CA 91601. Tel: 818/508 9788.  
Telex: 662526 AMEK USA  
E-MAIL: AMEK US.  
Fax: 818/508 8619.





# AES PREVIEW

## R

● **Ranson:** will be showing the following equipment: Inovonics FM stereo audio processors; Audiometrics *AMCDS 1000A* multiplay broadcast CD player; Gentner teleprocessing equipment; Shively FM antennas; Broadcast Electronics tape cartridge equipment; Soundtech audio consoles; CRL Dynafex equipment; CTE International transmitters and Sonifex tape cartridge equipment. On show in a demo room in conjunction with Incomtel and Allied International will be the Mediatouch *Touchstone* system allowing computer control of a complete radio station with a colour TV monitor replacing the audio console. ● **RE Instruments:** range of test instruments featuring the *RE201* dual channel audio analyser. ● **Robotecnica (AEG):** range of tape cassette loaders. ● **Rood:** range of broadcast products including stereo encoders and decoders, bandwidth extension systems, MPX equipment, and drives for FM transmitters. ● **RTW:** featured will be the new *1150DA* peak meter for digital audio signals. It is connected

direct to the status port of the *PCM1610/1630* processor and offers overload indication, displays for CRC, average, hold, parity, mute and emphasis. Also featured will be the analogue/digital interface for the Sony *PCM-701* offering conversion from 701 to 1610/1630 code digitally in both directions; and also the *CL-1* cassette loader for medium and small load cassette production. The full range of RTW meters will also be shown.

## S

● **SAJE:** variety of consoles suitable for radio, TV, recording, theatre and stage applications. Featured will be the *Memory* assignable console. ● **Saki Magnetics:** line of long life ferrite heads for Ampex, MCI, Otari, Scully and Studer tape machines. Featured new product will be a ferrite audio post head for the Sony *BVH 2000*. ● **Sanken:** full range of Sanken mics. Featured is the *CMS-7* portable MS stereo handheld mic with a stereo control matrix box and designed with high immunity to noise. Also on show will be the *CU-41* double capsule condenser mic, the *CMS-2* MS stereo condenser; the *CU-31* and *CU-32* small condensers. ● **Scenic Sounds:** UK distributor of products from Schoeps, Audio Precision, Lexicon, Publison, dbx, Orban, etc, will be showing details of their product ranges and services. ● **Schmid:** no details received. ● **Schoeps:** full range of microphone products and accessories. Featured will be a prototype power supply with mic preamp for connecting professional mics to line inputs. ● **SCV:** range of signal processing equipment including dual compressor/limiter, 13 and 28 band graphic equalisers, spring reverb and frequency selective noise gate. Other products include active and passive DI boxes, crossover, phase checker, buffer and mic splitter. ● **Seem Audio:** no information available. ● **Sennheiser:** range of RF wireless, condenser and dynamic microphones along with headphones for various applications. ● **Sescom:**

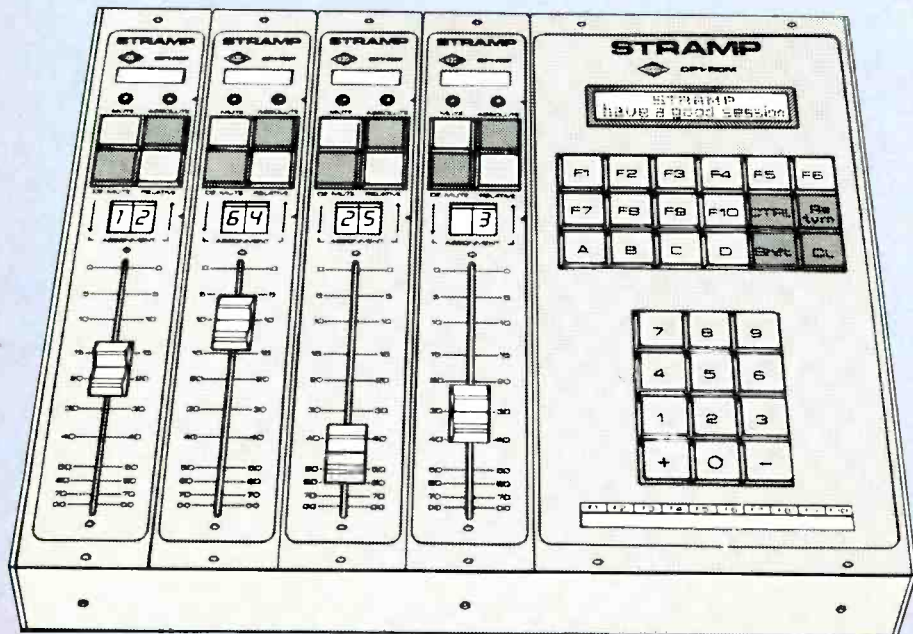
range of audio and interface products including mic splitters, audio transformers, modules, snakes, line drivers, extension cords, etc.

● **Shape:** *Mark 10* audio cassette designed for professional applications incorporating unique design features and Agfa high bias tape. Also available will be details of their video cassette products and CD manufacturing facilities. ● **Shure:** microphones and accessories will be on display including the latest *SM 89* shotgun mic, the *FP* series audio mixers and the new wireless microphone system. ● **Siemens:** no information received. ● **Sifam:** full range of meter products including *PPM* and *VU* types in addition to wide selection of collet and push-on knobs. ● **Solid State Logic:** will be demonstrating their complete range of audio consoles, studio computer systems and machine control systems in the form of the *SL 5000M* series, *SL 6000E* series and the *SL 4000E* series. Featured will be the new high performance *Studio Computer* which allows productions that would normally have taken two floppy disks to be loaded into high speed dynamic RAM giving instant access to any part of the mix. Large amounts of data can be carried on the compact 20 M/byte disk cartridges. ● **Sonosax:** range of small portable mixers designed for broadcast, fixed or mobile studios, and post-production. ● **Sony Broadcast:** equipment will be displayed in two demo rooms and 'workstation' areas that make up the stand. 'Dem room 1' features the merging of audio and video showing the *BVH-2800 1* in C-format VTR with 16-bit digital audio. 'Dem room 2' shows digital editing with *PCM-1630* CD mastering system and *DAE-1100A* editor and *DMR-4000* U-matics with *DTA-2000* tape verification in addition to an edit pair of *PCM-3402* stereo 2-speed DASH machines. Other equipment includes the *MXP-2000* broadcast mixing console, CD players including the *CDP-3000* pro unit and the *CDK-006* 'juke box', full range of analogue tape machines and the DASH product line with the *PCM-3324* being demonstrated in 48-track configuration with a range of interfaces.

● **Sound Engineer:** sound recording magazine. ● **Soundcraft:** featured will be the new *TS12* in-line console interfaced to the *Saturn* multitrack equipped with *Total Remote*. The *TS12* contains many of the features of the *TS24* and is suited for 24-track operation. Also on display will be the new series 600 patchbay console with 24-track monitor module; the series 500 monitor desk for live work; and the series 200SR monitor console for more modest PA applications available in 8-, 16- and 24-channel frames. ● **Soundtracs:** range of mixing consoles including the *T*, *M* and *MR* series. ● **Stanton Magnetics:** will be displaying their range of professional cartridges and styli, the *310B* professional preamp equaliser and the *30M/SR* disco headphone. ● **Stellavox:** full range of tape machines. Featured will be the *TD9* with its newly developed tape loading and muting program. ● **Strand Magnetic:** wide range of products for the audio and video duplication industries. ● **Struven:** featured will be the *CP-1* mixdown automation system to automate audio levels up to 64 channels. New for the show will be the *CPI-RC* remote control which is a modular controller system allowing up to four controllers direct access to all 64 channels either for single groups or complete groups. ● **Studer:** wide range of products with featured models being the *A820* multitrack tape machine; the *A807* 2-track compact recorder; the *A812* mid-sized professional recorder; the *SC 4008* system controller and the *963* compact mixing console. ● **Switchcraft:** full range of audio connectors, switches and jackfields.



ART ProVerb and Stramp CP-1 from Struven







# See top performers from Sony at AES in London...

... and if these are the stars of the show, you should see the full supporting cast!

**PLUS! FOR YOUR FURTHER ENTERTAINMENT...**



a chance to win a 'Super Discman', the world's smallest compact disc player, with full repeat mode, 21 programmable selections, remote control capability and a playing time of 4½ hours.

**Complete your draw card and bring it to the Sony AES stand.**

IF, HOWEVER, YOU ARE NOT ABLE TO ATTEND THE AES SHOW IN LONDON, BUT REQUIRE FURTHER DETAILS ON THE SONY TOP PERFORMING RANGE OF PRODUCTS, PLEASE COMPLETE THIS COUPON AND SEND IT TO:

Marketing Services, Belgrave House, Basing View, Basingstoke, Hants RG2 2LA

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Tel. No: \_\_\_\_\_

We look forward to hearing from you —

**SONY**  
THE LEADER IN DIGITAL AUDIO.

— only Sony have the product line up, for a perfect production —



## AES PREVIEW

### T

● **TAC:** full range of TAC consoles with featured new products being the *SR9000* advanced sound reinforcement console and the new *Scorpion* model *XPB* added to the range with an integral patchbay. ● **Tannoy:** celebrating their 60th anniversary, Tannoy will be showing the *SGM* series of dual concentric monitors; the *DTM-8* compact desk-top monitor for nearfield work; the *FSM* studio monitor; the *Wildcast* live music PA loudspeaker systems and the *Tannoy SR840* power amp. ● **Tape Automation:** range of duplicating equipment including master transports, slaves and loaders. ● **Tapematic:** will be featuring the model *8000* fully automated cassette feeding device, tape winders, video loader, 480 in/s duplicating system and quality control equipment for audio duplication systems. ● **Tascam:** in addition to the *ATR 60* series and series *40* tape machines and the *300/500* series mixing consoles there will be a large number of

new products including the *ATR 80* 24-track 2 in multitrack featuring high speed tape handling; the 16 bus *M600* series console with 24 to 32 inputs and 16- or 32-channel monitoring; the *ES 50* synchroniser for sync of a slave ATR to a master machine and the *ES 51* synchroniser control unit allowing expansion up to 4 machines; the *CD 501* professional CD player; and the *122 Mk2* pro cassette recorder. ● **Timeline:** on show will be the *Lynx* timecode unit and *LTC-422* controller. ● **TracSystems:** will be showing their modular-based cassette duplication systems for short production runs and fast turnaround. ● **Trident:** featured will be the *Di-An* digitally controlled console, now fully working, and a restyled series *80C* with a new monitor module. ● **Turbo-Sound:** see Edge Technology entry. ● **Turnkey:** no information available.

### V

● **Valley People:** featured new products include the model *400* mic processor which is a multi-function single channel unit comprising a transformerless mic preamp, 3-band EQ contoured for the spoken word, compressor and de-esser; model *440* limiter compressor/dynamic sibilance processor; and the model *610* dual compressor/expander. ● **VCL Audio:** futuristic console design for controlling sound, light and video. ● **Versadyne:** professional high speed duplicating equipment including the advanced *1500* series system.

### W

● **Wandel & Goltermann:** range of test equipment including the *NFA-1* automated test system. ● **Westec:** will be demonstrating the *LT 3000* SMPTE-based console using hard disk storage and floppy disk backup. ● **Westlake:** full *BBSM* range of nearfield monitors. It is hoped to

have the new *BBSM-15* three-way high level monitors on show. Westlake distributor in Europe, Britannia Row will also be showing the full range of BGW amplifiers including the new *SPA1* and *SPA3* signal processing power amplifiers; the Summit *TLA 100* tube levelling amplifier and the *TPA 2* tube mic preamp; the full range of Sonosax mixing consoles; the full ElectroSpace product range and details of their hire services.

### Y

● **Yamaha:** new professional products include the *DMP-7*, an 8:2 automated digital mixer with three built-in multi-effects units and motorised faders along with the low cost 8:2, *MV802* rack mounted mixer. Other products include the *TX81Z* fully programmable, rack mounted FM expander; *MFC1* MIDI foot controller; *S500* three-way sound reinforcement speakers and the *PD2500*, a 2U high 500 W per channel power amplifier weighing only 12 kg.

### Z

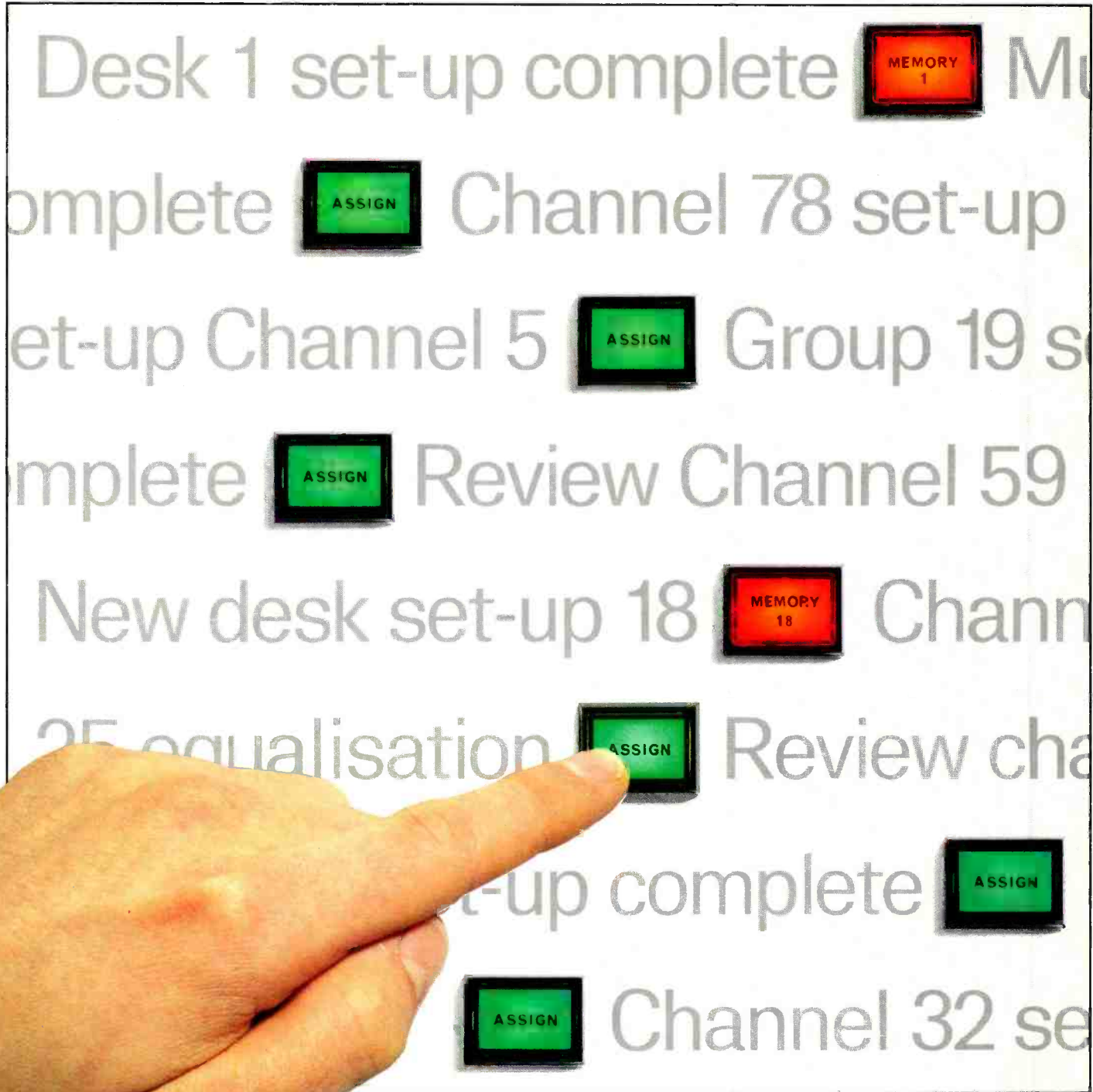
● **Zonal:** full range of tape products including *900*, *950* and *200* series MSR film; *675* and *610* series audio tape and the complete range of cassette tape products. New product will be the *839* series of tapes designed for portable recorders, duplicating and logging use.

● **Studio Sound** will be based on stand 375 exhibiting copies of the latest issues together with magazines from our sister publications *Broadcast Systems Engineering*, *One To One* and our reference publications. Both editorial and advertising staff will be in attendance at the stand or around the convention and we look forward to meeting anyone who wishes to drop by for a chat. □

Tascam ATR 80/24-track 2 in machine





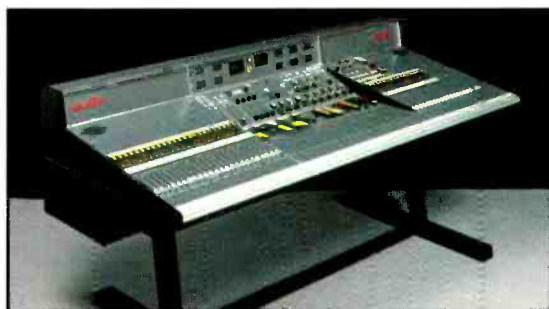


# The AAT3000. All it stretches is your imagination.

You won't find endless rows of channel strip controls on the AAT3000. So you don't waste time endlessly exercising your arms.

Instead, a central control panel can be set up and assigned to any selected channels or groups. Sensitivities, equalisation, levels and routing are all digitally controlled at the push of a button.

And the memory system holds and recalls any of up to 20 whole desk states instantly. In short, the AAT3000 gives you more time and freedom for creativity. Not at a stretch. At a push.



**audix**

AUDIX LTD., STATION ROAD, WENDEN, SAFFRON WALDEN, ESSEX CB11 4LG, ENGLAND. TELEPHONE SAFFRON WALDEN (0799) 40888. TELEX 817444 AUDIX G.

# LIFTING A DIGIT FOR ART'S SAKE

*Alan Parsons mixes some personal views with practical experience on the subject of digital multitrack recording. The basis of this article was originally presented by Alan at Digital Information Exchange '86*

**I**ntense competition has brought enormous pressure on recording studios to charge ludicrously low rates for the facilities they offer. It is particularly difficult for studio owners to justify the capital outlay on digital multitrack recorders unless their rates can be sensibly increased, and they can guarantee their studios will be booked because they have kept up.

There is a further problem with the lack of a digital multitrack standard. On the other side of the fence, the vastly increased studio rates charged to artists for digital recording have led to the need for more thrifty use of studio time. Caught in the middle are the record companies who demand to know why the cost of an album can be increased by as much as 100% by this mysterious new technology. They have had a further shock to the system recently as they've had to spend as much as half their budget in a day and a half to shoot the obligatory promotional video.

Video is a high-tech area which has to be paid for and is an acknowledged and accepted expense. Digital recording is also a high-tech medium, and therefore also entails high costs. Record companies find this difficult to accept; few realise that the payoffs can be not only a dramatic improvement in the sound quality of the finished record but also a potential new breed of musical product made possible by the creative use of the latest technology.

Pre-production can always save time, and therefore expense, but is sometimes not practical. The artist will often take the attitude that it's not their money. (It nearly always is!) Current trends allow for sequencers and drum machines to be programmed at home (by voice command in the bath perhaps?) or in a cheaper demo type studio. Rehearsal halls offer another cheap alternative for routing material while others enjoy the freshness of creating the product from scratch in the studio. Many thousands of hours of studio time have been wasted trying to 'get it the same as the demo' so cutting out the demo stage can help in some cases but it is usually only those with superstar status that are given this opportunity.

Many A & R men consider digital recording as an expense which they feel can be avoided but would they shoot a promo video on VHS? Not on your life! "If this album does well we'll think about doing the next one digital."

I think the industry should come to terms with the fact that by their refusal to give their artists the benefit of the new technology, they are holding back the development of music. If the record companies were just a little more adventurous, increased sales would mean hardware prices could come down and everyone would benefit. Here we are in the age of the laser scanned digital disc, and many of us are still using studio recording technology dating from the thirties.

The norm for the recording of rock music is now 48-track (2x24 analogue) in many music studios but facilities offering a pair of in-house Sony 3324 machines are fairly scarce. The PD format's 32 digital tracks have been found by many to be not quite enough and a pair, making 64, would be too much—especially since there are no music studios that I know of that have 64 monitor positions on their console. Both systems have their supporters, however, and it is still unclear which system is going to stick. Perhaps Studer will be the guiding force for a standard (*in number of tracks only—Ed*).

I have my own doubts about the realistic practical use of a 64-track system owing to the restrictions imposed by console monitoring configurations but I would not wish to get into deep water with a discussion of the other merits of Sony v Mitsubishi. I have yet to work with the Mitsubishi system hands on, and can therefore not comment on its audio performance. In most respects both systems offer similar operational facilities, and although my experience is with the Sony DASH format, there is much common ground from a user's point of view between the two systems.

Dolby SR has been given a lot of exposure in recent months. Multitrack analogue, particularly beyond 24 tracks, does benefit from noise reduction and I acknowledge that the SR system is extremely good at reducing noise but not a great deal more than that. It covers up a major problem that exists in analogue recording, ie tape hiss, but it doesn't make transient clipping disappear altogether, and problems associated with inaccurate machine alignment, azimuth and tape wear, still don't go away. I therefore do not regard Dolby SR with analogue any real alternative to digital; it is simply a very good hiss reducer and—to Dolby Labs' credit—a great deal better than Dolby A. It is, therefore, of benefit to those who insist that the future lies in the ancient technology of analogue electronics.

Right! That's the criticisms out of the way. Now on to the operational stuff!

## *A nice pair*

Firstly, a statement for which I may be criticised myself: to take full advantage of the creative and technical potential of digital multitrack in the recording of rock music it is vital to work with a pair of machines. This goes beyond the fundamental requirement for a large number of tracks as we shall see.

Much has been said on the subject of manual editing on digital multitrack. The Sony system does not allow us to make infallible splice edits. Even if we are lucky enough to have successfully cut and spliced two sections of tape together (with our sterilised gloves and face mask in a dust-free room) the manufacturers recommend safety copying the tape immediately. (Requirement number one for two machines.) So why not take a tip from the video guys (who threw away their razor blades long ago) and edit electronically? (Requirement number two for a second machine.) Even Mitsubishi, with their more reliable cut and splice editing facility, would have to acknowledge that electronic edits are more flexible.

With electronic editing there are distinct advantages. Firstly we can hang on to the original unedited sections and make new decisions based around old and new versions. (Classical producers love this!) Secondly a 'preview' of the chosen edit can be made via the machine electronics without recording a note,

Alan Parsons started his career as assistant engineer with The Beatles in Abbey Road studios at the age of 18. He went on to engineer for Paul McCartney, The Hollies and Pink Floyd for whom he recorded the classic *Dark Side of the Moon* album. As a producer, his credits include Pilot, John Miles, Ambrosia, Al Stewart and of course his own Alan Parsons Project. He is apparently available for weddings and bar mitzvahs and makes great tea.



and any inaccuracies can be corrected by trimming the 'in' and 'out' points with 1 ms resolution. This would be equivalent to joining on or cutting off bits of tape less than 1 mm in length (at 30 in/s), or 1/40 of a film frame, and also avoids the shaking, sweaty hands and heart failure!

Requirement number three (and probably the most exciting and as yet unrealised justification for a second machine): is for manipulation of sounds and sections. It has become commonplace in many productions for a bank of, say, backing vocals to be recorded on only one chorus of a song and then 'spun' in for the remaining choruses. The source is often an AMS or similar Infernal Machines (sic) with a long memory store or a stereo recorder containing a mix of the appropriate section. (Digital stereo recorders are difficult to 'hand sync' unless synchronised with timecode.) There seemed to be a competition going on at one time to see who had the greatest memory capacity in their AMS! The disadvantages are of course that the A/D/A conversion in the sampler of the AMS will result in increased noise and a deterioration of signal quality. Needless to say, any analogue tape generations bouncing material backwards and forwards will also be at the expense of audio fidelity.

There has been some experimentation in manipulation of sounds with devices like Fairlights, Synclaviers and AMS (again!) *AudioFile* systems. A second digital multitrack offers a good specification, the longest 'memory' and the best track flexibility for this technique of all the systems. It remains at all times in the digital domain and gets stored on a shelf as a tangible piece of real time product—not as a hard disk buried inside a machine or as a microchip which might crash.

I have found a system of selective digital bouncing, or 'lifting a digit' has been incredibly useful and musically creative. For example a drumfill, taken from an earlier take, can be inserted into the same tracks of the master multitrack with no signal degradation. Similarly, if the piano player only managed to get his part right before the band went to the pub, his sober performance can be incorporated into a new master where the remaining tracks come from different takes or a new live performance. (This does make the assumption, of course, that all recording has been made to a click track.)

Further uses for the second machine are the formatting of different versions of songs, ie 12 in mixes, album and single versions, and the compilation of whole album sides including effects and crossfades where necessary. Once again the degradation that would be expected following any analogue processing does not exist. Also a multitrack tape can be sent abroad for a Jellybean or dance-music-engineer-of-the-month remix, and a multitrack 'clone' just as good as the original can be retained back at base.

## Old digits die hard

The best way of dealing with the operational differences between analogue and digital recording is to make comparisons at each stage of the recording process.

*Hiring machines and transport:* Many digital machines are owned by hire companies, and are readily transported on a project by project basis to the studios that do not possess their own. Digital machines tend to be very heavy. The time taken for a difficult load-in therefore needs to be taken into account. It isn't my intention for this article to enter into a 'buy or hire' discussion but it has always baffled me why record companies don't go into the equipment hire business!

*Line up:* 48-track Dolby analogue can involve as many as 624 adjustments if a client's tape is to be used for the first time. (For those who don't believe me the following sequence is necessary to line up a Studer machine: Replay—level, HF, LF; Sync replay—level, HF, LF; Record—bias, level, HF; Dolby replay in and out; Dolby record in and out—13 parameters×48=624. And then if you want to use 15 in/s as well as 30!)

Suffice it to say that digital scores greatly in this area. Although a full technical line up on digital machines can be fairly time consuming and involves an oscilloscope and other test equipment, the only day-to-day adjustments are level in and level out. Most users have adopted a standard level setting and have left these adjustments completely alone for weeks, even after a machine has been unused for several days. Abbey Road studios allow two hours for line-up on Day 1 of a 48-track analogue

session, and say 20 minutes to tweak daily. The attitude with a digital machine is switch on and go, perhaps making a quick check that the machine gives unity gain between the console and the monitor chain. Ask any studio technical engineer which he would rather do! In fairness to Studer I should mention their new analogue multitrack. When is their digital multitrack coming?

*Tones:* All that is usually necessary is a 1 kHz tone at 0 dB across all tracks. High and low frequency tones are not necessary on digital multitrack, but a 10 kHz tone is useful for a later phase check on 2-track formats like *FI*, if a mix is made on multitrack.

*Timecode:* Many analogue multitrack users would not bother to lay down timecode until it was needed, perhaps for a synchroniser or automated remix. There is some advantage in pre-stripping code on both analogue and digital multitrack and I would recommend it for either. In the case of analogue machines, a definitive identity is given to each point on the tape, and machine counter inaccuracies can be checked. Also any timecode-based drum machines or sequencers can be clocked or triggered with reference to a taped timecode. When stripping a digital tape



*I think the (record) industry should come to terms with the fact that by their refusal to give artists the benefit of the new technology, they are holding back the development of music*

# LIFTING A DIGIT FOR ART'S SAKE

with timecode we lay down the control track at the same time. This gives us a 'no tears' situation for later locating, synchronising and overdubbing. For 48-, or 64-track, it is a good idea to match the timecodes and control track numbers of both tapes, so that no offsets will be required for synchronisation. An advantage of digital recording is that new code can be added after the event, since the speed of the tape has to be the same as the pass on which the control track was recorded. But analogue machines are essentially free running devices, and a new code striped on to an analogue tape will bear no relation to the recorded material, meaning a sync drift will almost certainly occur. Digital machines invariably have a dedicated timecode track making all 24 or 32 tracks available for music.

*Tape speed and sampling rates:* It is usual on analogue to choose the highest tape speed, ie 30 in/s for most applications in music recording, though the lower speed (15 in/s) might be used for running time or economy reasons. With digital we have to decide whether or not to use emphasis, and make the choice between 44.1 kHz and 48 kHz sampling rates.

In the case of the DASH system, there has been much discussion about which settings give the best results though 48 kHz is obligatory for use with the Neve DSP all-digital

---

*... analogue systems do suffer from tape compression which tends to prompt 'Where's the punch?'*

---

console. For me the decisions are easy. I use 44.1 kHz sampling so that a direct transfer can be made from a pair of 3324 tracks to a 1610 or 1630 processor. This is via a special interface designed by Sony for the purpose. I do not use emphasis for the simple reason that the music is most likely to be louder on CD without emphasis than if the recording had been made with the emphasis switched on—end of story!

*The first recording:* When noise reduction is used for a first time analogue recording, the machine's performance is usually ignored until playback. The only chance we get of checking the tape is listening to a distinctly nasty fizzy rendition of the encoded programme, or by looking at line out on the console meters. In the old days (why does everybody always talk about the old days?) it was an accepted practice to monitor everything including the current input off tape. Noise reduction turned this into a forgotten luxury, since each channel could only handle one mode at a time, ie record or replay. At least at mixing stage we could listen off tape, because tying up four Dolbys for a stereo machine wasn't so extravagant. (Notice the past tense all you antique dealers!)

With digital, noise reduction can be forgotten about. (Cue for another endless discussion.) Although we cannot monitor the tape itself while recording, we can at least hear what the digital processing is doing to our sound. I have recently been monitoring all input material via the machine. This is similar to

getting an off tape signal without the tape running! If you make the assumption that any later error correction is transparent, there will be no surprises after the material has been recorded. From this point on, a digital machine is dealing with numbers. All we are asking the machine to do is remember to output the right numbers in the same order that they were put in, and not to take away the number we first thought of!

*Playing back the good one:* As mentioned earlier, analogue systems do suffer from tape compression which tends to prompt the comment 'Where's the punch?' Digital systems arguably have a transient response unequalled by any analogue system, and since the majority of rock music is based around drums, it is important that we keep all the 'oomph' we can.

At a recent comparison (set up by the British Record Producers' Guild) of analogue with Dolby SR against DASH digital, the off tape differences were very subtle with a close miked piano. The SR did in fact give the lowest noise level. But as soon as a Linn drum machine was plugged in, the lack of punch off the analogue machine against the DASH machine was really quite noticeable. Even at low level the analogue machine could not compete with the digital's extra kick.

One further comment: a digital recording does not suffer in the same way as analogue when it is played repeatedly, perhaps hundreds of times. Tape wear on most analogue systems results in a loss of high frequency response which is difficult if not impossible to retrieve. On a digital recording, tape wear leads to increased error correction. This is usually not noticed by the ear unless the errors are very serious, and can be alleviated by copying the tape after a sensible number of passes. It is important to keep an eye on the error lights in the machine.

*Dropping/punching in and out:* I have successfully dropped-in and out on entire backing tracks on digital machines. Although analogue machines have had improved specifications in recent years, there is still often a glitch, especially on drop-outs. Digital machines also offer a rehearse mode which helps to avoid accidents. Also those tight one-syllable inserts can be stored in memory and recalled.

*Headphone cue monitoring:* Because of the nature of digital processing, there is a small time delay between input and output. This is an extremely short delay and certainly not long enough for the ear to perceive as a late signal. However, if a processed and unprocessed signal are directly combined, a noticeably phasy sound will result.

For the sake of simplicity, engineers usually send to studio headphones from monitor or tape return circuits. This means that when a vocal track, for example, is being overdubbed and dropped in, the vocalist will hear the voice on the tape and a line in signal via the machine when the tape is stationary or when he is recording. If he asks to hear himself as well as his recorded voice before the drop-in, a direct feed to the cue circuit is sent from the microphone channel or, in the case of SSL consoles, Ready Group and Ready Tape are pressed together. This is fine for analogue recordings. On digital the time delay phase errors result in endless complaints about the voice in the headphones sounding different before and after the drop. As soon as the machine goes into record, a delayed line in signal gets combined with the live microphone feed and consequently gives a phase error.

A good way round this problem is to turn down the mic channel cue send and assign the microphone to a dummy machine track which is used exclusively for sending to the headphones. The chosen track on the machine remains on line in at all times and will always be in phase with the track on which the recording is being made. This is because the dummy track has undergone similar processing and therefore will appear with the same time delay as the useful track.

*Track bouncing:* It is usually necessary on a rock recording to reduce a quantity of recorded tracks down to a more manageable number. This would be typically for 'vocal combining' between various performances or to balance up multi-layered parts down to, say, a pair of tracks. Bouncing can also be a clean-up operation to create space for new material.

Careful engineers working in analogue would be reluctant to bounce drums around as any generation losses are most likely to be noticed on transient material with a lot of frequency content. They would further avoid bouncing anything more than once.

Digital offers great flexibility, as track-to-track transfers can take place in the digital domain with no multi-generation losses



Introducing  
ART's  
IEQ  
with  
Smartcurve™



**The  
INTELLIGENT  
Approach to  
Equalization**

- Fully programmable, including Smartcurve™
- Superior audio performance
  - over 100dB dynamic range
  - less than .009% THD
  - $\pm 15$ dB with  $\frac{1}{2}$ dB steps
- Over 120 user presets
  - 16 character user definable titles
- User-friendly alphanumeric LCD display
- Complete MIDI interface
  - Reassignable MIDI presets
  - Total computer control over all functions
- The composite video shows:
  - Actual frequency response
  - Slider positions
  - System and MIDI info
- Controls up to 15 other ART programmable EQ's
- Active balanced input
- Quick to set up, simple to use, rugged and reliable.

It Has To Be A Work Of

**ART**

**Applied Research & Technology**

215 Tremont Street  
Rochester, New York 14608  
716-436-2720  
Telex: 4949793 ARTROC

# LIFTING A DIGIT FOR ART'S SAKE

(even drums). Mixing down multi-layered parts does mean, of course, a D/A/D conversion but a minimum of quality is lost. Unlimited amounts of material can be stored digitally on other tapes (if you have another compatible machine—sorry!) and later retrieved.

Mitsubishi supply a well designed on board digital patchbay with their machine and an external patchbay is easily constructed for the Sony system. Mine is a network of bantam jacks which is pluggable via 50-way connectors to the 3324 machine's digital data ports. Sony are currently working on software-controlled digital patching.

*Mixing:* Video productions, notably documentaries which may



*Rock and pop music is so much based on quality sound and production these days, and writers and musicians are hungry for new techniques. . . Digital recording isn't just a science; it's becoming an art form*

have several different language versions, are sometimes recorded on analogue multitrack and mixed internally on two spare tracks of the machine. This can then be used as a submix to which commentary can be added. For analogue music recording, a mix on multitrack would offer no benefit as a further tape generation would be inevitable to get the mix on to a mastering format.

On digital, if we mix on to two spare tracks, we have the advantage of not having to set up a 1610/1630 (or other stereo machine) to record on to until we are convinced we have the definitive version of our mix. Then the transfer is just a formality and the mix can stay in the digital domain (unless we are transferring to an incompatible format). With a mix running alongside the source and with digital's clean cut drop-in and out facility, short sections of a mix can be corrected without editing, or running the tape for its entire duration. Of course, there is no harm in mixing directly to 1610/1630, F1/701 or even 2-track analogue but, as I will explain, there are further advantages to having a mix on the multitrack tape.

If we come back to a mix days later and say to ourselves: "The mix is great but it needs a little more rhythm guitar," we can run the existing mix into two faders on the console, and add the rhythm guitar via another fader into the overall balance. Then we can record the result on another pair of tracks—or can we?

There are two areas for concern. Firstly, the process I have just described has taken the music out of the digital domain for the second time (the first was the recording of the first mix). Now the mix, containing the rhythm guitar at its original level, has gone D/A again and back into the desk. The guitar track, appearing on a different channel is still first generation.

Whoops! The same time delay phasing problem has reared its ugly head again. All the elements in the mix have been processed twice but the guitar is just going through one D/A conversion. In order to bring the guitar back out of its time warp, we have to delay it, either within the machine as previously described (see 'headphone cue monitoring') or via an external delay line. There would be a good case for manufacturers to come up with a variable 'digital domain delay line' for this purpose.

*Album compilation:* If by now all our mixes are on 1610/1630 format, we can take our stack of U-matics to a digital editing suite or hire in a Sony DAE 1100 editor, with a second VTR, and compile our album.

If we have the mixes on multitrack, however, and we are lucky enough to have a pair of machines (does he ever give up?) we can stripe and code a piece of blank tape long enough for the whole production, and make digital transfers on to a pair of mix master tracks from the various source tapes.

A digital patchbay is again essential for this operation. Crossfades and effects can be compiled on other tracks and edited into the mix master tracks. It should be mentioned that we have gone D/A too for the duration of the crossfade but on analogue, crossfades always mean a downgrade of one tape generation.

## The future

Ah! The good old standby 'future' heading, which means I now have to meaningfully wrap things up!

I admit to being utterly sold on digital—both multitrack and stereo. Possibly I had already made that clear.

These days everyone's a hi-fi buff. It is no accident that CD hardware is selling the way it is. Even punters can tell a good sound from a bad one, particularly when it is an export pressing mastered in the Middle East from a copy that was made from the export copymaster of the copy of the compilation EQ'd production master copy which 'we think was Dolby'd' or an off azimuth pre-recorded cassette which the (major) record company 'could not afford' to put on chrome tape or use the best tape housings. Rock and pop music is so much based on quality sound and production these days, and writers and musicians are hungry for new techniques. We've barely scratched the surface up till now. Digital recording isn't just a science; it's becoming an art form.

*Cue cowboy riding into the sunset with a guitar over his shoulder and a digital 100-track 'portastudio' strapped to his gunbelt. . . fade up music. . . and. . . Credits.* □



*Count*  
SIGNATURE SERIES

... for sheer mastery  
of sound reproduction



### SN20, SN30 and SN60 Studio Monitors

From our long experience in the design of control room monitoring systems, comes this range of acoustically compatible soft-dome studio monitors combining the smoothness of a high fidelity speaker with the transient response and power handling of a studio monitor.

For broadcasting or recording, small or large control rooms, rock or classical monitoring ...and, we suspect, for a few privileged homes.

T H E S I G N A T U R E S E R I E S

**TECHNICAL INFORMATION**

The Court Signature series studio monitors are not only the result of twenty years in loudspeaker design, but many years experience in the actual installation and commissioning of studio monitoring systems.

So far as we know, no other manufacturer of studio monitors has actually worked on the design of control room monitoring systems with all their inherent design and installation problems.

For optimum performance, the Signature Series monitors can be mounted on rigid platforms secured to the control room floor. Alternatively they can be wall or flush mounted either vertically or horizontally.

Except in the most adverse acoustic conditions, the Signature Series monitors should not need separate equalisation, and the response curve shows the ultimate compatibility between the three models, the only significant difference being the sensitivity – which is substantial for soft dome speakers – and the very low frequency performance which is obviously improved on the larger enclosures.

Due to their unique dispersion, the Signature Series monitors need not be 'beamed' at the engineer, but may be mounted in a line parallel to the control desk. This way the engineer is assured of a linear response, whilst the rest of the control room receives equal energy at all frequencies.

**CONSTRUCTION**

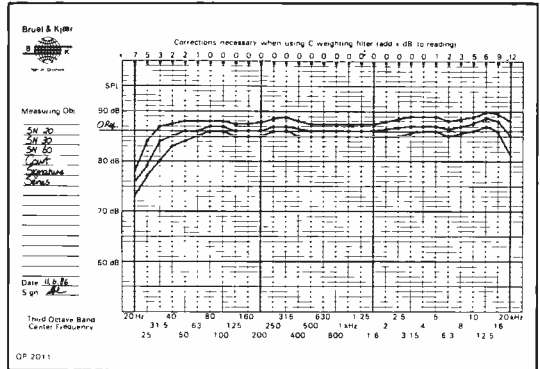
The Signature Series monitors are made from 18 and 25mm very high density fibreboard, and are braced by 3" x 2" stock as well as high density fibreboard panel braces throughout. The result is a highly rigid enclosure with minimum colouration.

All transducers use the latest technology, and in the case of cone drivers, including the 8" midrange unit, have die cast chassis for absolute cone control.

Crossovers are rated at 500 watt peak power for minimum distortion and insertion loss. They are also high tolerance units, rarely encountered in speaker design.

The Signature Series monitors are finished in metallic grey hammer with black acoustic cloth grills.

Due to continual research and development, S.J. Court & Associates Ltd. reserve the right to alter specifications without prior notice.



**SPECIFICATIONS**

**SN20**

Frequency Response: 40-20,000Hz ± 3db.  
Power Handling: 150 watts.  
Impedance: 8 ohms nominal.  
Sensitivity: 94db.  
Size: Width 500, Height 340, Depth 240mm.  
Weight: 10 Kg.  
Crossover: Passive 3500Hz.  
System: 8" homopolymer bass/mid,  
1" ferro fluid soft-dome hf.

**SN30**

Frequency Response: 30-20,000Hz ± 3db.  
Power Handling: 250 watts.  
Impedance: 8 ohms nominal.  
Sensitivity: 96db.  
Size: Width 794, Height 546, Depth 360mm.  
Weight: 35 Kg.  
Crossover: Passive 300Hz and 3500Hz.  
System: 15" roll surround lf, 8" homopolymer mid,  
1" ferro fluid soft-dome hf.

**SN60**

Frequency Response: 25-20,000Hz ± 3db.  
Power Handling: 200 watts, 400 watts.  
Impedance: 8 ohms hf, 4 ohms lf.  
Sensitivity: 97db.  
Size: Width 1078, Height 546, Depth 360mm.  
Weight: 82 Kg.  
Crossover: Passive 3500Hz and 200-300Hz electronic.  
System: 2x15" roll surround lf, 8" homopolymer mid,  
1" ferro fluid soft-dome hf.

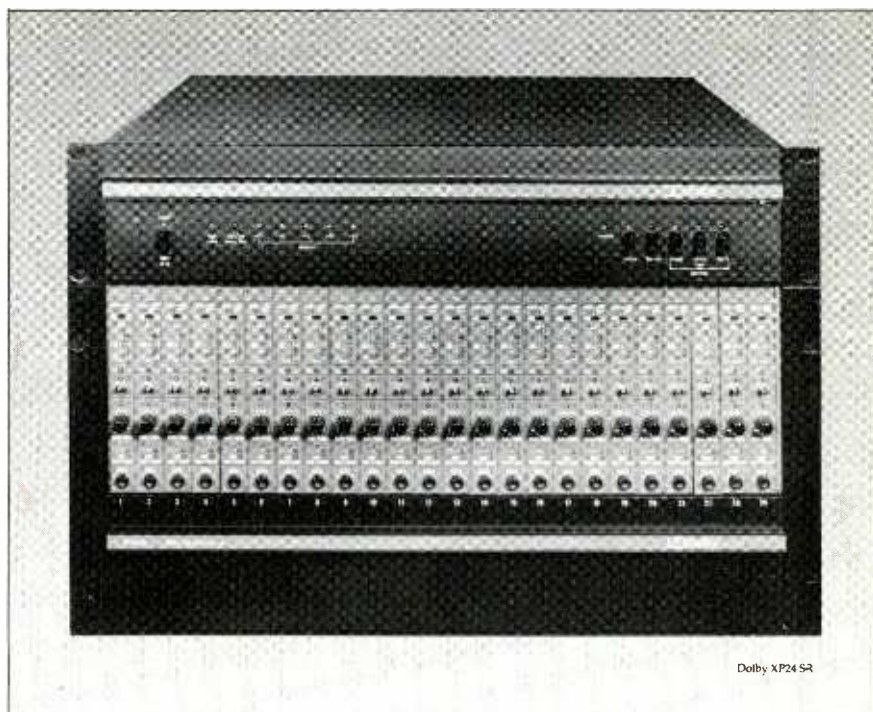
DISTRIBUTED BY:

U.K. DISTRIBUTOR:  
  
PROFESSIONAL AUDIO LTD.  
Professional Audio House  
Corsica Street  
London N5 1JT  
Telephone: 01-226 1226  
Telex: 24824 Proaudio G



# Dolby spectral recording

*The ideal format for  
highest quality  
multi-track recording.*



**Quality...**Signal integrity and clean transients over an extremely wide usable dynamic range are characteristic of recordings made with Dolby SR.

**Practicality...**Dolby SR can be used with any professional analogue recorder, retaining the efficiency and flexibility of established studio techniques. This makes Dolby SR the ideal format for highest quality multi-track recording.

Dolby SR gives the freedom to record anywhere. It works well with the many thousands of professional recorders all over the world, or the new generation of very high quality analogue recorders. It is already being used for some of the finest recording projects.

**The multi-track solution...**The DolbY XP24 SR multi-track unit is now available. It can hold up to 24 DolbY SR modules, Cat. No. 431, each containing the complete SR circuit for one channel.

Drop-in/Drop-out switching is silent and there is ample dynamic range available in the low-distortion input and output circuits. There is an accurate LED meter and an UNCAL setting for rapid realignment on overdub sessions. The separate power supply with a low-noise fan keeps the unit cool even under difficult operating conditions.

In short, everything you need to maintain the unsurpassed quality of DolbY SR recording.

The Cat. No. 431 modules are also available separately to retrofit existing SP and XP Series DolbY A-type NR units. For the earlier DolbY M Series units, as well as Model 360 and 361 single-channel units and Model 365 two-channel units, the Cat. No. 280 DolbY SR module is already being delivered in substantial quantities.

## The new master recording process

**Dolby SR**



## CHIPPING NORTON

*Janet Angus reports from this well-established residential studio in the rural setting of Oxfordshire, England*

The studios in the old school house at Chipping Norton are run by the Vernon brothers—Mike and Richard, both very familiar figures in the business for many years. The rural setting is more reminiscent of country mansions than a prospering market town. Pastoral views from the main building stretch over a rambling green valley with, of all things, a tweed mill off in the distance.

The main building is of course the school house, circa 1853, with accommodation consisting of a series of cottages. These form one side of the courtyard of a former coaching inn, originally a stopping off point for the Stratford to Oxford coaches. The cottages were converted from the old stables. All very romantic.

The atmosphere at Chipping Norton is not one of high pressure. It is best summed up by one pro-audio dealer not very far north of Watford when he said that Chipping Norton was his favourite studio because when he arrived a little early for an appointment he was told to go into the kitchen and have some breakfast while he waited! And what a kitchen too; but more of that later.

The school became a studio over 14 years ago. Residential studios were very much a new idea then—Rockfield had just started and the Manor was thinking about it. Mike Vernon at the time was enjoying not inconsiderable success as a record producer, and he and brother Richard had started the Blue Horizon Records label which boasted amongst its acts Fleetwood Mac. Since they were spending money left, right and centre on recording studios it was only sensible to acquire one of their own. The residential idea started simply for practical reasons and over the years has developed a luxurious nature which no band could possibly find wanting.

The original studio was built within the confines of the existing building and the first studio design was by David Grinstead, then of Decca. The original set up was six bedrooms and self catering but Neil Grant has now completely redesigned the recording facilities.

The studio area itself has not changed dramatically but a live room has been added. It is in the control room, however, that changes have really

taken place. The area has been extended and further space has been afforded by the removal of the machinery to a separate machine room.

Mike Vernon: "We closed down between mid-November 1985 until mid-March '86. The studio had been redesigned in 1977 by John Storyk of Sugarloaf View. The reason we chose him then was that we have always been inclined not to follow trends and everybody else here was having Eastlake or Westlake. It was fairly futuristic for the time but the acoustics were far more successful than they had been! We were doing it a bit in the dark first time round. We still didn't have a live room with that design—we used to use corridors and things. We never looked past what we had in terms of structure you see. If we had put a live room in then there wouldn't have been room for a studio. But it worked. The drum sound on *Baker Street* became quite popular and we got quite a name. But it was never truly satisfactory. Over the last two or three years we began to realise that we had to do something major—adding a live room and a larger control room—especially with the increasing popularity of electronic keyboards and MIDI facilities in the control room. As it was before, there was no room to get anything in at all!"

Although the building is Victorian with lovely high ceilings, the original design incorporated false ceilings which had then been forgotten about. Raising these, taking the floor down 5 ft and taking out two walls increased the available working area.

"We chose Neil Grant to design the new facility because we wanted something different, and we felt that Neil's designs tend to be unique."

Requested softdome monitoring was also installed. "They're tremendous—I can't speak too highly of them. We listened to lots of other systems but really there was no alternative."

Measuring 7.5x5.5 m the new control room is of the lighter and brighter design which is currently favoured to give a less stressful working environment. Low voltage lighting enhances the light grey fabrics which tone with the grey RPG diffusers at the rear of the room. Smoked glass mirrors give an added illusion of space. There is a great deal of room behind the console with a seating area at the back. The overall design is of the LEDE-type, and in addition to the RPGs, there are wooden slats on the side walls which suck in the mid range. Between the monitors are sliding glass doors through to the new machine room, which is faced by the console. The control room wiring has been designed by Brian Haywood to accommodate any quantity and combination of keyboards desired. Chief engineer/studio manager Barry Hammond reported that he has not come up against any keyboard situation that they have not been able to handle. There are 32 keyboard inputs plus 16 parallels dotted around the room. In addition there are MIDI points all round the room and thus anything can be plugged in anywhere.

Another feature of the control room wiring is that there are machine inputs at the back of the room so that if a producer wants to have the machines in during the mix they are easily wheeled through from the machine room.



# WHAT TO LOOK FOR WHEN YOU LISTEN TO A POWER AMPLIFIER.

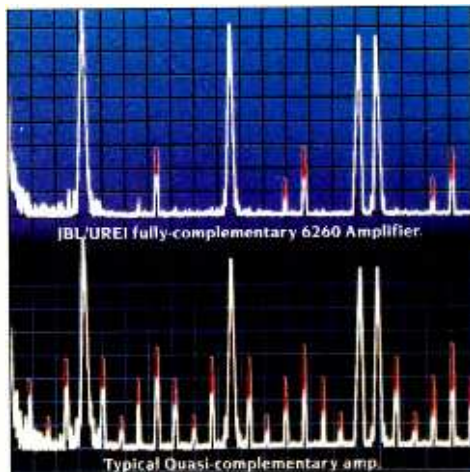
When it comes to evaluating amplified sound, seeing is believing.

In fact, when engineers judge the sound quality of an amplifier, they often rely on two precision instruments: the human ear, and the industry-standard Transient Intermodulation Distortion Test, because when measuring sound with T.I.M. what you see is what you get.

And what you see can be eye-opening. Amplifiers that seem to square off evenly spec. for spec., often perform very differently under the scrutiny of T.I.M. Pushed to their limits, many produce brittle, edgy or distorted sound especially during high frequency passages and sharp transients.

Many manufacturers deal with distortion by using massive amounts of feedback through a single overall feedback loop, placing greater demands on the amplifier and producing an inferior sound.

When we built our new JBL/UREI Amplifiers, we committed ourselves to designing the industry's purest-



Red spikes in the TIM Spectrum reveal the dramatic differences in distortion output.

sounding amps that would not only score highest marks on the T.I.M. Test, but deliver the truest amplified sound ever heard.

Instead of sloppily force-feeding massive amounts of

output signal back into input stages, and congesting it all into one circuit loop, we've established operating points at *each* gain stage. This allows signal purity to be maintained along the entire circuit. And permits optimized use of the type and amount of feedback for each individual gain stage.

In a simple analogy, the new JBL/UREI Amplifiers do each signal track right the first time, so that you don't have to fix it in the mix. The result is sound far cleaner than typical quasi-complementary and fully-complementary output stages only. And far more pleasing to the ear.

Put JBL/UREI's remarkable new Amplifiers to the test at your local JBL/UREI dealer today. We're confident you'll think it's the finest amplified sound you've ever heard. Or seen.

For an informative Technical Paper on the unique design philosophy behind the new JBL/UREI Amplifiers, please write to:



JBL Professional  
8500 Balboa Boulevard  
Northridge, CA 91329

**JBL** UREI  
ELECTRONIC  
PRODUCTS  
Available in the U.S. through Gould Marketing

# CHIPPING NORTON

The mixing console, as far forward in the room as is practical, is a 32/24 Trident *TSM* with phantom power on channels and extra auxiliaries.

Mike: "We used to have a Trident A series 16-track with MCI and Scully machines and JBL monitoring. One of the reasons we have always stayed with Trident is that the EQ is so good with the faders—it is something that we have always favoured. We have always been very pleased with the results we have got out of the desk—lots of hit records and clients who come back. We felt that we did not want to be 85th on the list of SSL studios. We have been Trident here for 14 years and it hasn't done us any harm. We got the *TSM* six years ago and our next move may well be the *Di-An*."

The tape recorders are an MCI *JH24* 24-track and Studer *A80* (¼ in) and *A820* (½ in) as well as a Sony *PCM-701*. The Dolby collection comprises *A361s*, *M16H* and *M8H* all housed in the machine room which is quite roomy, 5.25x2 m deep, and cosmetically refurbished to tone in with the control room.

In addition to the main Quested monitors, nearfield monitoring is by Yamaha *NS-10Ms*, Visonik *David 6000s* and *AR 18s*. There is an extensive complement of outboard gear including AMS *RMX 16* and Klark-Teknik *DN780* digital reverbs, AMS *dmx 18-80S* digital delay with pitch shifter, Publison *Infernal Machine* with 21 s stereo sampling, Drawmer *DS201*, Roger Mayer and Kepex noise gates, dbx *902* and Orban *Parasound* de-essers, Marshall *Time Modulator*, Bel *BF20* stereo flanger, Orban *621B* parametric equaliser, dbx *160* and *165* limiters, UREI *1176* limiters, Survival Projects stereo panner, Eventide *1745M* digital delay and *H910 Harmonizer* and two

EMT *140* stereo echo plates. There are also Aiwa and Tandberg cassette decks for copies.

Plans for the future equipment-wise: "We're looking at Dolby *SR* at the moment. We definitely won't be buying a digital machine because they can't make up their minds about the format, and with analogue and Dolby *SR* you can virtually deliver the same. It really doesn't warrant spending the sort of money involved. Realistically speaking we won't be even thinking about digital until we have a new desk. The cost of equipment and the amount of equipment you need to have available because clients demand so much puts studios almost in a financial bind so that prices have to go up and then the record companies won't pay. Album budgets nowadays are in the region of £100,000 and on a new band A&R men don't like it. It's a vicious circle but our answer is not to buy the sort of equipment which forces us to charge those sort of rates.

"As for machines, we are MCI at the moment but will probably go for an Otari or Studer. We are getting a lot of enquiries for 48-track and the new room is prewired for it but it stretches the *TSM* so that is why we are looking at desks. But you have got to take these things slowly and think about it, listen to our clients..." which include Duran Duran, Level 42, Barbara Dickson, the Fureys and Gerry Rafferty whose gold discs adorn the kitchen walls.

The new live room measures 4.25x4.85 m x 5 m high. RPG diffusers feature again here on one side wall and the oak is set off by the grey fabric also used in the control room. Loose carpets may be moved or removed as required. There is a track above the glass doors to mount *PZMs*. The studio area has not changed a great deal. There are soffits down one side which are finished in a combination of oak, grey fabric and stone. Angled windows give clear vision through to the control room and the mahogany flooring gives a nice feel to the room. Built within the original building it is possible to walk right round between the two which is obviously useful for wiring purposes.

Within the main building there are various nooks and crannies where a band member may lose himself—sitting rooms, video and listening rooms, pool room, all accessed from different routes and all comfortable. One sitting room features old school photographs which turn out to have been a job lot from a local dealer and not originals, but you wouldn't notice the difference. There is a small kitchen for sneaking the odd cup of coffee behind the machine room but upstairs is the real centre of the universe. The main kitchen has also been given a face lift with very attractive wooden finishes and a huge kitchen table constantly laden with all sorts of delicious fare provided by three cooks who work various shifts to ensure that there is





## BREAKING THE BARRIERS OF SOUND

Fane professional audio components represent the ultimate in advanced design technology, superlative performance and outstanding durability. Every product is designed according to the most up-to-date developments in materials and magnet system research. They are hand built to a standard which ensures that its original performance excellence will be retained indefinitely. Breaking the barriers of audio research towards perfection.

# FANE

*Towards Perfection*

Fane Acoustics Limited  
286 Bradford Road, Batley,  
West Yorkshire WF7 5PW, England.  
Telephone: Batley (0924) 476431  
Telex: 556498 AUDIO G

Distributors and Agents: **Belgium** Filtecar BV, Mechelen 23, 2578 Honingshaakt, Lie. **Canada** Belsie Acoustics, 80 Rang St. Marguerite Est, Quebec J0L 1H0. **Denmark** Storm Power, Sundtalvej 88, 3000 Helsingør. **England** Audio Equipment Limited, Audio Factor, Robin Lane, Pudsey, Leeds. **Finland** MS Rudkaron Oy, Laitantie 10, 00420 Helsinki. Radio Mikro Oy, Honkasuonte 1, 00390 Helsinki. **France** Comac, La Richerrie, 44850 Moutzeli, Loire. **Germany** Ralom Hai GmbH, Gewerbegebiet Süd, RM-Gutbackenstein 5, 6390 Usingen 1. **Greece** Omikron, 20 Salomon St, Athens 142. **Hong Kong** Excel Hi-Fi Company, GPO Box 2853, 7th Floor BCC House, 10 Queens Road Central. **India** Quadra Technics Limited, Room B17B, Watson Est, 2-8 Watson Road, North Point. **Indonesia** Guntur Rintarunsa, P16a Hoi Tapu, P.O. 531, Jakarta, Jakarta Barat 11001. **Italy** Outline, via Brozzi 4, 25100 Brescia. **Japan** Handa Shokai Corp, Handa Toyu Bldg 12F, 3-4-2 Handakaji Cho, Chiyoda Ku, Tokyo 101. **Osomoto Onkyo Co.** 2-19-23 Nishihara, Asaminami Ku, Hiroshima, Japan 731-01. **Netherlands** Fane Holland, Julianaplaan 2, 3534 an Utrecht. **New Zealand** Clef Industries Ltd, P.O. Box 37-005, Parnell, Auckland. **Norway** Eurotek Limited, Lyd & Lysr Engros, Fossvæien 24, 0551 Oslo 10. **Portugal** Acoustica, Rua de Padrao 58, 4440 Valongo. **Papua New Guinea** Rooks Radio, P.O. Box 191, Lae. **R.O.C.** Alimko Industrial Svcs, P.O. Box 512, Taichung, Taiwan. **Singapore** Bell & Order Engineering P1E Ltd, 37 Cantoning Lane, Unit 04-05, Perlex Ind Bldg. **Spain** Dinaz Electronics, Pique 50, Barcelona 4. **Sweden** Rodax Electronic AB, Industriegatan 4, 112 46 Stockholm. **Hi-Fi Art Electronic AB**, Box 9309B, 104 35 Stockholm. **Switzerland** Sacher Music, Steinengraben 40, CH-4051 Basel. **Thailand** Hi-Chareon Mackwe Tool Co, 73 Bsdang Road, T. Sarnchapolisua, Bangkok. **USA** Fane America, 1316 E Lancaster St, P.O. Box 8344, Fort Worth, Texas 76113. **U. Indies** Music Centre, P.O. Box 883, Grenville St, St Vincent, Windward Islands.



## CHIPPING NORTON

always something interesting about to come out of the oven.

Also upstairs is the overflow accommodation which consists of five bedrooms of various descriptions and which is presumably the original accommodation. Out in the courtyard the row of cottages provides total

privacy and comfort and should people wish to bring their families each one is totally self sufficient. There is even a laundry room.

As Richard said, he thinks people like staying at Chipping Norton because there are so many places to get away from people and you can make it pretty difficult for people to find you if you want to! The whole complex is run on a very small staff which also helps to create the family atmosphere. **Chipping Norton Studios Ltd, 26/32 New Street, Chipping Norton, Oxfordshire OX7 5LJ, UK. Tel: 0608 3636.** □

**N**eil Grant of Discrete Research was first approached by Chipping Norton in 1984. It was, however, mid 1985 before work actually commenced. Major alterations to the building had to be carried out before the control room 'rebuild' could start.

A former kitchen, workshop and basement boiler room were all ripped out in order to create more space and bring the control room floor down to the same level as the studio area. The lowering of the floor increased the ceiling height enormously. A new foundation slab was installed and building of the room started all over again.

Neil Grant: "The previous control room was extremely small and sounded dreadfully bad—it needed enlarging and acoustically treating so that there was no imaging, etc."

The height of the room, some 4.5 m is what Neil considers the most appealing feature of the room. Designed on an "... evolution of the LEDE principle—known as reflective free zone (RFZ) I was creating an area wherein mixing and working areas of the room would hold no competing reflections. I used RPG diffusers (whereas before I would have used splayed surfaces, as a result of my more recent experience I now employ RPGs).

"Having broken out the original floors and excavated the basement, the builders demolished the workshop and kitchen, toilet and stairs landing and lowered the level of the floors to accommodate the new foundation; new structure membranes had to be put in. In this large void we built a timber acoustic shell.

"It is a very tall room. One of the big limitations in London is that you usually cannot get the height—here we had two storeys to play with."

Acoustic finishes are essentially rear of the room diffusing and front absorbing. The rear of the room is finished in beech and ash hardwoods as well as RPGs, with a newly created access to the reception area. The front of the room consists of two densities of Rockwool: low/medium backed by a higher density. "There are voids behind the structure for LF absorption while the timber shell functions as an LF absorber."

The control room ceiling and front wall are covered in a series of grey and charcoal open weave woollen fabrics. The floor is light oak tongue and groove with a section of carpet at the rear. Possibly the most visually striking feature of the room is the unusually large floor to ceiling windows through to the studio which are matched for symmetry on the facing wall with smoked glass mirrors, angled to control reflections.

The old light fittings were replaced with low voltage lights which, although initially more expensive, are cheaper to run and because of their

higher colour temperature, are brighter and provide a more comfortable working environment.

Monitoring proved to be a bone of contention between designer and client. Neil: "The monitors are on concrete plinths and were designed to be mounted on isolation pads. The studio's engineer thought that wouldn't work because he could push them... we have since proved that it does work. However, Barry vetoed it. When the monitors are bolted on to concrete, LF energy travels faster through the concrete and fabric than air, so it is travelling through the structure of the room and shows the bass response. Subjectively you get more bottom end but this is an illusion, so it is our policy to isolate them. It was just a last minute burst of nerves on the part of the client."

Neil Grant had more or less a free hand in the designing of the room, the only client requirement being that they must be able to see the machines, and there should be as much room as possible for musicians in the control room. Although the newly created machine room is not inordinately large, it does leave the control room clear of clutter. It is equipped with its own air-conditioning plant which was installed as part of a major revamp and replacement of the existing system.

The mixing console is placed very far forward in the room, allowing space for working behind it. "Yes the console is far forward—my rooms are all forward biased."

The original studio area was very dead—"an anechoic little box"—into which Neil introduced variable acoustics with one end relatively dead and lifeless for piano and vocals, getting progressively brighter towards the live room end. "The request for an actual live room as such only came about half way through the project!

"We didn't do too much in the studio. We put in a new 'technical ceiling' to match the rest of the facility; changed fabrics and removed some of the trapping to brighten it up. It is still controlled but not as dead as it was."

The live room used to be a tape store. "Again there is a lot of height—very nice. All surfaces are reflective. We built a timber shell, as in the control room, and apart from some LF control there are no absorbers. There are sliding glass doors into the studio and one wall holds a bank of RPGs—otherwise the walls are splayed and angled."

Either side of the sliding doors there are little recesses which turn out not to be a subtle part of the acoustic design but "little nooks and crannies to be in keeping with the studio area".

Neil's overall assessment of the finished work: "It is a very unusual control room with a unique high ceiling." □



# GUITAR HERO

New sounds  
New music

STEPP  
DGI

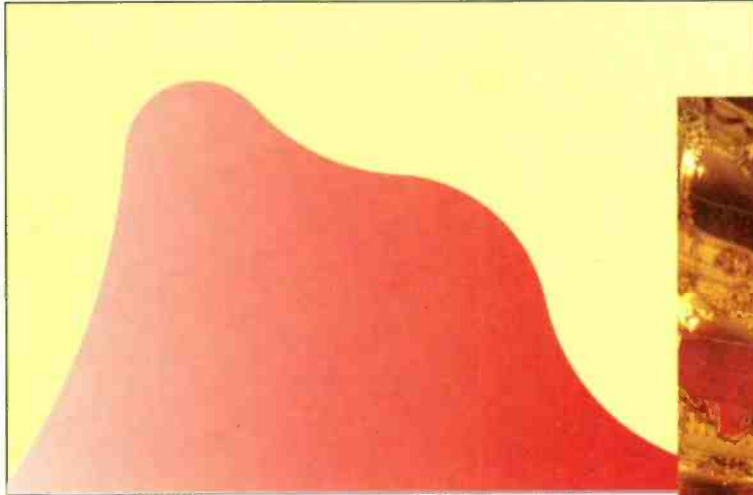


See it at *Paul Smith* Floral Street Covent Garden. Hear it at **UNIT Eight** — Call for an appointment 01 586 6006  
STEPP Ltd. 3 Primrose Mews, Sharpleshall Street, London NW1 8YL. Tel: 01 722 5448. Telex: 267002 E.Mail: 78 DGS 2199





# Only new ideas change the way we listen.



## Now we have a clearer picture.

The 480L's innovative SHAPE and SPREAD controls continuously adjust the diffused reverb profile to match the ideal ambience characteristics of a real hall — with uniquely natural pre-delay

## Digital processing for digital production

The 480L is engineered for the unforgiving all-digital audio environment, with its higher standards of accuracy and dynamic range. The PCM 1610/1630 compatible *digital I/O interface* lets you add true stereo ambience and sampling, *all in the digital domain*. 18 bit linear internal architecture and converters produce a wet signal dynamic range of 98 dB. Now you can add reverb without adding noise — even on a digital master.

## The next stage — and beyond

Right now, the 480L is a powerful and dramatic step forward in digital signal processing technology. Yet its present software doesn't strain the architecture, which is itself designed for future hardware additions. If you need continually expanding creative options more than disposable packages of cliché sounds, experience new possibilities. Treat your ears — and your imagination — to an hour with the new 480L Digital Effects System from Lexicon.



*Gexco International Inc. is the worldwide distributor of the Lexicon 480L and other high quality products for the recording, broadcast and postproduction industries.*

**lexicon**



Scenic Sounds Equipment Limited  
Unit 2, 12 William Road, London NW1 3EN  
Tel: 01-387 1262, 01-734 2812  
Telex: 27939 SCENIC G

**ACE**

ADVANCED COMMUNICATION EQUIPMENT  
(INTERNATIONAL) CO., LTD.  
Wing Ming Industrial Centre, 1/F, 15 Chung Yee Street,  
Cheung Sha Wan, Kowloon, Hong Kong  
Telex: 40862 ACECO HK, Cable: 1918  
Tel: 3-7452343-4 3-7452679 Fax: 3-7457776



GEXCO  
INTERNATIONAL

317 St. Paul's Avenue, Jersey City, NJ 07306/USA  
(201) 653-2383 Telex 285261 GEXCI

# A MARRIAGE OF CONVENIENCE BRINGING TOGETHER THE BEST ANALOG DIGITAL PRODUCTION TOOLS AVAILABLE

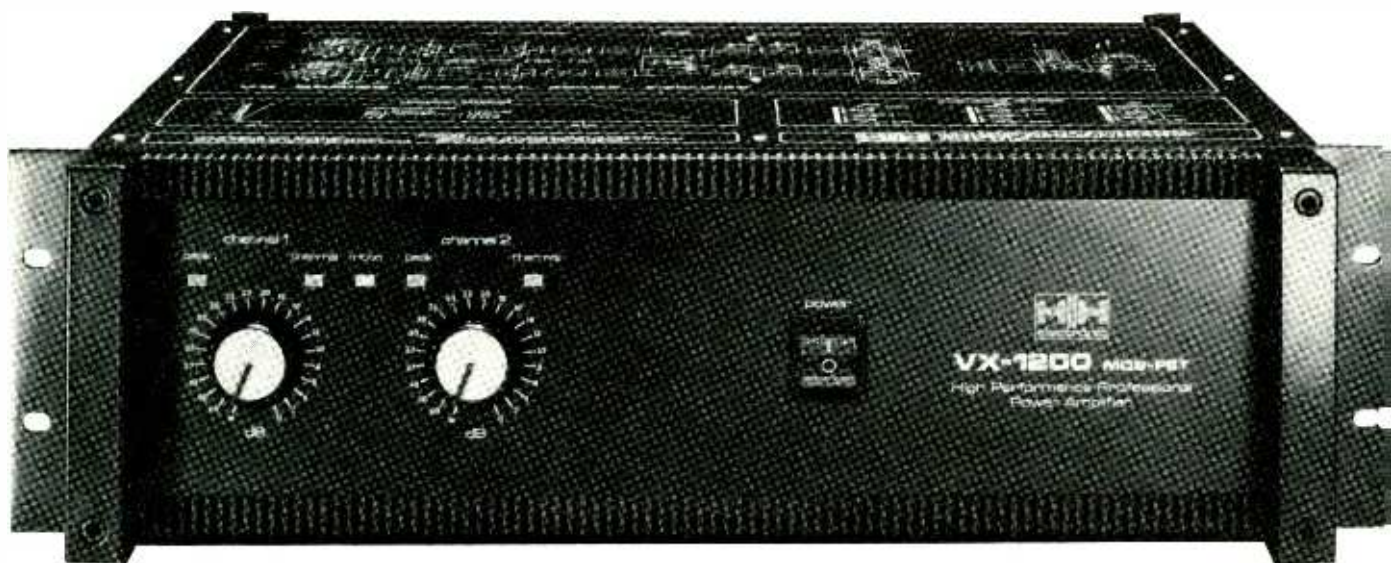
## HH "VX" Range

The HH "VX" series; a new range of power amplifiers offering a significantly improved size/performance package.

A range that, for the first time from HH, offers a compact one unit high, two channel work-horse.

Enhanced specifications include two speed, quiet-running fans on higher powered units, 70 V $\mu$ S slew rate and power outputs from 60 to 600 watts per channel.

Call John Wase for a demonstration.



## Lexicon PCM 70

Lexicon Digital effects set world standards for sonic quality.

The PCM 70 offers the essence of Lexicon sound as well as being the only digital reverberator to have Dynamic MIDI™ for control of all reverb and effects parameters.



# OGUE AND BLE

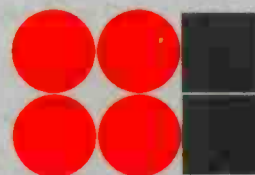
# D

FOR 15 YEARS SCENIC SOUNDS HAS SOUGHT OUT AND DISTRIBUTED PRODUCTS WHICH OFFER THE BEST TECHNOLOGY OR BEST VALUE OF THEIR KIND.

WE ENJOY DEALING WITH OUR CLIENTS DIRECT, ADVISING AND LEARNING FROM THEM, BUILDING UP LONG TERM RELATIONSHIPS.

WE ALSO RECOGNISE THAT YOU MAY PREFER A LOCAL SOURCE OF SUPPLY, SO WE HAVE CREATED A NETWORK OF DEALERS TO ENSURE THAT MOST OF OUR PRODUCTS ARE EASILY ACCESSIBLE WHEREVER YOU ARE BASED.

DO CONTACT US FOR DETAILS OF OUR RANGE AND OUR DEALERS.



SCENIC SOUNDS EQUIPMENT LIMITED  
Unit 2, 12 William Road, London NW1 3EN  
Tel: 01-387 1262, 01-734 2812  
Telex: 27939 SCENIC G



## dbx 150X

The dbx 150X features two separately powered, simultaneous encode/decode channels of dbx Type 1 noise reduction giving up to 40 dB improvement in signal to noise ratio using analogue tape.

The 150X can be mounted singly or in pairs in 1U of rack space – full rack mount kit included as standard.

The 150X outperforms its best selling predecessor, is more flexible and breaks a new price/performance barrier.

We know it sounds too good to be true but assure you it's for real.

To prove to yourself that digital signal to noise ratios are attainable for well less than two hundred pounds, call Scenic or a stocking dealer soon.



Despite being deceptively simple in appearance and very affordable, the PCM 70 has a specification which puts it in the top rank of professional digital signal processors.

Call us for the name of your nearest stocking dealer.

# MARTIN POLON'S PERSPECTIVE

The night is warm—unseasonably so for London. On this June evening two men pull a van up to the deserted sidewalk on Osnaburgh Terrace near London's fashionable Regent's Park. They are circumspect as they get out of the vehicle, as though they are only too aware of the district police facility less than half a 'click' away up Albany Street. One of the men is vaguely oriental as though one parent had come from Hong Kong several generations ago. The other man is large and swarthy, with thick sweating lips that come from descent via the desert. Both men are well dressed but the larger man looks of New Oxford Street while his Asiatic companion bespeaks New Bond Street. The two men begin unloading four large wood and cardboard boxes. From their markings, these boxes have clearly reached London via freighter from Asian waters.

Another car suddenly pulls up to the kerb; this time a shiny blue Rover that parks behind the van. The two men are startled from their unloading but recognise the driver and nod. Two men fashionably attired respectively for the business suites of Damascus and Tokyo exit the Rover. One of them carries a small aluminium suitcase. The obvious leader of the second group, seemingly Arabic in nature, issues a curt command to his underling. This worthy exits around the corner of the large 1930s building, only to return quickly with a porter pulling a trolley. All of the containers are loaded on to this ancient transportage. The merged group follows behind the load as it is wheeled into the discrete and genteel ambience of the lobby of the White House Hotel. The leader now asserts his command of the whole group and slips the porter a £5 note with a room key. The group waits for several minutes and then heads for the lifts. The four men emerge on the sixth floor and enter a large suite.

Once inside, this surreptitious force take their respective coats off and roll up their sleeves. From the boxes, four sleek electronic components emerge along with test generators, scopes, digital

multimeters and tools. Of the special components, three are larger than the last. Screwdrivers and other tools are flourished and quickly the innards of the four units are bared to the harsh glare of the overhead fixture. From the aluminium case comes small plastic boxes cradling computer chips. A 'black' box dangling thick cables is also brought out. Ninety minutes later the modifications are completed and the testing and alignment begins. Finally, the units are then connected together and the four men synchronise their watches. The leader reaches for the 'black' box and pushes a button. The men hurriedly exit the room and dash for the lifts!

Does this report tell of a deadly Libyan threat to the peace of London? Is this a gathering of sophisticated Asian and Arab terrorists? What terrible weapon have they foisted on the unsuspecting residents of London North West One? Perhaps an Iranian-backed effort to sabotage peace efforts in the Middle East? A disastrous turn of events engineered by the Soviets in the epic struggle between Iraq and Iran?

No, dear reader, if we are to believe what the press says the Western World's record companies are currently engendering, something far worse is taking place—R-DAT digital tape machines have been modified to make digital one-on-one copies of compact disc recordings. In our little story, the modified DAT units are busily dubbing away as the pirates leave their copying set-up to partake of a spot of late supper in the cosy French restaurant below.

That the Western World's major record companies have been waging a vitriolic campaign against R-DAT is fact; that the real reason is the threat of digitised piracy remains a question to be analysed. According to published reports, no less a figure than the honourable Stanley Gortikov, President of the Recording Industry Association of America (RIAA), told members of the United States Senate that the impending introduction of digital audio tape (DAT) "has struck fear into the hearts of the music industries throughout the world". Gortikov reportedly also stated, "Congress has a rare opportunity to devise, in separate

legislation, a permanent solution to the digital home taping problem before severe incremental damage is caused by the product."

Unfortunately for the RIAA and its world partners in the IFPI, the White House has taken a strong position against home taping legislation and Congress is so obsessed with issues like deficit reduction, tax reform, the war on drugs and 1987 budgets that no action is expected on the DAT issue at this time. Nevertheless, the concern shown by American record company executives has been categorised by many as extraordinary. One executive was quoted as stating that R-DAT would turn every home into a record factory.

On the international front, officials at Philips have taken a very strong stand on R-DAT as have officials of other companies. There has been a strong suggestion of a possible direction to be taken by the members of the IFPI global label trade group and the European Association of Consumer Electronics Manufacturers (EACEM). The veiled threat of prohibitive duty within the framework of the General Agreement on Tariffs and Trade (GATT) has been raised, according to many observers of the European A/V scene. It is even hypothesised that such action would encompass a joint US/EEC response against R-DAT. As one US journalist assigned to trade negotiations put it, "Why fight the Pasta war or the Orange war when you can beat up on R-DAT. It has no friends outside of Japan." Whether or not that last statement is true, R-DAT has stirred up a veritable hornets' nest on a worldwide basis.

The clearly implied threat of R-DAT is that it would be an ideal tool for copying the compact disc—the vessel, parrot and broad sword of the digital pirate. Does that implication match the reality of R-DAT? The answer is probably not. It would not be impossible to use R-DAT for compact disc copying but there is a real lack of logic to the process. Compact disc in playback utilises a single set of digital to analogue (D/A) converters to produce a usable stereo audio output. The use of an R-DAT recorder would require that the D/A converted analogue signal from the CD be subjected to A/D conversion at the input of the DAT recorder and then to undergo another set of D/A conversion when the R-DAT is in playback mode. There is justifiably no reason to make such a recording from the point of view of fidelity of the recorded copy since the CD in playback requires only one set of conversions—the R-DAT mode sees the use ultimately of three sets of conversions.

Aha, you say. Clever people will modify their R-DAT machines by simply bypassing the D/A circuitry, leaving the desired functions in the digital domain, you say. The approximately 84 signatories to 'the R-DAT Concordat' (great title for a Ludlum thriller) conceded the possibility of illicit copying and designed the R-DAT with 48 kHz sampling. This total incompatibility with the 44.1 kHz sampling rate of the compact disc player means that nerdy teenagers with broken glasses patched with tape, will not pop the covers of their CD and R-DAT and short circuit the analogue converters to record digitally. Not that is, unless they can afford the \$10,000-plus pricetag necessary for a viable digital audio standards converter. In addition, the initial plan for R-DAT encompasses blank media providing less recording time capacity than that needed for the transfer of CD software.

Aha, you say. The record companies are concerned that the evolved R-DAT will be used to steal the CD by consumers who are willing to sacrifice some quality for relative fidelity of the



digital copy, you say. That is all well and good but the evidence points in another direction. The R-DAT will sell at introduction for a premium price in the \$1200 range. If CD's history is an accurate predictor, it will be at least two years before R-DAT reaches the \$500 price point: portable and automatic R-DAT players will come but not overnight. Blank cartridges for R-DAT will also cost about the same as video cassettes when it reaches mass market status. In the near term, blank media could cost closer to \$10 a pop. Aligning the future of CD with the same time frame, we find CDs selling in the \$10 price range. That provides little economic justification to the 'home pirate' who has to spend upwards of \$1000 to break into the game and \$10 for each tape that is 'pirated'. If and when R-DAT achieves some success and those figures are reduced to \$500 for the recorder and \$5 for a tape; there is still not sufficient incentive considering the potential loss of digital fidelity for the sophisticated audio enthusiast. The bulk of all illicit copying is done by young people, according to several recent studies, and they use recorders costing under \$200 and blank cassettes costing less than \$2. They copy for convenience, to save money and to avoid the poor quality of pre-recorded cassettes.

The question of CDs and cassette copying does provide some alternative insight to the problem of copying. It seems that our friends in Japan have devised sophisticated combinations of CD players and high quality cassette recorders in the same package. One maker has a CD-cassette component with necessary timing and control electronics. The product is targeted at 'the audiophile with limited space' just the thing for turning out a perfect copy of the latest Bruce Springsteen album. Another well known Japanese name has a sophisticated 'executive boom box' with a CD player, two high-speed cassette recorders and the necessary control electronics to automate the entire process of multiple taping of a CD. Sold with its speakers, AM-FM tuner, equaliser and amplifier, the unit is just the thing to set a budding entrepreneur up in the copy business. Add a dual high-speed dubbing deck and four studio-perfect cassette copies are available in the blink of an eye.

No one can argue with the record companies calling 'foul' over home hardware configured suspiciously as to allow piracy. That the need for such equipment has been engendered by the record companies' notoriously poor cassette quality is not the point here. Two wrongs do not make a right—even in the audio industry. Then why haven't the record executives launched an attack of equal virulence at CD-cassette copying? It might have something to do with hidden agendas towards R-DAT.

Item one involves the threat that R-DAT could affect the future success of the whole CD format. Highly coercive metal tape cartridges, slightly smaller than the analogue Philips cassette, are attractive in size, could be used in pocket-sized digital 'walkers' and would be a sensational format for automotive usage (the tape medium eliminating the 'jiggle' problems that moving CD players seem to have). Commercial software generation via digital tape copying would be significantly improved for R-DAT over the multi-million dollar 'clean room' technology of current CD pressing facilities. Large quantities of R-DAT software could be placed on the market in a relatively short time and be quite price competitive with the CD. We are told that CD pressing plants will achieve billion disc output by 1990. Unfortunately, if we have 5 million players searching for 100 million discs in 1986, we could well find 50 million CD players in need of the 1

billion discs promised for the next decade. Add 1,000 titles for a reasonable catalogue of CD releases divided into one billion disc capacity, still leaves only 1 million copies of each disc to serve potentially 50 million CD players worldwide. So, it appears that CD software shortfall and portability issues of CD hardware are areas of threat posed by R-DAT to the future of the compact disc.

Item two is the potential for the recording CD and/or other optical digital recording formats. Recent *Wall Street Journal* articles have linked major audio/video companies like Philips, who control record label affiliates, to the development of the recording CD. It certainly seems to make little sense to place R-DAT into the marketplace and then try to introduce a similar disc-based system several years later. Curiously, both Philips and Sony are important signatories to the R-DAT agreement. It is impossible to pinpoint all the elements involving R-DAT that are making the record companies hot under the collar but what we do know is that where there is smoke there is fire.

Some analysts see the most disappointing facet of all this as the apparent ease with which the Japanese have been backed down. Several respected technologists who work for Japanese consumer electronics companies have been heard expressing private doubt if R-DAT 'is really the right product': the same individuals were ecstatic about R-DAT three months earlier. Does this mean Japan is suddenly talking down R-DAT for good reason or merely because of the direct and relatively political pressure that has been applied. Is there a private horsetrade to avoid the 'Hunter-Killer' chip on conventional audio recording products in exchange for a significant delay in R-DAT's consumer introduction? All very hard to say and even harder to prove.

What is fact is the reality that Japan is not going to abandon R-DAT. Certainly, the demand for a top ticket true digital R-DAT for the recording studio and professional broadcast marketplaces has never been greater. Reported agreements between several powerful Japanese consumer electronic companies have apparently mandated a Spring to Summer 1987 release for R-DAT. Whether that will be in the consumer marketplace or in the professional audio sector remains to be seen.

The bottom line, boys and girls, of the world's consumer electronic companies and record companies is that if you bungle the transition amongst digital products, you will without doubt throw consumer confidence out the window. Certainly, the 'final solution' (not my words, the words of a record executive at a conference) offered by record companies to the 'problem' of R-DAT is not a consumer confidence builder. This is the insertion of the now infamous CBS Labs 'Hunter-Killer' or 'Filter-Chopper' chip that disrupts recording from commercial releases so configured. Here we have the audio industry's version of the pre-frontal lobotomy. Or as a CBS Labs press release implied: you don't hear a thing.

For better or worse the new/old owners of CBS have marked the lab for extinction and whether The Chip ends up in all our R-DAT machines or on general sale remains to be seen.

Please, all ye of little faith who runneth this industry—please let's work together to establish consumer confidence in digital products of all kinds. Remember that there was *not* an eleventh tablet hauled down from the Mount with the inscription, 'Thou shalt buyest all consumer electronics hardware and software.' □

# why we excel!



**RELIABLE  
24 HOUR  
SERVICE**

*With 24 hour, 7 day, round the clock service, no other company can equal our immediate response.*



**FINEST DIGITAL  
& ANALOGUE  
TAPE MACHINES**

*We actively lead the way in tape machine rentals with the Mitsubishi X850 and X80 digital, Sony 1630 digital mastering systems and Otari MTR90 and MTR12 recorders.*



**COMPLETE  
PACKAGE  
SUPPLIED**

*All machines and instruments are supplied professionally cased and include as standard all necessary cables, manuals, disc library and latest software updates.*



**FULL  
OPERATIONAL  
BACK-UP**

*Even after installation our factory trained operators and technicians are always available to give advice on operation and programming.*



**RAPID  
DELIVERY  
ANYWHERE**

*Our radio controlled vehicles provide rapid delivery and installation nationwide while international rentals are easily arranged.*

**MUSIC  
LAB HIRE**

*leading the way*

76 EVERSOLT STREET, LONDON, NW1 1BY  
TEL: 01-387 9356 TELEX: 28159 MUSLAB G



# BARRY FOX'S BUSINESS

## Name dropping

Word has just filtered through of a musician found by the police slumped helpless over the wheel of his car on the motorway hard shoulder.

He wasn't drunk or ill, he was just helpless with laughter. Another musician in the car had just told him about what happened on the LBC radio phone-in programme a few nights earlier...

The phone-in host was giving away T-shirts as prizes in a musical competition. Callers had to give the Christian names of famous musicians.

An Australian phoned to compete.

"The name of the musician," said the chat-show host, "is Mozart. What were his two first names?" Silence.

"We'll give you some help," said the host. "His first name was Wolfgang and there was a film about him. All you have to do is tell us his second name."

Silence again. Time is running out. Finally the man from Oz who had volunteered for the job, spoke up hopefully.

"Er...er...would it be Bruce?"

## Stereo TV for Britain

It looks as if Britain will be getting stereo and bilingual sound with television by 1988—using the first terrestrial digital system in the world. Because the system is digital, it can also carry data, text or graphics. And the technology is compatible with the digital sound format that all Europe has agreed to use with MAC TV for direct broadcasting by satellite.

The far reaching decision by the BBC to go ahead and start broadcasting TV sound in stereo, and the promise by the IBA to follow, has been underplayed because there is continuing confusion over which government department is responsible for technical matters like this in broadcasting.

Currently the only way the British get stereo TV sound is through simulcasts. Japan, the US, and West Germany have started broadcasting stereo with TV. A technical compromise is always necessary because the stereo signal must be compatible with existing mono receivers. Everyone including, now, Britain has chosen a different compromise. The British system really does look like being the best.

All television programmes in all countries, are broadcast with the picture signals on one carrier and mono sum sound on a second carrier of higher frequency. The spacing between the vision and sound carriers differs from country to country but is usually around 5 or 6 MHz.

For stereo, Japan chose a multiplex system similar to that already used all round the world

for FM stereo radio. The sound carrier has an extra sub-carrier, either for difference information (for stereo) or a second language (for bilingual tracks). A pilot tone tells the receiver whether to keep the two signals separate for bilingual or matrix them for stereo.

Europe, led by West Germany, refused to adopt the Japanese system. The official argument was that it could not adequately separate two different language channels. The real reason was that politicians wanted to limit low cost imports from the Far East. The West German system puts the stereo signal on a second sound carrier which is transmitted at a slightly higher frequency, and lower level, than the main sound carrier. Patents on the idea are probably worthless because it is old technology, so the import ban would not hold anyway. There have been some problems with birdies and although the Germans don't talk about it, stereo sets incorporate a noise reduction chip derived from the old Burwen studio system.

The US scorned the German technology and modified the Japanese multiplex system. The stereo sub-carrier is processed by dbx noise reduction.

The BBC has effectively updated the West German system with digital technology. There will be two sound carriers. The main carrier, with mono sound, is analogue and picked up by existing receivers. The second carries a stereo pair in digital code, and will be received by a new generation of sets or bolt-on decoders.

The bit stream is compatible with the C-MAC bit stream adopted by the European Broadcasting Union and all European governments for DBS. For stereo hi-fi or bilingual broadcasts, the sound is sampled at 32 kHz, and encoded into 14 bit words which are compressed down to 10 bits. One or both sound channels can be replaced by data running at 704 kbit/s. This stream can carry teletext, graphics, paging signals or even still pictures.

Responsibility for broadcast decisions in Britain is now split between the Department of Trade and Industry and the Home Office. The BBC asked the DTI to approve its system, and the IBA backed up the request. The DTI recently decided 'yes', but thought it was up to the Home Office to issue a formal announcement. The Home Office thought there was no need for an announcement because the system does not need any extra radio frequency allocation. Actually, says the Home Office, there was no need for Government approval anyway!

Need or no need, the BBC had to go through the motions because manufacturers would not invest in the design of sets without some kind of formal blessing. Most now promise sets in the shops by 1988, in time for the BBC's service. The IBA will join in later: after 1988 when it starts to

replace aging mono transmitters with new ones which are stereo-capable.

The big question now is, what will West Germany do? Their system was launched with a bang in autumn 1981—at the Berlin Radio Show. The German electronics industry saw stereo as a way of selling new receivers to a saturated market. But five years later still only one of the three TV channels (the second channel) is transmitting stereo and still only a few programmes a week. Germany and France will soon get DBS and digital sound from C-MAC. The terrestrial TV broadcasters in Germany could easily switch to the BBC's digital system. But the people who have bought receivers for the analogue system will not be amused.

Sometimes it pays not to be first.

The BBC terrestrial TV transmissions, or German and French DBS programmes, will not be the first digital TV sound broadcast direct into homes. Japanese homes can already receive digital stereo with TV signals from a direct broadcasting satellite.

Japan began DBS in May 1984. There was an incentive to do this because Japan is so mountainous that terrestrial transmission cannot reach some parts of the country. Commercially Japanese DBS has been a flop because two out of the three transmitters on board the satellite failed. The Japanese blamed French company Thomson, which supplied the microwave amplifier tubes. In the future they will buy Japanese.

A second satellite is now broadcasting and the omens look better. The sound from the Japanese satellites is PCM. It can be transmitted in either of two ways, modes A or B. In the A mode the digital data stream carries four audio channels each sampled at 32 kHz, coded into 14 bit words and companded to 10 bit. In mode B there are two channels, sampled at 48 kHz with 16 bit linear coding.

By sacrificing the analogue TV signal, and using the whole 10 MHz satellite channel to carry digital audio, there is room for 12 or 16 channels of hi-fi mono, six or eight stereo pairs or a deluge of teletext, fax, HDTV still pix or MIDI music.

## Timecode explained

A German company claims to have developed a timecode system that can be used with ½ in domestic video recorders. Normally there is no room for a timecode track on the tape. The new system, called Rapid, slots digital timecode words into the pulse track on the edge of the tape which is used to synchronise linear tape transport with rotation of the video head drum. When checking the story and comparing it with SMPTE coding, I found not a single text book on the shelf which explained SMPTE code clearly and concisely. Most of them just waffled.

No wonder there is such confusion, for instance over 'drop frame', the electronic bodge necessary to compensate for the fact that American and Japanese colour video tape does not run with a frame rate of exactly 30 Hz—it's a shade under (29.97 Hz) to avoid interference effects. Anyone looking for a clear description of timecode, not just SMPTE but VITC (Vertical Interval Timecode) as well, need look no further. Future Film Developments of Wardour Street, London, will sell you one which is published by Cipher Digital Inc of Boston Massachusetts. It's written by Walter Hickman and in 100 or so pages tells all in English which is as plain as possible for something that is as tricky as timecoding. The only snag is the price. Those 100 or so pages will cost you £8. (*Well recommended. Ed*)



# PERFORMANCE NOT PROMISES

Exotic automobiles exude high performance and deliver it. A word of caution; in audio signal processing, a pretty faceplate does not translate to superlative performance.



Valley products are designed and engineered to set the standard for excellence when processing audio signals for the desired effect.

The processing circuitry in our equipment does not come from an electronics textbook. We invent it.

Fresh, new terms such as Linear Integration Detection, Peak Reversion Correction, Automated Program Dependency, Auto Slope, and Program Variable Release Shape, appearing in conjunction with our products are indicative of our commitment to deliver unequalled performance, instead of merely conforming to accepted practice.

The heart of our signal processors, the VCA (Voltage Controlled Amplifier), is not purchased elsewhere. We created it and patented it! Its employment in our products yields our distinctive clean, pure sound.

Valley makes signal processors ideally suited to fulfill your performance criteria. Let us prove it. Call to receive an immediate demonstration.



GRISBY MUSIC PROFESSIONAL s.r.l.  
Via delle Industrie, 4  
60022 CASTELFIDARDO (Ancona) - Italy  
Phone (071) 781714-5-B - Fax (071) 7819048



1 Cornhill Place, London NW1 8ET Telephone 01-623 4533  
Fax 01-623 4534

GEXCO International Inc., 317 St. Paul's Avenue, Jersey City, NJ 07306 (201) 653-2383 Telex 285261 GEXCI

GEXCO  
INTERNATIONAL





# INSIDE THE NATIONAL SOUND ARCHIVE

*Tim Leigh Smith delves into the records*

The National Sound Archive began life in 1951 as the British Institute of Recorded Sound (BIRS) in Russell Square near the British Museum, 1968 brought a move to west London alongside an accumulation of renowned museums (Science, Geological, Natural History, Victoria and Albert) and educational establishments (Imperial College, Royal College of Music, Royal College of Art, City and Guilds College).

Funds were provided directly by the Department of Education and Science until 1983 when the National Sound Archive (NSA) became a department of the British Library. This meant more secure funding and a brighter future. The NSA acquired the use of a second building in Exhibition Road and was able to make improvements to its facilities, including the installation of Neve's fourth DSP desk.

The scale of the Archive's work is somewhat mind-boggling as it aims to be a comprehensive collection representing the full spectrum of recorded sound, particularly in Britain, over the past century. This so far comprises about a million discs of all kinds and over 45,000 hours of recorded tape.

The NSA collection is divided into various subject areas which are the responsibility of specialist curators. Music is covered in four areas: Jazz, Popular Music, Traditional Music from all parts of the world, and Western Art Music. Two curators specialise in the spoken word: one deals with Recorded Literature including plays and poetry; the other deals with recordings of interest for their linguistic content such as accents and dialects.

One curator is responsible for the collection of Wildlife Sounds which has major contributions from the BBC Natural History Unit at Bristol, individual recordists and members of the Wildlife Sound Recording Society. Another area where enthusiastic individuals have already done considerable groundwork is Industrial Sounds;

from transport and factory noise to weaponry ancient and modern. The NSA is now establishing a curator to develop this part of the Archive.

## Acquisition

The collection continues to grow very rapidly as the NSA receives copies of most currently available commercial recordings and makes its own recordings of broadcast material and live performances likely to be of historic interest. It also receives occasional gifts or bequests of both commercial and private recordings from individual collectors, and even complete back-catalogues from some record companies.

An arrangement with the British Phonographic Industry ensures that the NSA receives copies of 80 to 90% of all discs commercially available in Britain, including major imports. This amounts to between 2,000 and 3,000 discs a month: from pop and classical music to the spoken word and wild life sounds; from singles, 12 in singles and remixes to albums, cassettes and compact discs.

A secondary source is by way of the Gallup organisation which acquires copies of all chart discs to check label details against sales data sent in by retailers for the chart compilation. These discs are subsequently passed on to the NSA to help fill any gaps as many small independent labels are not members of the BPI. Thus any record that makes the Top 100 is assured of its place in the Archive.



Cataloguing this vast influx of material should be greatly assisted by the National Discography computer database which began operation in January 1986. This is a joint venture between the NSA and the Mechanical Copyright Protection Society. It is intended first to cover all new releases, then gradually to include all currently available recordings and finally to work backwards in time to take in all existing material in the Archive.

The NSA also holds copies of all BBC Sound Archives material and BBC Transcription Service discs (radio programmes for sale to broadcasters overseas). Independent local radio does not have a central archiving system but ILR material is acquired from the Association of Independent Radio Contractors' programme sharing scheme.

Some 20 hours of BBC programming is recorded off-air each week. A rack of five *PCM-F1*-type digital processors each feeding up to three Betamax machines controlled by digital time switches provides unattended off-air recordings. Three VHF tuners cover Radio 2, Radio 3 and Radio 4; a fourth tuner takes Radio 1 medium wave and a line feed from Broadcasting House can be used for Radio 1, Radio 4 long wave, or BBC World Service.

About 300 hours of live material is recorded each month by NSA staff. Much of this is spoken literature from the National Poetry Centre, the Institute of Contemporary Arts, the British

Council and major literary festivals. It includes almost every production staged by the National Theatre and the Royal Shakespeare Company over the last 20 years and the English Stage Company at the Royal Court since 1973. Recordings are also made of visiting musicians from overseas whose work is not widely available on commercial recordings.

Portable recording equipment comprises four Nagra 4.2s, a Uher and two portable *F1* kits. A couple of Marantz cassette machines with Dolby C are used when lightweight gear is needed for overseas travel. Microphones include the AKG *C451* capacitor mic with its range of different capsules, and moving coil mics such as Beyer *M210*, AKG *D202* and *D220*.

Theatre recordings have been done on a single Nagra using double play tape at 3¾ in/s to get the required running time. More recently it has been found that the stereo signal from a pair of *C451*s with the *CK8* short shotgun capsule is quite good enough to justify digital recording.

It is perhaps surprising that the National Sound Archive also collects videotape recordings. These come from two main sources. Some video productions are bought in because they feature historic sound recordings which are not otherwise available. The NSA also makes its own video recordings of some of the events it covers, where it is thought that the visual image provides an unusually high degree of information about the

sound. For example performances by foreign theatre companies or visiting overseas musicians playing unusual instruments.

The NSA's Education Officer Jeremy Silver points out that these are purely archival documents and not multi-camera productions: "We're very concerned that the cultural events we are documenting are not affected in any way by our presence. Obviously that's where sound still wins out, and that's why we've been able to make recordings in so many different places for so long. Even with low-light cameras and so on, video technology still isn't capable of making a satisfactory recording in a darkened theatre but we are starting to video a certain number of events. It's something that we'd like to move into more—it's a question of resources—at the moment we can't afford it."

## Conservation

The bulk of the Archive collection is stored in climate controlled vaults downstairs. Back-up copies are kept at a secure store 'somewhere in England' lest any of the worst excesses from the small print of insurance policies come about. Every spare corner of the premises is occupied by work in progress: boxes of tapes and discs of all ages and sizes awaiting treatment, duplication or cataloguing.

For instance one attic room is the temporary home for about 1,000 tapes and over 3,000 discs which constitute 'the Bishop collection'. Jack Bishop provided recordings of sound effects and background music for many West End theatre productions in the 1930s, 40s and 50s, first on disc and later on tape. He also occasionally recorded the performances providing an intriguing side light on theatrical history.

In the offices and technical areas Revoxes and Studers, mainly *B62*s, abound. Besides swish Technics turntables there are older workhorses



The Neve DSP alongside a 1924 gramophone designed by Louis Lumiere



# INSIDE THE NATIONAL SOUND ARCHIVE

such as the Garrard 401 fitted with SME 12 in arm and Shure M44 cartridge to track 78s at four grams, or more, using a wide range of special styli which Expert Pickups provide to suit all types of groove. Dirty discs get the full treatment from a Keith Monks twin turntable Record Cleaning Machine.

Familiar equalisers are supplemented by machines like the Packburn Audio Noise Suppressor. This unit aims to get the best signal off a mono disc played with a stereo pickup. The operator can select a stereo output, or a single channel, or combine both channels to read either lateral or vertical information.

The combining system works on the principle that modulation which is the same on both channels is signal and any difference is noise. If either channel is more than 3 dB noisier than the other then the quieter channel is selected. If neither channel is more than 3 dB noisier than the two are attenuated and mixed so that the summed signal maintains the same level and the noise is reduced.

In the second stage a type of peak clipper is used to recognise the sudden impulse of a scratch or click and apply gain reduction to suppress the noise. The final stage is a form of dynamic noise suppressor. A soft knee low pass filter rolling off at about 9 dB/octave is automatically adjusted to operate from any point between 15 kHz and 3 kHz

according to the HF content of the signal. The results are most impressive.

## The Neve room

Much of the NSA's technical equipment is tucked away in small back rooms but the Neve DSP desk is presented in a tastefully curtained room. This console has three 2-channel inputs and a 2-channel output so it is more like a DSP mastering unit than the mighty multitrack desks such as at CTS and BBC OBs. It is intended mainly for processing individual items so the faders are set off to one side and the signal processing controls are right in front of the operator.

Each channel has 4-band EQ offering up to 12 dB lift or 24 dB cut from 30 Hz to 15 kHz with considerable overlap between adjacent bands; high and low pass filters with up to 24 dB/octave roll off; three notch filters which are each tunable over the range 45 Hz to 200 Hz in 1 Hz steps, 200 Hz to 1 kHz in 5 Hz steps and 2 kHz to 16 kHz in 50 Hz steps with variable Q. Limiter, compressor, expander and noise gate are also available.

As in other DSP desks a single set of controls is assignable to any channel and the various processing stages can be configured in any sequence. Digital readouts allow very accurate and repeatable settings, any of which can be held in one of 30 memories or stored on micro-floppy disk.

Day-to-day operation of the DSP is in the hands of Noel Sidebottom whose superbly descriptive job title is Audio Restorer. He has found the precision of the DSP controls particularly useful—mains hum and its harmonics are no problem: "When it's not simply a mains hum I use a spectrum analyser (Klark-Teknik DN60) to identify exactly what we're getting. You can usually see if there is a particularly irritating colouration or resonance. Then I can key in exactly what I want to remove. I had to remove a cricket recently from an Amazonian field recording. It was quite near the microphone and was distracting from the music which was on the other side of the river. You could actually see the thing at almost exactly 12 kHz on the analyser so I notched it out. That

worked extremely well."

The convenience, cost and quality of the PCM-FI format make it a very attractive storage medium for the NSA, particularly as there is rarely any requirement for editing. Thus material from acetate tapes or discs of dubious longevity, for instance, is currently being transferred on to Betamax.

It is NSA practice to put two versions of mono material on to the twin track copy: one channel is treated to achieve a more acceptable sound by present standards and the other is a straight copy without any processing so future generations can still get back close to the original as tastes and sound processing technology change. The University of Cambridge Department of Engineering is developing a digital scratch filter which is already achieving good results but is not yet up to real time signal processing.

## Chief engineer

Chief engineering officer Lloyd Stickells worked closely with Neve engineers in the planning of the NSA DSP equipment. Lloyd started out as a technical operator in BBC Radio and worked in the Film Unit at Maida Vale, transferring extracts from film soundtracks to ¼ in tape for programme inserts and helping to compile programmes such as *Movietime* and *Movie-Go-Round*.

A move to the government Central Office of Information (COI) Radio Division was quickly followed by three years with Radio Zambia. Lloyd then returned to the COI as maintenance engineer in the Radio Division. In 1974 he joined the Imperial War Museum's Department of Sound Records which basically deals with oral history recordings. Then in 1979 Lloyd was invited to fill a vacancy for chief engineer at the BIRS.

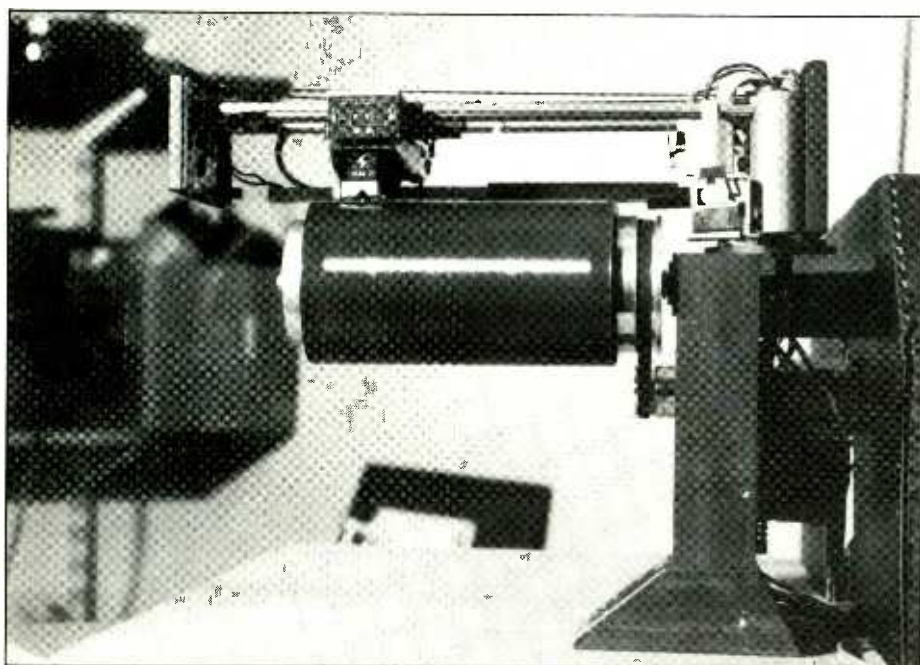
Several special bits of equipment have been built by Lloyd Stickells—"cobbled together" is his expression. One of these is a sequential monitor system which allows a single operator to keep an ear on several playback or recording machines. The duration of the sample from any machine can be individually adjusted to between 4 s and 1 min to suit the relative importance of each feed.

A prize exhibit is a device for playing wax cylinders. An earlier attempt to motorise an Edison machine had resulted in mechanical noise from clanking gears and thrashing wheels which often exceeded the noise on the cylinder. With several thousand cylinders to be dubbed off it seemed worth the effort to construct something better.

An old machine was found with a belt drive fitted directly on the mandrel which carries the cylinder. Suitably mounted, this offered much quieter operation. The drive motor had to provide a wide range of speeds as cylinders were nominally recorded at 160, 144 or 120 RPM and could require higher or lower speeds.

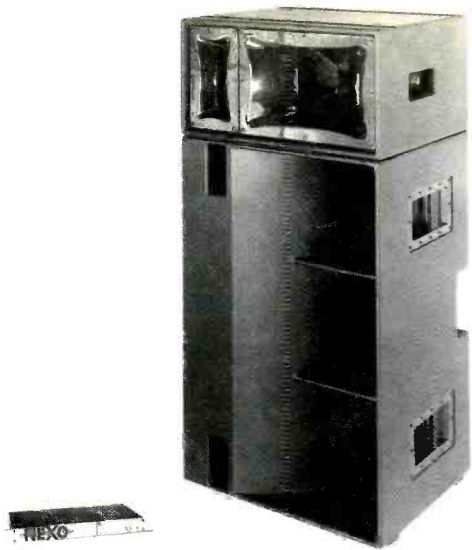
Early recordists working in some far flung corner of the Empire were more concerned with getting an event on wax than niceties of recording speed, as Lloyd Stickells has observed: "There is a certain degree of guesswork if you don't know what the material originally sounded like — if you've got a recording of chanting, you don't know whether it's children chanting or women chanting or men chanting, and depending on what speed you play it at it could sound like any of them—but I've played cylinders that needed speeds down to less than 80 or up to over 200.

"It can vary quite widely sometimes from one end of the cylinder to the other. They were spring



For playing wax cylinders the NSA constructed this machine





NEXO

SIB - SIMA - SIMKTP **Integrated System**

**14 BUILDING  
BLOCKS**

**3 SYSTEMS**

**FOR ALL  
APPLICATIONS**

**Mini Integrated System**

MSC - MSW - MSV - MSP



NEXO



**PCLine**

PC115 - PC212 - PCSub - PCPro - PC15W - PC212W - PCProW

**NEXO**

NEXO Distribution  
ZAC PARIS NORD II  
B.P. 50107  
F-95950 ROISSY C.D.G. CEDEX - FRANCE  
Tel. : 33 (1) 48 63 23 01 - Telex : 232531 NEXO F

# INSIDE THE NATIONAL SOUND ARCHIVE

driven motors and if the guy was trying to squeeze another one in before he wound it up again then occasionally the speed would drift a bit between one end and the other.”

A Revox capstan motor with varispeed proved to be the ideal drive. The next stage was to fit a pickup arm. People have settled for simple solutions such as a 12 in SME arm tracking in a shallow arc, arguing that tracking error is not the greatest problem with cylinder.

Lloyd decided to go for parallel tracking. Experiments were made with a stepper motor driving the pickup carriage but this caused too much vibration. Most of the companies making turntables with parallel tracking arms were reluctant to part with the arm alone but Studer readily agreed to sell the arm assembly from a Revox B795.

This has a DC drive carriage which follows the head across the playing surface using optoelectronic servo control. The length of travel on the arm had to be slightly extended to accommodate all sizes of cylinder then with a Shure M44 cartridge installed the system was ready for action. A final refinement was a 3-digit LED readout showing speed in RPM.

The finish may be functional rather than cosmetic but Lloyd points out that most of the noise from this machine is caused by the vibration of the mains transformer on the baseboard. It also works very well, successfully tracking cylinders at over 200 RPM. The next



The NSA often have to deal with damaged discs

project Lloyd has in mind is a universal wire recording playback system.

Will dedicated audio engineers in 100 years' time build home-made PCM-FIs to recover historic recordings of the late 20th century?

## Conservation manager

Peter Copeland joined the National Sound Archive in October 1986 as conservation manager in charge of the Conservation and Technical Section—the people who operate the recording, playback and sound processing equipment.

Peter became interested in collecting records at the age of 10 when his grandfather died and the family inherited a wind up gramophone and record collection. The gramophone had woodworm and was quickly banished to the bottom of the garden. This did not dampen Peter's enthusiasm, he braved the British weather to play records in the rain.

Determined to build up a collection within the limits of two shillings pocket money a week (less than half the price of a single new record) he went looking for worthwhile second hand records in junk shops. He soon learned how to tell the date of a record, its probable quality and even its contents if the label was obliterated, just by the look of it. An ability which has been refined by over 30 years of record collecting and is proving useful at the NSA.

While still in his teens Peter began to experiment with sound recording. A local library provided a book on the subject—published in 1928. It explained that recording was done by cutting a groove in a wax disc. So some modelling wax was melted down in a tin lid to produce a disc-shaped slab and a Meccano machine was made to cut the groove.

This set up was in the summer-house at the bottom of the garden without electric power so Peter's first recordings were made by the acoustic method—yelling into a horn. (Edison would have approved.) The only problem was he had no lightweight pickup to play the soft wax discs.

By now it was 1960, Peter was 18 and leaving school. Someone suggested he should apply for a job as a BBC technical operator. He took one of his wax slabs to the job interview and was promptly accepted for a post with the BBC External Services at Bush House. At that time very few of the 33 studios there were equipped with tape machines but they all had turntables and there were numerous disc cutting channels for direct recording. Peter got a lot of experience cutting live material on to 78 RPM lacquer discs.

Within a couple of years the BBC began to sell off this disc cutting equipment. Peter bought several sets, keeping the best and selling the rest at a profit. He converted his lathe to microgroove with new gear wheels, new lead screws, a heated stylus cutter head and the appropriate RIAA equalisation. Thus in 1962 he set himself up a profitable sideline as an independent disc cutter.

Very few people had tape recorders in their homes then and Peter Copeland arranged his business accordingly: “It wasn't possible to make any money doing tape recordings but it was possible to make a recording and then sell copies on disc. In fact I never actually charged for making the original recordings. This will horrify *Studio Sound* readers: the thought of my making a charge for recording a pop group for three days just never crossed my mind because I knew that I would get the money back from selling the copies.

I was operating like an old-fashioned record company in that respect.”

In the meantime Peter's BBC career was developing: he transferred in 1964 from engineering to studio operations at Broadcasting House and broadened his experience by offering to travel to any BBC regional station to cover staff shortages. He also spent some time helping to establish the BBC Gramophone Library Transfer Suite where rare and valuable discs are copied to tape.

In 1971 he became senior sound supervisor in charge of the Bristol dubbing suite which proved to be absorbing work. In 1986 he was appointed conservation manager at the NSA.

## Access

Anyone can listen to material held in the Archive free of charge simply by making an appointment to visit the NSA in London or the British Library's Document Supply Centre in Boston Spa, West Yorkshire. The London facilities have been closed to the public for some months to allow major renovation, but should reopen on Tuesday 24 February 1987.

The London listening service includes viewing facilities for the increasing collection of videotape recordings. There is also a reference library of books, monographs, catalogues and magazines relevant to technical aspects of recording and the various subject areas covered by the Archive. This can be consulted free of charge without appointment.

A commercial search and copy service offers information about the existence of recorded material and its copyright owners. The NSA can provide a copy of material from the Archive at 'a quite reasonable price' but only if the user has obtained copyright clearance from the owner.

A series of public events is staged at the NSA in the form of talks, discussions or demonstrations illustrated by material from the Archive. In recent months topics have included the influence of European commercialism on Afro-Caribbean music, the music and experience of popular female singers, the role and achievements of the popular music press and the uses of digital sound spectrography.

These events are recorded and become part of the NSA collection. They are presented by people with considerable experience in the appropriate field and are often attended by other experts. For example, Michael Gerzon was in the audience for a recent presentation on the validity of recording improvised music. He has recorded a great deal of such improvisation and agreed to lend his collection of tapes to the NSA so that copies could be added to the Archive.

This year sees the 40th anniversary of the Institute of Contemporary Arts. The ICA and the NSA are combining forces to produce a series of presentations on the subject of 'British Culture over the past 40 years' at the ICA with George Melly as MC. These lively events will be recorded and edited highlights will be broadcast on LBC. At the time of writing a sponsor for this venture is being sought. Any offers? □

If *Studio Sound* readers have any suggestions of suitable subjects for a NSA presentation they should contact Jeremy Silver at the NSA. The National Sound Archive, 29 Exhibition Road, London SW7 2AS, UK. Tel: 01-589 6603.



# Introducing the Newest Digital Audio Star

SIRIUS-100 Digital Audio Memory is a new audio star from FOR-A. Combining the latest 16 bit digital recording and hard disk technology, SIRIUS-100 provides the answer to out-dated and costly mechanical cartridge tape systems by offering instantaneous random access to up to 1000 minutes of CD quality digital audio. With up to 8 channels of superior audio and playback quality that never varies from the 1st to the 1000th play, SIRIUS-100 also provides the fastest, most accurate audio editing available for radio, TV, and motion picture facilities.



- Virtually instant random access to recorded segments
- 16 bit CD quality with flat frequency response to 15 kHz
- Playback quality that never varies
- Up to 8 channels available
- Very high signal linearity with low distortion — Less than 0.15 % THD +8 dB
- Voice and effects mode available to extend recording time in exchange for bandwidth

**SIRIUS-100**  
DIGITAL AUDIO MEMORY

See it at AES  
Stand 361

## FOR-A COMPANY LIMITED

Head Office: 3-2-5 Nishi-Shinjuku, Shinjuku-ku, Tokyo 160 Japan.  
Phone: Tokyo (03) 346-0591 Fax: (03) 349-8556 Telex: J28696  
LONDON OFFICE: 166 Upper Richmond Road, Putney, London SW 15 U.K.  
Phone: (01) 788-7664 Fax: (01) 788-7435 Telex: 51937084 FORALD G  
SHARJAH OFFICE (Middle East): P.O. Box 7177, Sharjah, U.A.E.  
Phone: 351177 Telex: 68856 FORASH EM

FOR-A CORPORATION OF AMERICA  
Nonantum Office Park, 320 Nevada Street,  
Newton, MA 02160 U.S.A.  
Phone: (617) 244-3223  
Fax: (617) 965-5085 Telex: 230 922407

**FOR-A**<sup>®</sup>  
INNOVATIONS IN VIDEO  
and AUDIO TECHNOLOGY



# NEP PRODUCTIONS

*This New York facility comprises A/V post-production suites and music studio mix rooms. Terry Nelson reports*

Opened in 1985, the new audio control room at NEP represents a new breed of studios: a fusion of music studio mix rooms and A/V post-production suites.

Though primarily concerned with audio tracks for video productions, the new NEP Audio B has been acoustically designed as a mix room, rather than just installing audio equipment in an A/V room.

NEP Productions Inc occupy two floors in central Manhattan, New York, with two 1 in computerised video edit suites, a ¾ in computerised editing suite—which can also handle ¾ to 1 in editing and copying plus Beta editing—Audio A and the new Audio B. Other facilities include a Rank Cintel telecine room, 25×30 ft stage with lighting grid and satellite up-link. The company also run two immaculately maintained large mobile video production trucks, the 'Supershooters'.

Audio A is equipped for recording, mixing and sweetening and features an Ampex 16-track recorder, ADM 16/2 console and a selection of outboard graphic and parametric equalisers plus reverb. The multitrack is equipped with dbx noise reduction and other recorders available include 4- and 2-track machines, NAB cartridge and cassette recorders. A large booth adjoins the control room and the studio is tied in to the two 1 in edit suites. Three-machine synchronisation is achieved via an MQS synchroniser.

The room itself is fairly conventional and though in appearance more like a lounge, the treatment of spaced panel absorption and moquette surfacing provides an efficient working atmosphere with reasonable sonic accuracy. The console is placed almost hard up to the large booth window with the JBL broadcast monitors either side of the top corners of the window and angled down towards the back of the room.

The increased awareness of the importance of

audio and use of sophisticated multitrack mixing techniques meant that NEP were either having to go to outside studios for mixing or losing out altogether. The obvious step was to build their own in-house mixdown room.

Barbara Flyntz is chief audio engineer: "Though there still is a certain amount of resistance to the idea of women engineers (dare one say male chauvinism?) we are not quite the rare breed we once were and you will find women popping up in studios, though it does tend to be more common in A/V work where women have been involved in television more than with music recording. However, there does seem to be a bit more opportunity for girls to make a career in audio if they feel so inclined—though it is still by no means easy!"

How did Barbara come to be involved with NEP? "I was working in a music recording studio where being a girl was definitely a disadvantage! As often happens, I got to hear about NEP through friends and that they were looking for an audio engineer with multitrack experience and also some experience with video. I had done some audio for video work for some personal projects with friends and that stood me in good stead. In short, I got the job and everything is turning out very well."

The bulk of the design for Audio B was done by Jim Maher with in-house input from people such as John Martin, head of audio, and Bill Hurlock, chief engineer (which in video parlance means design and maintenance). The basic structure is standard room-within-a-room with an interior floating ceiling and floor. The floorplan is a symmetrical polygonal shape to disperse the sound evenly and avoid any build-up of standing waves. Large panel absorbers are used quite extensively with four sections on the ceiling and two fronting the rear wall. The surface treatment consists mainly of moquette and hardwood with some black acoustically transparent fabric over the low frequency absorption areas, which blends in well with the overall beige/natural wood colour scheme.

The rear of the room is raised, housing a large producer's desk with intercoms, telephones, etc, where clients can supervise—or just watch—the production in hand. There is ample space for three or four people to work without being cramped. In front and below this section are the tape machines, racks and console. An attractive wooden wing has been built out from the right of the console to form a convenient working area for scripts, etc, and houses a turntable (which is used mainly for playing sound effects records, etc). The raised area is carpeted while the 'studio floor' is parquet.

Monitoring is by JBL 4311s powered by a Crown PS-400 and equalised by White ½-octave graphics. ("As it turned out, the response of the room doesn't really need any equalising so we can either use them for really fine tuning or creating an overall response on masters or problem areas, etc.") Secondary, or nearfield, listening is provided by console-mounted NS-10s and Auratones powered by a BGW 75. The JBLs are mounted flush into the front wall sections and are completely isolated from the structure. Video monitoring is with a Mitsubishi 40 inch rear screen projection monitor which is free standing between the loudspeakers.

Mixing in Audio B centres around a Sound Workshop series 40 automated console (ARMS automation) with 28 input channels and 16-track busing. For 24-track recording the first eight buses can be assigned as 1 to 8 or 17 to 24.

Flyntz: "I find the Sound Workshop real easy to work with. Like every console, it takes a bit of



# Ecstasy without the agony

If you think a great sounding console means you'll be stuck with complex and expensive interface problems, see how Neotek takes the agony out of high quality sound.

Direct Digital Interface is all you need to make the console part of your video system using your editor's existing GPI lines.

MIDI Direct provides read, write and update of console mutes on the MIDI bus, so your sequencer controls the console as if it were an instrument. From there it's just a short step to SMPTE.

Neotek's separate fader panels make fitting any automation system a snap. Traditional, moving fader, disk based, SMPTE locked. At the factory or in the field.

We even send your gold multipin connectors in advance, so hooking the whole thing up takes minutes, instead of days.

Ease of interface gets you unbeatable Neotek sound faster and easier. And that's ecstasy.

**NEOTEK**

1154 West Belmont Avenue  
Chicago, Illinois 60657  
(312) 929-6699

[www.americanradiohistory.com](http://www.americanradiohistory.com)



Barbara Flyntz, chief audio engineer, at the Sound Workshop mixing console

# NEP PRODUCTIONS

time to get to know it but I found it very easy to get on with right away. The EQ section is comprehensive (4-band parametric) but more importantly, sounds very good. Some consoles have very brutal or hard-sounding EQs but the series 40 is very smooth and just sounds nice. I like it!"

Any particular reason why NEP chose Sound Workshop? "We needed a console that would perform well and do the job without costing the earth. A/V work is different from music recording and there are some features that you just don't need. For instance, the console has 16 buses and routes to 24 at the touch of a button. Most recording will be done one or two tracks at a time so the routing on the console we have is just fine.

"There was obviously some shopping around and gathering of opinions and the series 40 seemed to fit the bill with regards to both performance and price. The construction of the room was not exactly cheap and we didn't want to eat into that budget. After all, it's the total installation that

counts in the end, not just one item."

Recorders are an Otari *MTR-90 Mk II* 24-track with Dolby *XP* noise reduction rack, Ampex *ATR-104* 4-1/2-track recorder, Otari *MX5050B Mk III* 2-track and Nakamichi *MRI* cassette machine. Four channels of Dolby *361* are also installed and other machines include Dynamax-Audio NAB cart machines and Sony *5850* U-matic VCR. Synchronisation between machines is achieved with a *btX/Cypher/Shadow/Softouch* system configured for one master and three slaves.

Whereas according to Barbara, "NEP don't have masses of outboard gear though we did try and get what was felt to be necessary," they don't do too badly and the equipment racks feature a *UREI LN 1178*, two *dbx 160X*, *Aphex Compellor* and *KepeX II* gates for gain reduction, with digital reverb and delay effects from an *Eventide SP2016* and *H949*, *Lexicon PCM 60* and *Super Prime Time*. Special processing is also available from an *Aphex Aural Exciter II* and *Ursa Major MSP126* stereo simulator.

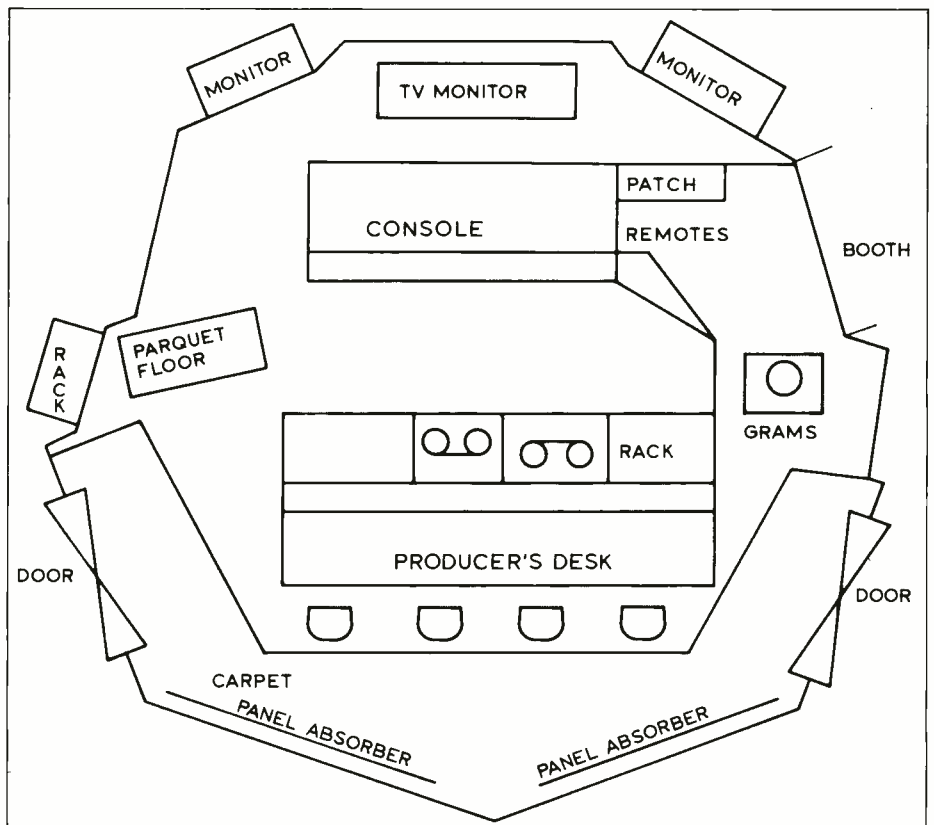
As can be seen from the floor plan, the layout of the room permits easy working without too much moving around, with the outboard equipment rack and tape machines being easily reached by just turning round from the console. The entrance to the room is at the rear so people can come and go with the minimum of disturbance. There is also a small voiceover booth to the front right of the room which is accessed externally.

The console is fitted with a video switcher that can call up on the monitor, any VTR in the complex for viewing and adding 'mix to pix', in effect making the whole NEP studio the machine room(s) for Audio B.

Since opening last year (1985) NEP have been "...real busy. In fact sessions were being done before the final finishing was in place! Stereo television and video are definitely what is up and coming and I think we have come in at the right time with the new room."

NEP Productions Inc, 56 West 45th Street, New York, NY 10036, USA. Tel: (212) 382-1100.

Control room layout







# The NFA-1

## The right answer to most audio test problems

The NFA-1 is the simple, easy and reliable way to do audio tests. 30 measurement modes, max. frequency 200 kHz. **High versatility:** ★ selective and wide-band level meter ★ phase and frequency meter ★ noise level meter ★ distortion and difference frequency meter ★ wow & flutter ★ runup time and rumble-voltage meter ★ signal generator. No need to bother with piles of equipment and masses of cable.

**Easy operation:** Due to menu control and memory for upto 49 complete front panel setups. Paired, balanced inputs and outputs. IEC/IEEE bus.

Wandel & Goltermann, Abt. PMW, Postfach 45, D-7412 Eningen  
Fed. Rep. of Germany, Tel. +(49) 71 21-89 11, Tlx. 7 29 833

I would like  
 an NFA-1 colour brochure  
 a sales engineer

SS/3/87

Name .....

Company .....

Street .....

Town .....

Tel. .... E 6369 KF

**PLEASE VISIT US AT THE AES CONVENTION, LONDON  
FROM 10th MARCH-13th MARCH '87**

# A SPEAKER CONNECTOR —SOME RESPONSE

*Ken Dibble's 'A speaker connector—three years on' in the December issue provoked some considerable comment*

**B Weingartner, President, Neutrik AG, FL-9494 Schaan, Furstentum, Liechtenstein**  
Our agents in the UK, Eardley Electronics Ltd, have brought Ken Dibble's article to our attention. We were rather surprised by some of Mr Dibble's statements in this article. There is no doubt that users wish to obtain standardisation in this area and that suitable connectors *are not yet available*.

We appreciate Mr Dibble's efforts to find a solution for this long standing problem but wish to clarify certain aspects insofar as they refer to ourselves.

Mr Dibble has not formally approached us—indeed discussions only occurred during a few moments at an exhibition. Had he provided us with the opportunity, we could have informed him that our negotiations with Dixon failed, for both technical and commercial reasons. At the end of 1983 we would have been happy to have licensed some aspects of these proposals but we expressed concern regarding the potential damage to contacts and to the shell, due to the semi-open construction, and safety problems, arising from the difficulty in shrouding the contacts.

Mr Dibble argued strongly in favour of these requirements in his article 'A Loudspeaker Connector at Last? Proposals for a Standard' published in *Studio Sound* in December 1983.

To expand upon our reasons for going our own way:

The Grunberg/Dixon/Utilux design is superficially interesting but on consideration has two major shortcomings, which are inherent in the design principle and therefore cannot be solved. The reason for this is that the contact and the surrounding shell, although being 'hermaphroditic', is not robust enough for the intended use. A very simple test, ie stepping on a free connector or bending a mated pair of Utilux connectors, makes the point better than words. The plug is not 'test finger proof' according to IEC 65. This is a basic requirement which we consider necessary for any new speaker connector design to become an internationally accepted standard, since potentials involved exceed those designated as non-hazardous by the EEC 'low voltage directive'.

There are other lesser shortcomings but these hardly matter alongside two major design defects.

Grunberg/Dixon/Utilux were unwilling to allow detailed engineering evaluation of their proposals, even when offered *bona fide* protection, as is normal in technical/commercial negotiations. It was thus not possible for them to allay our apprehensions as to design shortcomings.

Grunberg/Dixon/Utilux made it clear, by setting unusually high licence fee targets, that they were

more concerned with taking what advantage they could of the market, rather than attaining standardisation, even though they recognised that we have a very much better entry to the market than they have.

The Cannon PDN-series are variations of the XLR types using a different insert. Unfortunately, using that shell means that the contact size, insert strength and applicable cable diameters are compromised.

We suggest that the IEC specification required by users based on our market research could be summarised as follows:

The device should have four contacts, ie 'bi-amp' or true stereo capable.

Only two variations for the simplicity of the connector shell; a free version and a chassis mounting type.

The terminations to be solderless, with easy assembly, making the free connectors field serviceable.

Contact accommodation up to 6 mm<sup>2</sup> core (10 AWG).

Cable clamp to be effective on cables with OD of 6.5 to 15 mm, with cable retention force >300 N

Chassis connector to be airtight.

Chassis connector to utilise existing cut outs.

Connector to be robust and withstand relevant IEC durability tests.

An effective latch, capable of resisting a disengagement force of 200 N but certain to disengage below 300 N

Connector design to be such that any damage caused by load connection or disconnection (arcing) is minimised, ie the connectors to have a high inrush/outrush current capability 30 A/20 ms.

Current rating 30 A RMS each contact.

Contact resistance 3 mΩ initially and after 5,000 engagements and withdrawals.

Voltage rating >250 VAC working.

Test proof voltage >4240 V peak to peak.

All contacts to be touchproof and the connector to meet the test safety requirements of IEC 65.

It will come as no surprise that we have been working against the design criteria set out above. We have solved the problems the application sets but we value our international reputation too greatly to release the product before our own tests have confirmed that the product is as robust and safe as it must be.

Unlike others in the field we will actively seek to make reasonable licensing arrangements for what we are sure will become the basis of the IEC standard loudspeaker connector.

Ken Dibble replies:

I really cannot argue with any of the technical

observations and statements made by Mr Weingartner. The shortcomings of the Utilux connector mentioned in Mr Weingartner's letter are all identified in my own appraisal of the connector in the article, and his listing of the desired qualities for a suitable connector are I think widely appreciated—except perhaps for the Neutrik assumption that 4No contacts are necessary. The only point of issue then appears to be that Neutrik were not consulted in the preparation of the article.

The article was not intended as a thorough survey of the activities of everybody in the field who may be contemplating the manufacture of a loudspeaker connector. It was prompted by commercial realisation of Dixon/Grunberg Design which had been the subject of an earlier article, and that contrary to their stated intention at the time, ITT-Cannon had simultaneously launched the PDM line. I had indeed made enquiries of Neutrik at the Paris AES Convention in 1984 and had been categorically assured that Neutrik saw no market demand for such a connector. I subsequently learned from Mike Dixon that preliminary negotiations with Neutrik had subsequently taken place and that these had broken down on a number of technical and commercial points. As no new connector had at the time of writing, and still has not been announced by Neutrik, I see no reason therefore, why Mr Weingartner feels that he should have been consulted.

In fact, if Neutrik are to launch a third loudspeaker connector after all, the market will be no further forward as I can see little prospect of standardisation with three alternative options available, and all directed at the same user group. I would, however, be delighted to receive details and samples of the proposed Neutrik product as and when this finally becomes available.

## Hugh Ford:

Following Ken Dibble's article in *Studio Sound* December 1986 I wonder just what the interest is in hermaphrodite connectors—at first sight they may seem to be a good idea for loudspeaker connections but there is one very serious danger in their use.

Whilst most modern power amplifiers do not take great exception to having their outputs shorted, interconnecting the outputs of two separate channels is a different story, usually resulting in instant death of an amplifier channel. Such a situation can very easily arise if hermaphrodite connectors are used in a multi-amplifier installation.

The XLR type of connector body is a well established industry standard which is proven to be extremely robust and the AXR-PDN connector appears to be a natural progression provided it is used the right way round. I have never understood the practice in audio circuits of having pins live and sockets dead—we were always taught that pins should be dead for the sake of safety irrespective of voltage, as shorting outputs is asking for trouble.

Turning to the Utilux connector, I have only briefly examined this type but find it hard to believe that it is as strong as the Cannon types. Also, whilst it is said to comply with safety requirements so far as access to live parts is concerned, I am far from satisfied that it is safe.

Whilst the standard test finger cannot touch live parts they are far from shielded and there would be a very good chance of making direct contact with them or shorting the live parts if, for instance, the connector were dropped into a box of tools.





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

**GENELEC**

FINLAND, Tehtaantie 17, PL36  
74100 Iisalmi tel. 3587713311

BELGIUM, Hes Electronics tel. 02-4652917, FRANCE, Publison Audio Professional  
tel. 1-43608464, ITALY, Audio Equipment S.R.L. tel. 039-836767, THE NETHERLANDS,  
Audioscript B.V. tel. 02158-5124, NORWAY, Siv Ing Benum A/S tel. 02-145460, SPAIN,  
Aprilia International tel. 3-2128915, SWEDEN, Intersonic AB tel. 08-7445850,  
SWITZERLAND, Emm-Studio AG tel. 061-542045, WEST GERMANY, FFD  
Vertriebsgesellschaft tel. 089-2780404, HONG KONG, Power Source Development Ltd.  
tel. 3-7446189, JAPAN, Otaritec Corporation tel. 03-392-7811, USA, Redwood Marketing  
tel. 615-3314743.

# A SPEAKER CONNECTOR —SOME RESPONSE

W Graham, Technical Manager, Borough of Harrogate Resort Services Department, Harrogate Centre, Kings Road, Harrogate HG1 5LA, N. Yorks, UK

I write on behalf of the Association of British Theatre Technicians (ABTT) Sound Committee following Ken Dibble's article in the December 1986 issue.

The ABTT will publish a standards document early next year which identifies the *AXR-PDN* series as the standard low impedance loudspeaker connector for performance sound installations in concert halls, theatres, conference centres or any other auditorium building.

The ABTT will also recommend that 100 V line systems should only be used on permanent installations where quality is less important, such

as paging or background systems, and where the connections may be made by soldered or compression terminal blocks.

The *AXR-PDN* is already on the specifications for several UK and overseas auditorium projects in line with these new standards.

I regret that Ken Dibble has indicated opposite to the above—he does after all have access to the papers of the committee compiling the document.

It has taken many years to get this one sorted and we can do without red herrings at this stage!

Ken Dibble replies:

I confess to being quite pleased over the reaction we seem to have generated.

Firstly, I accept that the ABTT are free to recommend any 'standard' they feel appropriate to the theatre industry, but even though there is a solid case for industry-wide standardisation in this area, the insular action by the ABTT does not necessarily blind other users to a standard which has been arrived at for one particular application. You may recall that my conclusions summarised that the *AXR-PDN* connector would be highly suited to this type of application.

My view remains, however, that it will not find widespread acceptance amongst sound hire companies for use on touring rigs due to the difficulty of terminating jumbo cable into this connector. It seems to me that there is little virtue in advocating specific connectors for different parts of the market and therefore a connector is needed which will meet both requirements. In essence, the *PDN* is a good connector which fully complies with the BS415/IEC-65 'finger test' and it therefore seems appropriate to use this for 100 V constant voltage line distribution systems where the third contact is more likely to be used to advantage and jumbo cables are not normally used. The extent to which the 100 V (or 70 V in the EEC and America) line system is used should not be under-estimated and contrary to the inference that such systems are second rate, there are many applications where constant voltage line distribution is the only technically acceptable approach. So why should an installer working on such systems have to mess about with soldered permanent sections—which are unsatisfactory at best—when an almost ideal connector has at last become available.

While Bill Graham may feel that he and his committee have 'got this one sorted' this does not necessarily mean that their solution will be acceptable on an industry-wide basis and I think I detect a degree of arrogance in his assuming this to be so. As regards 'red herrings', the search for a 100 V line connector has been going on elsewhere for at least as long as the ABTT search for a low impedance connector, and with respect I would suggest that the ABTT would do far better had they involved other parties to the debate, eg ASCE, AES, APEHC, etc, rather than arriving at their own proposals in isolation.

For my part I am simply looking to open the debate in a hope that something useful may come out of it at the end of the day. I certainly have no personal interest in whose connector is used or any other axe to grind on the matter. In my capacity as an independent consultant, a good deal of information crosses my desk well before it becomes common knowledge. Also I need to be alert to such boring matters as standards and regulations and if I can use this background and many years of experience to put a subject into perspective in order to fuel the debate, why not?

Unlike Bill Graham with his dogmatic approach, I am not saying that this is how it must be. I am offering some suggestions as to how these new connectors might be usefully employed having regard to the identified strengths and weaknesses of each design, in a hope that something constructive might eventually emerge. Surely he does not think that having developed and tooled up for the new connector, Utilux are going to sit back and have the entire project thrown out because one minority user has other ideas—this irrespective of any observation I may make on the subject?

The last thing we need is several different connectors being used by different sections of the industry for the same purpose—a situation which is looking increasingly likely with the apparent imminent entry of Neutrik into the arena.

## SWITCH ON TO HARRISON



### In touch with your needs

That's why our products are more compact than ever before.  
That's why we incorporate extra unique features as standard.  
That's why Harrison is the most comprehensive pro-audio range available.  
That's why Harrison products are ultra reliable and excellent value for money.  
That's why Harrison sounds superb.  
That's why you should call us for more details.  
Harrison listens to you, so you can be sure you love listening to us.



DISCO MIXERS SP-SERIES



MIXER AMPLIFIERS P.A. SERIES



AMPLIFIERS DSA SERIES (DIGITAL) X-SERIES (MOSFET)

# HARRISON

INFORMATION TECHNOLOGY LTD

Unit 3, Button End, Harston, Cambridge CB2 5NX.  
Telephone: 0223 871711 (4 lines). Telex: 81687 HIFC AM G.

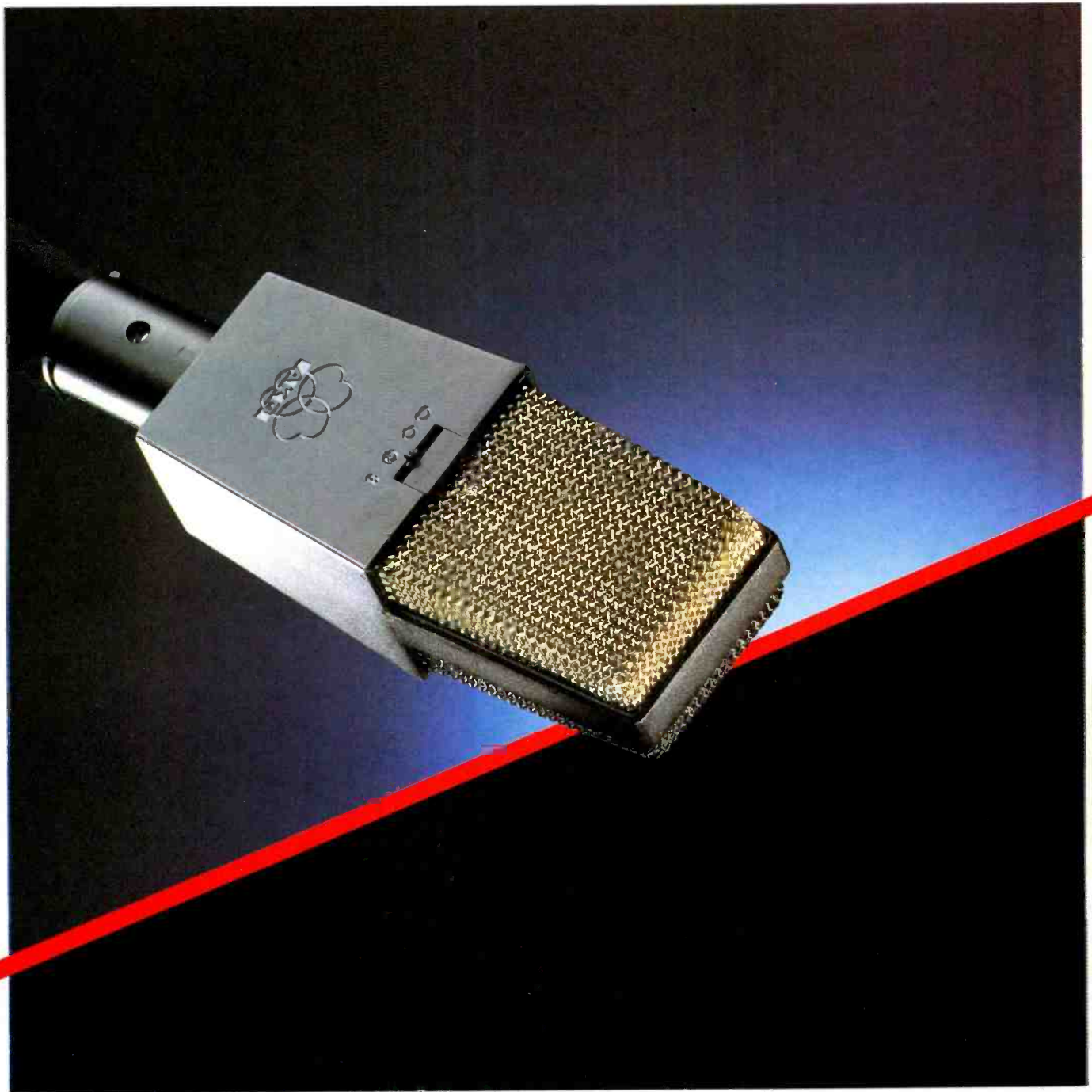


# AKG

ACOUSTICS

## THE C414 B-ULS

UNMARRED SOUND + TECHNOLOGY FOR YEARS TO COME



1987 MARCH 10-13. SEE YOU AT THE AES!

Based on the one-inch gold-sputtered dual-diaphragm capsule - the CK 12 - the electronics of the new C 414 B-ULS are a completely new departure, and the key to the digital level performance of the microphone. Special attention has been paid with these microphones to completely linear transfer characteristics of all transmission parameters. The low inherent self-noise and the high overload point guarantee a dynamic range in the order of 126 dB, which is substantially higher than figures found in conventional microphones and other associated equipment. As an alternative for purist recording engineers, we have provided a transformerless version of this exceptional microphone - the C414 B-TL. For more information call AKG or your AKG dealer, please.



AKG AKUSTISCHE U. KINO-GERÄTE GESELLSCHAFT M.B.H. Brunhildengasse 1, A-1150 Vienna/AUSTRIA, Tel: (0222) 95 65 17-0, Tx: 131839 akgaca, Fax: (0222) 92 34 58  
AKG ACOUSTICS LTD., Catteshall Wharf, Catteshall Lane, Godalming, Surrey GU7 1JG/GB, Tel: (4868) 25 702, Tx: 859013 akgmic g, Fax: (4868) 28 967

ADV 354/1/E

# BOB AUGER

*Janet Angus speaks to Bob Auger,  
specialist in classical recording*

**B**ob Auger must surely have one of the most unusual backgrounds of any recording engineer today—13 years with British Rail!

A love of music and recording, however, finally won through, and today he is one of the select few who specialise in recording classical music. Not that he is averse to the odd foot tapping melody, as the heavy metal records strewn around the studio bear witness. It is more a case of musicians recording as musicians should. The day multitracking pop and rock techniques took the ensemble work out of the recording studio Bob Auger retreated to the world of the classics where at least the musicians can come in rehearsed, do their bit and go away again.

"We were using 8-track, and there was talk of 16-track and I found that the recordings weren't exciting any more in the studio. The groups were coming in and using the studios as a workshop which is more or less what they do today, and that's when I got out. As long as they could stand up, play and sing, more or less all at the same time I was very happy."

As with so many people of his generation, Auger's hobby interest led to him entering the profession full time. His first job, as trainee engineer was at Nova in Bryanston Street, London, where they recorded anything for anybody who wanted something done.

"You got people walking in off the street recording messages for relatives overseas and we recorded an awful lot of stuff for foreign radio programmes, newsreaders—NBC, Voice of America and all those people for their London correspondents, and a lot of political stuff of course; music station idents for Rediffusion when they started commercial television in 1955 was the first time I had been involved in recording an orchestra of any size."

Nova was unusual in that it used Ampex tape machines which were insisted upon by their American clients. When Pye formed their classical department around 1956, which they equipped with American equipment, Auger was invited to join them as an English engineer experienced in these matters, alongside American Bob Fine, to record the Hallé orchestra in Manchester with Sir

John Barbaroli.

"It was like crossing the footlights for me—somebody who I had admired since way back in 1943 and suddenly I was asked if I would like to work with him!"

A very educational two weeks was spent working with Bob Fine whose influence on Auger was very strong and Auger spent the next four years working for Pye.

This was followed by two and a half years at Granada television, commencing in 1960, as chief sound supervisor, in charge of sound output for the whole network. The job entailed watching over the recording of programmes such as *University Challenge* and the great English soap opera, *Coronation Street*, which both started during his time there.

"I was supervising the stage and the sound output and just occasionally got something which was in my line like the Duke Ellington Band and the Count Basie Orchestra, which suited me fine. But they were very few and far between; it was mostly mundane speech stuff, so after two and a half years I got a bit bored."

Once again Pye came to the rescue and put Auger in charge of their new studio project at Marble Arch, Bryanston Street, where he stayed until 1970.

This is where he had a very enjoyable eight years recording a lot of studio pop music, as well as putting together a mobile recording unit which they hired out to "... anybody who wanted to use us, and we did a lot of classical music which is what I am in the business for really. I was able to do a lot of it for RCA and CBS and people who hadn't got their own equipment."

He also played an active role in launching the Pye Collectors and Pye Golden Guinea classical labels.

"We must have done about 100 albums there for Pye, besides doing operas for RCA (we did Richard Strauss' *Salome* for them) and all that kind of thing."

About the end of 1969 Auger was getting itchy feet again, particularly since this was when the multitracking techniques were beginning to take a heavy hand in rock and pop recording.

"We made some lovely records and had great fun—all the Kinks LPs, Spencer Davis, the

Nashville Teens, *Yeah Yeah*, for Georgie Fame—I did a tremendous amount of R&B all through the 60s, and a lot of foreign groups used to come to London then to record because they didn't have the facilities back home; London was the place to be.

"They didn't use the studio as a workshop; if they wanted to make a single they came in and spent about three hours at it, went out, came back the next day, tarted it up a bit by mixing and whatever they wanted to do, and that was the end of it. None of this business of going into the studio for six months to make an album. I got a bit worried because these groups started booking the studio for a week, coming in on Monday morning without an idea in their head. They'd sit down, work out something and within 36 hours perhaps lay down a rhythm track. I thought this was not for me so I decided to concentrate on the classical side."

Whilst seeking finance to start up his own mobile, Auger found himself once again at Granada's door, where rather than offering a bundle of money, they offered to set the project up as a Granada company, with Auger at the helm and his own master. This was the beginning of Granada Recordings, based in the old Decca factory at the Oval, where for four years they recorded classical repertoire.

"That was very nice. It didn't make much profit for the company but we didn't lose too much either!"

After four years he decided it was time to upgrade from 8-track to 16 or 24, and feeling that Granada would not want to invest more capital in the project, he sought to buy it from them instead.

"They were very kind—they sold it to me at a rock bottom price and helped me with the finance and said if you get into any real trouble come back again. Fortunately I've not had to go back."

This was 1974. His immediate plans were to open an editing and dubbing suite and he automatically felt the facility should be based in London. In the nick of time he realised that his own home, in Henley-on-Thames, would provide a much more suitable base. The house was extended to incorporate a large studio room which doubles as a living room when the equipment is secreted behind floor to ceiling curtains.

"All the equipment is down one wall and the Neve mixing console moves out into the middle on wheels and we sit here in the middle of the room looking out the window at the garden while we are mixing—it is very comfortable. All the editing is done here.

"Unfortunately we don't do any more jazz. It doesn't seem to be commercial anymore. A very similar situation seems to have arisen with brass bands. We did a phenomenal amount of brass band recording. I should think two weekends a month we were up North recording bands for somebody. Those bands were so fast and efficient, such good musicians. Unfortunately that market became saturated which doesn't surprise me. There is very little of that going on now. So the business has tailed off quite a lot, as it has on the classical side as well.

"I was doing 200 albums a year from 1969 to about 1976. We used to do most of CBS's classical work—we did seven operas back-to-back one summer—but most of that has gone away because the pound was too strong. It is not economical for the company anymore. I can't really handle a dollar at 1.50 to the pound but when it went down to nearly one to one we had phone calls from people we hadn't heard from for 10 years. Our turnover of albums per year is down to 35 to



40. They are not all for one company—two major clients in terms of numbers are CRD (Continental Record Distributors)—mostly chamber music—and Unicorn Records, who do much more varied music and a lot of Avant Garde music. That's very exciting and they do quite a bit of big orchestral stuff."

Other clients include the Norwegian Composers' Guild, who do a lot of their recording in London.

As part of the deal with Unicorn, Auger looks after their Sony 1610 digital mastering system. Everything he records nowadays is digital.

In addition to the Neve console in the mixing room, Auger has an original Midas 12/4 console (serial number 1) which he takes on the road.

"It is an ancient Midas which has been marvellous. I thought perhaps the old desk was a bit noisy for digital work, so I had it updated last year and now it's quite amazing. Midas had only built PA desks before they built this one. One of my engineers upgraded all the chips and now it's very quiet.

"The Neve is a 16/8 which is about 12 years old. I did some work with Soundstream about three years ago. It was with one of their first digital systems on the market—a reel-to-reel and very high quality with electronic editing, not knife and fork editing like some of the reel-to-reel machines have now. The electronic editing was all done in Utah in the States. I never saw it working. Anyway their engineer brought some machines over and we had to record for them. He checked out the Neve to see if it was good enough and he was amazed. It was the quietest mixer he had ever come across, so I felt a bit chuffed and never changed it. Generally speaking it tends to stay here. It is very heavy and we tend to take the Midas with us to most places. The Neve goes out occasionally—we take the modules out for which we have special cases but the Midas is performing so well and it is a one-piece mixer.

"The Midas has 12/4 channels which are fully selectable, 3-way equalisation, the usual echo send and return system, a foldback system and talkback, and an oscillator. That's about it. The equalisation is very simple and I so rarely use any it doesn't really matter.

"It's the same with the Neve. It has fairly straight equalisation and we only use it for correcting things. We don't use it in a creative way at all.

"I calibrated the equipment myself and I know that every microphone into every module in both the channels with a fader set at a particular place will produce the same level. They're completely calibrated. We use about three or four different microphone systems—I could virtually balance without monitors. You don't need monitor speakers if you know that the eight microphones usually work in this configuration and with the faders in this particular setting—you're not going to be far wrong if you don't listen to it till you come back. The fact that the control room is either too bright or too dull—if it doesn't offend the artist when you have a playback then it doesn't offend me. I just don't compensate for it. You have to decide whether it is the studio that's got a particular colour or whether it's the control room. If you know the control room's colour, either bright or dull, then you just have to say to the artist 'I'm afraid you might not like the sound of your voice in this room, in fact it's the room, believe me.' Usually they trust you and get on with it. It usually seems to come out alright."

For many years a digital fan, Auger first worked with a Sony PCM1 in 1978, then the 100, then for seven or eight years the 1600, and now the 1610.

"I believe the 1600 was the first one you could edit—before that you had to accept the best you could do and compile a master. You could only put movements together, you couldn't edit within movements. It didn't last too long fortunately. We were all quite surprised when we learned of the new digital editing technique. It's so much more sophisticated than a razor blade.

"It's different for people on the popular side; they don't have the technical commitment the way we do with the classics because they get their masters made and a lot of them die off in another year or so, never to be heard of again. So if they changed their recording system it wouldn't matter very much. The investment on the classical side into one particular system—all the masters made and put into a library on that system—you're going to have a hell of a job trying to talk classical companies into using something different. The fact that they went wholeheartedly into the Sony PCM system is remarkable really; that's why other systems have either disappeared or are not made anymore.

I think a lot of engineers would agree that we don't need 24 tracks but it would be very handy for classical people to have four. We could do with a little rebalancing back home. It doesn't matter how big the score is at the moment—it's very exciting, the way I was trained to do it—I would do it 2-track.

"I think all of us get it right most of the time on a 2-track but there are times when for example with a violin concerto you come back and say that's OK but you know if you had the violin on a separate track and you mixed it back into the orchestra... you could get exactly the same balance but you could alter the sound of the violin a little bit. Maybe it's a bit dry—you could put a bit of artificial reverberation on the violin and mix it back and that would be 5% better. So a 4-track machine would be nicer but I can manage without it. If they could get out a simple 4-track system based on the 1610, I'm sure some of the jazz and pop groups wouldn't mind moving on to 4-tracks. The 24-track is phenomenally expensive as a machine.

"The recording engineers in the classical world accepted digital with open arms. The people who didn't accept digital, much to my amazement, were the hi-fi fraternity; they fought it off for as long as they could—the journalists in particular. For two years hi-fi journalists didn't want to know about compact disc. All they could find was faults; they couldn't hear the obvious.

"One of the great things about digital is not just the lack of noise but the pitch stability. You play a chord on the piano on a digital machine,

you play it back and it's as rock steady as it was in the first place. You can't say that about any black disc. People just don't seem to notice that. Anything musical they couldn't hear—they only heard harmonics or extraneous coding noises; they are obviously not interested in music at all. You won't find much criticism of it in the papers today."

Microphones: Bob Auger uses a lot of Neumann microphones, especially 87s. "I've still got a lot of M49s which are much loved by brass bands and the like. The designs are over 30 years old but they still sound very good."

The orchestral microphone set-up generally used in reverberant halls involves four 87s across the front of the orchestra, two each side. "In the middle I would normally put a stereo mic like an old SM2—which is not a nice microphone on its own but fantastic used with others. So I tend to put the SM2 stereo mic over the conductor and then two mics each side—one on the front desk and one on the back desk (of violins) and perhaps another mix on the double basses which would make five up front and the two channels of SM2.

"The reason I like the SM2 is that it gives a nice stereo picture mixed in with the others and is also very bright—it clears up any fog that's around or any mushy sort of noise. That has proved a marvellous combination and I would normally have the others on cardioid—the SM2 goes on double figure-of-eight—that's the most useful one of all. Then some boosters on the wind, timpani, percussion and horns.

"I've got some Calrec 1050 cardioids, which are marvellous; they're not too narrow, very clean and very pure. I use those on keyboards and most of my piano and harpsichord records. On the horns probably an 87 and I use the old M49s on the timpani which make a wonderful timpani sound. I try and make getting the percussion straight one of my specialities. I use a separate microphone for percussion usually because, especially in modern music, you get an awful lot of quiet instruments mixing with the loud ones and you get a lot of vibraphones and marimbas which, if you want to hear them, they've got to be helped, otherwise they just get buried under the strings. If that's what the composer wants, then that's alright, but I find that they don't usually complain if you can actually hear what they're doing. We get a lot of tom toms these days which are very loud, and I can't stand a tom tom that sounds as if its coming from 50 yards away.

I like it to be reasonably pleasant and not tight, so we use extra mics on those just to get it in the right position—not too far and not too near. It's a question of adding some of it and not all of it, so



Bob with film director Christopher Mupen and the Philharmonia Orchestra



## BOB AUGER

we'd probably use 87s on those.

"It's quite a good idea to use as many similar microphones as you can on a job, just in case you have any kind of failure—it's easy to change round. You've always got to be careful on a location job when there are cables about—someone will always either trap a cable in a door or kick a microphone over. So the more similar stuff you've got the better it is really. Especially if you've got lights to worry about as well, which we do in a lot of places."

Yes, for some peculiar reason it quite often falls to Auger's lot to provide lighting in dim locations, and he has even been known to supply heaters! He feels that it is better to do all you can to help a client than begrudge arranging things which are strictly beyond his responsibilities.

"Everything's the engineer's fault. I don't like having to provide lighting but sometimes you have to. The same with heating—it's our fault if it's cold!"

Monitoring at the studio is on 15 in Tannoy *Reds* with custom cabinets. Although they have several pairs which may go on location, a pair of flightcased JBL 4311s are used instead, for convenience as much as anything else. "They don't sound so different from the Lockwoods which I am used to." Monitor amps are Quad 405s and 406s.

Smaller jobs—both in size and budget—will more often than not go down on Sony *F1*.

"About 18 months ago we did the music for the film *Greystoke*—the Tarzan movie. We did that at Tooting and the client didn't care how much we spent on it."

The vice-president of the film company enquired of Auger which digital system he proposed to use, and was told Sony 1610. Discovering that this was a paltry two tracks, he asked about multitrack. So even though it was a symphonic score and there was no need for multitrack, he discovered that it was possible to hire a Sony 3324. 'Get two!'

"So we probably had the first session in Europe with two Sony 24-tracks. Yes we used most of the tracks somehow—I think we got up to at least 14. But we only did it because the company asked for it, I don't think it gained a lot from being 24-track."

So much for multitrack, digital or analogue.

The Neve console was originally developed for broadcast use. The input modules are 1066s with 3-band EQ and a bass cut-off. "Then there's an 1883 routing module which goes round the eight tracks and also there are echo and foldback. You can

route anything to anything and there are eight master faders. It's a marvellous desk to take out on the road because if anything untoward happens you can plug round it very easily. You can change the modules round, you can change all the connectors on the back. It has stereo echo send and stereo return plus all the complicated monitoring you might want to do. You can put echo on the monitors. We have a separate 24-track monitor mixing console as well which sits on top or on the side."

Tape machines are Scully 8-, 4- and 2-tracks which have always been thoroughly reliable.

"We've dropped some of those off vans and things and we've never had anything go wrong with them; even the cases haven't split. They haven't got American motors in them. We were lucky, when they changed the 117 V machines in the States for 240 V they put German motors in, so we've got Pabst motors which are perhaps the best in the business; maybe that's an advantage. They're built like a battleship and I understand them, so they can't be too complicated! They are obviously designed by an operator of a tape machine. There is nothing complicated about them at all; the alignment is very straightforward."

"We're still using U-matics for the Sony but they have been very reliable. If you log your editing carefully and do your paperwork on your editing then you can edit just as fast with that as you can with the latest machines."

"We also have 16 Dolbys, the original 301s. We found them much cleaner than the later 361s. We have got some 361s which go out on location but the 301s live in the studio. 'I've read about Dolby SR but I haven't tried it out. I wouldn't use it anyway because we wouldn't work analogue anymore. Here we have a bank of Aiwa cassette machines and there's the booze cupboard at the end."

The whole house is wired up although these days it isn't used much for actual recording. The EMT 240 plate is in the garage where it hasn't been switched off for 12 years. The Augers have been gradually cutting back the extent to which their home is cluttered up with various bits of audio equipment. The latest cutback was the ceremonial dismantling of the quad speakers.

"That's the end of quad," he explains dryly. "We did a lot of quad when it was about. We didn't know what to do with it that was the trouble. Thinking it might happen we used to try

and talk all the customers into mixing down quad as well. They would work in 8-track or 16 and when we did the 2-track mixdown we used to say, 'well what about doing the quad in case it's needed.'

"The thing is nobody knew what to do with the classical stuff—whether to wrap the instruments around you, which we did try, or whether to just broaden out the acoustic, the ambience. Making the ambience nice round the room was quite exciting because we kept the orchestra at the front. But it was so subtle really that the man in the street wouldn't have been bowled over by it, so of course he wasn't prepared to buy any equipment for it. I don't blame them really. It's different on the popular side where you wrap the instruments around and do all kinds of effects but I think that failed because the discs were so bad. It would be easy in digital of course now but I don't think anybody bothers anymore."

"We haven't found a need to change the equipment very much; we are always making good tapes. In the last 15 to 20 years the problem was always getting it on to disc. There was so much quality lost in getting a black disc out; most discs didn't get to within 60% of what was on tape. What the public has discovered now, much to their amazement, is how good the tapes were because now we are getting CDs made up of analogue tapes and old analogue masters and they are very close indeed to some of the digital recordings in quality. I think that the man in the street in most cases won't know the difference—tape noise is not too obtrusive. Some of my other work at the moment is actually converting old masters to digital masters, especially on the classical side."

"Where possible, if we did record the original on 4-, 8-, 16-track or whatever, I try to convince the customers to go back to those original recordings and re-mix it down to digital and not be tempted to pick up the old 2-track tape which produced the original record. There were tremendous losses in the mixing down to analogue for the second generation. Most of them agree to do that. It can be fun mixing down some of the old tapes. It's getting quite hard to find some of the instructions and notes we made in the first place, but they're around somewhere!"

Recent work in this area includes a complete recording of Elgar's *Dream of Gerontius* for CRD from the original 16-track "It was marvellous going back to those. The difference in the dynamic range and what we were able to get on to the digital compared with what we had to squash on to the 2-track recorder before."

"We prepare tapes for CD mastering ourselves. We make the master cassette here but we don't do the PQ coding—that's usually done at the pressing plant. We prepare the tape and do all the instructions and the index to the music for the tape. I'm really only interested in preparing the musical side of it."

Working for small independents does not involve recording traditional classical repertoire, since the major companies have that side of things more or less sewn up. Auger therefore finds himself involved in the recording of a large proportion of contemporary classical music:

"Music written in the last 50 years or last week, for example Peter Maxwell-Davis, Nigel Osborne, people like that. In all the years I've been in the business I've not recorded a complete Beethoven or Brahms cycle yet and I don't suppose I ever will now."

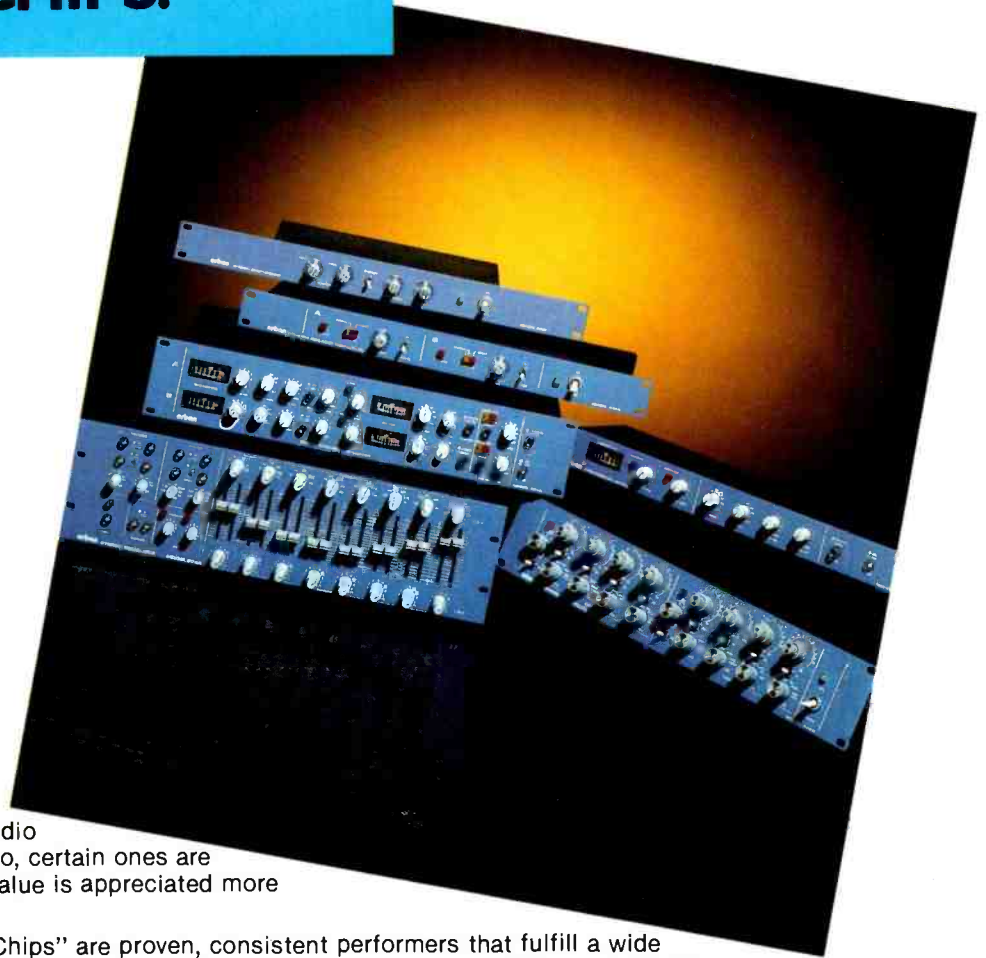
There is nothing insurmountable about recording this type of music as far as Auger is concerned: "It's written to be heard, so long as



Bob with Leonard Bernstein



# THE BLUE CHIPS.



While trendy audio products come and go, certain ones are timeless. Their true value is appreciated more year after year.

Orban's "Blue Chips" are proven, consistent performers that fulfill a wide variety of essential production and system requirements in top facilities worldwide.

**622B Parametric Equalizer:** The standard by which all others are judged. Sonically and musically pleasing. Can be used as combination 4-band EQ and notch filter. A real job saver.

**672A/674A Graphic Parametric Equalizers "The Paracrossalizer":** Combines eight bands of parametric EQ with tunable high and lowpass filters. A uniquely versatile production tool. Also quickly becoming the smart choice for room and system tuning because it eliminates ringing and phase shift problems. Can be used as full electronic crossover plus EQ in one cost-effective package.

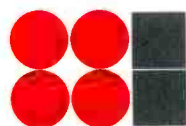
**536A Dynamic Sibalance Controller:** Around the world, Orban de-essers are the salvation of vocal sessions. Quick set up and easy operation.

**422A/424A Gated Compressor/Limiter/De-Esser "The Studio Optimod":** The most flexible, cost-effective level control system available. Orban compressors are known and appreciated for their smoothness. No pumping, no breathing; they work for you, not against you in tough applications.

**412A/414A Compressor/Limiter:** Transparent level control delivers the punch without the bruise. Very cost-effective. Ideal for installations and reinforcement work.

**245F Stereo Synthesizer:** Magical stereo effects from mono synths, drum machines, or any mono source. Perfect for extending capability of smaller format multi-track systems—the 5th, 9th, 17th, or 25th track. Inexpensive.

Orban also manufactures the reliable 111B Dual Spring Reverb as well as attractive acrylic security covers which fit all standard 19" rack mount products.



SCENIC SOUNDS EQUIPMENT LIMITED  
Unit 2, 12 William Road, London NW1 3EN.  
Tel: 01-387 1262, 01-734 2812  
Telex: 27939 SCENIC G

Belgium Trans European Music (Bruxelles) Finland Studiotec (Espoo) France 3M France SA. Mincom Div (Paris) Germany Estemac (Hamburg) Germany Broadcast Consulting Intl. (Schwaig) Greece Audiolab (Hellas) (Athens) Holland Cadac Holland (Hilversum) Italy Audio Products International (Milano) Norway LydRommet (Oslo) Portugal Amperei (Lisbon) Spain Singleton Productions (Barcelona) Sweden Tal & Ton (Gothenburg) Switzerland Audio Bauer (Zurich)

## BOB AUGER

it's written for acoustic performance then it should be possible to reproduce it. In our way of recording you shouldn't have to go into a studio. The only thing you have to watch of course is that they use a tremendous range of orchestral colour and it's not uncommon to record an orchestra with 60 or 70 percussion instruments so you have to make sure you can cover it all.

"I did the six symphonies of Carlos Chavez (who's a top Mexican composer) with the LSO for a Mexican company three years ago and there was an incredible amount of percussion; a lot of American/Indian instruments—anything you can scratch or rattle—so we had to get that all under control and make sure they all evened up, otherwise if you don't mic them up and do a bit of sorting out you find that some of them sound miles away and others sound close. You've got to sort some relationship out of it.

"The musicians are up against it because they are playing music they are unfamiliar with and they don't have unlimited time. They have to master it as quickly as they can and you have to help them out with some detail. Most of the stuff we've recorded hasn't been played in concert, it's all new and certainly new to the musicians."

Although not an active musician, Auger does read music, but anyone who has ever set eyes on a contemporary music orchestral score will know

that a knowledge of conventional notation will not necessarily make you any the wiser! Auger tends to rely on a good briefing from the producer. The producer can, in a telephone call, describe the type of music they are going to be tackling.

"You agree it on the wavelength 'it's a bit like Gershwin's piano concerto except for this and that' so we've got the style of the thing cracked before we go. Sometimes the producer will tell you that there's a piano in the orchestra and you will ask how important it is. 'Bloody important; it's not a piano concerto but it's a wizard of a piece of piano playing.' So we'd better make sure we can hear him properly; you know you can't get away with using a percussion mic—it requires more individual miking. The producer suggests what's needed and you make your own mind up whether it is or it isn't."

Piano miking in general: "In an orchestra you wouldn't take quite as much trouble over the piano itself, just make sure that there are two microphones which cover the whole instrument. You wouldn't really go for the detail quality. I would probably use the Calrec because it's a reasonably tough cardioid which will shut out an awful lot of the other stuff.

"For solo piano works I would again use two Calrecs, very carefully (they wouldn't be coincident because I don't like that very much) angled out quite a lot, about 6 in apart with a very wide angle of about 120 degrees. That would be quite close to the piano which would give you a fairly wide image and possibly then they would be a bit on the dry side, so we would probably add two other mics in the studio to add some life. That would be a standard way of working. I don't like a very narrow piano image but it shouldn't be too wide either. Sometimes I've done it too wide but I do like to hear the notes move a little bit from the centre.

"I had been working with a pianist for four or five years, when he said to me 'I've only just worked something out which I've been worried about for quite some time—when I sit at the keyboard the treble's on the right and the bass on the left, and I couldn't work out why on all the records I hear, especially yours, the treble is leftish but of course that's the way the audience hears it.'

"For ensemble work, I don't like string quartets too loud and I don't like one violin in one speaker

and a cello in the other. I try and get them a bit in between the two speakers if I can; it's more interesting. It makes even dullish music sound interesting if you've got some sort of stereo movement in it. I'd use the same sort of miking—probably two 87s on a quartet (because they've got more body in them), pretty high and fairly close and on one stand looking over. I have to wait and hear the room to decide whether they're going to be cardioids or not. They might go into figure-of-eights or you'll get some reflection from the back of the mic—it depends on the room. The 87 is quite a nice mic if you get it in the right place—it's quite sweet. The cello's usually alright. I wouldn't expect to use more on a quartet. But then again we might have to add two at the back of the hall somewhere.

"I don't like distantly recorded chamber music; it's intimate music and I think it should be recorded fairly close. The difficulty in working at any distance from a chamber group is that there's too much noise coming in. It is difficult to find anywhere that is really quite to record in, apart from CBS studios."

Auger has recorded a great many operas in his day. At the time of this interview he was looking forward to recording *Emilia di Liverpool*, written in 1824 by Donizetti—the first complete recording.

"That's going to be done at Conway Hall. It's not a very big score and we have to record on eight consecutive days because that was when we could book the singers. It has caused enormous problems in getting a location. Eight consecutive days rules out all the churches because it cuts across two weekends which you can't do because of Sunday services; town halls weren't available for such a long time. We were lucky to get Conway Hall; it's very small but it will take us all and I did a lot of Handel there in the 70s—the stage is just big enough to take a small chorus. With an orchestra of about 50 we will be okay and it should sound quite nice actually.

"That is going to be 2-track. It is for Opera Rara, who have worked 4-track analogue previously and I've done about nine operas for them so far. I like working with them—they produce some very good singers and artists; they take a lot of trouble to get the pressing right too. It is always disappointing when you work for a company that takes your tapes and then goes to a pressing plant where the result doesn't reflect the effort that's gone into it."

As for the recording set-up: "The singers and chorus always work behind the orchestra and that works well—they'll be up on the stage in this case, the singers in front of the chorus. We'll just add probably three mics for the singers, depending how close the chorus is to them. With the singers being behind the orchestra you pick up their voices on the orchestra mics as well; they sing over the orchestra so you're able to get a nice sound off the singers—the orchestra mics adding reverb to that."

Bob Auger's reputation and standing in the world of classical music recording is best summed up in a sleeve note which producer Bob Hardcastle wrote for a record he and Bob made in 1981 called *Hear This!* On it the two experts discuss the history and development of recorded sound from the early days of mono to digital recording in the 80s.

"To be a consistently successful recording engineer like Bob Auger you need much more than the very latest equipment and a high level of expertise. You have also got to have exactly the right temperament, a knowledge and a love of music, and an instinctive understanding of the way in which musicians' minds work." □



BBC Symphony Orchestra at Wes; Ham Central Mission



# dbx

The future is modular...



902 De-essing or full load band ducking, auto threshold sensing  
903 Stereo strappable Overeasy™ compressor limiter  
904 Fully adjustable gate  
905 Parametric EO with infinite notch on each band

911 Type I noise reduction encode/decode I channel  
941A Type II noise reduction 2 channel encoder  
942A Type II noise reduction 2 channel decoder  
F900 9 slot frame, modular power supply

9?? The future is modular!!

**dbx** PO Box 100C, 71 Chapel Street, Newton, Mass. 02195 USA.



Austria KAIN GES MBH & COMPANY Salzburg, Vienna · Australia KLARION ENTERPRISES PTY LTD South Melbourne · Belgium TRANS EUROPEAN MUSIC SA Dilbeek · Denmark SLT Copenhagen · Finland STUDIOTEC KY Espoo · France S.C.V. AUDIO Paris · Great Britain SCENIC SOUNDS EQUIPMENT LTD. London · Greece ANTALEX O.E. Athens · Hong Kong STUDER REVOX LTD · Indonesia P.T. KIRANA YUDHA TEKNIK Jakarta · Italy SCIENTEL AUDIO SRL Modena · Japan BSR LIMITED Tokyo · The Netherlands SPECIAL AUDIO PRODUCTS B.V. Amsterdam · New Zealand VICOMM SYSTEMS LIMITED Auckland · Norway LYDROMMET Oslo · Singapore LINGTEC PTE LTD · South Africa PRO SOUND Johannesburg · Spain AUDIO PROFESSIONAL SA Barcelona · Sweden TAL & TON ELEKTRONIK AB Gothenburg · Switzerland AUDIO BAUER AG Zurich · Taiwan YANG'S AUDIO VISUAL LABS Taipei · Turkey OMER TRADE EXPORT AND REPRESENTATION Ankara · West Germany AUDIO EXPORT NEUMANN.

[www.americanradiohistory.com](http://www.americanradiohistory.com)

## ACOUSTICAL INTERFACE™ SYSTEM

### PS9200 DUAL CHANNEL POWER SUPPLY



Shown PS9200, 4012 and 7013

**Precision Acoustical Measurements  
with FFT's, Scopes and Meters.**

**The system includes:**

- Type 1 Measurement Microphone(s), Companion Preamplifier(s) and Cables.
- Available in 1, 1/2 and 1/4 Inch Models.

**ACO Pacific, Inc.,**  
(415) 595-8588

2604 Read Avenue  
Belmont, CA 94002

**ACOustics Begins with ACO**

# ABACUS ARTA 600

Use the ARTA 600 third-octave audio analyser adaptor and your own oscilloscope as the most cost effective solution to real-time analysis.

Verify the audio frequency responses of tape, film and VTR recorders in moments and save hours in daily maintenance.

£795 plus VAT



Abacus Electrics 10 Barley Mow Passage, London W4 4PH England  
Telephone: London 01-994 6477 Telex 8811418

**\$ 20**

The reportophone is a small 2 channel mixer with inputs for microphone and tapemachine, specially designed for reporters to send their items to the studio using the public telephone lines.



**\$ 22**

The REPORTOPHONE S 22 is in fact a double S 20, wich enables the use of TWO lines for separate send- and return circuits.



**\$ 50**

## Reportomix

This 4 into 2 mixer offers a lot of applications in the field of:  
television ENG/EFP  
film sound recording  
radio (outside broadcast)

the small size, light weight, universal powering, heavy duty construction and ergonomical lay-out make this mixer a must for the audio engineer in the field.



**THE POWERFULL PORTABLES FROM**

**eela audio**

Audio and Design U.K. Tel.: (0734) 861088



S M A L L S T U D I O

**BIG**

*sounds*



SCSI ·  
SMPTE ·  
SAMPLER ·  
SEQUENCER ·  
DRUM MACHINE · 24, 48, 96, PPQN ·

**SEQUENTIAL  
STUDIO 440**

**... DON'T COMPROMISE**

MAIN LONDON DEALERS  
SEQUENTIAL AT

**CHROMATIX**

73 Princedale Road, London W11 4NS  
01 229 2041

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



**SENNHEISER**

beyerdynamic



**Today's  
orders through  
your door, Today  
or Tomorrow**



**SHURE**



*Save time - phone*

**STUDIO SPARES**

*first*

**TRADE COUNTER**

Open 8.30am - 5pm (Mon - Fri)

TELEPHONE ORDERS: 01-482 1692

ADMIN: 01-485 4908

16 Stucley Place, Hawley Crescent, Camden Town, London NW1 8NS

Please send free 56 page catalogue

Please send account application form

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

\_\_\_\_\_

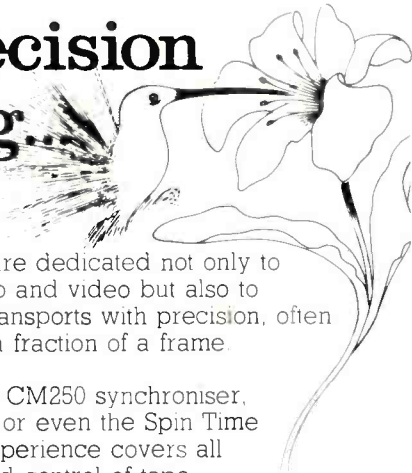
\_\_\_\_\_

\_\_\_\_\_





precision  
timing...



All our products are dedicated not only to the timing of audio and video but also to controlling tape transports with precision, often with accuracy to a fraction of a frame

Whether it be the CM250 synchroniser, CM50 autolocator or even the Spin Time tape timer, our experience covers all areas of timing and control of tape including the all important knowledge of audio and video machine interfaces.

## Applied Microsystems

Bagshot Road, Chobham, Woking, Surrey GU24 8BZ. ☎ (09905) 6267.

**AUSTRALIA:** Klarion Enterprises. (03) 613541. **CANADA:** Gerr Electro Acoustics. (416) 868-0528. **DENMARK:** AB Music. (06) 198733. **HOLLAND:** P.A.C.. (040) 424455. **ITALY:** Startek. (051) 321063. **NORWAY:** Audiotron. (02) 352096. **NEW ZEALAND:** Maser Communications. (444) 3583. **SOUTH AFRICA:** Eltron. (011) 293066. **SWEDEN:** Audio Development (040) 186120. **SWITZERLAND:** EMM Studio. (0611) 54 20 45. **U.K.:** Don Larking Audio Sales. (0582) 450066.

# Audio

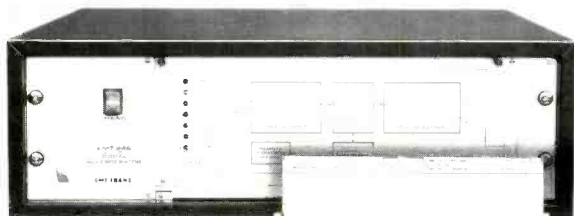
Developments Ltd.

the  
finest range  
of portable  
mixers  
in the world

Hall Lane, Walsall Wood, Walsall, West Midlands WS9 9AU, England  
Telephone: Brownhills (0543) 375351. Telex: 338224, Audev G.

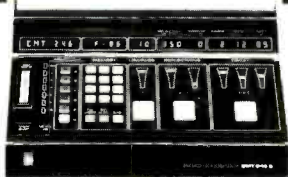


## Studio Technology of world wide fame

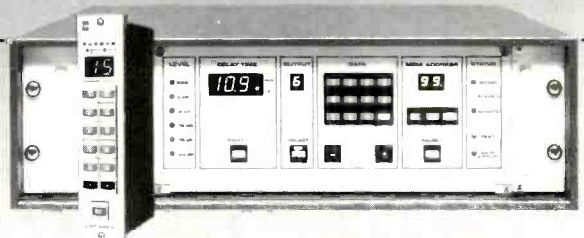


THE EMT 246 DIGITAL REVERBERATOR expands the boundaries: New reverberation programs with optimized eigentone distribution allow reverb times from 0.25 to 20 seconds. The

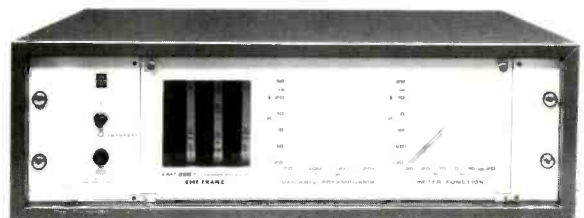
"sound" of the reverberation is freely adaptable due to the adjustments in bandwidth, pre-delay, level of early reflections, as well as frequency content of the reverberation. In spite of the abundance of parameters, operation of the unit is quite simple, even if things should become hectic. And, if need be, one of the 190 (!) program memories may be of assistance.



POSTFACH 1520, D-7630 LAHR  
TEL. 07825-1011, TELEX 754319  
FEDERAL REPUBLIC OF GERMANY



THE EMT 445 DIGITAL AUDIO DELAY UNIT combines separate entities: picture with sound, when transmitting via satellite and cable or in combination with video standards conversion or framestores; sound with sound, when transmitting via wire and air. The high-resolution delay will help you with these tasks. Even stereophonic signals may be delayed with absolute phase coherence: ideally suited for analog disk cutting.



THE EMT 266 X TRANSIENT LIMITER solves your worries: because (with adaptive pre-emphasis) you will never exceed the maximum frequency deviation for FM transmissions, but, moreover, are able to process maximum levels at the input of the limiter; because transients are limited in a click-free manner with digital recording or in tape duplication applications. It's all made possible by the principle of transient limiting.

RICHARD GARRIDO  
Directeur du marketing

Sorry for the  
wrong document  
For further information  
Contact

SCV  
AUDIO

186 ALLEE DES  
ERABLES BP 50056  
ZI PARIS NORD II  
95947 ROISSY  
C DE GAULLE CEDEX  
TEL (1) 48 63 22 11  
TELEX 212 802 F

I&R  
SCV

フランスSCV社は、パリ近郊に本社を置くプロ周辺機器専門メーカーです。  
SCV社の製品削りのポリシーは、現場の生の声を最優先し、  
製品ラインに反映する姿勢を一貫して崩さないことです。  
プロの現場エンジニアが欲する機能性と使い勝手、さらには  
「こんな場面に即応できる機器があれば、どんなに便利だろうか!」という  
見解を積極的に受け入れ、独自の開発による高性能機器群を生み出しています。  
まさにフランスならではのエスプリが感じられる、  
ヒューマン溢れる製品を世界に供給し続けているのです。  
我国では音響特機が、プロのお手許にお届けしています。



「問題処理アンプ」

# 渴望の1台。現場の究

## MODEL DI BOX 2

アクティブ・ダイレクト・インジェクション・ボックス

最先端技術を駆使し開発された本機は、トランスを使用しないアクティブな回路を採用し、季節な伝送特性を実現しています。プロのユーザーにとって、低出力レベルのステップアップ用に内蔵された+20dBのゲインをもつブースターアンプは、きわめて適用範囲が広く、同時にダイレクト・スピーカー・インプット機能は、重みを発生することなく、非常に高レベルのボルテージの受け入れが可能です。全アクティブ回路、ゲインに対しての十分なフレキシビリティ、クリアなサウンド、さらにバッテリーやファンタム電源により駆動できる、ハンディでハイパフォーマンスなDI BOX 2です。

【SPECIFICATIONS】 ●周波数特性(20~20kHz): +0, -2dB ●SN比: 0ゲインセット: 96dB, +20dBゲインセット: 82dB ●THD: 0ゲインセット(200Hz): 0.08%, +20dBゲインセット(2kHz): 0.12% ●IMD: 0.1% ●RISE TIME: 0.05μsec ●電源部: 9Vバッテリー(300時間) ●15~48Vファンタム ●寸法(mm): 120W X 56H X 94D ●重量: 430g



## MODEL PC80

フェイス・チェッカー

PC80は、オーディオ信号系の位相を、電気的にも、アコースティックな面からもチェックできる、ハンディなフェイス・チェッカーです。ミキサーのパッチポイント、パッチ盤、ワイヤリングの端末など、ライン系の位相の他に、マイクやスピーカーユニット、スピーカーシステムなどのアコースティックな位相も正確にチェックできます。PC80は1Hzのワイドバンドパルスを発振する(発振部)と、読み取り用マイクを内蔵した(受信部)とで構成されます。新設の音響システムと最終チェック、ホール等での持ち込み機材と既存システムとの位相合わせ、さらに、プロセッサや天井埋め込みなどの既存設置スピーカーの位相の見直しなど、「音響設備のあるところには1台」絶対に欠かせない位相チェッカーです。



【SPECIFICATIONS】 ●ハルスレート(発振部)1Hz ●周波数スペクトラム: エレクトリカル(発振部)1Hz~20kHz(検知部)1Hz~20kHz, アコースティック(発振部)200Hz~5kHz(検知部)100Hz~15kHz ●出力レベル(発振部)0~1V ●入力レベル: マイク・ポジション(検知部)10mV~1V, ラインポジション(検知部)0.5~50V ●寸法: 113W X 60H X 31D (mm) ●重量: 発振部280g(検知部)250g

## MODEL NGS-2

デュアル・チャンネル・ノイズ・ゲート

プロユースとして開発された、ステレオ2chのノイズゲートです。プロ現場のあらゆる用途に対応でき、例えば演奏ステージのミュージシャンが使用しているマイクのON/OFFを、自動的にに行ったり、ゲートをかけた周波数バンドの選択も可能です。バランス入力で、リリース・タイムは0.1~3secの間でアジャスタブルです。

【SPECIFICATIONS】 ●F特: 20~20kHz +0, -1dB ●SN比: 84dB ●THD: 0.01% ●IMD: 0.01% ●アタックタイム: 1μsec ●リリースタイム: 0.1~3sec ●寸法: 483W X 44.5H X 190.0D (mm) ●重量: 3.2kg



## MODEL SRL 2

ステレオ・リミッター・コンプレッサー・ディエッサー

ステレオタイプのディエンク機能をもつ、コンプレッサー・リミッターです。FMTランスミッター、ディスクのマスターリング・プロセス、SRやディスクティックの音楽シーンに対応し、ギターやベースなどのサステイン効果のコントロールなど、多様なファンクションを装備しています。入力感度を含めた出力ゲイン、アタック・タイム、リリース・タイム、コンプレッション・レシオなどのパラメータの調整が可能です。バーディスプレイの表示は、出力レベルとリダクション・ゲイン、スイッチングにより切り換えられます。超ローノイズ級のICとFETを効果的に使用、本機の開発段階からの原因として、RFIのプロテクションには、最大の配慮が成されています。

【SPECIFICATIONS】 ●周波数特性(20~20kHz): +0, -0.25dB ●SN比: 73dB ●ライスタム: 2μsec ●THD: 0.15% ●IMD: 0.01% ●コンプレッション比: 2:1~20:1 ●寸法: 483W X 190D X 44.5H (mm) ●重量: 4.1kg



## MODEL 824

アクティブ・マイクシグナル・スプリッター

マイクロホンからの信号を効率よく分配するために構成された分配器で、各チャンネルあたり3系統の出力が得られ、入力側にはパッドが装備されています。

モデル824は、1ユニットで8ch構成であり、各入出力にはハム・ループをカットするグラウンド・リフト・スイッチが設けられています。モデル824の特徴の一つとして、入力信号の簡易モニター機能があり、ヘッドホンとバークラフによりモニターが可能です。使用例としては、出力の1系統はメインのSRミキサーへ、1系統はレコーディングへ、残りは中継へ送り出すといったことができます。その場合、出力はラインレベルのため、信号の劣化を生ぜず、誘導雑音に対しても、強力にプロテクトされます。

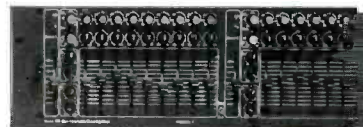
【SPECIFICATIONS】 ●F特: 20~20kHz +0, -0.5dB ●THD: 0.01% ●IMD: 0.01% ●重量: 7.5kg ●電源部(824ps)別売



## MODEL 209

デュアル・パラメトリック・イコライザー

ステレオ2ch構成のハイパス・ローパス・フィルターを装備した9端子パラメトリック・イコライザーです。各9のポイント周波数において、±15dBのゲイン・コントロールと、1~2オクターブまでのQ値のコントロールができます。ハイパス・ローパス・フィルターは、大出力時のスピーカーの保護に有効な遮断特性が設定されています。トータル・ゲインは-∞から+6dB間で任意にセットでき、動作中バイパスの状態にもできます。ハイインピーダンス・バランス形入力と、ローインピーダンス・バランス形トランス出力により、あらゆる機器と接続できます。ループから派生するハムをカットするグラウンド・リフト・スイッチを装備しており、フロント・パネルには、アクリル保護カバーも付属しています。オプションのカードにより、2WAYのチャンネル・ディバイダーとしても機能させることができます。



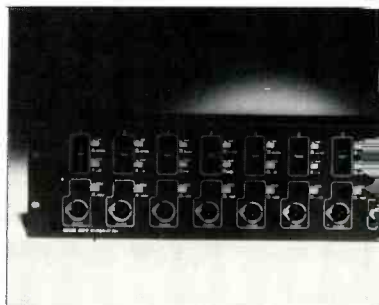
【SPECIFICATIONS】 ●F特: 20~20kHz +0, -1dB ●SN比: 84dB ●THD: 0.01% ●寸法: 483W X 133H X 190D (mm) ●重量: 6kg

## MODEL MD8

マルチDI BOX

MD8は、きわめて評価の高いDI BOX 2を8連装した、画期的な19インチラックマウントタイプの8chマルチDI BOXです。従って、ユニットの基本的な機能やスペックはDI BOX 2と共通です。

MD8は、その優れた音色に加えて、この8chマルチDI BOXという独自の機能性によって、スタジオ、SR、放送局等々応用範囲は広く、特にマルチキーボード演奏シーン等には最大の効果を発揮します。







# Model 288 ユニバーサル バッファ・アンプ

## モジュールタイプ

- 282: マイク・プリアンプ / 入力トランス使用のバランス形入力。低雑音回路採用。フロント・パネルで感度調整可能。
- 283: RIAA イコライザー / RIAA イコライジング後の出力は、トランス使用のバランス形。フロントパネルで、出力レベル調整可能。
- 284, 285, 285T ラインアンプ / バランス入力。フロントパネルで出力レベル調整可能。キャノン3Pコネクター。
  - ・284は、電氣的バランス入力で、アンバランス出力。
  - ・285は、電氣的バランス入力で、トランスによるバランス出力。
  - ・285Tは、トランスによるバランス入出力。

M288は、プロ現場で派生するほとんどの難問を、卓抜な能力で解決するユニバーサル・バッファ・アンプ。

- 応用例 ① 入力レベルがマイクレベルだった。あるいは-20dBでどうしても+4dBは欲しい。出力インピーダンスがハイインピーで、ケーブルを延ばせない、どうしよう//
- 応用例 ② 出力がアンバラ出力だ。ノイズが心配だ//
- 応用例 ③ 出力を2パラ、3パラ、それ以上のパラ出力が欲しい。
- 応用例 ④ なんてこった、フォノプレーヤーを結ばなければならない。プリアンプなんて手元にない//
- 応用例 ⑤ 600Ω出し、600Ω受けて統一しなければならぬ。機材にトランスを入れるわけにはいかない。

こんな時こそ「問題処理アンプ」M288の出番。プロ現場のテクニカル・サポーターとして、そんな諸問題を一挙に処理、解決してしまうプロの強い味方です。

# 極のノウハウ。M&R

## MODEL 228

デュアル1/3オクターブ・グラフィック・イコライザー  
ステレオ2ch | 3オクターブ・バンド | 28素子構成のグラフィック・イコライザーで、位相差のきわめて少ないLC RCネットワークと、超ローノイズICとで構成されています  
放送局、ディスク・マスタリング・プロセス、ポストプロ、SRコースと広い適合範囲をもち、28ポイントの中心周波数で±12dBの可変レベル幅をもっています。出力ゲインの調整幅は-∞ ~ +6 dBです  
イコライザーのハイ・パス時にはランプで表示され、リレー動作により、クリック音の発生を防止しています  
ハイ・インピーダンス電子バランス入力と、ロー・インピーダンス・バランス形トランス出力をもち、あらゆる機器と接続が可能です。ハム・ループをキャンセルするグラント・リフト・スイッチを装備しており、フロントパネルにはアクリル保護カバーが付属しています

[SPECIFICATIONS] ●周波数特性(20~20kHz) +0, -1dB ●SN比: 92dB ●THD: 0.01% ●寸法: 483W × 190H × 178D(mm) ●重量: 7 kg

## MODEL 222

2WAYステレオ・クロスオーバー  
モデル222は、SRコースや設備用に開発された、2チャンネル2WAYのチャンネルデハイターで、クロスオーバーポイントの変更は、フラグイン方式のカートの選択により行えます。両チャンネル共、35Hzローカットフィルターを装備し、さらにロー、ハイ各チャンネルにはミュートスイッチと位相切り換えスイッチが用意されており、使いやすさを十分に考慮しています

[SPECIFICATIONS] ●周波数特性: 20Hz~20kHz +0, -0.2dB ●SN比: 96dB ●THD: 0.1%以下 ●IMD: 0.01% ●寸法: 483W × 44.5H × 175D(mm) ●重量: 3.0kg

## MODEL 2A4-2

4/WAYステレオ・クロスオーバー  
SMPやディスタンス・マイクなどの設備に欠かせないステレオ2chのチャンネルデハイターです。4WAYまたは3WAYのクロスオーバー・ポイントの変更は、フラグイン方式のカートの選択で行えます  
各帯域には、ゲイン・コントロールとLEDインジケーターが装備されています  
入力部はハイインピーダンスで、電子バランス入力、出力部はローインピーダンスで、アンバランス出力。クロスオーバー・スロープは、24dB/OCTというきわめてシャープな過渡特性をもち、スピーカーの特性のあはれなどに影響されないスムーズなつながりが保証されます

[SPECIFICATIONS] ●周波数特性: 2Hz~20kHz +0, -3dB, 20Hz~20kHz +0, -0.2dB ●SN比: 96dB ●THD: 0.1%以下 ●IMD: 0.01% ●寸法: 483W × 44.5H × 175D(mm) ●重量: 3.2kg

## MODEL 213

デュアル2/3オクターブ グラフィックイコライザー  
モデル213は、位相差のきわめて少ないLC/RCネットワークと超ローノイズICとで構成された、13バンドのグラフィックイコライザーで、ディスクマスタリング、放送局、ポストプロ、SRコースを考慮して開発されました  
オーディオ帯域を13ポイントでカバーし、各ポイントのゲインは±12dB幅で可変できます。トータル・ゲインの調整幅は-∞ ~ +6 dBです  
ハイパススイッチも装備し、ハイインピーダンス電子バランス入力とローインピーダンス・トランス・バランス出力によってどのような機器とも接続できます

[SPECIFICATIONS] ●周波数特性: 20~20kHz 0, -1dB ●SN比: 94dB ●THD: 0.01% ●IMD: 0.01% ●寸法: 483W × 190D × 89H(mm) ●重量: 1kg

## MODEL 128

モノラル・グラフィック・イコライザー  
レコーディング・スタジオ、放送局、ポストプロ、SRに対応する、LCフィルター・ネットワークとローノイズICとで構成された28素子構成のグラフィック・イコライザーです。各28のポイント周波数におけるゲインのコントロール幅は±12dBで、トータル・ゲインは-∞ ~ +6 dB間で可変できます。また作動中のハイパス・スイッチも設けられています  
ハイインピーダンス電子バランス入力に、ローインピーダンス・トランス・バランス出力を備え、どのような機器とも接続が可能です。グラント・リフト・スイッチが装備され、ハム・ループをカットすることかできます

[SPECIFICATIONS] ●F特: 20~20kHz +0, -1dB ●SN比: 94dB ●THD: 0.01% ●寸法: 483W × 89H × 190D(mm) ●重量: 5.4kg

### ■特長

- 1) INPUTには通常入力の他、HILEVELポジションを選択すると、最大300W出力のアンプからの信号をダイレクトに入力することができます
- 2) 低出力ピックアップ用には、ゲインを20dBアップすることができます
- 3) バランス出力(チャンネル)の他、アンバランス出力を用意しています
- 4) グラントリフト・スイッチ及びリヤパネルには、バレルコ・マルチ出力コネクターが標準装備されています

[SPECIFICATIONS] ●F特: 20~20kHz、+0dB~-2dB ●SN比: 96dB ●THD: 0.08% ●ID: 0.1% ●電源: ファンタム又は外部バッテリー ●寸法: 483W × 133D × 170H(mm) ●重量: 4.1kg ●チャンネル接続: 1番グラウンド、2番ホルト、3番コントロール



〒162 東京都新宿区早稲田鶴巻町519 洛陽ビル4F  
☎03-208-3061代 FAX ☎03-203-8351

# CLARITY BEYOND BELIEF

Sennheiser studio microphones have long stood for quality, being widely used by studios throughout the world. With the increase in digital recording the need for a microphone with extremely low inherent noise and capable of accepting high sound pressure levels with low distortion is required. The MKH 40 with its cardioid response has been designed to meet these requirements.



## MKH 40 P 48

“The clarity of this  
mic is astonishing . . .”

Simon Crott *Sound February 1986*



# SENNHEISER

Hayden Laboratories Ltd, FREEPOST, Hayden House, Chiltern Hill,  
Chalfont St Peter, Bucks SL9 9BS. Tel. (0753) 888447



Sennheiser manufactures an extensive range of audio products. Please tick the appropriate box if you would like information on the following.

Dynamic mics  Electret condenser mics  Tie clip mics   
Studio condenser mics  Radio mics  Infra-red sound  
transmission  Headsets  Headphones

Please send me further information on the Sennheiser range of Dynamic microphones.

NAME .....

ADDRESS .....

.....

.....



# Digital Mastering Rentals.

HHB are pleased to announce that they've re-equipped their digital rental service with the new Sony PCM 1630 processor and the purpose-built DMR 2000 recorders.

The PCM 1630 is the successor to the PCM 1610 and maintains the CD format compatibility which has made Sony the undisputed digital masters.

The PCM 1630 employs a superior 'oversampling' technique, resulting in even greater sonic accuracy, and the metering has been improved now giving essential 'over' and 'peak-hold' indication.

The DMR 2000 is the first U-matic recorder specifically designed for digital audio. Among other advantages of this machine are an integral fast-reading time-code generator/reader, which allows assembly of a continuous stripe, and self-cleaning heads.



Another new service – often free of charge – is the use of Sony's tape analyser DTA 2000. This employs the status port of the PCM 1630 to provide a print-out of errors vs. time, thereby removing one of

the uncertainties of the older systems.

These new machines, with the DAE 1100, form the heart of the digital mastering service that has made HHB leaders in the field.

Economic access to all this is afforded by a variety of interfaces that allow two-way digital communication between



the 1630 and the lower-cost PCM F1 and 701ES, thus significantly reducing post-production costs.

Not only do we supply and install mastering and editing systems where you want them, but we also provide full editing and copy facilities in-house, with skilled operators if required. Of course, this is backed up by HHB's trusted support service, with experienced Sony-trained engineers on 24 hour call-out.

By the way, it is not just our rental service that has expanded – we are now authorised Sony Broadcast dealers, handling their full range of digital and analogue products, as well as the lower cost processors.

And don't forget that we can also supply full studio installations, multitracks, consoles, video systems, signal processors, amplifiers, monitors..... in fact anything you need

For digital rentals, contact Richard Kershaw on 01-961 3295.

**SONY**<sup>®</sup>

FROM



# REVIEW

## Next in the series of technical loudspeaker reviews, Neil Grant examines the UREI 813C

**F**ollowing the acquisition of United Recording Electronics Industries by the JBL Corporation, it was perhaps only a matter of time before the integration of manufacturing and engineering facilities resulted in the production of new models, based on previous UREI products.

One of the first of these is the UREI 813C, externally familiar enough but in fact a completely new and re-engineered speaker system, that owes only its external dimensions and design philosophy to its predecessors in the 813 range.

Based originally on a successful Altec dual concentric device, the 813 range has been developed through a series of models since the design inception by Ed Long. The principal marketing edge has always been that of 'Time Alignment', a registered trade mark of UREI's, and one of the most emulated but least understood of speaker design philosophies.

It is perhaps worthwhile, before discussing the change to the 813, to briefly pass over what is and is not involved in 'Time Alignment', and as to whether this is a valid engineering, as opposed to marketing, principle.

### Time alignment

Loudspeakers are dynamic devices; their amplitude performance varies with respect to frequency and the power input applied to the terminals. This is an effect generally categorised as power compression. The same effect is observed in the time domain.

It is incorrect to presume that any loudspeaker is a point source. The position, or 'acoustic centre' of any loudspeaker, or combination of loudspeakers, varies with frequency and input level. This position may, or may not, be related to the voice coil position. In some low frequency devices the apparent source is centimetres behind the physical position of the speaker. Now without attempting to simplify excessively a highly complex issue, the acoustic centre of a single loudspeaker is not a critical matter, and its wandering with respect to frequency, within defined limits, need not concern us.

If a system is assembled which consists of more than one driver, however, the matter becomes most important. Because of the finite slope of the practical crossover filters employed, it is obvious that at least two drivers in the complex system will be radiating the same frequency information and at the crossover point, with the same amplitude. If the two drivers are not in the same acoustic plane, then the acoustic phase at the crossover frequency will not be the same for both drivers.

In the real world this results in losses at the crossover point, measured as a notch, along with poor imaging and coherence.

The 'Time Alignment' of a system compensates for this path difference at the crossover point, and smooths the amplitude and phase response by inserting a short delay into one of the drivers, to precisely match the acoustic centres at one frequency—the crossover frequency. Movement of the acoustic centres above and below the crossover point will continue as before but the system will now be integrated at the crossover.

This speaker will not be a point source over its entire bandwidth, for the reasons given above. The time smear over the operating bandwidth will ensure that the cabinet acoustic centre occupies quite a large area but this is typical of any moving coil dynamic loudspeaker system.

It is to the credit of UREI that, in designing a crossover network that persuaded a recalcitrant dual concentric to function properly through the crossover region, an engineering solution was turned into the very powerful, and much misunderstood, sales tool that 'Time Alignment' has provided.

### Crating

The speaker system is delivered as two crates, each on a small wooden pallet. Each cabinet is crated in two boxes; an outer waxed carton, and an inner, heavy, tri-wall box. Unpacking instructions are thoughtfully stenciled on the external faces of the box. There should be little risk of any damage to the cabinets or drivers during shipping with this level of protection. Polystyrene packing protects the internal cabinet

faces and the protruding horn assembly.

The enclosed operating instructions manual carefully warns against removing the blue open cell foam from around the lip of the horn assembly, it is there to reduce the shift in impedance, and consequent diffraction, around the lips of the mouth of the horn. UREI have obviously suffered frequently in the past with this being removed and discarded with the balance of the packaging on arrival at the purchaser's studio.

### Cabinets and drivers

The system design philosophy is fundamentally unchanged from the very first UREI 813 model; each cabinet is fitted with three speaker drive units, two 380 mm bass units, and a 50 mm diaphragm diameter, 25 mm throat, compression driver, mounted concentrically with the upper bass driver and loaded through a short horn mounted on the pole piece of this driver.

Each cabinet is attractively finished in a charcoal textured paint and it is at this stage that the first important external difference is noticeable: UREI have engineered out the light bulb assemblies, originally provided as protection for the previous generations of drive units, all with rather limited thermal headroom.

The space on the control panel is now taken up purely with three amplitude trim controls, wire wound potentiometers, flush mounted, and designed to be adjusted with a screwdriver. The idents on the panel are rather poorly screened, the effect being somewhat cheap and rushed, out of character with the initial impressions of the rest of the cabinet.

Terminations are to the rear of the panel, on two somewhat inadequate push terminals.

Users of large diameter, multistrand, speaker cables will find termination difficult, especially since the cabinet connectors are mounted on a small lightweight plastic moulding, which would not lend itself to modification. It is also questionable whether rear mounted connectors are ideally situated, since the cabinets have to be terminated prior to installation in a monitor wall, not necessarily the easiest of gymnastic manoeuvres.

Internally, all three drive units are entirely new, and now obviously of JBL parentage. Impeccably engineered and presented, their appearance was somewhat at odds with the quality of cabinet construction and cabling.

The crossover unit has been reduced from the previous rather complex two box assembly, and is now a neat single card, accessible from the front of the cabinet as a rear-mounted extension of the control panel, sliding out between wooden rails. The cabling interconnects are lightweight, however, and unsupported within the cabinet.

The cabinet itself is manufactured from a medium density chip particle board, the front baffle being laminated, the carcass apparently from 25 mm sheet.

The internal faces are extensively braced with 100×50 mm softwood timber, which would appear to have been more than adequate but was in practice badly jointed and secured to the cabinet walls.

The result produced a reasonably stiff baffle assembly and similar rear wall but the side walls were poorly supported. It was noticed during the distortion tests conducted at high level that these faces showed considerable movement.

### Manufacturer's specification

**Power rating:** 150 W (to IEC 268-1).  
**Frequency response:** 45 Hz to 17 kHz, ±3 dB.  
**Sensitivity:** 101 dB SPL, 2.83 V input, 1m.  
**Impedance:** 8 Ω nominal, >4 Ω minimum.  
**Enclosure volume:** 326 litres.  
**Weight:** 91 kg.

**Dimensions:** (whd) 787×914×585 mm.  
**JBL International, 8500 Balboa Boulevard,  
Northridge, CA 91329, USA.**  
**UK: Harman Audio (UK) Ltd, Mill Street,  
Slough SL2 5DD.**



CP6800

SOUNDTRACS

A British company dedicated to the design and manufacture of one of the broadest ranges of mixing consoles in the World. We offer ten individual models in over fifty versions to suit your specific requirements.

The choice is yours.



#### Features

SMPTE/EBU Time Code triggering of patches, events and muting. Channel, group and monitor muting automation. Eight external events controllers. Accuracy to 1/25th seconds. Visual display of track sheets and console status. Floppy disk storage of information. Optional hard copy information print out.

#### Applications:

**24 Track Recording.**  
**Video Post Production.**  
**Broadcast Production.**  
**Theatre and 'On Air'.**

Soundtracs plc. 91 Ewell Road, Surbiton, Surrey  
KT6 6AH, England Telephone: 01-399 3392  
Telex 8951073/STRACS/G Fax: 01-399 6821

# REVIEW

Internal acoustic dampening is achieved with the use of flat glass fibre slabs, wedged around the perimeter of the box.

Great care has to be taken in the removal of any of the drivers, especially the concentric units. With a rearward centre of gravity, the tendency is for the speaker to tilt sharply on removal, and since it is checked back into a routed recess in the baffle, the lip of this quickly becomes damaged.

Because of the symmetry of the dual concentric, the cabinet can easily be mounted vertically or horizontally, care merely being taken to ensure, if the cabinet is inverted or rotated,

that the high frequency horn maintains the correct, horizontal, orientation.

## Time domain performance

Fig 1 is an energy time curve, showing the time behaviour of the system to a passing transient. Note the initial early arrival at about 6 ms. This is the leading edge of the bass section of the system, arriving fractionally before the higher frequency information from the horn assembly.

The decay of the system is quickly controlled, and passed within approximately 3 to 4 ms. Transient behaviour and coherence will be good.

The envelope, however, is ragged; this is partly due to the residual diffraction around the edges of the cabinet but principally originates from diffraction around the lips of the horn assembly, despite the foam edging and horn slotting used.

## The Definitive Gate



Fixed or tracking four stage envelope lets you create envelopes as well as modifying them.

High resolution filters for frequency conscious gating or programme equalisation.

Trigger mask up to four seconds can be used to remove offbeats or change accent levels.

Envelope delay up to two seconds gives slapback and repeat effects.

**Developed for the new breed of studios where perfection is the only standard. The Rebis RA701 gives the warmth of analogue with digital precision.**

Velocity sensitive MIDI output drives synths and drum machines without the need for special pads or interfaces.

Merge input allows units to be chained to give a single MIDI output.

Stereo and duck facilities, 90dB attenuation range, 5 volt trigger in/out and external key input.



For full information/demonstration contact:

**Rebis Audio Ltd.** Kinver Street, Stourbridge West Midlands DY8 5AB. ENGLAND. Telephone: (0384) 71865. Telex: 335494. Fax: (0384) 397105

**Australia:** John Barry Group, Artarmon N.S.W. 02 439 6955. **Austria:** Bauer Sound, Himberg 02235-89298. **Belgium:** S.E.D., Bruxelles 522 70 64. **Canada:** Heint Electronics Inc., Ontario 727-1951. **Denmark:** Kinovox A/S, Lyngø 02 18 76 17. **Finland:** Studiotec, Espoo 592055. **France:** High Fidelity Services, Paris 285 0040. **Germany:** Thum & Mahr Audio, Langenfeld 2173-7806-0. **Hong Kong & China:** Audio Consultants Co. Ltd., Kowloon 3-7125251. **Italy:** Startek, Bologna 32 10 63. **Jamaica:** Audiofion Systems Ltd., Kingston 926-2569. **Japan:** Hibino Electro Sound Inc., Tokyo 442-4101. **Netherlands:** Special Audio Products B.V., Amsterdam 140035. **New Zealand:** Maser Broadcast Systems Ltd., Glenfield 444-3583. **Saudi Arabia:** Fadi Halwany & Sons, Dammam 8570848. **Singapore, Malaysia & Indonesia:** Bell & Order, Singapore 7438081. **South Africa:** Tru-Fi Electronics, Johannesburg 786 7177. **Spain:** Singleton Productions, Barcelona 237 70 60. **Sweden:** Tal & Ton, Gothenburg 803620. **Switzerland:** E.M.M. Studio, Basel, 061 54 20 45. **U.S.A.:** Rebis U.S. Atlanta, Georgia 404 633 6626.

## Modulus of impedance

Fig 2 illustrates the electrical behaviour of the system between 10 Hz and 2 kHz, as the modulus of impedance with frequency. The bottom of the curve is at 134 Hz, an impedance of 3.6 Ω, fractionally below the minimum claimed by the manufacturer. Note the three related notches at 548 Hz, 752 Hz, and 1.45 kHz.

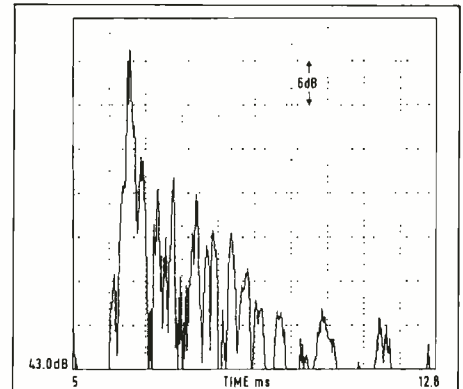


FIG 1 TIME DOMAIN ENERGY TIME CURVE  
0 dB: 0.00002 Pa  
Scale: 7.3366E-01 m/in or 2.8884E-01 m/cm  
2138 μs/in or 842 μs/cm  
Line spacing: 19.6072 μs or 6.72526E - 3 m  
Line width: 266658 μs or 9.14636E - 3 m  
Window file name: A:HAMMING.W8T

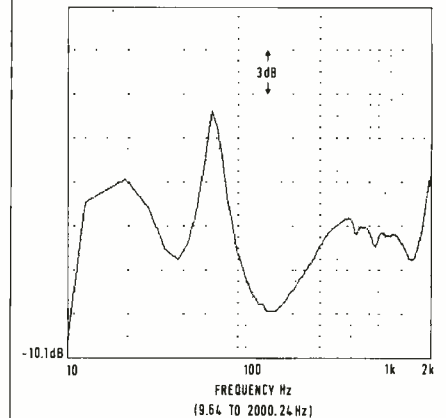


FIG 2 MODULUS OF IMPEDANCE, HF OVERLAYS  
0 dB: 8 Ω  
Log frequency axis: 2.7 decades  
Resolution: 3.4267E + 02 m and 1.0010E + 01 Hz  
Sweep rate and bandwidth: 10.02 Hz/s and 1.0010E + 01 Hz

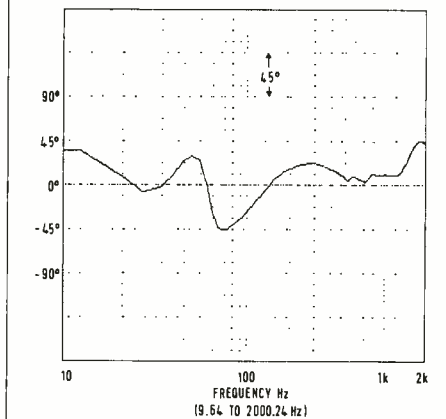


FIG 3 ELECTRICAL PHASE  
Log frequency axis: 2.7 decades  
Resolution: 3.4267E + 02 m and 1.0010E + 01 Hz  
Sweep rate and bandwidth: 10.02 Hz/s and 1.0010E + 01 Hz





**Ever get  
the feeling  
you have to buy  
more video/audio  
patching than  
you really need?**

The trouble with ordinary patching systems is that they're not really cost effective for small edit requirements because they give you more jacks than you need.

But now ADC's exclusive Video/Audio Modular Patchbay – VAMP – lets you custom design your own bay. Our VAMP saves you money, because you can buy the exact number of video or audio circuits you need; and add circuits as your needs increase.

It saves time too – just ring ADC or an ADC broadcast distributor for fast order turnaround and delivery.

And it saves space by allowing you to combine audio and video patching in one bay.

VAMP audio modules feature ADC's exclusive OCP punchdown ID contact for fast, durable terminations, with no soldering or wire stripping. Video modules feature ADC's SJ2000 self-normalling jacks, or a pair of CJ2011 single coax jacks. Each VAMP chassis holds up to 20 modules, which you can mix or match audio/video to suit your needs.

For flexible audio and video patching with no wasted space or unnecessary costs, revamp your system with ADC's VAMP.



## Breeze through circuit labelling with SAILS

Our exclusive Self-Adhesive Identification Labelling System – SAILS – makes circuit labelling easy and efficient. Each VAMP chassis comes with a sheet of form feed computer-printable adhesive-backed labels. The unique polyester label material won't smear or yellow, it's easy to write or type on, and removes cleanly without tearing. Over half-inch width gives you plenty of room for circuit designation.



ADC Europe  
Ltd., 126/128  
Crockhamwell Road,  
Woodley, Berkshire,  
RG5 3JY. Tel: 0734  
695998. Telex:  
849103 ADCEUR G.  
Fax: 0734 699611.

AUTHORIZED ADC  
BROADCAST DISTRIBUTORS:  
**Belgium** TEIN S.A. 02 215-7785; **Finland**  
TECHNOSPAN OY 03 580 803; **France** AUDIO  
PLUS SA 014 585-1599; **Israel** SOTEK 04 254 401; **Italy**  
SIRCES SRL 02 564962; **Norway** ERCOTRON A/S  
02 933-565; **Spain** LEXON SA 03 203-4804; **Sweden**  
ERCOTRON AB 08 756-7355.

**ADC Europe Ltd.**



# REVIEW

Whereas the 20 Hz and 53 Hz resonant peaks are the inevitable result of the competent design of the box low frequency loading, which works well, these three resonances appear to be the result of the interaction of the two bass sections within the system, indicating a muddying of the upper midrange section of the system response.

## Electrical phase

The electrical phase of the system, Fig 3, plotted over the same frequency limits as the previous impedance curve, illustrates the reactive behaviour of the system. The worst case load, the capacitive reactance, is the maximum capacitive phase angle, where the amplifier is required to deliver maximum current and a low

instantaneous voltage but maximum voltage slew rate.

In the case of the UREI 813C this occurs at 69 Hz, with a phase angle of  $-45.5^\circ$ . This is considerable, though not excessively severe but consider power amplifier choice carefully. Amplifiers should be rated to below  $4 \Omega$ , and capable of at least 250 W into a nominal  $8 \Omega$  impedance. Considering the swings in impedance with respect to frequency, first class low impedance hook up cable should be used to avoid impairing the frequency performance of the system.

The balance of the impedance response of the system is illustrated in Fig 4, with three curves being overlaid.

The centre curve is for the system set up for a nominally flat response, the lower with all three trim controls at maximum, and the upper with all three controls at their minimum.

The phase angle at high frequencies, though briefly capacitive, is not severe, there is therefore little likelihood of a competent amplifier running into problems slew rate limiting with this speaker as a load at higher frequencies.

## Frequency domain and amplitude response

The speaker amplitude response is shown in Fig 5. Generally, the response is commendably flat,

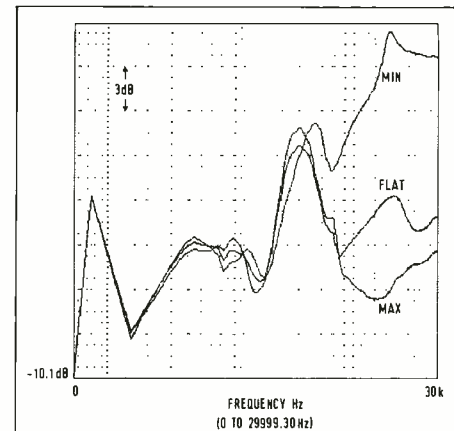


FIG 4 MODULUS OF IMPEDANCE HF EQ OVERLAYS

0 dB:  $8 \Omega$   
Log frequency axis: 2.7 decades  
Sweep rate and bandwidth: 1001.91 Hz/s and 3.1653E + 01 Hz

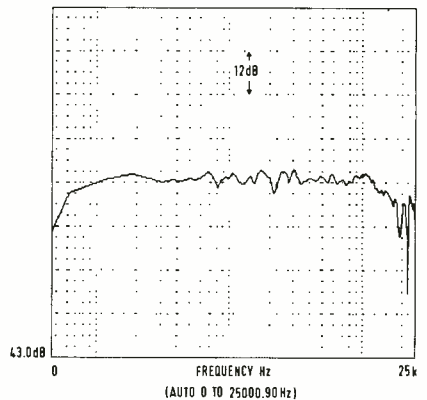


FIG 5 AMPLITUDE RESPONSE

0 dB 0.00002 Pa  
Log frequency axis: 2.7 decades  
Resolution: 7.6111E + 00 m and 4.5066E + 01 Hz  
Time of test: 5900  $\mu$ s, 2.0237E + 00 m  
Sweep rate and bandwidth: 2030.90 Hz/s and 4.5066E + 01 Hz

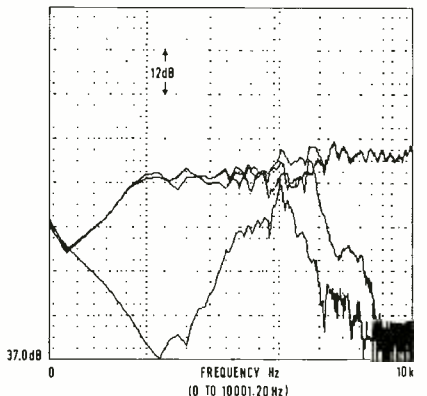


FIG 6 DRIVER OVERLAYS

0 dB: 0.00002 Pa  
Log frequency axis: 2.7 decades  
Resolution: 7.6111E + 00 m and 4.5066E + 01 Hz  
Time of test: 5843  $\mu$ s, 2.0040E + 00 m  
Sweep rate and bandwidth: 2030.90 Hz/s and 4.5066E + 01 Hz

ON  
**ANTHONY JACKSON**

FM ACOUSTICS

In the studio and in concert, Anthony Jackson is world famous for his artistry on the contrabass guitar. Less known, but essential to his standard, is his uncompromising dedication to the accuracy with which the sound of his instrument is reproduced. His musicianship is always complimented by the most precise amplification available so we are pleased when he says:

"This instrument is perhaps more demanding on a sound system than any other and your amplifiers are nothing short of awesome. The FM 1000's reproduction of low-frequency transients is unmatched. There is no detectable sound of stress, no sense of thermal stress either..."  
"There is nothing to compare to lifting the lid on a piece of equipment and realising that it has been designed and constructed with no regard to cost."  
"I've owned many power amps, and heard and played through many more, and as far as I am concerned, the search for the ultimate has stopped here. Thanks for your most inspiring performance!"

*Anthony Jackson*

Anthony Jackson, New York

FM ACOUSTICS LTD. Tiefenhofstr. 17, CH-8820 Wädenswil/Switzerland  
Telephone: 01/780 64 44, Telex: 875414 FMAC  
US office: FM ACOUSTICS USA, P.O. BOX 854, BENICIA, CA 94510  
Telephone: (707) 745 4444, Telex: 550161 FMA





# Studiomaster Series II



Features: Automated muting of input channels and auxiliary returns, 6 auxiliaries, 4-band equalisers on inputs, expandable 16-40 inputs, expandable up to 24-track monitoring, the best audio specifications in its class.

Further details from:

STUDIOMASTER, Studiomaster House, Chaul End Lane, Luton,  
Beds LU4 8EZ

☎ 0582 570370 Telex: 825612 STUDIO G Fax: 0582 570242  
U.S.A.

STUDIOMASTER INC., 1316E Lancaster Street, P.O. Box 2344,  
Fort Worth, Texas 76113

☎ 817 336 5114 Telex: 758285 IMCTXUT Fax: 817 870 1271

**STUDIOMASTER**

# REVIEW

and well controlled. The ripples between 800 Hz, and 5 kHz are the frequency domain results of the diffraction around the lips of the horn noted earlier. The jagged response above 18 kHz is due to the nature of the resonant structure of the high frequency compression driver diaphragm and, though apparently severe, only marginally effects the more audible areas of the high frequency response over the immediately preceding octave.

The performance of the individual drivers and their respective crossover frequencies is illustrated in Fig 6.

Acoustically, the two cone drivers run together until the lower is crossed out, passing the high frequency unit at 1 kHz.

The two dual concentric units crossover acoustically about half an octave higher. This arrangement will give a maximally flat on-axis

response, given the relative sensitivity of the two cone drivers, and the high frequency unit.

The high frequency response is 3 dB down at 13.1 kHz. This does not meet the manufacturer's specification, which indicated 17 kHz.

Fig 7, the low frequency response, gives a -3 dB point of 65 Hz, with the system radiating into  $4\pi$  free space. The system is obviously designed to be mounted flush with a rigid baffle within a monitor wall, and mounted thus should then comfortably exceed the manufacturer's prediction of 45 Hz as a half power point. It would not be recommended that the system is mounted in free air on a stand.

The acoustic phase response of the system confirms that the low frequency section of the system is in polarity.

In other words a positive going electrical impulse will produce a positive going pressure wave from the cone drivers, and that the compression driver high frequency section is 180° out of polarity. Not untypical of this kind of passive system.

Fig 8 details the on-axis frequency response to variations in the trim controls on the cabinet. The centre curve is the nominally flat response, the

lower with all controls set at minimum and the upper with all controls set at maximum. There are three controls: high frequency trim, high frequency drive and midrange trim. Whereas the manual recommends adjustment to suit the room characteristics, it is likely that these controls will be used more frequently to adjust the response of the cabinets themselves according to subjective tastes.

## System decay and polarity response

The decay curve in Fig 9a confirms the orderly, rapid and controlled way in which the system settles following the passing of a transient. Note the frequency shifting curve of the settling low frequency section, and the only objectionable resonance decaying at 200 Hz. Fig 9b is the frequency time curve of this display, which has been converted to iso-contours.

The 200 Hz resonance decay is very clearly illustrated, as is the slower decay of the

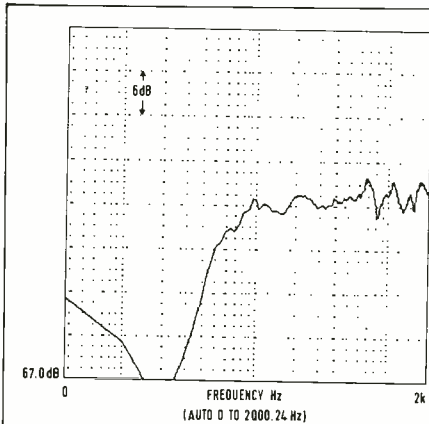


FIG 7 LF RESPONSE

0 dB: 0.00002 Pa

Log frequency axis: 2.7 decades

Resolution: 2.4198E +01 m and 1.4175E

+01 Hz

Time of test: 5900  $\mu$ s, 2.0237E +00 m

Sweep rate and bandwidth: 200.92 Hz/s and

1.4175E +01 Hz

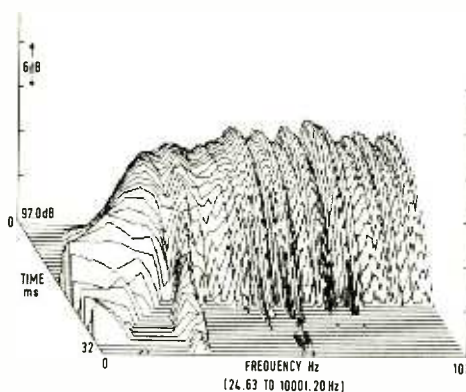


FIG 9A TRANSIENT RESPONSE—3D DECAY CURVE

0 dB: 0.00002 Pa

Log frequency axis: 2.7 decades

Resolution: 4.7928E +00 m and 7.1565E

+01 Hz

Time of test: 32000  $\mu$ s 1.0976E +01 m to

0  $\mu$ s 0.0000E +00 m

-1032  $\mu$ s/step or -0.354064516129 m

Sweep rate and bandwidth: 5009.55 Hz/s and

7.0000E +01 Hz

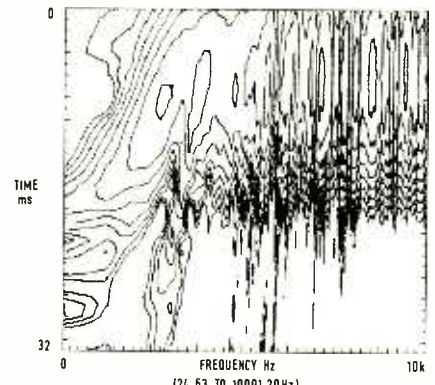


FIG 9B TRANSIENT RESPONSE—FREQUENCY TIME CURVE

Resolution: 4.79284 m and 7.1565E +01 Hz

Sweep rate and bandwidth: 5009.55 Hz/s and

7.0000E +01 Hz

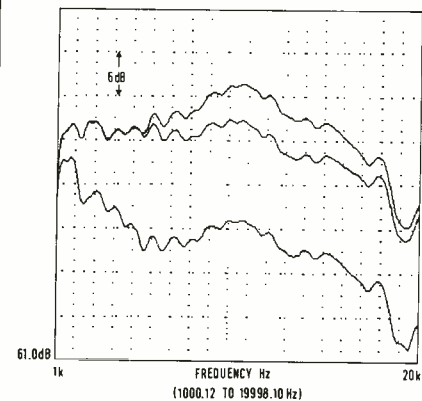


FIG 8 HF EQ OVERLAYS

0 dB: 0.00002 Pa

Scale: 5194.24 Hz/in or 2044.98 Hz/cm

Resolution: 5.7058E -01 m and 6.0115E

+02 Hz

Time of test: 5900  $\mu$ s, 2.0237E +00 m

Sweep rate and bandwidth: 75143.30 Hz/s and

1.2500E +02 Hz

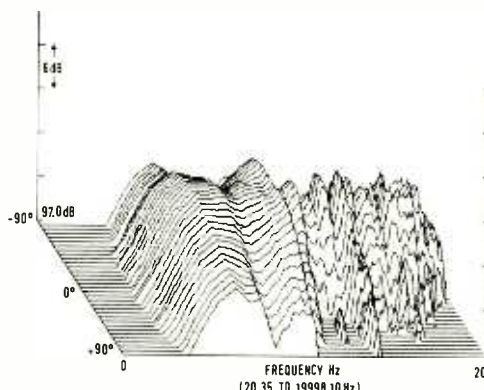


FIG 10A POLAR RESPONSE—3D DECAY CURVE

0 dB: 0.00002 Pa

Scale: 5462.12 Hz/in or 2150.44 Hz/cm

Resolution: 3.3109E +00 m and 1.0362E

+02 Hz

Time of test: 5823  $\mu$ s 1.9973E +00 m (front)

to 5823  $\mu$ s 1.9973E +00 m (back) 0  $\mu$ s/step

or 0 m

Sweep rate and bandwidth: 10734.80 Hz/s and

1.0362E +02 Hz

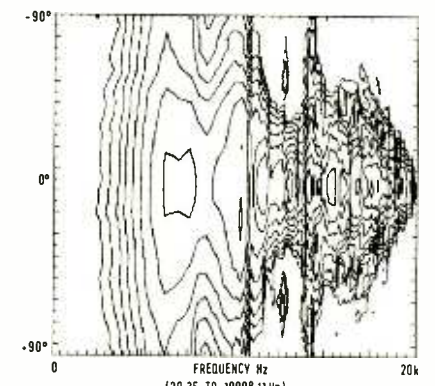


FIG 10B POLAR RESPONSE—FREQUENCY TIME CURVE

Resolution: 3.31087 m and 1.03598E +02 Hz

Sweep rate and bandwidth: 10734.76 Hz/s and

1.03619E +02 Hz



# The best of both worlds:

## THE SOUND TECH 1510A AUDIO TEST SYSTEM

Until recently, most Audio Test Systems have been either manual stand-alone systems or external-computer driven automated systems.

Engineers have long enjoyed the portability, ease of operation and cost effectiveness associated with manual stand-alone systems. Unfortunately, these systems have always lacked speed and documentation capabilities.

On the other hand, the ideally configured external-computer driven test system can provide speed, data analysis, documentation, graphics and integration with other GPIB test systems. Unfortunately external-computer driven systems are designed for production testing and are not suitable for troubleshooting or field work.

However, Sound Technology has combined the Best of Both Worlds into a portable, intelligent stand-alone system with complete PC compatibility: the Model 1510A! The Model 1510A can be used as an intelligent stand-alone system, and when connected to an external computer it becomes the ideal Automated Test System.

### The ST1510A as a Stand-alone System

- Built-in Intelligence
- Portable
- Semi-automatic and Manual Test modes for fast troubleshooting
- Built-in CRT/Graphics

### The ST1510A as an Automated Test System

- Graphics
- Test Chaining/limit testing
- Industry-standard Computer Interface (GPIB)
- User Choice of PC
- Bundled software for IBM, HP
- Compatible with Automated Switchers
- Production Testing

Contact us now for full technical and applications information. Learn firsthand why the ST1510A is the only test system that combines the best of both worlds!

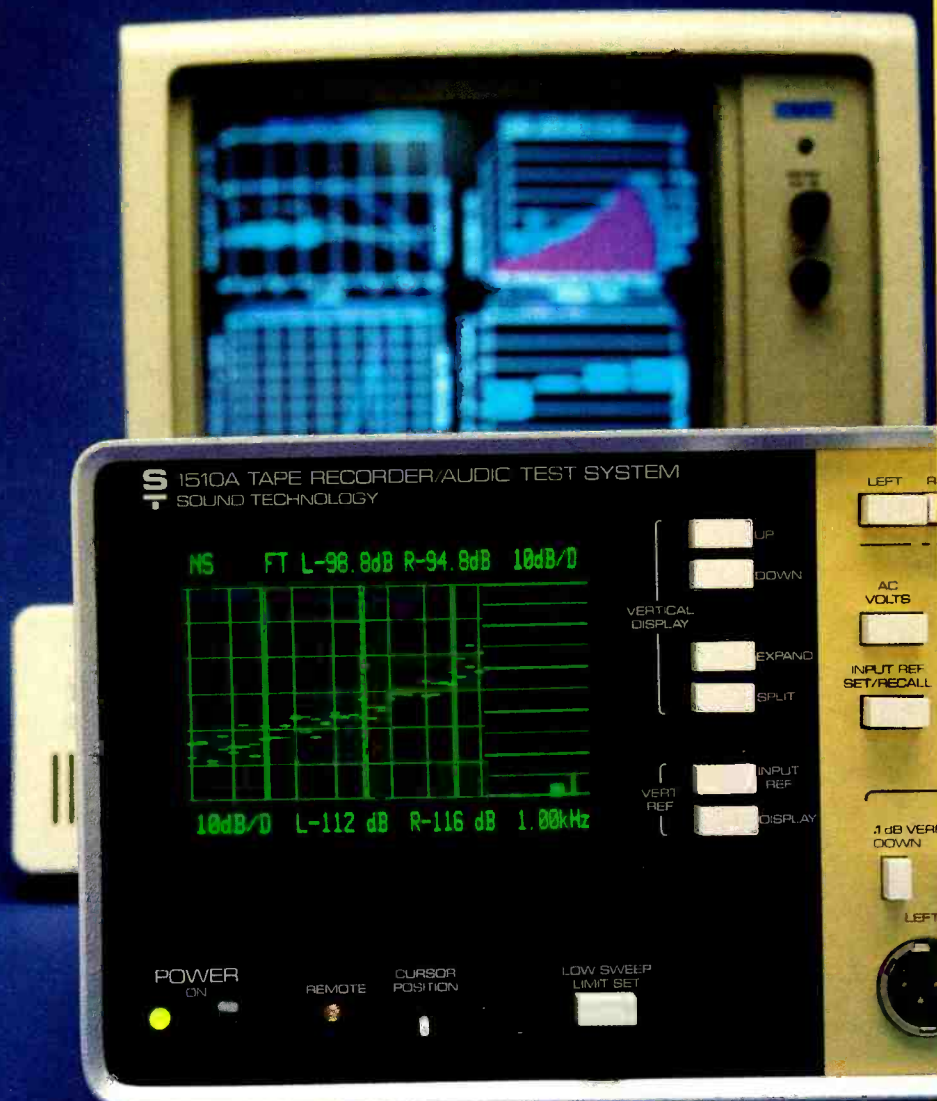
**S SOUND  
T TECHNOLOGY**

PRECO LTD

21 Summerstown, London SW17 0BQ  
01-946 8774



**Put The Best  
To Test!**



# REVIEW

information below 100 Hz, along with the shift downwards in frequency as the system amplitude decreases. With the exception of this resonance, this is an excellent performance for a speaker of this type and class.

All low frequency moving coil transducers exhibit this frequency shifting behaviour as excursion amplitudes decrease following the passage of transient information.

The polar response of the cabinet has been illustrated with two curves in Fig 10. Fig 10a is a conventional 3D, with the curve being on axis with the microphone and the outer curves being at right angles in line with the edges of the baffle. Already it can be seen that there is a pronounced step in the off-axis performance between the low frequency section of the system, and the horn section. Reference to the FTC of this curve set, Fig 10b, shows a severe waistband effect between 1 kHz and 2 kHz, then a broadening to a still very directional high frequency section, pencil thin above 12 kHz.

Whilst typical of this type of monitor, this is a highly directional system and I would query whether, in large modern control rooms, imaging across the rear of the room would suffer because of the beaming. Certainly frequency shifting off-axis is noticeable, due to the lobing of the response above the upper mid band.

## Distortion

The introduction of JBL drivers and engineering has improved sensitivity and power handling very considerably. Judging that headroom was now sufficient, the manufacturer has omitted the bulb protection, with the associated power related non-linearities and it would seem that that confidence was well placed. Fig 11 shows the distortion performance of the system at 100 mW, 1 W, 10 W, and 100 W levels. This is creditable. Sensitivity, though slightly down on the claimed figures, is still very high.

The system is showing little signs of distress at 100 W input, equivalent to an RMS sound pressure level of 119 dB, ref to 20  $\mu$ Pa. Clearly, though this is a very substantial level, there is potential for much more.

## Summary

To all intents and purposes, the UREI 813C, though externally similar to its predecessors, is a totally new monitor loudspeaker.

There have been many improvements. The new JBL drive units are superbly engineered and significantly improve the system sensitivity and power handling. The response is very linear on-axis and the system is well damped, behaving in an exemplary fashion in the time domain, imaging and transient response both being good.

Power handling and sensitivity are high by comparison to direct radiating monitor systems and even though the distortion performance of the UREI is only average for the type, the system headroom is high.

Disappointing, though, was the poor standard of box construction, the indifferent cabling internally, the average external connectors and

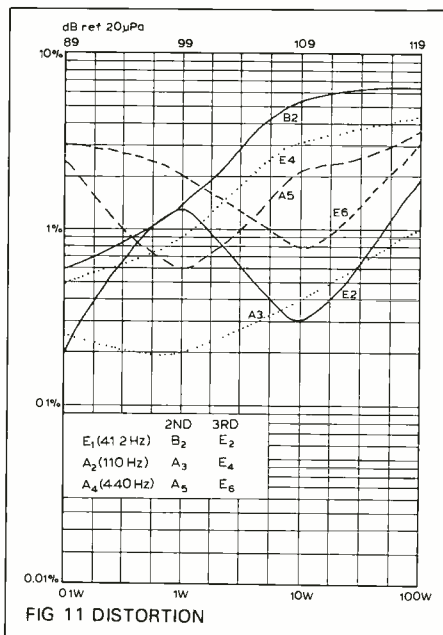


FIG 11 DISTORTION

the general finishing.

Off-axis response is poor, though this is fundamental to this type of design.

The UREI 813C is an expensive passive monitor system in Europe, and it would be hoped that the cosmetic points could be improved because the engineering improvements to the system will continue to extend the life and popularity of an otherwise thoroughly competent system.  $\square$

## UREI comment

UREI thanks *Studio Sound* for the review of the 813C system, which is very well done, and appreciates the opportunity to respond.

*Time Align* and its derivations are registered trade marks of E M Long Associates and are not generic terms. UREI is the exclusive licensee of this trade mark and process for full-size studio monitor applications. The technical explanation of the process is correct and clearly written.

The pair of 813Cs reviewed were the first pair off the production line and were hurried through the process in order to meet a show deadline. Consequently, a few cosmetic details may not have met normal UREI standards, such as the network panel screening, current production reflects normal cosmetic standards for this series of products.

Contrary to the description in the review, UREI uses 5-way binding posts, spaced 19 mm apart, and does not use push terminals. These posts will accept up to 12 AWG wire directly as well as crimped lugs and will directly accept standard dual banana plugs.

UREI does not believe that installing connecting terminals on the front of a loudspeaker enclosure is advisable for permanent installations, although it can be of use in temporary ones. Normal studio practice in most installations has been to run monitor loudspeaker cabling through conduit to the rear of the speaker soffit. All transducers and well as the *Time Align* network may be front of the enclosure for maintenance.

The internal cabling of the first production run of 813Cs was smaller than desirable because of a problem with material availability. Subsequent production uses 12 AWG wire for the link between the rear panel terminals and the network and 14 AWG wire for connections to the transducer.

## WORLDWIDE AGENTS:

- AUSTRALIA: CREATIVE AUDIO MELBOURNE  
TELEPHONE: (03) 379-1511
  - AUSTRIA: AUDIOSALES MOEDLING  
TELEPHONE: (2236) 26 123
  - BELGIUM: T.E.M. DILBEEK  
TELEPHONE: (02) 569-1823
  - CANADA: OMNIMEDIA QUEBEC  
TELEPHONE: (514) 636-9971
  - CHINA: WO KEE ENGINEERING HONG KONG  
TELEPHONE: (5) 249073/5
  - DENMARK: PER MEISTRUP PRODUCTIONS  
KARLSLUNDE TELEPHONE: (02) 151300
  - FINLAND: MS-AUDIOTRON HELSINKI  
TELEPHONE: (0) 566 4644
  - FRANCE: REGISCENE PARIS TEL: (01) 4396-5050
  - GREECE: ALPHA SOUND ATHENS  
TELEPHONE: (01) 363-8317
  - HOLLAND: AMPCO MAARSSEN BROEK  
TELEPHONE: (30) 433134
  - HONG KONG: TOM LEE MUSIC CO.  
HONG KONG TELEPHONE: (3) 722-1098
  - INDONESIA: PT AUVINDO MERIKEN  
PRIMA JAKARTA TELEPHONE: (01) 323029
  - ISRAEL: BARKAI RAMAT-GAN TEL: (03) 735178
  - ITALY: AUDIO LINK PARMA TEL: (0521) 598723/4
  - JAPAN: MTC JAPAN LTD. TOKYO  
TELEPHONE: (03) 295-4731
  - KOREA: BANDO PRO AUDIO SEOUL  
TELEPHONE: (01) 405-9665
  - NORWAY: NORDTEK EQUIPMENT OSLO  
TELEPHONE: (02) 231590
  - SINGAPORE/MALAYSIA: SWEE LEE SINGAPORE  
TELEPHONE: (03) 336-2307
  - SPAIN: LEXON BARCELONA  
TELEPHONE: (03) 203-4804
  - SWEDEN: INTERMUSIC STOCKHOLM  
TELEPHONE: (08) 778-1512
  - SWITZERLAND: SINEC SCHONENWERD  
TELEPHONE: (64) 413747
  - THAILAND: BANGKOK CINE/GRAPHIC  
CENTER BANGKOK TELEPHONE: (02) 314-3570  
K.C.M. BANGKOK TELEPHONE: (02) 222-4712
  - TURKEY: NEFAN ISTANBUL  
TELEPHONE: (01) 160-4514
  - UK: TURBOSOUND LONDON TEL: (01) 226 0099  
USA: TURBOSOUND NEW YORK  
TELEPHONE: (212) 460-9940
  - W. GERMANY: ADAM HALL USINGEN  
TELEPHONE: (6081) 16031
- UK DISTRIBUTORS:**
- SOUTH-EAST: BODLEY KNOSE LTD. UNIT 2,  
THE PINES TRADING ESTATE, BROAD STREET,  
GUILDFORD GU3 3BH. TEL: (0483) 504868.  
CONTACT: SIMON CURRY.
  - SOUTH-WEST: DRV, THE MAWES,  
LOWER TREGENNA, ST. COLUMB MINOR,  
NR. NEWQUAY, CORNWALL TR8 4HS.  
TEL: (0637) 875824. CONTACT: ROGER VINTON.
  - LONDON: ELECTROMUSIC, 89-97 ST. JOHN  
STREET, LONDON EC1M 4AB. TEL: (01) 253 9079.  
CONTACT: MIKE NOVAK.
  - NORTH: JSG, 104-108B MAIN STREET, BINGLEY,  
WEST YORKSHIRE BD16 2JH. TEL: (0274) 561044.  
CONTACT: PAUL SMITH.
  - SCOTLAND: THE WAREHOUSE, UNIT 14,  
50 WEST HARBOUR ROAD, EDINBURGH EH5 1PU.  
TEL: (031) 552 8194. CONTACT: NEIL HUTTON





# HEREVER YOU ARE IN THE WORLD, YOU CAN EXPECT A BRILLIANT RESPONSE.



► At Turbosound, revolutionary new ideas are our forte.

Here are two that will keep us at the forefront of sound reinforcement – and take our unique concept to even more of the world's major venues.

The first is the comprehensive global service we're developing for touring.

Called 'TurboLink' it enables Turbosound-equipped rental companies in, say, Japan to pick up where their counterparts in Europe or the US (for example) leave off.

This guarantees compatible equipment and cuts touring overheads. An agile response wherever you are in the world.

We're also creating a wealth of new technology.

Foremost is the revolutionary V Series, the result of our designers completely re-thinking the concept of high frequency reproduction: a breakthrough combination of manifold technology and Turbo-loading techniques.

The remarkable V-2, seen above in profile and available initially in our best-selling TMS-3, is the first product of this research.

It allows two custom-designed 1" compression drivers to blend gradually, avoiding phase cancellation.

The perfect complement of top-end dynamics and clarity to the unrivalled performance of the TurboBass™ and TurboMid™, extending the TMS-3's response to -3dB at 20kHz, without the use of compensating electronic enhancement or extraneous ultra-HIF devices.

In a hi-fi speaker that would be impressive enough; in a highly compact 775-watt RMS concert enclosure, it's something of a miracle. (As you've come to expect from Turbosound.)

For more details of Turbosound advanced concert and installation systems, and the TurboLink network, contact any of the Worldwide Agents or UK Distributors listed on the facing page. ◀



Turbosound Ltd. 202-208 New North Road, London N1 7BL. Tel: (01) 226-0099. Telex: 265612. Fax: (01) 354-4940. IMC: TURBO-UK. Turbosound Inc. 611 Broadway, New York, New York 10012. Tel: (212) 460-9940. Telex: 230199. IMC: TURBO-US.

an EdgeTech company  
LONDON • NEW YORK • TOKYO

# REVIEW

## *The Fostex E-22 is a 1/2 in twin-track transportable tape machine. This is Hugh Ford's technical performance report*

**W**hilst the advantages in terms of dynamic range of the 1/2 in twin-track format are well-known it has been largely restricted to the more expensive machine manufacturers, introduction of a pro/semi-pro machine is therefore most welcome.

As standard the Fostex machine is a portable (*more transportable—Ed*) machine fitted with sensible recessed carrying handles at the sides; however, a console mounted version is available with a tilting stand and a separate meter bridge. It would appear that it is very simple to convert one version into the other and the machine may also be mounted into a 19 in rack, with the meter bridge and control panel separated.

Whilst the standard machine is readily portable, weighing only 30 kg, the standard of construction leaves something to be desired and care in handling is essential. The main frame of the machine is formed from folded 2 mm thick steel covered in plastic trim at the sides. The top, bottom and rear covers are folded steel 1 mm thick secured to the main frame by self-tapping screws and the machine has a matt black finish.

The tape transport is formed from a 6.1 mm thick alloy plate underneath which the reel motors and capstan motor are secured with their shafts feeding through holes which appear to have been punched rather than machined. The reel motors are DC servos operated at constant tape tension, the latter being sensed by spring loaded

tension arms with electronic position sensors. Both shafts are fitted with solenoid operated band brakes above the transport plate and turntables which accept cine type spools provided they have the three large locating holes. Sensible NAB adaptors are provided, these being secured on to the platters by large threaded knobs.

From the reels the tape passes over the 12.9 mm diameter ball bearing tension sensor rollers then to 45 mm (approx) diameter roller guides also fitted with ball bearings. The guide at the pay-off end is rubber covered and is used to drive the tape timer via optical pickups; the roller at the take-up end is just a guide.

At the head area there is an optical tape presence sensor before a fixed post edge guide followed by a steel post and the ferrite twin-track erase head. The capstan is directly driven by a servo motor with a very long shaft. Before this there are two further fixed edge guides with the metal record and replay heads in between. Each head has wide left and right tracks and a narrow centre track.

The tape guides are fitted to a plate which is supported on the main deck plate by stand-off posts. Further posts support the head plate with the heads slung underneath. Spring loading provides the height, azimuth and zenith adjustments. The overall finish of these parts and the head mounting is poor. Severe permanent azimuth errors could be introduced by just touching the heads.

The capstan motor with its metal shaft is DC servo controlled and locked to a crystal or external frequency source. The internal varispeed function is by means of a variable frequency oscillator. The solenoid operated pinch roller is conventional with a sleeve bearing and is secured by a threaded cap with easily lost shims on either side which bears on to the 12.044 mm diameter capstan.

Access to all mechanical components is very good as all except the motors are above the transport plate, itself covered by a readily removable cover. Within the head area a pushbutton operated head shield covers the record and replay heads and a solenoid operated tape lifter removes the tape from the heads in fast modes. The lifters may be manually defeated.

Below the tape transport but forming part of it to the left is the power on/off switch, the 30/15 in/s speed selector switch and a Meter Calibrated/Line Out switch which switches the metering to the variable level line out or to a point before the gain control. The latter two functions have red warning LEDs with a third LED indicating Bias 2. A slide switch below the panel allows two bias and record equalisation settings to be used. To the right is the tape timer indicating hours, minutes and seconds corrected for tape speed and giving positive and negative indications. This display is also used to indicate tape speed if the nearby coaxial fine/coarse varispeed potentiometer controls are touched, the indication being as a percentage of nominal speed. A pushbutton switch selects the nominal or varispeed functions. A red warning LED is illuminated in the varispeed mode which may be used in both record and replay. The final feature of this section is the dump edit button which like other functions has a red warning LED.

At the bottom the 2-part control panel may be hinged forward to give access to the audio alignment controls and the Bias 1/Bias 2 switch. This panel is easily removed permitting remote control of the audio functions, the tape movement functions or both. Within the audio section are three illuminated VU meters which include red



### *Manufacturer's specification*

**Tape:** 1/2 in (12.7 mm), 1.5 mil base.

**Format:** 2-track, 2-channel with centre track.

**Heads:** three in-line heads (erase, rec/play and play).

**Reel size:** 10 1/2 in (270 mm) NAB hub.

**Tape speed:** 30 and 15 in/s (76 and 38 cm/s), ±0.1%.

**Pitch control:** ±15%.

**Line input:** +4 dBm nominal, balanced and floating, imp 40 kΩ, max input level +24 dBm, -10 dBV/0.3 V nominal, unbalanced, imp 40 kΩ.

**Line output:** 4 dBm nominal, balanced and floating, imp 40 Ω, max out level +24 dBm

600 Ω load, -10 dBV/0.3 V nominal

unbalanced, load imp 10 kΩ or higher.

**Equalisation:** 30 in/s; AES/IEC-2 (infinity + 17.5 μs), 15 in/s; IEC-1 (infinity + 35 μs).

**Record level calibration:** 0 VU referenced to 250 n Wb/m of tape flux.

**Wow and flutter:** 30 in/s: ±0.05% WTD,

±0.08% UNWTD, 15 in/s: ±0.05% WTD,

±0.10% UNWTD.

**Starting time:** 30 in/s: 1.0 s or less, 15 in/s:

0.5 s or less.

**Fast wind time:** 140 s for 2,500 ft (762 m) of

tape.

**Frequency response:** 30 in/s (sync/repro):

40 Hz to 30 kHz, ±3 dB, 15 in/s (sync/repro):

30 Hz to 26 kHz, ±3 dB, 30/15 in/s (cue sync):

50 Hz to 12.5 kHz, ±3 dB.

**Signal to noise ratio:** 30/15 in/s (repro): 74 dB

WTD, 70 dB UNWTD, 30/15 in/s (sync): 74 dB

WTD, 68 dB UNWTD, 30/15 in/s (cue sync):

64 dB WTD, 58 dB UNWTD.

**Total harmonic distortion:** better than 1% at

1 kHz, 0 VU.

**Erasure:** better than 70 dB at 1 kHz.

**Crosstalk:** cue to L, R track, better than

80 dB/1 kHz from max peak recording level (all

tracks in REC mode).

**Power requirements:** 120 VAC, 60 Hz, 125 W,

220 VAC, 50 Hz, 125 W, 240 VAC, 50 Hz, 125 W.

**Dimensions:** (whd) 430 × 463 × 313 mm.

**Weight:** 30 kg (standard version).

**Manufacturer:** Fostex Corporation, 560-3

Miyazawa-cho, Akishima, Tokyo, Japan.

**UK:** Bandive, Brent View Road, London,

NW9 7EL.

**USA:** Fostex Corporation of America, 15431

Blackburn Avenue, Norwalk, CA 90650.



**WORLDWIDE AGENTS**

- Australia*  
Syntec  
Sydney 406 4700
- Austria*  
Audiosales  
Moedling 2236 26 123
- Belgium*  
TEM  
Dilbeek 569 1823
- Canada*  
Gerr  
Toronto 868 0528
- Denmark*  
SC Sounds  
Toastrup 99 88 77
- Finland*  
Audiontron  
Helsinki 0566 4644
- France*  
Regiscene  
Paris 4396 5050
- Germany*  
Audio Vertrieb  
Quickborn 41 066 9999
- Greece*  
Ban Studio  
Athens 6449 345
- Holland*  
Ampco  
Utrecht 433 134
- Hong Kong & PRC*  
Tom Lee  
Hong Kong 722 1098
- Indonesia*  
Expotus Ltd.  
London 405 9665
- Israel*  
Mar Productions  
Tel Aviv 454 003
- Italy*  
Audio Link  
Parma 598 723
- Japan*  
MTC Japan Ltd.  
Tokyo 295 4731
- Korea*  
Young Nok  
Seoul 267 8987
- New Zealand*  
Maser  
Auckland 444 358 314
- Norway*  
Lyd Rammet  
Oslo 11 4085
- Singapore/Malaysia*  
Lingtec Pre Ltd.  
Singapore 7471951
- South Africa*  
Colosseum Acoustics  
Johannesburg 2345 41
- Spain*  
Lexon  
Barcelona 203 4804
- Sweden*  
Intersonic  
Stockholm 744 5850
- Switzerland*  
WA Gunther  
Zurich 391 3939
- Thailand*  
Expotus Ltd.  
London 405 9665
- Turkey*  
Nefan  
Istanbul (01) 160 4514
- USA*  
Klark Teknik Inc.  
New York (516) 249 3660



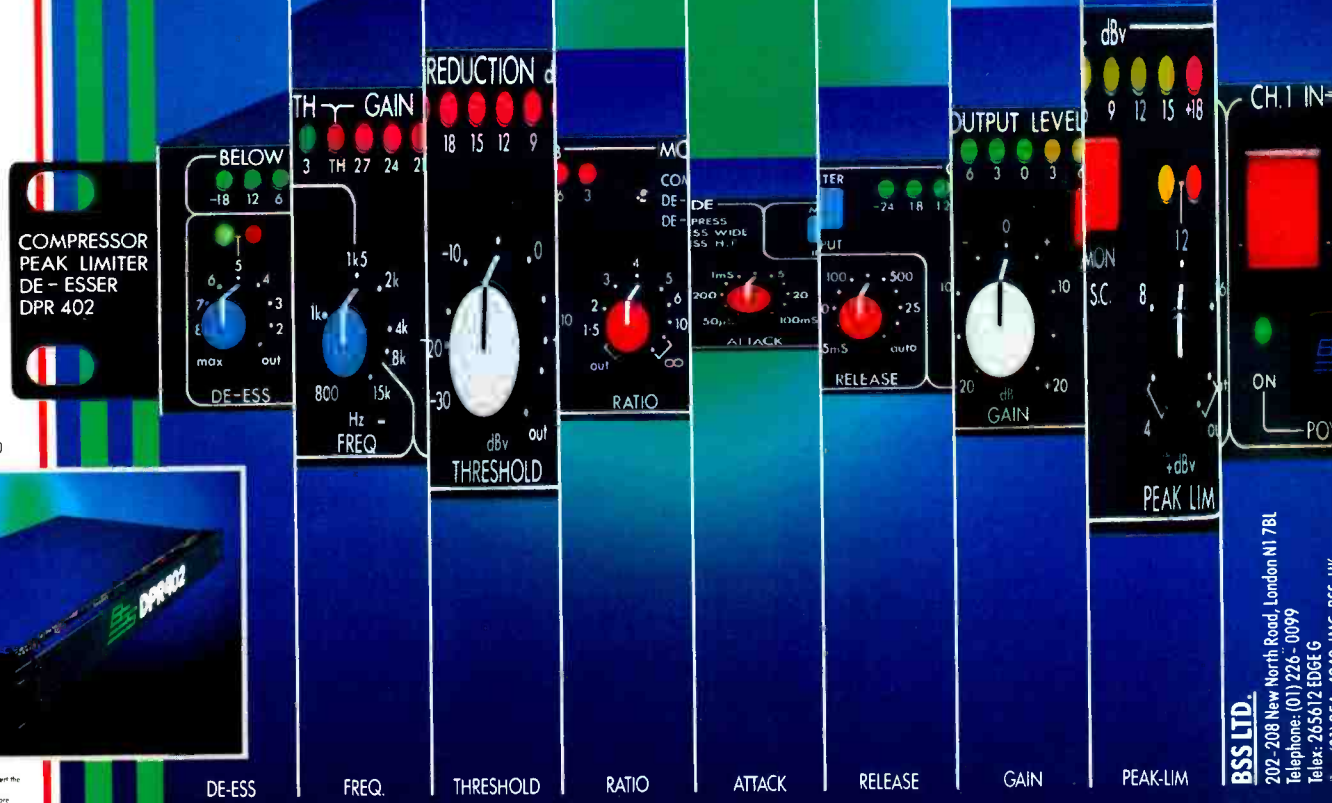
# DPR402

## THE SIGNAL SHAPER

The BSS DPR402 uses novel high spec double-side-chain architecture to give total flexibility on two channels. This new approach also makes dynamic equalisation, LF only compression and level dependent signal mixing possible. It features:

- Active knee** – a variable contour compression knee for varied situations.
- Active window** – Manual control of frequency band range.
- Active metering** – Expressive LED metering for total creative control.

**Compresses  
De-esses  
Expands  
Limits**



A security cover kit is available to convert the DPR402 into a fully tamper-proof rack mounting case. All front panel controls are then hidden behind a blank metal panel.

**BSS LTD.**  
202-208 New North Road, London N1 7BL  
Telephone: (01) 226-0099  
Telex: 265612 EDGEG  
Fax: (01) 924 4040 IMC, acc. 117

# REVIEW

peak LEDs—one each for the left, right and cue tracks. In the case of the left and right tracks there are input and output level controls below the VU meters; the cue track only has an input level control.

All controls are calibrated for +10 dB to -30 dB and thence an infinity (off) position in addition to a Cal marking at 0 dB. The output level controls are detented. To the right of the VU meters three vertical rows of momentary pushbuttons control the functions for each track. A red LED indicates the current status for each button.

The Safe/Rec Ready control flashes its LED in the record ready state but is constantly illuminated in the record mode. The remaining buttons select the line output signal between input, sync and reproduce.

Within the tape movement section momentary pushbuttons select the normal fast, play and record modes. The record function illuminates a red LED in the record mode. A nice feature in the fast modes is that holding down the fast button while fast winding slows down the tape and if it is held down the tape proceeds at a low speed.

Seven further buttons are associated with the tape timer, the first being the reset button with two further buttons loading the current timer indication into Memory 1 or Memory 2. Locate buttons locate zero or memory time in Memory 1.

Of the remaining buttons Auto Return plays to the time stored in Memory 2, then rewinds to the time stored in Memory 1 and stops. If Auto Play has been selected (shown by an LED) the machine will cycle between the points stored in the two memories.

To the rear of the machine the three sets of

audio inputs and outputs are available balanced at XLR connectors or unbalanced at phono sockets. In addition to these there are three ribbon cable connectors, a 20-way connector for the remote meter bridge, a second 20-way connector for a synchroniser and a 40-way connector for a remote autolocator. Whilst these connections are designed for use with Fostex accessories they may well have alternative uses.

There remain two ¼ in jack sockets intended for use with a foot switch. One provides a locate function: when in the stop mode it starts the recorder or when in other modes performs a Locate 1. The second socket provides a punch in/out facility so that when in the play mode the switch puts the machine into record until it is again actuated and performs a punch out. Alternatively if in record, the switch performs a punch out.

Removing the back cover gives access to the transport control electronics mainly mounted on to three printed circuit boards of good domestic quality with useful component identifications for servicing. The toroidal power transformer is mounted between the reel motors with the power stabilisers and individual fuses for the six separate rectifier circuits. All the fuses are properly identified in value.

Secured to the rear of the capstan motor is the capstan servo board with three preset potentiometers, two for the tacho pickup and one for setting the mid point of the varispeed oscillator.

The control logic is on a hinged board just inside the rear cover, thus giving very good access for servicing. This board has 10 preset potentiometers which may be adjusted from either side of the printed circuit board. These adjustments are almost entirely concerned with tape tension in the fast mode, play mode and edit mode.

In the audio department the electronics are contained on six plug-in boards which are

accessed beneath the machine but most of the alignment controls are reached by hinging down the VU meter panel. Each of the three audio channels have identical record and replay electronics boards (except the cue track which includes a low pass filter). Like the other printed circuits these are to a good domestic standard using indirect edge connectors for reliability.

The controls beneath the machine are the input and output level calibration controls and a metering calibration control—that is those that normally need little attention.

Beneath the VU meter panel the replay amplifiers have separate sets of controls for the reproduce and sync replay modes, each having a level control and high frequency equalisers for the two tape speeds. Whilst the standard equalisation is to the AES 30 in/s and IEC-1 15 in/s (35 µs) standards there is a removable link for inserting the 3180 µs NAB low frequency time constant but this is restricted to affecting both tape speeds.

Within the record electronics there are adjustments for the two optional bias settings with separate high and low frequency equaliser controls for the two settings. The remaining controls set erase level, tune the erase head and set record level.

With the tape in motion the machine was quiet and ran cool but the operation of the solenoids was rather noisy giving a healthy 'clunk'. When fast winding the speed was such that it took about 100 s to rewind 2,400 ft of tape—an average speed of about 280 in/s which is rather fast and tended to give uneven winding but not excessively so.

During all tape movement operations the tape tensions were very well controlled without the slightest tendency to snatch; in the play mode the tension was close to 120 g, ideal for ½ in tape. In the fast wind modes the take-up tension was 150 g maximum at the take-up reel remaining at 80 g at the pay-off reel—very satisfactory conditions.

Whilst the machine came to a steady halt from

FIG. 1 FOSTEX E-22  
COMMON MODE REJECTION OF  
LEFT AND RIGHT CHANNELS

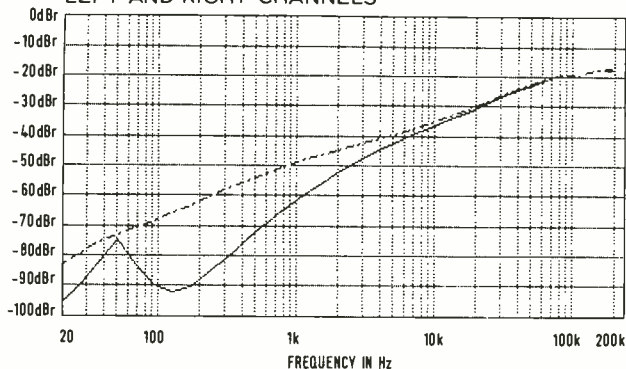


FIG. 2 FOSTEX E-22  
FREQUENCY RESPONSE FROM BALANCED  
INPUT TO BALANCED OUTPUT IN INPUT MONITOR MODE

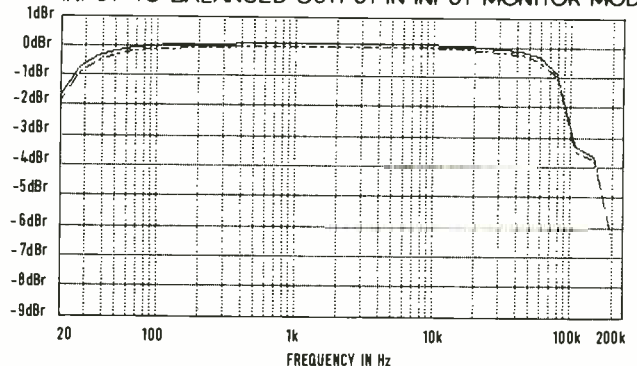


FIG. 3 FOSTEX E-22  
CHANNEL A REC/REPLAY RESPONSE

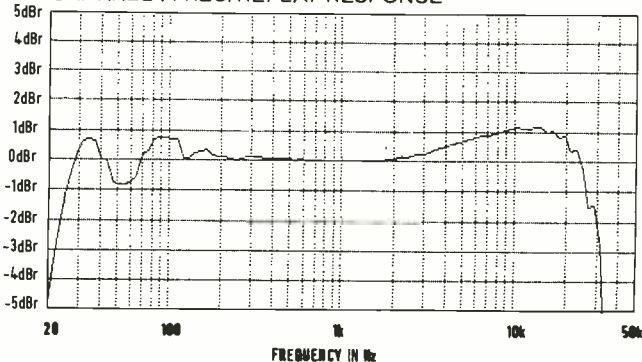
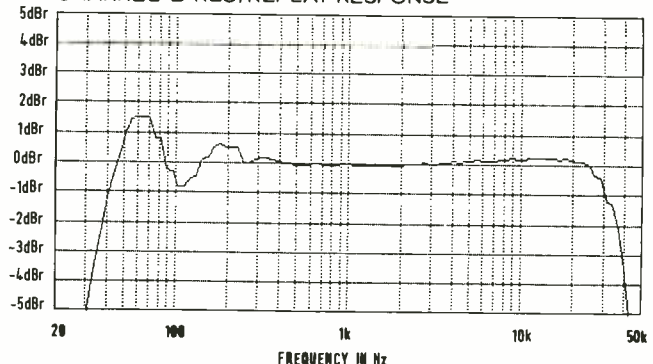


FIG. 4 FOSTEX E-22  
CHANNEL B REC/REPLAY RESPONSE





any mode in the event of power failure this was not the case when the tape was rewound off the machine: the brakes failed to be applied and the tape flayed about for quite a long time. There was also a peculiarity in the dump edit mode where again there was no tension on the pay-off spool when exiting a dump and the spool continued to dump tape.

Editing by rock and rolling the reels was not ideal but quite reasonable with the autolocate and autoreturn functions being smooth in operation locating the tape to the nearest second.

When in the preset record mode any track could be punched in/out with the record ready buttons and in the event of recording in the autoreturn mode, the machine dropped out of record at the Memory 2 point before entering the rewind mode. As may be expected of a budget machine, other than normal bias ramping, punching out of record leaves a gap in the recording due to the difference in position of the erase and record heads.

## Inputs and outputs

The balanced and unbalanced audio inputs and outputs were very well contrived with the balanced input impedance being 19.8 k $\Omega$  for each leg. This gave a total input impedance of 41.6 k $\Omega$  with a maximum input level capability of >+32 dB.7V being able to cope with any eventualities, the shunt capacitance being only 80 pF.

Common mode rejection for two channels was reasonable (see Fig 1). The unbalanced input had a similarly high input impedance of 38.6 k $\Omega$  in parallel with 20 pF and a maximum input level capability of +23 dB.7V.

At the audio outputs the impedance was 223  $\Omega$  for the unbalanced outputs which were capable of delivering +19.5 dB.7V or 43.8  $\Omega$  for the balanced outputs (22  $\Omega$  on each leg) which could deliver +27.0 dB.7V. The output was not truly balanced but formed from separate out of phase output amplifiers such that grounding one leg halved the output level.

As received, a replayed fluxivity of 320 nWb/m indicated +1.5 VU in the Cal metering position, this delivering about +6.5 dB.7V in the 0 dB position of the replay gain controls at the balanced outputs; in round figures 6 dB less at the unbalanced outputs. The range of the replay gain controls was such that this could be varied between +16.5 dB.7V and -30 dB before the control cut the output rapidly to the off position.

At the inputs with the level controls at the Cal position +4 dB.7V was needed to record 320 nWb/m at the balanced inputs or about 6 dB less at the unbalanced inputs with the controls having 10 dB gain available.

## Frequency response

The overall response in the input monitor mode from the balanced inputs to the balanced outputs was as shown in Fig 2 for two channels. Both are effectively identical with -1 dB points at 30 Hz and 80 kHz.

Measurement of the replay response to the AES 17.5  $\mu$ s standard at 30 in/s and the IEC 35  $\mu$ s standard at 15 in/s revealed 1.5 dB differences between channels at high frequencies, so the machine was carefully re-aligned after which the response was within +0/-0.5 dB from 60 Hz to 18 kHz.

In the record/replay mode using Ampex 456 tape for which the machine had been aligned, the

# SCHOEPS

Colette series with interchangeable capsules for a variety of applications.



## Get the Iron Out!

SCHOEPS gets the transformer out of the microphone.

### — Contact —

- AUS** Klarion Enterprises Pty. Ltd. P. O. Box 379, South Melbourne, Victoria, 3205. Tel.: (03) 6135 41
- A** Studer Revox Wien Ges. m. b. H. Ludwiggasse 4, 1180 Wien. Tel.: (02 22) 47 33 09
- B** Heynen B.V., Bedrijfsstraat 2, 3500 Hasselt. Tel.: 011-2100 06
- BR** Centelec Equipamentos e Sistemas Eletrônicos Ltda., 20561 Rio de Janeiro/R. J., Tel.: (021) 268-79 48
- CDN** Studer Revox Canada Ltd. 14 Banigan Drive, Toronto, Ontario, M4H 1E9, Tel.: 416-423-2831
- SF** Lounamaa Electronics Oy, Uumariopolku 27 A, 00330 Helsinki 33, Tel.: 90-488 566
- F** ELNO S. A., 18-20, rue du Val Notre-Dame, 95100 Argenteuil, Tel.: (1) 39.82.29.73
- HK** Audio Consultants Co., Ltd., 58 Pak Tai Street, Tokwawan, Kowloon, Hong Kong B. C. C., Tel.: 3-7 1252 51
- I** TDS - Tecniche del Suono S. r. l., Piazza Crivellone, 5, 20148 Milano. Tel.: 46.96.105
- IL** Kolinar Ltd., 18 Ha'arba'a Street, Tel-Aviv. Tel.: 03-26 32 98
- J** Imai & Company Ltd., 1-6 Tomihisacho, Shinjuku Tokyo, Tel. (03) 357-0401
- NL** Heynen B.V., P. O. Box 10, 6590 AA Gennep. Tel.: 08851-96111
- N** Siv. Ing. Benum A/S, Boks 145 Vinderen, Oslo 3, Tel.: (02) 14 54 60
- P** G. E. R. Av. Estados Unidos da América, 51-5°, Dto. 1700 Lisboa, Tel.: 88 40 21
- E** Singleton Productions, Via Augusta, 59 Desp. 804 - Edif. Mercurio, Barcelona-6, Tel.: 237 70 60
- S** NATAB Akustik AB, P. O. Box 6016, 55006 Jönköping, Tel.: 036-14 24 80
- CH** PAJAC - Jaques Zeller, Morges 12, 1111 Echichens, Tel.: 021-72 24 21
- GB** Scenic Sounds Equipment Marketing Ltd., 10 William Road, London NW 1, Tel.: 01-387 1262
- USA** Posthorn Recordings, 142 West - 26th Street, 10th Floor, New York City, N.Y. 10001, Tel.: (212) 242-3737

Schalltechnik Dr.-Ing. Schoeps GmbH,

Postbox 410970 D-7500 Karlsruhe, Telex 7826902, Tel. (0721) 42016/42011

# REVIEW

response of the left and right channels was fairly well matched. The results at 15 in/s and at 30 in/s are shown in Fig 3 and Fig 4 and the improved response obtainable from both channels is shown in Fig 5 and Fig 6 where the two channels are intentionally offset.

The available range of the replay and record high frequency equalisers was similar at both tape speeds. The results for maximum cut and boost are shown in Fig 7 and Fig 8 at 30 in/s using Ampex 456 tape biased to 4 dB over bias at 10 kHz at 15 in/s as recommended by Fostex. Clearly, whilst the equalisation range of the replay equaliser is good, that of the record equalisers is most inadequate, being around only 2.5 dB at 20 kHz.

Because the cue track has a much narrower track width than the left and right tracks the low frequency response shows significant low frequency deviations as shown in Fig 9 for 30 in/s with the peak at 200 Hz being shifted down one octave at 15 in/s. In other respects the equalisers were similar to the left and right tracks.

In the sync mode the frequency response of the left and right tracks was close to that of the response in the normal replay mode but the cue track in the sync mode includes a low pass filter. This restricted the high frequency response to a -3 dB point at 17 kHz but in other respects the response was close to that of the normal replay mode at both tape speeds.

## Noise and distortion

Noise was referred to a fluxivity of 320 nWb/m. The left and right channels were close to each other except in the 22 Hz to 22 kHz band limited

measurement where the right channel was 2 to 3 dB better than the figures shown in Table 1 measured with tape. The table shows noise figures with and without tape recorded on the machine with no input signal present. The figures show a good margin between machine noise and tape noise, particularly when operating at 15 in/s with the 35  $\mu$ s time constant. Noise in the sync replay mode was very close to that in the normal modes for the three channels.

In the case of the cue channel the reference level to noise ratio is worse due to the narrow track width to the extent of 10 dB with tape. This was consistent with all weightings.

Third harmonic distortion was measured when recording the reference fluxivity of 320 nWb/m on Ampex 456 tape. The maximum output level for 3% third harmonic distortion was also measured ref 320 nWb/m.

In all cases the second harmonic was at a very low level, indicating that the bias waveform had minimal even harmonic distortion. The figures in Table 2 were tape limited. In fact the machine was able to drive levels in excess of 20 dB above

TABLE 1

Measurement method	Reference level (320 nWb/m) to noise			
	Left & right 30 in/s		Left & right 15 in/s	
	Tape	No tape	Tape	No tape
22 Hz to 22 kHz RMS	55.2 dB	63.9 dB	55.2 dB	69.8 dB
A-weighted RMS	66.3 dB	75.0 dB	66.3 dB	80.3 dB
CCIR-weighted RMS	58.5 dB	66.4 dB	58.6 dB	72.5 dB
CCIR-weighted quasi-peak	55.7 dB	62.5 dB	55.3 dB	68.7 dB
CCIR/ARM ref 2 kHz	65.3 dB	72.9 dB	65.3 dB	79.1 dB

TABLE 2

Distortion at 320 nWb/m	30 in/s			15 in/s		
	Left	Right	Cue	Left	Right	Cue
Distortion at 320 nWb/m	0.25%	0.29%	0.37%	0.28%	0.31%	0.43%
Maximum output level	+11.3	+11.8	+11.0	+11.5	+12.0	+11.0

FIG. 6 FOSTEX E-22  
FREQUENCY RESPONSE OF LEFT AND  
RIGHT CHANNELS AT 15 IN/S

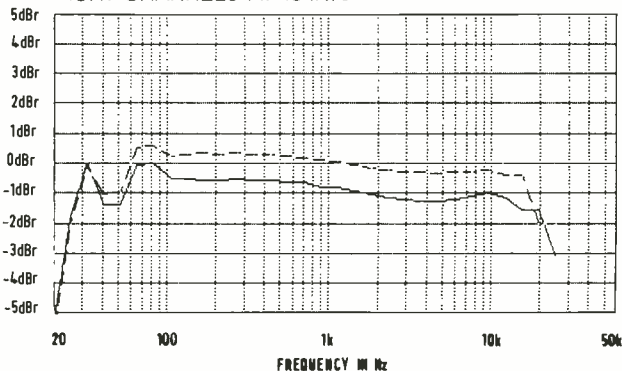


FIG. 8 FOSTEX E-22  
PERFORMANCE OF HIGH AND LOW  
FREQUENCY RECORD EQUALISERS AT 30 IN/S

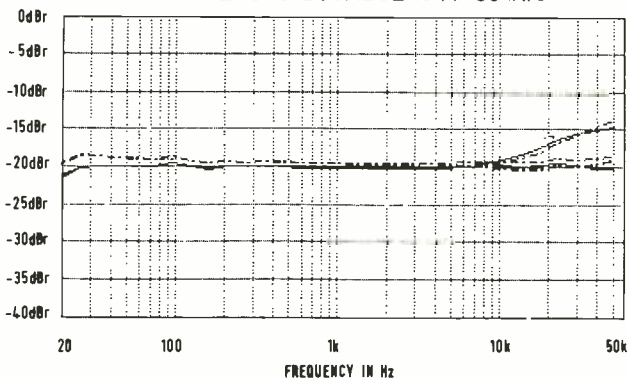


FIG. 5 FOSTEX E-22  
FREQUENCY RESPONSE OF LEFT AND  
RIGHT CHANNELS AT 30 IN/S

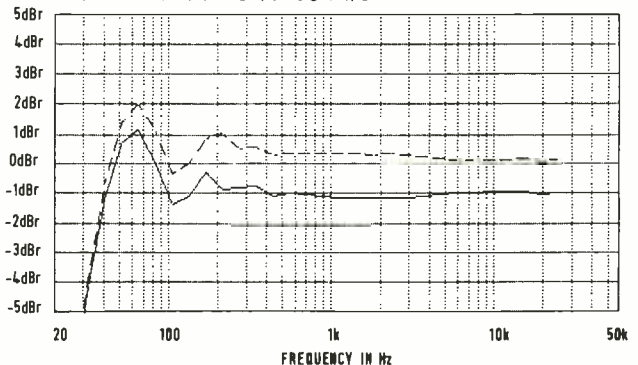


FIG. 7 FOSTEX E-22  
PERFORMANCE OF HIGH FREQUENCY REPLAY  
EQUALISERS AT 30 IN/S

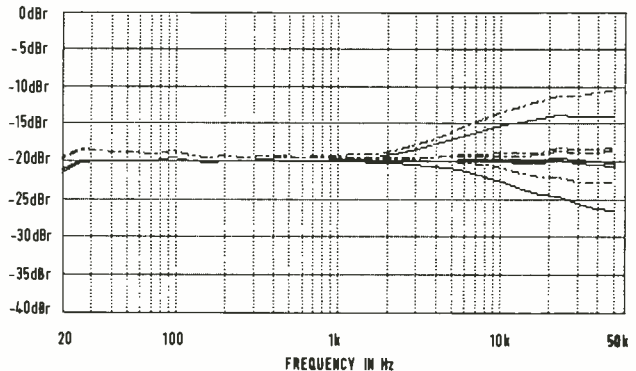
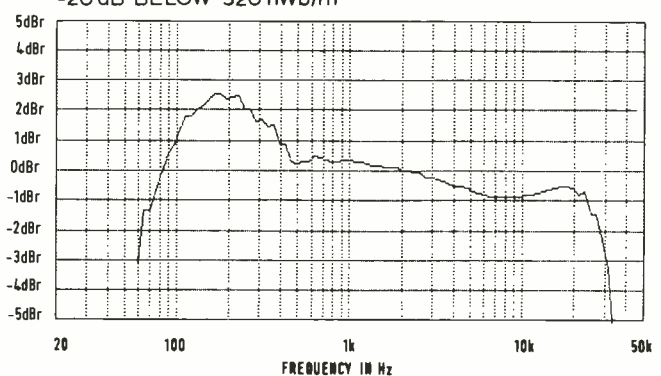


FIG. 9 FOSTEX E-22  
RESPONSE OF CUE TRACK AT 30 IN/S  
-20dB BELOW 320 nWb/m







# THE LEGEND CONTINUES

*When you're in the studio, tape that's good enough is not enough. Which is why for ten years Ampex has continued pushing the potential of recorded sound. Through a decade of increased fidelity and reliability, Grand Master® 456 remains an audio tape obsessed with performance. Which is why more top albums are recorded on Ampex tape than any other tape in the world. For Grand Master 456, the beat goes on.*

**AMPEX**

Ampex Corporation, Magnetic Tape Division, 401 Broadway, Redwood City, CA 94063, 415/367-3809 Ampex Corporation • One of The Signal Companies

**AND THE BEAT GOES ON**

Ampex Corporation Magnetic Tape, International Division, Acre Road, Reading, England. Tel. (0734) 875200

# REVIEW

320 nWb/m for Ampex 456 tape before the onset of serious record amplifier distortion.

When in the input monitor mode total harmonic distortion did not vary widely; level below +20 dB.7V remained below 0.01% up to 1 kHz and then rose to 0.1% at 20 kHz.

Partially in view of the lack of transformers square wave performance was remarkable. Fig 10 shows a 1 kHz square wave recorded and replayed at 15 in/s.

## Crosstalk and erasure

Crosstalk between the channels was measured at 15 in/s and Fig 11 shows the situation between the left and right channels. There was very little crosstalk at low frequencies. The crosstalk between the right and cue channels was of course worse. Crosstalk into the cue channel from the right channel was more serious than that into the right channel from the cue channel in view of the different track widths. This is shown in Fig 12 where the upper trace is the crosstalk into the cue channel.

The erase performance was checked for a 1 kHz tone at 15 in/s with the left and cue channels erasing by 77 dB and the right channel by 80 dB on the first pass. Some multitrack machines leak the erase field between tracks, therefore a 20 kHz tone was recorded separately on each track and subjected to the erase field from adjacent tracks. No significant difference in level was observed.

## Wow, flutter and speed

Wow and flutter was measured at the beginning, middle and end of a 2,400 ft reel of Ampex 456 tape with very little variation between the positions. IEC quasi-peak weighted figures were close to 0.075% at 30 in/s or 0.09% at 15 in/s—a good standard.

Narrow band analysis of a 10 kHz tone recorded at 15 in/s is shown in Fig 13 where quite severe sidebands are apparent, separated from the 10 kHz carrier by  $\pm 10$  Hz,  $\pm 20$  Hz and  $\pm 30$  Hz. These sidebands clearly relate to the capstan diameter of 12 mm.

The accuracy between the two speeds and also the drift from one end of a reel of tape to another were both less than 0.005%. The varispeed facility has a range from -17.58% to +16.77%. The indicated speed variation in the tape timer display was within the 0.1% resolution of the display with the fine speed adjuster having a sensitivity of about 7% per turn of the control giving a good resolution.

## Other matters

The VU meters were found to be genuine instruments complying with the standard rectifier characteristics and ballistics—an unusual feature for a machine in this price range. Within the VU meters the red peak indicator LEDs became illuminated at +12 VU giving a readable indication at 2 ms of overload.

As the machine was aligned for Ampex 456 tape with 0 VU corresponding to approximately 13 dB below the 3% maximum output level, both the VU meters and the peak LEDs are set to ideal levels.

A complaint is the difficulty in accessing some of the alignment controls. Whilst the VU meter

panel hinges down to give access to the trimmers, the hinge is limited in movement making it difficult to reach the lower controls. Also, all controls need the use of a smaller screwdriver than normal trim tools.

The Accessory 1 connector intended for a Fostex synchroniser includes TTL level command inputs for tape motion and tally outputs which are grounded when the appropriate function is activated. A +5 VDC rail is available for lamps. Also included on this connector is a standard 9.6 kHz capstan reference input, this source being automatically connected when an input is present. Using an external oscillator, stable operation was obtained down to -95% nominal speed and upwards.

## Summary

The Fostex E-22 is an attractive proposition as a ½ in twin-track machine. The audio tracks offer a good performance with all the advantages of the wider track width in comparison with ¼ in stereo machines.

The cue track is a useful addition for lower quality audio, timecode or other applications, however, whilst crosstalk from the cue into the audio tracks is low, the reverse is not true and caution may be needed.

Generally this is a well made machine for its class and very easy to maintain with an excellent service manual and good access to all parts. Some improvement in the construction of the head support is desirable, however, as the head mounting is far from positive. Also the range of the record equalisers is far from satisfactory.

The audio input and output configuration is excellent and the machine has the ability to interface with professional and domestic levels and impedances. The remote control facilities and provision for external synchronisation is a valuable asset. □

FIG. 11 FOSTEX E-22  
CROSSTALK BETWEEN LEFT AND RIGHT CHANNELS

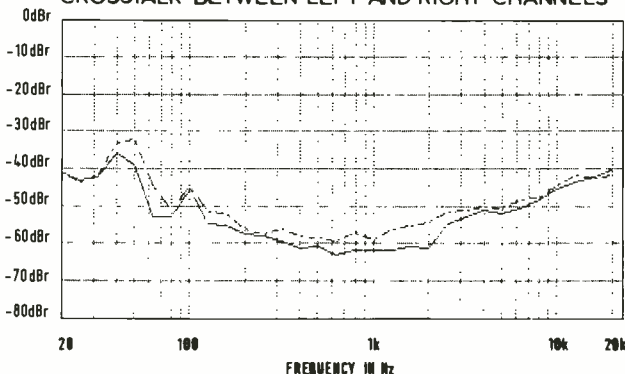


FIG. 12 FOSTEX E-22  
CROSSTALK BETWEEN CUE AND RIGHT CHANNELS AT 15 IN/S

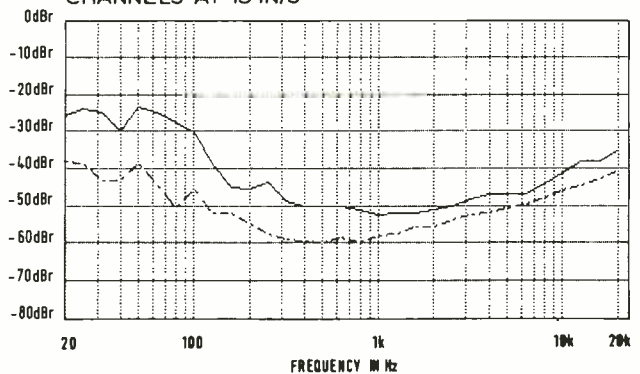


FIG. 10 FOSTEX E-22  
1 kHz SQUARE WAVE

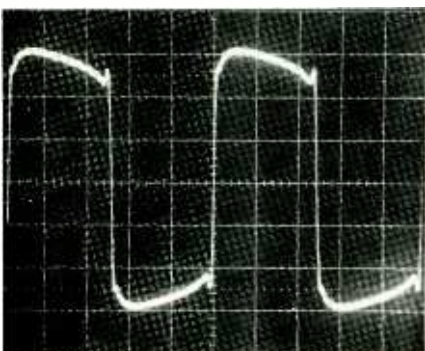
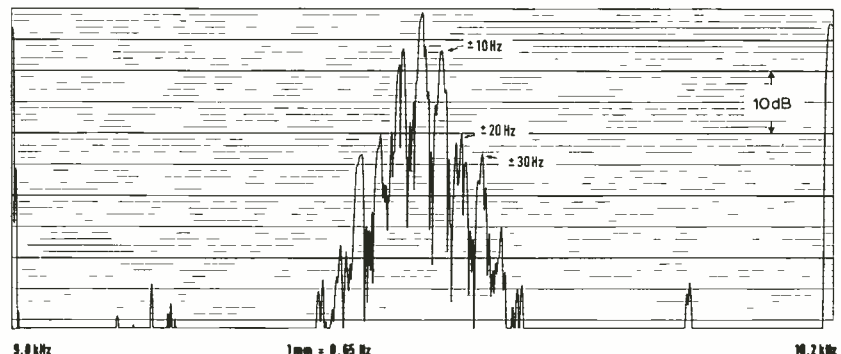


FIG. 13 FOSTEX E-22  
NARROW BAND ANALYSIS OF 10kHz TONE AT 15 IN/S





# AES

Visit us on STAND 426

# T

# D

# M

Digital path transparent to full AES code

Dual high speed bus for reliability

Digital inputs and outputs to AES/EBU standard

Comprehensive control options

Integral digital tone and silence generators

Mixed analogue and digital inputs and outputs

Analogue conversion uses gain-ranging and oversampling providing over 100dB dynamic range

## The Digital Audio Router from

# pro-bel

LIMITED

Danehill, Lower Earley, Reading, Berkshire RG6 4PB England Tel. 0734 866123 Fax. 0734 755787 Telex 849727



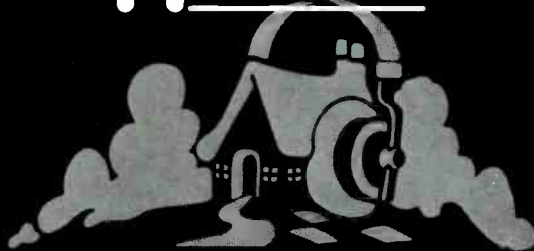
## Rycote

### windshields

new  
a twist locking end cap  
a fantastic unique  
wind JAMMER  
a large windshield  
for stereo

Rycote Microphone Windshields, New Mills, Slad Road  
Stroud, Gloucestershire GL5 1RN, England  
Tel: 04536 79338

# HARDWARE HOUSE



With eight years experience of using radio systems for live performance we are ideally placed to tell you the advantages and disadvantages of going cordless.

We can also offer an extensive range of professional sound equipment including the recently developed 'Hackney Cab' speaker system.

To find out more about equipment rental and sales and our specialist technical and engineering services please phone us at any time on:

**01-986 6111**

Hardware House (Sound) Limited  
West Works, Chalgrove Road  
Morning Lane, London E9 6PB

UK distributors for MARY radio systems and Countryman microphones. Dealers for Amcron, AMEK/TAC (live performance), Court, EAA, Electrovoice, JBL, Yamaha



# BREAKING THE MOULD

The world of digital audio has become divided by format incompatibility. One side of the market can't communicate directly with the other side without a lot of fuss.

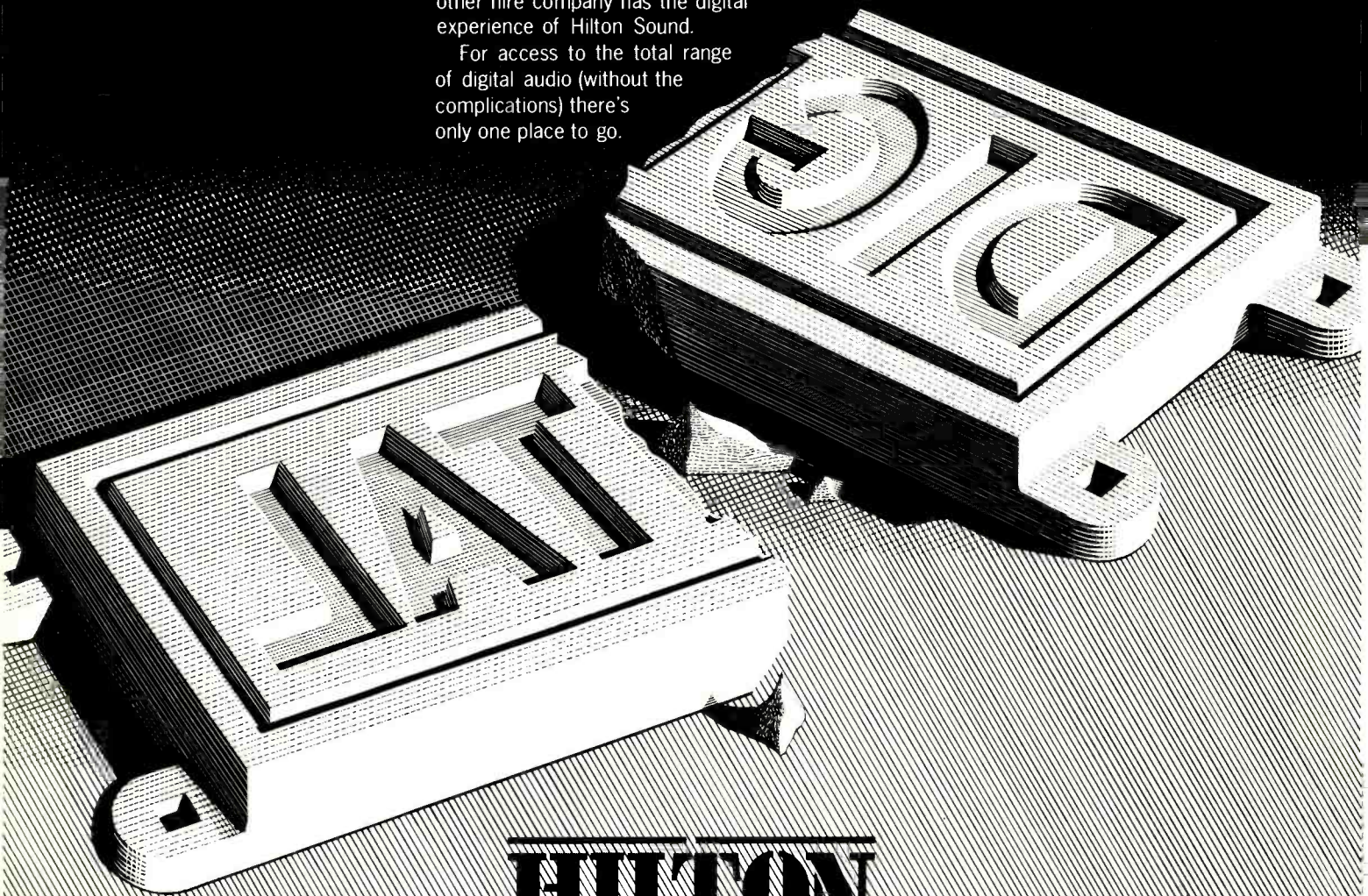
Now Hilton Sound have changed all that.

No UK hire company has been more dedicated to the digital ideal than Hilton Sound, but until now, we've been able to tell only half the story. Not liking to do things by halves, a policy decision was made that will break the digital mould.

From now, whatever your digital persuasion, whatever format and however many tracks you want, we can supply you. And supply Hilton developed interfaces that let formats communicate directly with each other, clearing away the laborious digi-ana-digi links that used to be necessary for transfer. Now you can interface between the formats the way it should always have been, totally within the realm of the digits.

No other hire company can do this, but then, no other hire company has the digital experience of Hilton Sound.

For access to the total range of digital audio (without the complications) there's only one place to go.



**HILTON  
SOUND**

10, Steedman Street, London SE17. Telephone: 01-708 0483 EMAIL REF: HILTON-SOUND-UK. DGS 1311

[www.americanradiohistory.com](http://www.americanradiohistory.com)



# NORTHERN AUDIO

## PROFESSIONAL STUDIO EQUIPMENT SECONDHAND PRODUCTS

### USED CONSOLES

Weststar 36 channel 4 band parametric eq 8 sends LED PPM peak stand etc. This console is six months old £55,000  
 S.S.L. 4000E 40 frame 32 fitted, with two extra stereo modules, light meters and total recall. Fitted July '84 £95,000  
 Harrison 32/32 56 frame 56 fitted with Alison 65K programer and Fadex, 7 years old in good condition £38,000  
 Neve V range with Necam 2 48 frame with 36 fitted, 16 months old in good condition £115,000  
 Neve 8128 32 frame 28 with 4 reverb channels, 3 years old £40,000  
 Harrison 32/32 40 frame 36 fitted with Alison Fadex 65K £27,000  
 Soundcraft TS 24 32/24 14 months old in good condition £23,500  
 Neve 24/4/24 in line 1066 eq 312 hole patch 24 VU 2 stereo, 4 main sends (pre/off/post), 4 sends mon, 4 stereo effects £23,500  
 Neve 8016 24/8/24 1973 4 comp, 2 stereo foldback, 2 echo sends, 4 effect returns, 24 VU 2 stereo 4 via echo phantom power £20,000  
 S.S.L. 6000 40 frame 32 fitted with total recall P.P.M. meters, 3 years old available immediately £85,000  
 Trident A series 28-24-2, 13 years old in good condition £20,000  
 Trident 75 series 24/16/24 with patch and stand, 1 year old £5,500

### USED MACHINES

3M 32/4/2 digital machine complete with editor £45,000  
 Mitsubishi X 850 (two machines), 6 months old P.O.A.  
 Mitsubishi X80 stereo machines. New £11,950  
 Studer A80 wide body 24 track recorder £15,500  
 Studer A80 narrow body 24 track recorder £13,500  
 Studer A80 Mk2 narrow body, no autolocate £12,900  
 3M M79 24 track with autolocate £9,000  
 Trident TSR 24 track recorder, 3 years old £9,500  
 Otari MTR 90 Mk1 autolocate, 4 years old in good condition £14,900  
 Lyrec 24 track recorder with autolocate, no meter bridge £12,500  
 Lexicon 200 DIG reverb £1,950  
 24 Dolby SP series, in rack, unused £9,500

Publison DHM89B2 with 5 seconds £2,950  
 Quantec QRS standard (new product) £6,500  
 Lexicon 224X with 4.4 and remote £4,995  
 Klark Teknik DIG reverb with latest updates £2,250  
 Neumann U87i MIC (two in stock) each £600  
 Neumann U67i £550  
 DBX 2100 loom set with gold plated connectors, 24 track N/R £900  
 2 Dolby 361 stereo units, each £395  
 SRC SMPTE time code modulator, 12 months old £2,250  
 MDB window recorder £1,250  
 MXR DIG rev £295  
 BEL flanger £295  
 Eventide 949 harmonizers, the pair £2,400  
 JBL 4430 monitors, 1 year old £1,900  
 JREI 813B monitors, six months old £2,500  
 Yamaha NS 1000M monitors £600  
 Tannoy Little Reds, new £720  
 Dolby 360 units, 14 in stock, each £395  
 Dolby 301 stereo units, 11 in stock, each £395  
 Midiverb, new, two units left, each £365

We stock new: Revox tape machines, Drawmer effects, Soundcraft, Bokse effects, Lexicon, Publison, Quad, Yamaha, Tannoy, Studer, A.M.S. effects, AKG, Sennheisser, Beyer, Shure, Neumann.

### NOTICE

We also act for studios as selling agents, let us handle the hassle of getting rid of unwanted items, it does not matter where you are in the world, why not drop us a line listing your equipment or ring us on the numbers below for the best rates. We assure you of our best attention and service plus the utmost confidentiality at all times.

WE ARE CONSTANTLY ON THE LOOKOUT FOR USED EQUIPMENT. PLEASE GIVE US A RING.  
**RING TONY BAYLEY ON 061-483 9563/4299 *anytime* or WRITE TO US AT:**  
 4 CHEVIOT ROAD, HAZEL GROVE, STOCKPORT, CHESHIRE SK7 5BH  
**TELEX 666597 NAUDIOG**

Tel: 061-483 9563/4299

# 'PRESSOR

# Spanner

# Electrospace

ELECTROSPACE DEVELOPMENTS LIMITED

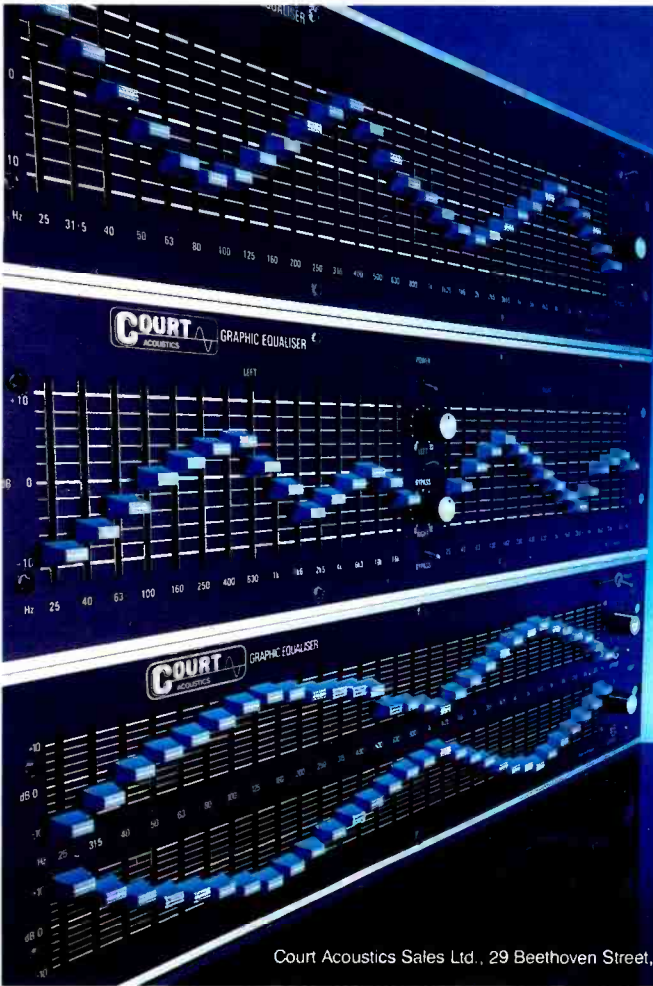
## EXCELLENCE IN EFFECTS

For details of our innovative, high quality range of effects, including the new variable knee compressor, contact us today:

Electrospace Developments Limited  
 33 Fore Street, St. Columb, Cornwall TR9 6RH, England  
 Telephone: (0637) 881144  
 Telex: 45707 ELECSP G.

# STRATE GATE

# THE GATE



# FLAT!

That's the only way to describe the response curves of the Court Acoustics Graphic Equalisers.

With our 'Uniloop' filter circuitry, even with all faders set at maximum boost or cut you still get a substantially flat response.

The result is a natural sound that is unique amongst graphic equalisers, with highly flexible control over the full frequency range.

With three models offering stereo or mono equalisation over 1/3 octave or 1/2 octave bands, there is a Court Acoustics Graphic Equaliser to suit your application.

Check them out now and hear the difference.

## The Graphic Equalisers



Court Acoustics Sales Ltd., 29 Beethoven Street, London W10 4LG. Telephone 01 960 8178. Telex 946240 CWEASY G Ref: 19018075.

# Source or sampling?

"There is no better sampling" \*)



The TC 2290 is the first sampler/delay in the world to give you 100% accurate sampling up to 32 seconds. Make an A/B comparison with any analog or digital master tape or compact disc, and you will notice there is no difference.

The new TC 2290 digital delay is based on a totally new converter principle. With a linear frequency response up to 20KHz +0/-0.5

dB an additional roll-off up to 33KHz and a unique 100 dB dynamic range, the TC 2290 is very warm, transparent, crystal-clear, musical... with absolutely no noise. It has 18 bit resolution - better sound quality than a compact disc, and many new innovative effects.

Ask your dealer for a demonstration of the new world standard of delay + programmable sampling. Just a few features are: delay with

ducking, chorus and delay simultaneously, automatic panning 100 presets and MIDI feature making it possible to control the TC 2290 from a computer.

**Big studios will like the extras, small studios will love the price**

\*) "There is no better sampling" is a quote from Bob Schwall - Right Track Studio in N.Y.C.

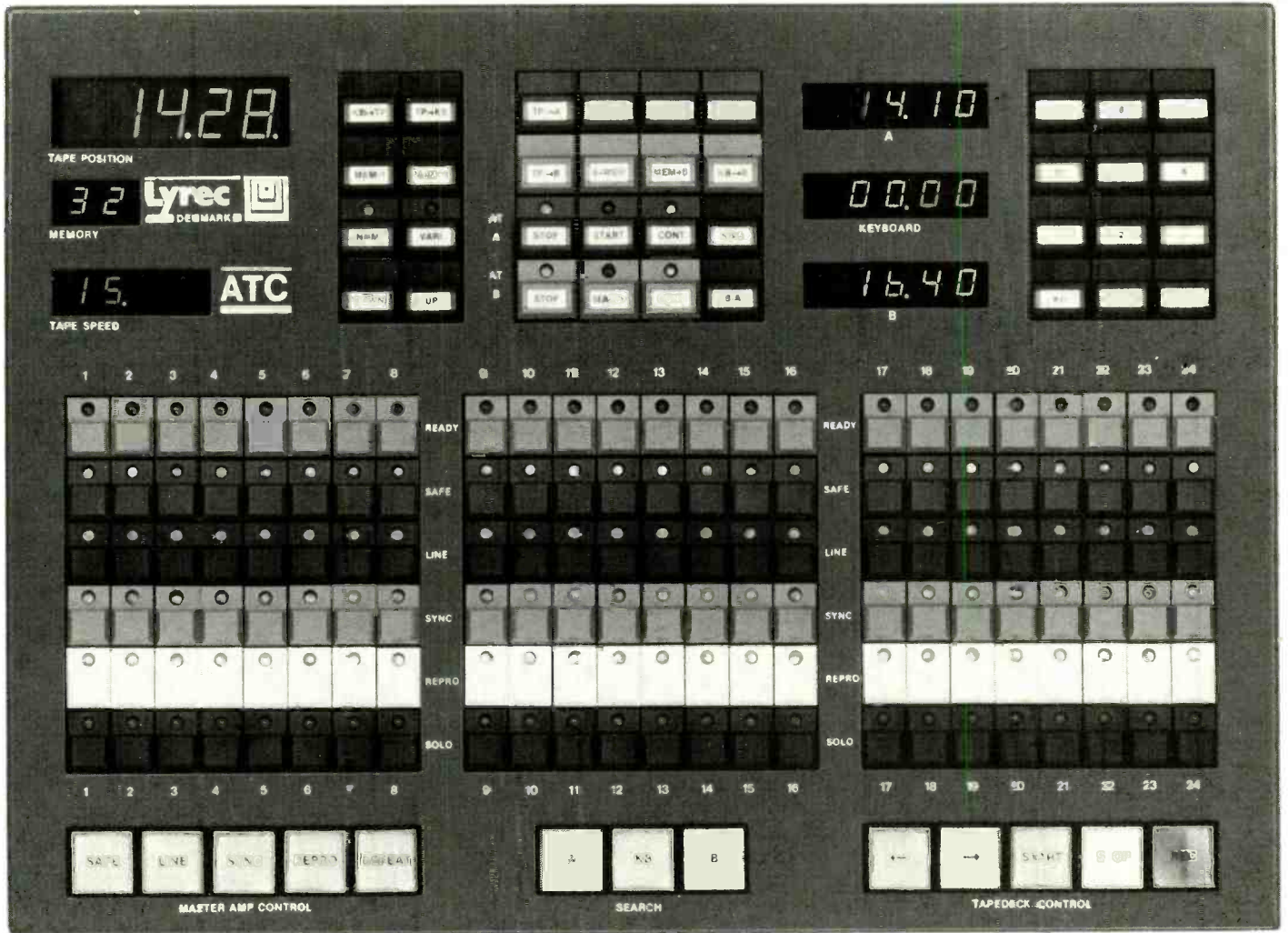
OF DENMARK

# t.c. electronic

U.K.: STATE OF THE ART DISTRIBUTION  
HIGH LANE VILLAGE, NR. STOCKPORT SK6 8 AA  
PHONE: 06632/2442

WEST GERMANY: 08157/7677, DENMARK: 06262800, GREAT BRITAIN: 010456262800, SWEDEN: (031) 134950, NORWAY: (033) 26798, HOLLAND, BELGIUM, LUXEMBURG: 003110-4588166, AUSTRIA: 00498157/7677  
ITALY: (02) 5084.1, FRANCE: (91) 498728, SPAIN: 91-4426426, USA: (201) 384-4221, CANADA: (416) 727-1951, JAPAN: (03) 329-8051, AUSTRALIA: (03) 6992388, FINLAND: 90-814133, GREECE: 01-3628541, SWITZERLAND: 073/226616.





## best in the business

The Lyrec ATC is the heart of the TR533's easy and flexible operation and, in spite of its' small size, offers the engineer more than 250 remote control functions, some of which, like the solo function, are unique to Lyrec. A balance engineer sometimes works under stressed conditions that do not allow for long sequences of commands, and therefore it was designed around the one button – one function philosophy; an important feature being the direct search to three tape positions.

It is impossible to outline all the virtues of the TR 533 in a small ad; **PLEASE send for our booklet.**

You'll be amazed at what the competition **cannot** offer!



**Lyrec**  
OF DENMARK

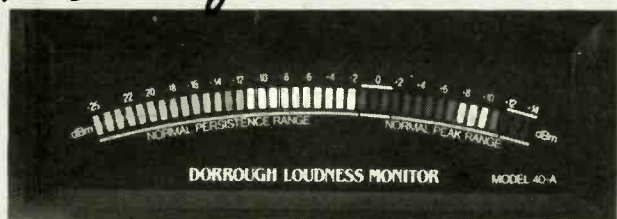


Lyrec (U.K.) Ltd.  
13 Hampden Hill  
Beaconsfield, Bucks. HP9 1BP  
Telephone: (04946) 4425  
Telex: 838725 LYREC G

Lyrec Manufacturing A/S Hollandsvej 12, DK-2800 Lyngby, Denmark. Phone: +45 2 876322 Telex: 37568 LYREC

See us at AES  
**STAND No. 120**

# The Dorrough Loudness Monitor



Model 40-A  
Dimensions: 8 1/4" X 2 7/8" X 6 1/2"

Simultaneous display of Peak and Average on one simple-to-read scale.

Equal perceived loudness from program to program can now be achieved. Dual bridging inputs allow for monitoring L + R or L - R.

More and more broadcasters and production houses are discovering the accuracy of this visual display.

## DORROUGH ELECTRONICS

5221 Collier Place  
Woodland Hills, California 91364  
(818) 999-1132

*Look for us at the  
82nd AES London Convention*

STRAMP

**mixdown automation**

- \* without console modification
- \* 8-64 channels (modular)
- \* synchronized via SMPTE - EBU TC / MIDI song position pointer
- \* affordable for **every** studio

**AUDIO VERTRIEB**  
Peter Strueven GmbH

AES BOOTH #337

Am Mühlenberg 26, 2085 Quickborn  
West Germany ☎ 04106/69999  
TX 2180 633 STAM D

## EUROPE'S NUMBER 1 DIGITAL HIRE · CO



FELDON AUDIO (HIRE) LIMITED · 126 GREAT PORTLAND STREET  
LONDON W1N 5PH · TELEPHONE 01 580 4314 · TELEX 28668 ADDAX G



WE'RE PLEASED TO ANNOUNCE THAT  
**DISKMIX™**,  
 THE TIME CODE-BASED AUTOMATION SYSTEM,  
 IS NOW AVAILABLE WITH

# MOVING FADERS

DIGITAL CREATIONS CORP.  
 400 S. Oyster Bay Rd., Hicksville, New York 11801  
 (516) 822-0881 Telex 510-600-5040



*Gateway*

SCHOOL OF RECORDING  
 MUSIC TECHNOLOGY  
 AND  
 MEDIA STUDIES

## EUROPE'S LEADING MUSIC INDUSTRY SCHOOL

Courses for 1987:-

- *Primary and Advanced Multitrack Recording*
- *Sampling and Midi Workshops*
- *Composing and Producing Radio and T.V. Commercials*
- *The Synthesizer Week, FM/DX Programming Weekends*
- *Synchronisation, using codes (SMPTE/EBU) Music to Picture*

For complete Brochure and Prospectus Call:-  
 Gateway School of Recording  
 and Music Technology  
 1A Salcott Road, London SW11 6DQ. 01-350 0340

We give a Certificate of Recognition for each completed Course.

Gateway Courses should not be confused with  
 ANY others offered . . .

## NEXO PC-LINE

The PCLine features are the result of innovative technology in the field of small enclosures.

PCLine components will comply to the requirements of users looking for performance as well as to applications where space and budget are critical.

- Compact dimensions.
- High-performance 3-way system.
- Can be extended to 4-way with the addition of PCSub-bass.

For details of entire range, contact:-

**PAUL FARRAH  
SOUND**

Paul Farrah Sound Limited.  
 7 St. Georges Industrial Estate.  
 Richmond Road, Kingston.  
 Surrey KT2 5BQ.

Telephone: 01-549 1787 Telex: 945114 FARRAH G Fax: 01-549 6204

PC 115 450w 8n	PC212 700w 4n
PCSub 700w 4n	





**DIGITAL RECORDING SYSTEMS:** MITSUBISHI X850/32 TRACK DIGITAL RECORDER WITH RAZOR BLADE EDIT CAPABILITY • MITSUBISHI X80/2 TRACK DIGITAL RECORDER WITH RAZOR BLADE EDIT CAPABILITY • SONY PCM1630/DIGITAL PROCESSOR (COMPATIBLE WITH SONY PCM1610) • SONY DMR2000/DIGITAL U-MATIC AUDIO RECORDER (FOR USE WITH SONY PCM 1630 PROCESSOR • SONY PCMF1/DIGITAL PROCESSOR • SONY SLF1/BETAMAX VIDEO RECORDER (FOR USE WITH SONY PCMF1 PROCESSOR) • AUDIO & DESIGN PROPAC II/PROPAK FOR SONY PCMF1 • SONY MP-1 RECHARGEABLE BATTERIES ARE AVAILABLE FREE OF CHARGE WITH THE SONY PCMF1/SLF1 SYSTEM — PLEASE STATE IF REQUIRED WHEN ORDERING • **ANALOGUE RECORDING:** AIWA ADF-770/STEREO CASSETTE RECORDER • DOLBY 361/A-TYPE NOISE REDUCTION UNIT (PER CHANNEL) • DOLBY SP24/24 CHANNEL NOISE REDUCTION RACK • OTARI MTR90/24 TRACK RECORDER WITH SYNC CARD • REVOX B77/2 TRACK 1/4" 7 1/2/15IPS RECORDER • STUDER A820/2 TRACK 1/4"/1 1/2" RECORDER WITH CENTRE TIME CODE FACILITY IN 1/4" MODE • STUDER A80/2 TRACK 1/4"/1 1/2" RECORDER • STUDER A80/16 TRACK 2" HEADBLOCK • STUDER A800MKIII/16 TRACK 2" HEADBLOCK • TASCAM 244/ 4 TRACK PORTASTUDIO • **DIGITAL DELAYS/PITCH CHANGERS/SAMPLERS/EFFECTS:** AMS DMX15-80S/STEREO DIGITAL DELAY 9.6/6.4 SEC DUAL LOCK-IN/REVERSE LOOP • AMS DMX15-80S/STEREO DIGITAL DELAY 14.4/1.6 SEC • AMS DMX15-80S/STEREO DIGITAL DELAY 6.4/6.4 SEC DUAL LOCK-IN/REVERSE LOOP • AMS DMX15-80S/STEREO DIGITAL DELAY 9.8/1.6 SEC • AMS DMX15-80S/STEREO DIGITAL DELAY 1.6/3.2 SEC • AMS DMX-K1/KEYBOARD INTERFACE • EVENTIDE H949/SUPER HARMONISER • LEXICON 93/PRIME TIME DIGITAL DELAY • LEXICON 95/PRIME TIME II DIGITAL DELAY • MARSHALL 5402/TIME MODULATOR • PUBLISON IM90/INFERNAL MACHINE: DIGITAL DELAY/REVERB/21 SECS STEREO SAMPLING/HARMONISER/MULTI SAMPLING OPTION (SOON TO BE UPDATED TO 80 SECS STEREO SAMPLING: SMPTE AUTOMATION & PITCH TRACKING; HARD & FLOPPY DISC STORAGE) • ROLAND SDE3000/PROGRAMMABLE DIGITAL DELAY 4.5 SECS • ROLAND SDD320/DIMENSION "D" CHORUS UNIT • ROLAND SBF325/STEREO FLANGER • ROLAND PH-830/STEREO PHASER • YAMAHA SPX90/MULTI EFFECTS UNIT/SAMPLING/MIDI • **DIGITAL REVERB:** AMS RMX16/DIGITAL REVERB: 99 STORES 1.6 SEC • AMS RMX16/REMOTE CONTROL & BAR CODE READER • EMT 240/GOLDFOIL REVERB • LEXICON 224XL/DIGITAL REVERB WITH LARG REMOTE • LEXICON 224/DIGITAL REVERB WITH REMOTE • LEXICON PCM70/DIGITAL EFFECTS PROCESSOR/MIDI 43 PRESETS • LEXICON PCM60/DIGITAL REVERB: 2 PROGRAM • QUANTEC QRS/ROOM SIMULATOR • ROLAND SRV2000/DIGITAL REVERB/MIDI/16 PROGRAM • URSA MAJOR SST282/SPACE STATION • YAMAHA SPX90/MULTI EFFECTS UNIT/MIDI • YAMAHA REV7/30 PROGRAM DIGITAL REVERB/EFFECTS • YAMAHA R1000/4 PROGRAM DIGITAL REVERB • YAMAHA REV1/8 PROGRAM DIGITAL REVERB WITH REMOTE • **LIMITERS/COMPRESSORS/NOISE FIGHTERS:** ADR F769X-R/VOCAL STRESSER/COMPLEX LIMITER • APEX COMPELLOR/STEREO COMPRESSOR/LIMITER • DBX 160X/OVER-EASY COMPRESSOR" • DBX 165/OVER-EASY COMPRESSOR" • DBX 902/DE-ESSER MODULE (PER CHANNEL) • DRAWMER DS201/DUAL NOISE GATE • EMT 156/COMPRESSOR • FAIRCHILD 670/VALUE STEREO LIMITER • ORBAN 516EC/DYNAMIC SYMBALANCE CONTROLLER (3 CHANNEL) • UREI 1176LN/LIMITER • UREI LA4/SOLID STATE LEVELLING AMPLIFIER • **EQUALISERS:** APEX TYPE "C" AURAL EXCITER • APEX TYPE "B" AURAL EXCITER • KLARK-TEKNIK DN60/SPECTRUM ANALYSER • KLARK-TEKNIK DN360/STEREO 30-BAND GRAPHIC EQUALISER • ORBAN 622B/PARAMETRIC • PULTEC EQP1/FULL RANGE VALUE EQUALISER • PULTEC EQP1A3/FULL RANGE VALUE EQUALISER • UREI 545/PARAMETRIC • **GUITARS:** FENDER STRATOCASTER WITH TREMOLO ARM AND FIVE TUNING • FENDER PRECISION BASS • FENDER TELECASTER • **KEYBOARDS AND OTHER MIDI PARAPHERNALIA:** FAIRLIGHT CMI/SERIES IIX WITH FULL SPEC/MIDI • FAIRLIGHT PROGRAMMERS AVAILABLE. PLEASE CALL FOR DETAILS • EMU/EMULATOR II DIGITAL SAMPLING KEYBOARD/MIDI SUPPLIED WITH 77 DISKETTES • CD ROM FOR EMULATOR II: EQUIVALENT OF 536 DISKETTES WITH 1000 SOUNDS AND IMMEDIATE ACCESS • ENSONIQ MIRAGE/DIGITAL SAMPLING KEYBOARD/MIDI • MOOG MINIMOOG/SYNTHESIZER • OBERHEIM OB8/MIDI • PPG WAVE 2.2/MIDI • ROLAND JUPITER 6/MIDI • ROLAND JX8P/6 VOICE POLY SYNTH WITH PG800 PROGRAMMER/MIDI • ROLAND JX10/12 VOICE MIDI SYNTH/76 NOTE VELOCITY KEYBOARD • ROLAND JUNO 106/PROGRAMMABLE POLY SYNTH/MIDI • ROLAND ALPHA JUNO 2/6 VOICE MIDI SYNTH • ROLAND SH101/PORTABLE MONO SYNTH • JUPITER POLY SYNTH RACK WITH MPG80 PROGRAMMER/MIDI • TECHNICS SX-PX7/PCM DIGITAL PIANO/MIDI • YAMAHA DX7/MIDI/SUPPLIED WITH 128 MEMORY UPDATE SUSTAIN PEDAL/FULL SELECTION OF ROMS • YAMAHA DX21/MIDI • YAMAHA TX7/FM EXPANDER/MIDI • YAMAHA TX816/8 DX7 FM MODULES IN A RACK/MIDI • KEYBOARD STANDS/3-TIER A-TYPE 1 OR 2-TIER X-TYPE • **DRUM MACHINES/RHYTHM BOXES/SEQUENCERS:** LA PERCUSSION BOX LINN 9000/DIGITAL DRUMS/SAMPLING/32 TRACK MIDI KEYBOARD RECORDER • LINNDRUM 2 VER 3.1/DIGITAL DRUM MACHINE • LINN LM1/THE ORIGINAL DIGITAL LINNDRUM • OBERHEIM DMX/DIGITAL DRUM MACHINE • OBERHEIM DSX/POLY SEQUENCER • ROLAND DR110/DR. RHYTHM • ROLAND TR707/RHYTHM COMPOSER/MIDI • ROLAND TR727/RHYTHM COMPOSER/LATIN PERCUSSION/MIDI • ROLAND TR808/RHYTHM COMPOSER • ROLAND MSQ700/MIDI/DCB KEYBOARD RECORDER • SIMMONS SDS9/CONTROLLER/5 PADS/BD PEDAL/STOOL • YAMAHA RX11/PCM DIGITAL DRUM MACHINE/MIDI • YAMAHA QX1/8 TRACK DIGITAL SEQUENCER/MIDI • **MICROPHONES:** AKG TUBE/VALVE MICROPHONE • NEUMANN U67/VALVE MICROPHONE • NEUMANN USM691/STEREO CONDENSER MICROPHONE • NEUMANN KU811/"DUMMY HEAD" STEREO MICROPHONE • SANKEN CU-41/UNIDIRECTIONAL DOUBLE-CONDENSER MIKE • **MISCELLANEOUS:** AUDIO & DESIGN PANSCAN/STEREO PANNER • AUDIO KINETICS TL66/TIME LINK SYNC PULSE GENERATOR • BGW 750/POWER AMP • CONN ST12/STROBETUNER • DYNAMIX/12-2 MIXER • ELECTROSPACE SP2/SPANNER STEREO PANNER WITH AUDIO TRIGGER • FOSTEX 450/8 CHANNEL MIXER • FRIENDCHIP SRC/SMPTE READING CLOCK/MIDI/INPUT MODULE • FRIENDCHIP SRC2/SMPTE READING CLOCK/MIDI • GARFIELD DRUM DOCTOR/6 CHANNEL DYNAMIC DRUM TRIGGER • MIDI BASS 360/MIDI CONTROLLABLE BASS SAMPLES • QUARK 999/MIDI LINK • ROLAND SVC350/RACK VOCODER • SOLID STATE LOGIC SL4000E/TOTAL RECALL CHANNELS • SONY KX20PSI/20" PROFEEL TV MONITOR • SONY VTX100UB/TV TUNER • STUDER A68/POWER AMP • TANNOY SRM12/200W 12" "LITTLE RED" MONITORS (PAIR) • TANNOY DTM8/DESK TOP STUDIO MONITORS (PAIR) • UREI 964/DIGITAL METRONOME • **AMPLIFIERS AND SPEAKERS:** BOSS MA-15A/MONITOR AMP 15W • CARLSBORO STINGRAY/PRO BASS AMP & 2x15" CAB • FENDER TWIN REVERB/2x12" GUITAR COMBO • GALLIEN KRUEGER 250ML MINI GUITAR COMBO • GALLIEN KRUEGER 200MB/MINI BASS COMBO • HI-WATT CUSTOM/50 WATT AMP TOP • HI-WATT CUSTOM/100 WATT AMP TOP • HI-WATT CUSTOM/4x12" CAB • MESA BOOGIE/100 WATT GUITAR COMBO/SIMULCLASS • ROLAND JC120/JAZZ/CHORUS 2x12" 120 WATT COMBO • SR&D ROCKMAN X100/GUITAR PREAMP • TRACE ELLIOTT BASS RIG/GP11 AMP; 2x15" BIN; 2x12" MIDRANGE • **MISCELLANEOUS** • LYNX SYNCHRONIZER MODULES • Q-LOCK 310 SYNCHRONISER • DBX 120X BOOM BOX • **DIGITAL DELAYS/PATCH CHANGERS/SAMPLERS/EFFECTS** • ROLAND DEP5 MULTI-EFFECTS PROCESSOR • BEL BD80 SAMPLING DIGITAL DELAY • AKAI 5900 • **LIMITERS/COMPRESSORS/VOICE FIGHTERS** • BROOK SIREN DPR 402 DE-ESSER • **MICROPHONES** • NEUMAN U64 • NEUMAN U47 • **DRUM MACHINES/RHYTHM BOXES/SEQUENCERS** • EMU SP12 • ROLAND MC 500 MICRO COMPOSER • ROLAND MSQ700 • **EQUALISERS** • PULTEC MEQ5 VALVE EQUALISER • LANG PE Q2 EQUALISER • **ANALOGUE RECORDING** • TASCAM 38 1/2" 8 TRACK RECORDER • NAKAMICHI MRI •

**24 HOUR SERVICE WITH TECHNICAL & MAINTENANCE BACKUP**

**TELEPHONE: (01) 451 6161 OR 451 6464**

**24 HOURS CALL 0836 203020**

**PRESS : STOP PRESS : STOP PRESS**  
 Just arrived from the US a substantial  
 number of Pulpec EQP 1A3 valve  
 equalisers and electronics LA2A  
 valve limitors



## SOWTER AUDIO FREQUENCY TRANSFORMERS

You name it! We make it!

For the past 45 years we have concentrated on the design and manufacture of high grade audio transformers during which period our total sold exceeds half a million. We continually take full advantage of all the improvements in magnetic and insulating materials and in measuring techniques utilising the most up to date instrumentation.

We have a very large number of original designs made for clients all over the world but naturally there are certain types of Sowter Transformers which are in constant demand. These have taken into account the tendency towards small size without sacrifice of performance, particularly for PCB mounting, and a few of these are listed below. They can be supplied with or without mumetal shielding cans. Performance requirements can be modified on request (utilising our readily available questionnaire) and generally without alteration in price.

We specialise in **LOW COST AND QUICK DELIVERY** which means a few days only or ex-stock.

### TYPICAL PERFORMANCES

Sowter Type No.	3575	4652	3678	6499	4079	6471	6469
Description	Miniature bridging transformer	Line output	Multi primary microphone transformer	Line output high level low distortion toroidal core	Splitter combiner transformer	Midget mic transformer for BT private systems	Very high quality microphone transformer
Impedances	10k $\Omega$ 10k $\Omega$ can be fed from 50 600 $\Omega$	600 or 1500 $\Omega$ inputs or outputs	Py 60 200 or 600 $\Omega$ 5y 5k $\Omega$ down to 1k $\Omega$	600 $\Omega$ 600 $\Omega$	200 $\Omega$ Bal Primary 2W 200 $\Omega$ Secondaries	Py 60 $\Omega$ 5y 60k $\Omega$	200 $\Omega$ Primary for 1k $\Omega$ loading (Bifilar B 1 step up)
Frequency range	20Hz 20kHz	20Hz 20kHz	30Hz 20kHz	20-20kHz	20Hz 20kHz	300Hz 3k4Hz	20Hz 20kHz
Performance	+ 0.1dB over above range	+ 0.25dB over above range	+ 0.5dB over above range	+ 0.3dB 40Hz 15kHz + 0.5dB 20Hz 20kHz	+ 0.5dB over above range	+ 0.5dB over above range	+ 0.2dB over above range
Maximum Level	7.75V r.m.s on secondary	7.75V r.m.s on 600 $\Omega$	on 5k123 4V r.m.s. at 30Hz	26dBm at 30Hz	2.3V r.m.s at 30Hz	0.6V p.p on Py	2.0V r.m.s on Py at 30Hz
Maximum Distortion	With 10V r.m.s. at 40Hz only 0.12%	Using 600 $\Omega$ and low impedance source it is 0.1%	Less than 0.1% at 1kHz	0.1% at 30Hz at 26dBm	negligible 0.1% at 1kHz	negligible	0.1% at 20Hz
Shielding	Electrostatic screens and mumetal can	Mumetal can if desired at extra cost	Mumetal can	Toroidal can	Mumetal can rigid fixing bolts	PCB mounting	Mumetal can
Dimensions	33mm diam - 22mm high	36mm high - 43mm - 33mm	33mm diam - 22mm high	50mm diam - 36mm high	33mm diam - 37mm high	11.1mm high - 19mm - 17mm	33mm diam - 22mm high
Prices each at works	1.5 £10.83 50 £9.77 100 £9.27	1.5 £9.67 50 £8.89 100 £8.69	1.5 £9.67 50 £8.67 100 £8.41	1.5 £17.12 50 £15.69 100 £15.35	1.5 £14.59 50 £13.37 100 £13.08	1.5 £3.89 50 £3.55 100 £3.29	1.5 £11.38 50 £10.12 100 £9.92

E. A. SOWTER LTD. (Established 1941) Reg. No. England 303990  
The Boat Yard, Cullingham Road, Ipswich IP1 2EG, Suffolk. PO Box 36, Ipswich IP1 2EL  
England. Phone: 0473 52794 & 0473 219390 - Telex: 987703G SOWTER

# WE KNOW MORE ABOUT THE PIANO MIDI-MOD BECAUSE WE KNOW MORE ABOUT THE PIANO.

*Designed by Forte Music, the MIDI-MOD retains all the subtleties of a grand piano, without any loss of piano quality.*

*Call Cristofori and talk to the craftsmen.*

*Cristofori*

Cristofori Ltd, 20 Conduit Place, London W2  
Telephone 01-402 4304 Telex 22278 Fax 01-262 6081



Tom Hannaford, Dixieland Productions, Atlanta, GA

## SONEX kills background noise beautifully.

SONEX is a special acoustic foam that absorbs noise four times better than acoustic tile or carpeting. It makes you sound like a pro — inexpensively — because your voice comes across clear, clean, and intelligible. Use SONEX for video, remote conferencing, voice-overs, radio communications, audio production, or anywhere else you need to sound crystal clear. Kill background noise beautifully — and save the true sound — with SONEX. Send for all the facts.

**Alpha Audio**

2049 West Broad Street · Richmond, Virginia 23220 · (804) 358-3852  
Acoustic Products for the Audio Industry

SONEX is manufactured by Illbruck and distributed exclusively to the pro sound market by Alpha Audio.

**AUDIO**

**SR-SERIES  
PROFESSIONAL  
POWER AMPLIFIERS**



- SR 202  
200 x 200w/4 $\Omega$
- SR 404  
400 x 400w/4 $\Omega$
- SR 606  
600 x 600w/4 $\Omega$
- SR 808  
850 x 850w/4 $\Omega$

*The perfect answer for all high-powered audio systems. Arrange of four models giving from 200 to 850 watts per channel, providing an amplifier suitable for all applications. For full specifications, please contact:—*

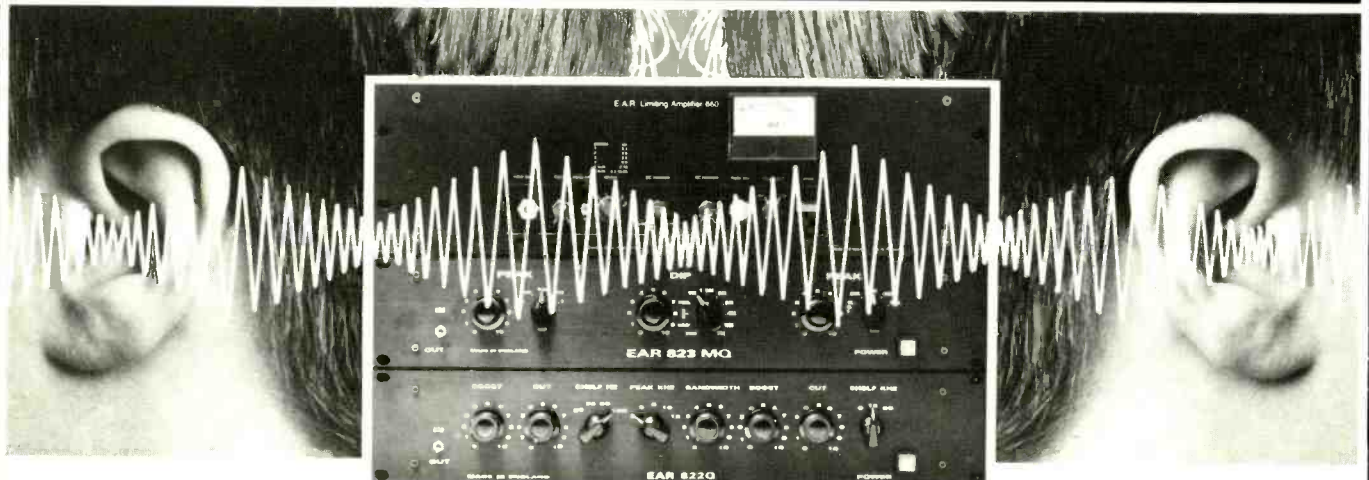
**PAUL FARRAH  
SOUND**

Paul Farrah Sound Limited,  
7, St. Georges Industrial Estate,  
Richmond Road, Kingston,  
Surrey KT2 5BQ.

Telephone: 01-549 1787 Telex: 945114 FARRAH G. Fax: 01-549 6204

# TRAD

FOR SALE		£	FOR SALE		£
AMEK ANGELA 39-24 AUTOMATION READY		23000.00	QUAD 306 AMPLIFIERS	NEW	180.00
NEVE 8068 32+4-24		48000.00	EAR 660 VALVE COMPRESSOR	NEW	750.00
NEVE 8048 32-16-24 4 BAND EQ NECAM 11		60000.00	EAR 822 EQUALIZERS VALVE	NEW	450.00
S.S.L. 6040 32 INPUT T/RECALL BARGRAPHS		87000.00	EAR 823 EQUALIZERS VALVE	NEW	450.00
A & H SYNCON B 32-24		5000.00	UREI L.A. 4 COMPRESSOR		300.00
TRIDENT A SERIES 28-24-48		20000.00	ELECTROSPACE DIG. DEL.	NEW	1200.00
ALICE PRODUCTION DESK 18-8-8 4 A&D COMPLIM		1300.00	EVENTIDE INSTANT FLANGER		150.00
RESPONSE 10-4 MIXER		250.00	STEINWAY 5' SMALL GRAND PIANO		3500.00
INKEL 8-2 MIXER BUILT IN REVERB - NEW		280.00	BLUTHNER 5'6" SMALL GRAND PIANO, RECOND,		
NEVE A SERIES 10 INTO 4 DESK		2500.00	RELAQUER		4000.00
3M M79 XT24 A/LOCATE FIRST CLASS ORDER		11500.00	TRADERA EDITING BLOCKS 2" - 3 SLOT		56.00
LYREC 532 24 TRACK 32 MEM: A/LOCATE		13000.00	TRADERA EDITING BLOCKS 1" - 3 SLOT		40.00
AMPEX MM1200 24 TRACK XT24 A/LOCATE EX. COND.		12000.00	TRADERA EDITING BLOCKS 1/2" - 3 SLOT		28.00
MCI JH114 24 TRACK WITH A/LOCATE 3		13000.00	TRADERA EDITING BLOCKS 1/4" - 3 SLOT		12.00
STUDER A80 MK1 16 TRACK		6500.00	WEBBER 2" TEST TAPES		210.00
STUDER MK2 A80 STEREO VU, 7, 5 & 15 I.P.S. 2300hrs		3250.00	WEBBER 2" TEST TAPES 30ips		235.00
LYREC TR55 1/2" STEREO NEW HEADS GUIDES ETC		4000.00	WEBBER 1" TEST TAPES		130.00
PROLINE 2000 STEREO 15/30 IPS		1200.00	WEBBER 1" TEST TAPES 30ips		160.00
REVOX A77 L/S STEREO SERVICED		250.00	WEBBER 1/2" TEST TAPES		38.00
REVOX A77 H/S STEREO SERVICED		275.00	WEBBER 1/2" TEST TAPES 30ips		60.00
DOLBY A360 NOISE REDUCTION UNITS	EACH	375.00	WEBBER 1/4" TEST TAPES		25.00
DOLBY A361 NOISE REDUCTION UNITS	EACH	410.00	WEBBER 1/4" TEST TAPES 30ips		30.00
DOLBY M24H NOISE REDUCTION UNITS		6000.00	NEUMANN KM 86 MICROPHONE		350.00
DOLBY CAT 22 CARDS	EACH	150.00	NEUMANN KM 56 MICROPHONE		350.00
DOLBY CAT 44 CARDS	EACH	100.00	NEUMANN KM 54 MICROPHONE		350.00
H.H. V500 AMP		400.00	AKG C12 VALVE MIC:S/MOUNT P.S.U. & PATTERN BOX		1200.00
QUAD 606 AMPLIFIERS	NEW	352.00	AKG C12A MICS S/MOUNT LEADS P.S.U. ETC		295.00



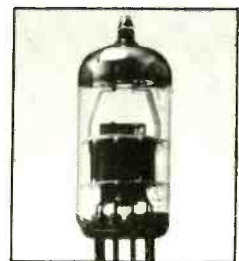
## Treat your ears to ours...

E.A.R. 660 Lim/Comp.

Remember the Fairchild Lim/Comp? Well here is its modern equivalent. The all tube EAR 660. Keeps levelling under control without destroying the music. No more gritty clipping. Get your EARS on good buddy and do your ears a favour.

E.A.R. 823MQ Mid Eq. and E.A.R. 822Q.

Both models are vacuum tube no loss Passive equalizers that are balanced input and output to 600 ohm standards. The amplification circuits are all balanced push-pull with 3 tubes that are readily obtainable types and engineered to provide at least ten thousand hours before re-tubing. The dynamic qualities and headroom are highly appreciated.



### TRAD ELECTRONICS SALES LTD

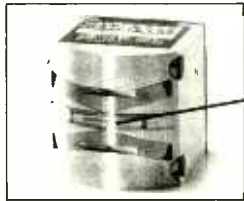
149B ST. ALBANS ROAD · WATFORD · HERTS · WD2 5BB · ENGLAND  
TEL: WATFORD (0923) 47988/9 · TELEX: 262741 Answerback TRADEQ

# TRAD



# Way ahead.

## With Magnetic Heads



Integral Timecode Heads Originally a B&A Innovation

Branch and Appleby heads used by the world's leading studios, manufacturers and broadcasters, are precision engineered for performance and reliability. They include Pro Audio up to 2" 32 track, Film Sound up to 70mm, Video Sound up to 2" and Tape Duplicating types.

B&A's Magnetic Head Clinic gives a same day rework service to restore performance to most types of head.

## With Electronic Systems



B&A supply a wide range of products and systems for the professional.

B&A Recorder systems, Timecode Adaptors and ADR controllers. Timecode readers and generators, Synchronisers, Film Dubbers and Projectors, Console Automation and Audio Test Systems. Call us about sound recording and control and we can get our heads together.

## Branch & Appleby

Branch and Appleby Limited incorporating Magnasound Electronics Limited  
Stonefield Way, Ruislip, Middlesex HA4 0YL GB  
Tel: 01 864 1577/01 423 3597. Telex 918582

# Why Compensate? THE MIDDLE MONITOR

by Wellard Research

*Raising the state of the monitoring art*



**KEEPING YOU AHEAD**

F.M. MUSIC  
HIRE & SALES  
64 HIGH STREET  
HARROW-ON-THE-HILL  
MIDDLESEX HA1 3LL  
FAX: 01-423 6692  
01-575 7233

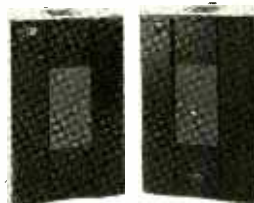


**MARTIN AUDIO**

## CX-SERIES COAXIAL SYSTEM

CX2 52cm x 36cm x 33.5cm  
8n 300w program power.

*The Martin CX2 is a versatile and compact coaxial cabinet, producing high resolution, precise localisation and pinpoint imaging.*



BX2 52cm x 81cm x 49cm  
8n 600w program power.

*Together with the BX2 sub-bass bin and the CXW wedge monitor, the CX system is a proven superior combination for professional use in AV, stage monitoring, theatre, discotheques, and sound reinforcement applications.*

**PAUL FARRAH  
SOUND**

Paul Farrah Sound Limited,  
7, St. Georges Industrial Estate,  
Richmond Road, Kingston,  
Surrey KT2 5BQ.

Telephone: 01-549 1787 Telex: 945114 FARRAH G. Fax: 01-549 6204

# STUDIO SOUND'S

## PRO-AUDIO DIRECTORY 1986/7

From the publishers of the world's leading professional recording magazine **Studio Sound**, comes the latest edition of their sister publication, **The Pro-Audio Directory**.

This unique and vital reference source has been completely updated and revised to provide in one volume information on every aspect of the professional recording industry; From Acoustic Materials to Tape Recorders; From Mixing Consoles through to Synthesisers.

In addition to its forty extensive hardware sections are chapters covering Dealers in the UK, USA and Worldwide. Pin-pointing which equipment can be brought where – anywhere in the world.

The ultimate section is the extensive address listing featuring the full details of over 3,000 companies mentioned in the directory, including key contact names. Also there is a cross reference listing of Worldwide Distributors detailing international availability of any given product. This information is not available in any other publication.

The Pro-Audio Directory has all the information you need, and to make sure it is straight forward to use, this edition sees a complete redesign with an even greater emphasis on clarity.

To ensure you stay in touch with the expanding, rapidly changing world of professional recording order your copy of the specialised **Pro-Audio Directory** now.



Professional Publications Group, Link House Magazines Ltd, Dingwall Avenue, Croydon CR9 2TA, United Kingdom.

Please send me ..... copies of  
**Pro Audio Directory 1986/7.**

£13 (UK) £14.00 Europe \$25 USA Airmail  
£16.50 World Airmail. *Includes Postage and Packing.*

I enclose a cheque/postal order/International money order payable to **Link House Magazines** for the amount \_\_\_\_\_

Or debit my credit card



Credit card No.

Credit card holders can order by simply ringing 01-686 2599 ext 550, quoting credit card No.

Signed \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

(please print)

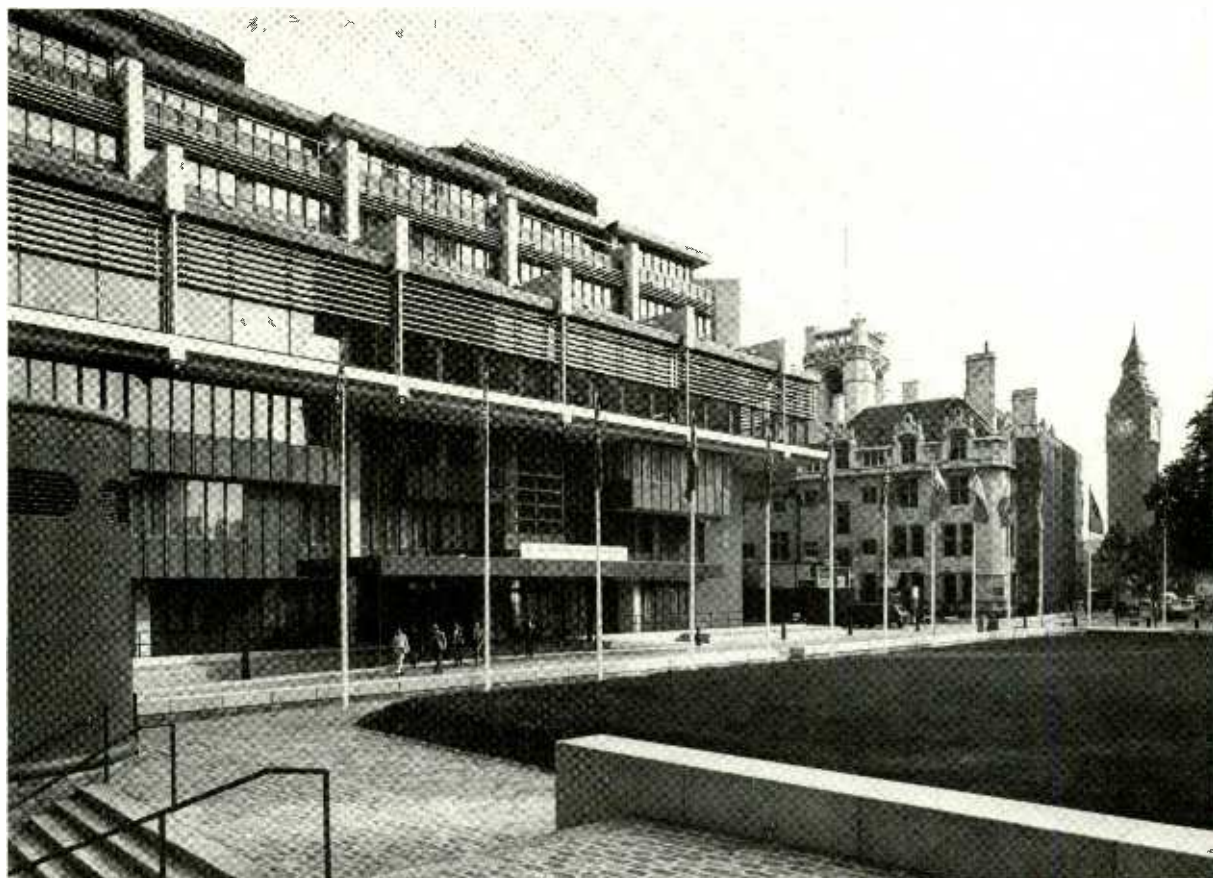
Please return the completed order form enclosing full remittance (including delivery) or giving your credit card number to **Professional Publications Group, Link House Magazines Ltd, Dingwall Avenue, Croydon, CR9 2TA, United Kingdom.**

Please allow 28 days delivery in Britain, extra overseas depending on country and delivery method.





# 82nd AES CONVENTION LONDON, ENGLAND MARCH 10-13, 1987



## Queen Elizabeth II Conference Centre, Westminster

The Audio Engineering Society returns to London for its 82nd Convention after two previous successful events in 1975 and 1980. This will be held at the new Queen Elizabeth II Conference Centre opened in June 1986, situated right in the centre of London, opposite Westminster Abbey.

The Technical sessions will present the latest audio information with over 60 papers — seminars and workshops will cover practical topics — both enabling the engineer to update his knowledge. More than 150 companies will be displaying the latest in audio technology through five floors of exhibition and many will be demonstrating their products in individual rooms.

Technical tours, a wide range of social activities and an Awards Banquet will run in parallel giving the opportunity for meeting old friends and making new ones.

Plan now to attend the 82nd AES Convention.

### For further information:

Roger K. Furness — Chairman 82nd AES  
Minim Electronics Limited  
Lent Rise Road  
Burnham, Slough SL1 7NY  
United Kingdom  
Telephone: Burnham (STD 062-86) 63724  
Telex: 847879 MINIM G

AES BAARN, THE NETHERLANDS  
Titia K. S. Bakker  
c/o PolyGram B.V.  
P.O. Box 23  
3740 AA Baarn, The Netherlands  
Telex: 43400 PHRC NL + ATTN: AES TSB

AES HEADQUARTERS OFFICE  
60 East 42nd Street — Room 2520  
New York, NY 10165 — U.S.A.  
Telephone: (212) 661 8528  
Telex: aes620298 uw(wui)

# CLASSIFIEDS

Advertisements for this section must be pre-paid. The rate is 60p + VAT per word, minimum £15.00 + VAT. Box Nos. £5.00 + 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 MAY issue must reach these offices by 18th MARCH 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

**QUALITY HIGH-SPEED** cassette copying also video cassette copying and processing. Any quantity. While you wait. 24-hour, 7-days-a-week service. Central London W2. GWBB Audiovision. Tel: 01-723 5190, two lines. (X)

**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)

**CASSETTE DUPLICATING,** reel or cassette. Other facilities. Label inlay design and printing. Free leaflet. Martlett Recording, Thrift House, Wellington Place, Hastings, Sussex. Tel: 0424 443805.

**MUSIC SUITE,** low cost, real time cassette duplication, labels and inlays. Master from ¼ inch, PCM, cassette. If you're looking for quality phone (0293) 711032.

## TAPE HEADS

**REWORK SERVICE,** relap and reprofile often same day or even quicker.

**REPLACEMENTS,** from the U.K.'s leading Pro Audio head maker.

**BRANCH & APPLEBY Ltd.**  
Stonefield Way, Ruislip,  
Middx HA4 0YL 01 864 1577

100 C-60 cassettes beautifully copied in stereo from £59.50 (plus VAT)  
We can copy from 100 to 5,000 high quality cassettes on our high speed loop-bin system, load them precisely into top-class shells. Price includes library case and all production work from your ¼ in edited master. Any length C-5 to C-90. Ring for price check.

**STUDIO REPUBLIC**

47 High Street, Pinner 01-868 5555 01-866 5555

## REAL TIME CASSETTE COPYING

All work carried out on Nakamichi machines to the highest standard. Normal or chrome tape available.

We also supply blank cassettes wound to length. AGFA and BASF chrome tape available

**GATEWAY CASSETTE SERVICES**  
1 GAUDEN ROAD, LONDON SW4 6LR  
TEL: 01-627 4758

*Check It Out...*



**DIRECT FROM OUR MODERN U.K. PRESSING PLANT**

- CUTTING · PRESSING
  - TEST PRESSING
  - LABELS · SLEEVES
  - CASSETTES
  - ARTWORK
  - COMPETITIVE PRICES
- MARKET LEADERS**

**SRT**

**01-446 3218**

## STUDER REVOX

WE ARE THE TAPE MACHINE SPECIALISTS WE PROVIDE PROMPT EFFICIENT SERVICE AND REPAIRS FOR THE WORLD FAMOUS RANGE OF STUDER REVOX MACHINES. WE ALSO HANDLE TEAC/TASCAM + NAGRA RECORDERS IN OUR WELL EQUIPPED WORKSHOPS WITHIN EASY REACH OF LONDON.

★ WHEN YOU RELY ON YOUR EQUIPMENT, YOU CAN RELY ON US!

**3M SPARES** OFFICIAL UK SERVICE CO.  
Service Calls Save Time!

153A VICTORIA STREET, ST. ALBANS  
Telephone: 58977 (0727)

**THE SOUND & VISION WORKSHOP LIMITED**

**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

CLASSIFIEDS



## SERVICES

# MRC

A ZONAL COMPANY

The Magnetic Recording Company, a subsidiary of Zonal, Britain's leading manufacturers of professional magnetic sound recording products, offer you cassette duplication of music, speech and data using Gauss loop bin, as well as the best equipment for winding, printing onbody labels and inlay cards.

You will get the service and quality that is expected of a company that has been in the magnetic products business for over 30 years.

## MAGNETIC RECORDING COMPANY

Holmehorpe Avenue,  
Redhill, Surrey, RH1 2NX.  
Tel: 0737-67171  
Telex: 946520  
Fax: 0737-67610



**CUSTOM WOUND BLANK CASSETTES AT AMAZING PRICES!**  
C1 - C120  
REAL TIME CASSETTE DUPLICATION  
CASSETTE LABELS AND INLAY CARDS  
**061-969 7618** Alf-sound, St. Martins Studios  
Greenbank Road, Ashton-on-Mersey,  
Sale, Cheshire M33 5PN.  
CALL FOR DETAILS AND FREE PRICE LIST

## CHANNEL 5 AUDIO

High Quality, Real-time cassette duplication, Printed inlay cards and side labels, Custom wound blank cassettes

Tel: 01-803 9036

- Quality Blank Cassettes •
- Real Time Duplication •

Fast professional service  
at competitive prices  
AGFA & BASF/Ferric & Chrome tape  
Inlay cards and label printing  
Tel 01 223 2481



**SPEEDY REVOX SERVICE**

Plus TEAC/TASCAM, FOSTEX, UHER, most Mixers, Amplifiers, Effects. Priority Bookings taken. Collection/Delivery arranged. A personal service by experienced engineers

34 Danbury Street, London N1 8JU  
Telephone 01-359 9342/3030

## RAPER & WAYMAN



## RECORDING SUPPLIES

Manufacturers of High Quality Blank Cassettes. Agfa Gevaert Tape Load. Example C-60 30p each, C-90 38p, C-15 25p with all labels. Duplicating in Stereo C-60 45p each.  
Manufacturers of Cassette Library Cases at 3.6p each, min 50 000 delivery FREE  
Please telephone 0205 750595

## 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

The Courtyard, 152-154 Ewell Road, Surbiton, Surrey KT6 6HE England 01-399 2476.7

# DATAGENK

CUSTOM LENGTH BLANK CASSETTES  
MONO & DATA DUPLICATING  
LABEL PRINTING - SHRINK WRAPPING  
READING 0734-302600

## CASSETTE DUPLICATION

Quality Cassette Duplication, High-Speed and Real Time, Overwrapping, Exact Length Blank Cassettes, Labels and Inlays  
Tel: Leicester (0533) 602064

ACCURATE SOUND LIMITED  
QUENIBOROUGH (Ind. Est.) MELTON ROAD  
QUENIBOROUGH, LEICESTER LE7 8FP

jbs records

## MUSIC-SPEECH COMPUTER

REAL-TIME or HIGHER-SPEED Quality Cassette Duplication and Blanks from 1 to 1000+. Computer printed Cassette Labels. Speech and 1/4" reel-to-reel recording/editing. 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

## CASSETTE DUPLICATORS

The specialist in the supply and service of cassette duplicating equipment, bulk custom wound cassettes, and accessories.

GRAFF SONY TELEX WOLLENSAK

Main Dealers UK and Export

SOUND CASSETTE SERVICES LIMITED  
BODEN STREET, CHARD, SOMERSET

0460 67237

NATIONWIDE

Let Saki expertise relap your tape heads in London

Factory-approved laboratory and training guarantees finish to original performance specification

ALL MAKES RELAPPED

Tapetek, 44A Brighton Road, London N16 8EG

Tel: 01-254 5203 or 0836 215900 (mobile)

Replacement Saki heads from:

Tape Marketing, 13 Elm Road  
Faringdon, Oxon SN7 7EJ 0367 20262




## CLONE

01-237-9748

Real time high quality cassette copying from digital Sony 701, 1/4" or cassette format (Agfa, TDK, BASF), labels and inlays fully typed. Analogue editing facilities.  
488-490 OLD KENT ROAD, LONDON SE1 5AG

## CLASSIFIEDS

## SERVICES

### REAL TIME CASSETTE DUPLICATION



on the latest equipment.

- Quality superior to high speed copying.
- No mastering charges.
- Any quantity at very competitive prices.
- Shrink wrapping. Fast security delivery.
- All work guaranteed. WE ALSO SUPPLY BLANK CASSETTES (C1-C100)
- Highest quality screwed or welded housings.
- Ferric or Chrometape
- LIBRARY CASES • LABELS • INLAY CARDS
- VIDEO CASSETTE TAPES & DUPLICATION. Phone or write for immediate quotation. **VIDEOCOPY** (Dept SS1) Unit 3, Buslingthorpe Green, Meanwood Road, Leeds LS7 2HG. Tel (0532) 625650.

### Revox & Uher Sales & Service

16mm sound 35mm slide projectors, open reel and cassette recorders, amplifiers, etc., serviced and repaired. Bell & Howell, Elf, Ferrograph, Revox, Tandberg, Uher approved service agents. Maintenance contracts available. Visit our Amateur Radio Showroom at— 58 High Street, Newport Pagnell. Tel: 0908 610625.

### Photo Acoustics Ltd

### REAL TIME CASSETTE DUPLICATION

USING AIWA AD F770 CASSETTE DECKS FROM ¼" AND PCM FI MASTERS

- Custom wound blank cassettes
- Shape MK10 and ICM-CO's
- Inlay card and label printing

TEL 0222 790040

BACKYARD RECORDING STUDIO LTD



## FOR SALE—PRIVATE

**AUDIX B100** Production Continuity Desk. 11 Mono/Stereo channels, compressors and V/O facilities, comprehensive monitoring T/B and auxiliary facilities. All offers please ring 0532 670095 evenings.

**SCULLY 8-TRACK**, one inch 30 i.p.s. £1,750, 16/8/2 M & A desk £875, 8 channels Bel N.R. in rack plus spare unit £260. Tel: 01-377 5726.

**DISC CUTTING SYSTEM** from November 1985—complete Neumann VMS 80-2 Stkstuder A 820 ¼" or ½" Studer Dad 16 Prel, Transfer Console, Klark Analyser Tannoy-FSM, Sony System Pal, Nisc, RTV AD2, Studer A 710, Dolby S, Neumann VMS 66, Ortofon, Electronics, A80 Mark 2, A88 Recordermark 2. many more items. Dansk Skaerestudie, Mariendalsvej 27 2.s DK 2000 Frederiksberg, Denmark.

**B&W 808 MONITORS.** Cost £4,500 offered £3,250 o.n.o. Pair B&W MPA 810 650w Power Amps Class A/AB cost £4,500 offered £3,250 o.n.o. All above six months old. Domestic Hi-Fi use only. (Space needed.) Tel: Worthing (0903) 61213.

**TAC MATCHLESS** for sale with Patchbay 14 months old £7,500 + VAT also have Soundcraft 24 track series 2 and ¼/½ mastering machines by Otari and M.C.I. Tel: 01-876 1689.

**TASCAM 59 PRO ½" 8-TRACK.** Full R.C. 51 remote control unit. Absolutely mint. £2,500. Tel: 0705 372733.

**OTARI DP4050 C2** High speed cassette copier and three Bay Slave. Exc. cond. Hardly used. Bargain for £1,800. For more details phone 061-702 8101.

**NEVE 80 SERIES CONSOLE** — 28/8/24 immaculately maintained (52 remix channels) £22,000. Neve 24/8/24 (10 cue-sends, 68 remix channels) £10,000. Package price for both desks £30,000. Pair Neve 22, 54 comp/limiters £950. Tel: 01-521 2040.

**LEXICON 200** digital reverb. Slightly marked but electrically perfect. £3995 new, will sell for £2100 o.v.n.o. 01-229 4665 (eve); 01-960 8178 (day).

**AMEK 2500 CONSOLE 36/24/36 INLINE,** Allison Automation, Bargraph Metering, perfect order £30,000. Hire then buy arrangement possible. Also Delta Lab Effectron 1024 £195. Delta Lab DL4 with 2 second extra memory module — Offers. Rebis rack, supply £60. 7 gates, 5 parametrics, 2 d'essers £35 each. Alesis XTC reverb £475. Tel: 01-671 3731.

## FOR SALE—TRADE

**M.S. AUDIO.** We specialise in 24TR, 16TR, 8TR package neg. and S/H dealer for all makes of Pro-Audio equipment. Phone for latest price list. Tel: 01-767 0126 or 09328 67581.

**TRIDENT TRI-MIX CONSOLE** 18-8-2 currently installed in top notch 16 track 2" studio going 24 track, inc. patchbay, patchleads, stand. Wooden speakerbridge and all cables. £4,500 + VAT. Tel: 01-729 2666.

**STUDER A80 MK I,** 30 I.P.S., 16 track only 5,000 hours, well maintained, 8 track headlock and all 1 inch fittings £6,500 o.n.o. or would exchange with cash for Fostex 16 track any model. Tel: 0272 47147.

**PUBLISON DHM 89 B2 DIGITAL AUDIO COMPUTER,** Eventide H 949 Harmonizer, Linn 2 Drum Machine, Drumulator Drum Machine (c/w, 3 sets of alternative sound chips). Electro-Voice RE20 Microphone, Uicol heavy duty ADJ Mobile stand. For more details contact 01-586 9433.

**AKG BX15 SPRING REVERB,** 2 channel, adjustable delay. £300 + VAT. AKG TDU7202 digital delay, 19 inch rack mounting, adjustable delay times in 25 mSec. steps. £900 + VAT. Contact Frances (073080) 519.

**OTARIO NTR 90 MARK II** 24-track with accessories 1 year old, 1,000 hours £23,750, UK 0923 772351.

**STUDER A80 VU** 2 track 15.7 1/2 2,500 hours, new heads £3,500, UK 0923 772351.

**DISC CUTTING EQUIPMENT** and systems bought, sold, installed and manufactured (under licence from ORTOFON). TAM/ENGLAND, 13a Hamilton Way, London N3 1AN. Telephone 01-346 0033. (X)

**LOCKWOOD, TANNOY, etc.,** new and used equipment always available and wanted. Lockwood Audio Sales 01-866 0671. (X)

**TEAC 244/34/38** discounts and HP and leasing. Erricks VCD, Brighthouse 722121 (Bob) (X)

**SPARES, SPARES, SPARES.** SSL, Neve, Dolby, Amek, Neumann etc. etc... Please call 0923 772351.

**AUDIX B100 PRODUCTION CONTINUITY DESK.** 11 mono/stereo channels, compressors and v/o facilities, comprehensive monitoring T/B and auxiliary facilities. All offers please ring 0532 670095 evenings.

**QUESTED LOUDSPEAKERS WITH CROSS-OVER UNIT** £3,200 pair. Tannoy Super Reds £700 pair. Quad ESL63 Electrostatics £700 pair. Eventide H949 Harmoniser £900. Amcron DC300a £350. Petrol 4.7kw generator £200. Tel: 01-995 5432/3543.

**ONCE-USED** splice-free Racal 888 or predecessor (Z317P) ¼" standard. Have about 100 unwanted boxed 10½ NAB spools (new and near). Davies. Tel: 06286 4811.

AMPEX			
	1	10	30
456 ¼" × 7"	8.00	6.50	5.85
¼" × 10 ½"	14.25	12.40	11.80
407 ¼" × 10 ½"	18.95	15.95	14.90
Order now for immediate delivery			
- Visa/Access accepted. Ring for			
1" and 2" prices			
(0222) 777839			
<b>film-tech</b>			
4/5 Willowbrook, Crickhowell Rd. St. Mellons, Cardiff			

## CLASSIFIEDS



**FOR SALE—TRADE**

**STUDIO SUPPLY DESIGN**

ALL YOUR STUDIO NEEDS...  
CALL 0525 55126  
FOR A FREE CATALOGUE

**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

**KGM Studio Specialists**

NEUMANN	J.B.L.	LEXICON	SOUNDCRAFT
SENNHEISER	TANNOY	DRAWNER	STUDIOMASTER
SHURE	REVOX	D.B.X.	B.E.L.
BEYER	TASCAM	YAMAHA	APHEX
UREI	QUAD	AMPEX	APPLIED MICROSYSTEMS
TRIDENT	ROLAND	AKG	AUDIO KINETICS

18-42 Charlotte Street, WAKEFIELD, W. Yorks WF1 1UH  
Tel: 019241 371786. Export Enquiries welcome. Telex: 556649

**WANTED**

SHURE 711 SPEAKER SYSTEM wanted in good condition. Tel: 0272 276444, Ray Lyon.

NAGRA PORTABLE STEREO TAPE RECORDER. Series III or IV. Michael Ritchie, Biology Unit, East Anglia, Norwich NR4 7TJ. Tel: 0603 56161, ext. 2947.

**AUDIO SERVICES**

Professional Audio & Audio for Video Equipment

Phone and ask for our latest list - more bargains are coming in daily!

**NEW HIGH-TECHNOLOGY EQUIPMENT**

● Sony Digital Audio Processors; the following units are NOT available: F-1, 701 and 501. So don't ask!! BUT the new PCM601 is. These machines are virtually identical to the 701 but with one major difference — digital in and out Price £750.

● T.C. Electronic of Denmark. Professional parametric equalisers and spatial expander. The parametrics are of the highest standard electronically and construction-wise. And the spatial expander has to be heard to be believed. Please phone for a demonstration.

- TC 1210 Spatial expander £735
- TC 2240 HS 4 band, 2 chan. (2MHz slew rate) £575
- TC 1140 HS 4 band, mono (2MHz slew rate) £345
- TC 1220 2 band, stereo (300 KHz slew rate) £265

Brochures on the above sent on request

● Amazing Alesis Microverb in stock now. 16 bit linear processing only 5 1/2" wide. Stick three together like jumbo Stickle bricks, and they rackmount. Price each £216. Special three deal + rack kit £599.

● Tascam Porta-Two now available in the March Madness give-away sale. Porta-Two + Teac 'Wet' Cassette + Azden dynamic mic + Drop-in foot switch all for £599 inc. VAT

● 24-track sequencer package, comprising: ATARI 1040 ST, monochrome monitor, mouse, word processing & language software plus STEINBERG RESEARCH Pro 24 software. All ready-to-run. Demonstration arranged by appointment. New Low Price £825

● The best drum machine ever to come out of Japan is now on demonstration in our Stockport Showroom. The KORG DDD-1. It does everything as well as sampling, tuning, midi, etc., etc., etc. Price £599.

● In stock now the new Roland DEP5, their attempt at cornering the digital multi-fx market. Features include 16 bit digital reverb, digital delay, chorus and parametric EQ — all programmable. "Very nice" you might say, but what about the SPX-90 — it does ten times as many effects. "Ah yes, but not at the same time!" All in sumptuous stereo. £587.

● T.C. Electronic of Denmark have been overlooked in the past as viable contenders in outboard processing - until now. With their new TC-2290 digital delay and multiple special effects processor. Equivalent to 18 bit linear processing, 100dB dynamic range, 0.05% THD, frequency response 20 Hz - 20 KHz standard units are equipped with 8 secs delay/ sampling expandable to 32 secs. As you will notice these specifications are incredible and far in excess of anything currently available - in fact we will challenge anyone to tell the difference between a C.D. and the same signal on the TC-2290 — A bottle of Moët is in the offing to anyone who can defy this challenge. Demonstration arranged by appointment. Brochure sent on request. Price for 8 second version £1,785.

**SECOND HAND & EX-DEMO EQUIPMENT**

STUDER A80 2 inch 16TK with Dolby M16	Phone London office for details
OTARI MX-5050 XHD four track - nice condition	£1,200
STUDER A80 1" 8TK 3,500 hours, one owner, immaculate	£4,000
NAGRA III with XTAL lock - mint	offers
AHB Syncon A 28:24 c/w producers desk and patchbay	£5,000
TWEED 24:16 PPM's, P + G's, cost 26K new	offers around £8,000
BEL BC-38 channel, N.R.	£295
MXR 2 x 15 band EQ, as new, just reduced	£250
FOSTEX E2 1/4" stereo + centre track 15" One only	special price £1,995
FOSTEX E22 1/2" stereo + centre track 30" One only	special price £2,250
TEAC 80.8 with DX-8 dbx, immaculate	£1,495
TASCAM 38 new, shop-soiled	£1,595
TEAC 35-2 very nice 2TK	£795
QUAD 405 S/H	£175
BEYER M201 3 available, all mint	each £90
TASCAM 122 still in box - mint	£395
EMULATOR 1 mint condition, just reduced	£1,295
MEMORY MOOG mint, just reduced	£599
OTARI DP4050 master to two slaves	£1,995
KORG DVP-1 Harmonizer/Vocoder. Very under-rated and very under priced one ex-demo unit	£599
EASTMILL T2 monitor system	£2,500
STUDER A810 virtually new	POA
TEAC 3440 As new condition with remote	£650
JBL 4350 Monitors with x-overs. Ex-Amazon - bargain	£1,500
JBL 4312 Monitors ex-exhibition, full warranty	£575
JBL 4612 Compact PA cabs c/w tri-pod stands, one pair only	£785
STUDER B67 virtually new	POA
DYNAMIX 6:2 Mint, boxed	£145
GIBSON LES PAUL De-luxe black c/w Hard case	£395 inc VAT
FENDER RHODES Stage 73, Good condition	£250
AHB Sigma series consoles	from £12,196
AUDIO KINETICS Q-Lock 3:10 with various interfaces, virtually unused	£9,500

**Special Deals**

**SPECIAL PACKAGE DEAL**  
FOSTEX MODEL 80 + SECK 12 B 2 £2,250 + VAT  
FOSTEX MODEL 80 + SECK 18 B 2 £2,499 + VAT  
TASCAM 38 + RAM R10 £2,150 + VAT

**TASCAM SUPER DEAL**  
TASCAM 244 PORTASTUDIO + TEAC V343 mixdown cassette + Microphone + Headphones + TEAC 'wet' cassette cleaner + RC-30P drop in/out foot switch **£639 + VAT**

**AHB CMC Mk I SCOOP PURCHASE:**  
CMC 16 £1,395 (should be £1,695!)  
CMC 24 £1,950 (should be £2,395!)  
(all prices excluding VAT)

We have a number of these very versatile consoles left, however our advice is to order now to avoid disappointment

**PACKAGE DEAL**  
inc. Wiring Loom  
TASCAM 38 1/2" eight track + AHB CMC 16 Mk I (16 B 2) console (r.r.p. £4,823) **£3,600 + VAT & del**

**CLASSIC COMPRESSOR**  
AUDIO - DESIGN Gemini Easy Rider  
A number of shop-soiled units FULLY GUARANTEED inc r.r.p. £434 **£250 + VAT**

Preferred method of payment is by BANKERS DRAFT or BUILDING SOCIETY CHEQUE  
For normal cheques please allow 7-10 days for clearance before collection or despatch of goods. For instant next day despatch you may quote your credit card number over the telephone. (Minimum telephone order £50)  
All new products advertised carry full parts & labour guarantees - all warranty work carried out on the premises by our team of highly skilled & trained audio engineers

Loads more equipment in stock — we have gear coming in all the time.

Please note: the prices above do not include VAT

STUDIO HOUSE All major credit cards accepted. LONDON High Lane Village 4 Wellington Road, Stockport SK6 8AA St. John's Wood, Tel: 06632 4244. Telex: 665721 London NW8 Tel: 01-586 3167

Normal opening hours are 9.30 am to 6.00 pm Monday to Friday; 10.00 am to 2.00 Saturdays. If you intend to call at either of our premises we recommend you make an appointment first.





## ARE YOU A GOOD MIXER?

We are looking for a young, enthusiastic Film Sound Dubbing Mixer to join our small dubbing and transfer team based in Birmingham.

You will be working with the latest dubbing and transfer equipment, including NECAM 96/ALBRECHT VFS on a variety of programmes ranging from network film drama to local current affairs.

Applicants must be familiar with all types of sound synchronisation systems and equipment, have experience of working to broadcast standard and be prepared to work irregular hours.

Applications must be made on our official application form, obtainable by telephoning our answerphone service during office hours on 021-643 9898, extension 4344.

An Equal Opportunities Employer.

 **CENTRAL**

## SITUATIONS WANTED

**ENTHUSIASTIC MUSIC GRADUATE**, recently completed advanced multi-track course, two years' experience Clockhouse Studios, including some with Fairlight C.M.I., seeks position in studio anywhere, London area preferred. Tel: 01-671 0375 evenings. 199 Norwood Road, Herne Hill, London.

## STUDIOS TO RENT

**SOHO 3,000 SQUARE FEET**, 2 equipped studios, leasehold £4.00 per square foot, subject to contract. Tel: 0923 772351.

**STUDIO FOR RENT**. Ready to occupy. Audio post production suite 470 sq. ft., control room, v.o. booth, machine room and lobby. Rental at £9 per sq. ft. p.a. Islington Green. Tel: Doug Gleave 01-354 2082.

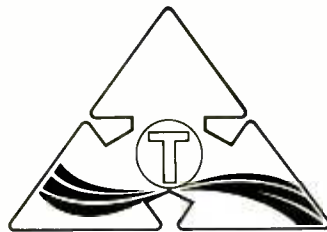
## STUDIO FOR SALE

### STUDIO FOR SALE

fully equipped 16-track studio  
South East Wales  
2 miles to M4

Contact **POWELL TUCK & PARTNERS**  
Tel: 0633 214447

## SITUATIONS VACANT



## JOIN THE TRILION TEAM

### Head of Sound

The Trilion group require a Head of Sound. This senior position will lead both outside broadcast and studio staff, therefore knowledge in both is essential.

Previous experience in both broadcast sound operations and organisational ability is essential.

Salary neg.

Applications with complete CV's should be sent to: Karen Lee, Trilion, 36-44 Brewer St. London W1.

**BUSY MONTREAL** recording studio needs qualified top maintenance engineer with good electrical and studio background. Salary based on qualifications. Send resumé to: Listen! Audio Productions Limited, 308 Place d'Youville, Montreal, Quebec H2Y 2B6, Canada.

**EXPERIENCED STUDIO ENGINEER**  
required by established Speech studio  
**LONDON, SE1**  
Tel: 01-231 0961

## BUSINESS FOR SALE

By Order of R. Hocking Esq. FCCA, of  
Stoy Hayward, Joint Administrative Receiver  
for THE GENETIC OPERATION LIMITED

## FOR SALE

### EQUIPPED SOUND RECORDING STUDIO COMPLEX — Streatley, Berks. —

Two 24-track and one 8-track studios with extensive outboards.  
Guitars, amps, synthesisers and grand piano including New Synclavier II with synthesiser.

Purpose built studios together 7 bed house and 3 bed bungalow, also offices and mess room on 22 acre attractive rural site — Freehold.

Contact: **C. J. C. Derry**  
Business Brokerage Division  
Brownlow House  
50/51 High Holborn  
London WC1V 6EG  
Tel: 01-405 8411

**HENRY BUTCHER**

## CLASSIFIEDS

IF YOU'RE NOT USING IT...SELL IT!

## THE BERTECH ORGANIZATION

YOUR NATIONAL CLEARING HOUSE FOR FINE USED AUDIO AND VIDEO

Our mailers reach thousands of professionals every month. We'll list your used equipment free of charge — or help you find that rare item you've been looking for.

## THE BERTECH ORGANIZATION

Distributors, brokers and custom fabricators of quality audio and video equipment

14447 CALIFA STREET, VAN NUYS, CA 91401  
(818) 909-0262 · Toll Free Outside CA (800) 992-2272

### INDEX TO ADVERTISERS

Abacus Electronics . . . . .102	EMT-Franz . . . . .105	Pro-Bel Ltd . . . . .127
ACO Pacific Inc . . . . .102	F. M. Acoustics Ltd . . . . .114	Rane Corporation . . . . .9
ADC Europe . . . . .113	F. M. Music . . . . .137	Rebis Audio . . . . .112
AKG . . . . .95	Fane Acoustics . . . . .71	Rycote Microphone Windshields .127
Allen & Heath/Brenell . . . . .12	Feldon Audio . . . . .132	SCV . . . . .106 & 107
Alpha Audio . . . . .135	For A . . . . .87	Saje . . . . .13
Amek Ltd . . . . .57	FWO Bauch Ltd . . . . .OBC	Scenic Sounds Equipment . .76 & 77, 101, 99
Ampex (UK) . . . . .125	Gateway . . . . .133	Schoepes . . . . .123
Applied Microsystems Ltd . . . . .105	Genelec OY . . . . .93	Simmons Electronics Ltd . . . . .IBC
Applied Research & Technology . .65	Hardware House . . . . .127	Solid State Logic . . . . .26 & 27
Asona . . . . .6	Harrison Information Technolog . .94	Sony Broadcast Ltd . . . . .59
Audio Design . . . . .51	Hayden Laboratories Ltd . . . . .108	Soundcraft Electronics . . . . .IFC
Audio Developments . . . . .105	HHB Hire & Sales . . . . .21, 23, 109	Soundtracs plc . . . . .111
Audio Kinetics . . . . .55	Hilton Sound . . . . .128	Sowter Ltd, E.A. . . . .135
Audix . . . . .61	J.B.L. . . . .69	Stage Accompany . .35, 37, 39, 41, 43
B.S.S. . . . .121	Keydial Ltd . . . . .6	Stepp Ltd . . . . .73
Bertech Organisation . . . . .146	Klark Teknik Research Ltd .32 & 33	Stesco . . . . .7
Beyer Dynamics . . . . .4	Lexicon . . . . .74 & 75	Stirling I.T.A. . . . .14 & 15
Branch & Appleby Ltd . . . . .137	Lyrec UK Ltd . . . . .131	Studiomaster . . . . .115
Bruel & Kjaer A/S . . . . .53	Mitsubishi Pro Audio Group . .10/11	Studio Spares . . . . .19, 104
Chromatics . . . . .103	Mosses & Mitchell Ltd . . . . .31	Stuven GMBH . . . . .132
Citronic Ltd . . . . .18	Music Labs Group Ltd . . . . .79	Surrey Electronics . . . . .146
Court Acoustic Sales Ltd . . . . .130	Nemesis Electronics Ltd . . . . .18	Syco Systems . . . . .46 & 47, 135
DBX . . . . .101	Neotek . . . . .89	Symetrix . . . . .8
Digital Creations Corp . . . . .133	Neve Electronics Labs Ltd . . . . .29	T C Electronics . . . . .130
Dolby Laboratories Inc . . . . .67	Nexo . . . . .85	Teac UK . . . . .49
Don Larking Audio . . . . .44 & 45	Northern Audio . . . . .129	Trad Sales & Services . . . . .136
Dorrugh Electronics . . . . .132	Orban . . . . .99	Turbosound . . . . .118, 119
Dreamhire . . . . .134	Otari . . . . .25	Valley People . . . . .81
Eardley Electronics . . . . .16, 17	Pangbourne Music Dist. . . . .16	Wandel & Goltermann . . . . .91
Eela Audio . . . . .8, 102	Paul Farrah Sound . . .133, 135, 137	
Electrospace Developments Ltd .129	Preco . . . . .117	

## PPM8

A high specification meter to  
IEC Type I (superceding DIN45406)



PPM8 displays a very wide dynamic range particularly suited to digital recordings. The attack and decay rates are faster than on Type II. PPMs and the display is more acceptable to committed VU users. The higher deflections given by low level sounds reduce the temptation for operators to gain ride unnecessarily while the unique scale law gives an even fall-back with good expansion where needed. Type II drivers available:

(1/7 or -12/+12 scaled)

PPM3 Unbalanced  
PPM5 20 pin DIL hybrid  
PPM7 Balanced, BBC licenced  
PPM9 Digital stereo

### SURREY ELECTRONICS LTD.

The Forge, Lucks Green, Cranleigh, Surrey GU6 7BG. Telephone: 0483 275997

*Studio Sound* is available without charge to qualified readers: these are directors, managers, executives and key personnel actively engaged in sound recording in any part of the world. The Publisher reserves the right to refuse applications considered inappropriate and restrict the number of free copies sent to any one company or organisation. Non-qualifying readers can buy *Studio Sound* at an annual subscription of £18.00. All enquiries to: Subscription Department, Link House Magazines, 120-126 Lavender Avenue, Mitcham, Surrey CR4 3HP. Published by the proprietors Link House Magazines Limited, Link House, Dingwall Avenue, Croydon CR9 2TA and printed by Lawrence-Allen Ltd., Gloucester Street, Weston-super-Mare, Avon BS23 1TB.



# THE NEW STANDARD IN PROFESSIONAL ELECTRONIC PERCUSSION

The process of playing and recording drums has changed dramatically since the Simmons SDS5 burst onto the scene earlier in the decade. Terms such as "sampling" and "sequencing" are as much a part of the modern drummer's vocabulary as "shell" and "head".

This has raised a number of important questions. Are the traditional skills of the drummer being overlooked? What does the future hold for drummers in the face of ever more sophisticated drum machines?

At Simmons we have dedicated ourselves to one objective—the furtherance of the drummer's art through the application of high technology to the instrument.

Our greatest achievement is the SDX—the new standard in professional electronic percussion.

Its drum and cymbal sounds are constructed from groups of high quality samples, subtly controlled by instructions from "Zone Intelligent" pads.

Using ultra-sensitive, force sensing materials, these pads detect not only the dynamic but the precise point of impact of each stroke. This provides a degree of player control not previously associated with electronic percussion.

SDX is a 16 voice, 10 piece kit with an unparalleled range of features.

16 bit sampling with variable sample rate up to 44.1 KHz.

Integral disc drive.

Expandable memory up to 8 megabytes of RAM (88 seconds of sampling at 44.1 KHz).

A "SCSI" port to access hard disc drives.

Extensive sample manipulation, cross fading and layering facilities.

Integral VDU for detailed display of complex graphics, waveforms etc.

A "Tracker Ball" to control a user friendly, menu driven programming format.

A growing library of "drum discs", created by some of the World's leading drummers and producers.

A fully assignable MIDI interface.

A digital recording package to be released later in the year for real time recording and on screen editing of drum parts with SMPTE chase/lock.

Dynamic key pads for "drum machine" type programming.

A sound analysis package for release later in the year allowing complex waveform analysis and on screen manipulation of samples.

Sound quality—player control—simplicity of use.

A total percussion system for the professional drummer from the original name in electronic drums.

**Now more than ever, Simmons have put the musician in control of the machine.**

Simmons Electronics Limited, Alban Park, Hatfield Road, St. Albans Herts AL4 0JH. Tel: (0727) 36191 (5 lines).

Simmons Electronics GmbH, Emil-Hoffman-Straße 7a, 5000 Köln 50. Tel: 022 366 76 66.

Simmons USA, 23917, Craftsman Road, Calabasas, Ca. 91302. Tel: 818 884 2653.

Simmons Japan, Beluna Heights 1B-1, 4-11, Hiroo 5-chome, Shibuya-ku, Tokyo, Japan 150. Tel: 03 440 0991

**SIMMONS**





# The New Business Machine



Running a business efficiently and profitably is a difficult enough job. Any new tool that will help to achieve profit and encourage new business has to be a good investment. The new STUDER A820 Multi-track is your New Business Machine. Working economies derive from benefits like:

#### **Integral Noise Reduction**

Installation costs are reduced. The A820 is the first multi-track to incorporate Dolby A/SR or Telecom NR processors.

#### **Automated Alignment**

Eliminates time wasted lining up between sessions by on-board storage of all alignment data including NR levels.

#### **New Amorphous Metal Heads**

Dramatic reduction in head wear coupled with a higher output to give better S/N ratio.

#### **PCB Compatibility**

The audio electronics of the A820 Multitrack use the well established PC Boards of the A810, A812, A820 family.

#### **Removable meter bridge**

Efficient use of serial communication means that the complete metering package and channel selection can be relocated within easy reach of the engineer.

#### **The new STUDER A820 Multitrack offers:**

Spooling speeds up to 15m/sec. Full serial communication EBU/SMPTE bus compatible; 3 speeds 7.5, 15 and 30 ips including Dolby HX PRO; Compact size; Low power consumption—No fans; High resolution bar graph metering with expandable scale for alignment.

If you want to take advantage of the New Business Machine contact your local STUDER representative for the full story.

**STUDER**  
INTERNATIONAL AG  
CH-8105 Regensdorf Telephone (01) 840 29 60

