

APRS 82

INTERNATIONAL PROFESSIONAL RECORDING EQUIPMENT

A.C. Electronic
Ampex GB Ltd
Alice (Stancoil)
AKG Acoustics
Audio & Design
Audio Developments
Audix
Audio Kinetics
Atlantex Music
Agfa Gevaert
Allen & Heath Brenell
Avcom Systems
Advance Music Systems
Audio Video Marketing
BASF United Kingdom
Bruel & Kjaer (UK)
F.W.O. Bauch
Beyer Dynamic (GB)
Cetec International
Clive Green & Co
Canford Audio
Calrec Audio

Cliff Electronics
Clyde Electronics
Dolby laboratories
Eardley Electronics
Eela Audio International
Electro-Voice (Gulton Europe)
F.M. Acoustics
Fraser Peacock Associates
Feldon Audio
Formula Sound
Future Film Developments
Gresham Wood Industries
H.H.B. Hire & Sales
Harman (Audio) U.K. Ltd.
Hayden Labs
H/H Electronic
Hill Audio
Industrial Cassette Developments
Industrial Tapes
International Musician
James Yorke
Jackson Music Group

WED THURS FRI
JUNE 23 24 & 25
10.00 to 18.00 hours 10.00 to 17.00

EXHIBITION

KENSINGTON EXHIBITION CENTRE
KENSINGTON, LONDON

Klark-Teknik
Keith Monks
Lindos Electronics
Lyrec Manufacturing
Lennard Developments
Leevers-Rich
3M (UK)
Music Lab
Mosses & Mitchell
M.C.I.
Magnetic Tapes
Midas Audio
Neve Electronics
Otari Electronic Co
Penny & Giles
Philip Drake Electronics
Precision Audio
Radio Month
Raindirk
Rebis Audio
Recording Studio Design
Roland

Soundcraft
Surrey Electronics
Shure Electronics
Sony (UK)
Studio Sound
Scenic Sounds
Solid State Logic
Sifam
Sonifex Sound Equipment
Tannoy Products
Theatre Projects
Toa Electric Co.
Trident Audio
Tweed Audio
Trad Electronics
Turner Electronics
Turnkey
Vitavox
Walter Luther
Zonal

Tickets: APRS, 23 CHESTNUT AVENUE, CHORLEYWOOD WD3 4HA, ENGLAND

RAINDIRK 400 SERIES BROADCAST SYSTEM CONSOLE

A new range of consoles designed for studio and OB use. High quality and flexible format with comprehensive facilities. The system may be adapted to meet individual requirements, i.e. separate patch bay and reduced mixer profiles for OB requirements. Performance exceeds IBA requirements.

BRIEF DETAILS

10 to 36 inputs 4 to 8 group outputs and one master group output to line and programme. 2 auxiliaries, 1FB, one reverb send and return. 2 compressor/limiters and telefx unit.

Input levels -80dBm to +10dBm

Output levels +24dBm (+26dB nominal)

Frequency response (-1dB points) 20Hz to 20kHz

Crosstalk at 20kHz better than -90dB between group outputs -80dB between auxiliary outputs

Balancing Inputs and outputs fully balanced via transformers

Fader insert points are electronically balanced

Noise: Mic, better than -127dB referred to input at gain of 60-80dB

Line, better than -90dB noise output at zero gain through the system

Distortion better than .16% at +8dBm output at 20Hz, typically better than .02% at 1K and 20kHz.



**SEE AT AES MONTREUX
STAND F**

RAINDIRK LIMITED, Downham Market, Norfolk

Tel. (0366) 382165/3823617

Telex 817737 RAIN DK G

APRS REPORT

successful *TSM Series*. Featuring a 32 into 24 group format with separate monitoring, the console has 4-band eq including two swept mid-ranges, five aux sends, separate mic and line inputs, separate stereo remix buss, electronically balanced line inputs, and electronic relay-less switching. Other features include compact size (only just over 7ft for the 32-24 frame), +24dBm output capability, fully modular patchbay with 512 patch points, bargraph LED metering, and the capability of automation using the Fadex/Trident system. The *Series 80* is available in any input/output configuration and for a fully equipped 32/24 console without automation (which can be retrofitted at any time) costs approximately £19,000. In addition to the *Series 80*, Trident also showed their *Fleximix* system which is being successfully used in a number of West-End theatres as well as its many other applications.

Soundcraft Electronics were showing a number of interesting products including a new console series. The new consoles designated the *Series 400* are modular 4-group, 8-track monitoring consoles available in 12/18/26 input configurations with four output and stereo remix busses. The input channels feature separate mic and line gain controls, phantom power, phase and line input switches, 4-band eq with sweepable frequency low and high-mid bands, three aux sends and long travel faders. Metering is by LED bargraph meters and the aux master module is fitted with a line up oscillator. High quality German-manufactured detent potentiometers are used throughout. Prices of the *Series 400* start from about £2,500, and the 18/4 configuration costs approximately £3,250. Soundcraft also had on display their modular *Series 1600* console system which features submaster and monitor channels separately located from the input channels. These consoles also allow the group/monitor channels to be divided into two sections thus allowing creation of a submaster with or without aux sends and pan, plus an effect return with 3-band eq, again with or without aux sends and pan. The *Series 1600* is available in a 16/16 configuration from £6,700 and in a 24/16 configuration from £8,500, either version offering excellent value for money. In addition to these consoles, Soundcraft also showed their *Series 3B* console which is a revised version of the *Series 3*.

On the subject of value for money, Malcolm Hill Associates were showing the new *K Series* of consoles. Represented by a 24/16 console the *K Series* are extremely neat modular consoles and feature free group selection 4-band eq, plus four independent aux sends and LED level indication on each channel. In addition the console has P & G faders, conventional metering and a separate monitor mix. A wide choice of options are available within the standard format and the company is willing to provide custom modifications at a low cost. The company additionally guarantees the consoles for five years for all parts except those parts which are subject to normal wear and tear. Prices of the *K Series* start from £4,000 for a 16/4 model with a 24/16 model costing approximately £6,000, while a 32+8/24 console costs approximately £11,000.

Clive Green & Co have been appointed UK distributors for the Enertec range of consoles and tape recorders. Most readers will recall



Above:
Malcolm Hill
stand
the new *K*
series rather
prominent
in the foreground

Right:
Wrap-round
console based
on the *MXT-1000*
from Audix



that Clive was previously MD of Cadac (London) Limited, and in addition to his involvement with Enertec he offers a studio consultancy service.

Magnetic Tapes were showing their new *Chilton QM2* range of consoles available with 12 to 24 inputs, 4 outputs and 8-track monitoring, or with 16 to 24 inputs, 8 outputs and 16-track monitoring. The consoles are fitted

with standard or parametric eq, full sweep high and low pass filters, peak reading VU meters with LED overload, push button channel assignment, and 48V phantom powering.

APRS saw the introduction by Audix of their ILR on-air console package. This comprises a specially designed "wrap-round" console based on the popular *MXT-1000* range. The console is comprehensively equipped for mono and stereo monitoring and incorporates clean-feed outputs and outside source switching facilities. Being marketed as a standard package the console makes it much simpler for ILR stations to be equipped at a reasonable cost and without the necessity of extensive custom building. Typical price for a package based on the *MXT-1000* is approximately £5,000.

Amek showed their *M 3000* VCA-assisted in-line console intended for 24/32/48-track recording. The standard console is a 36 input desk offering simultaneous quad, stereo and mono mixes from 32 tracks, with dc sub-grouping of VCA-assisted channel and echo return faders. Each input has a mic and two differential line inputs, variable 4-band para-

48 ▶

STEREO DISC AMPLIFIER 3

A reference amplifier for disc monitoring and transfer when replay signals of the highest quality are required.

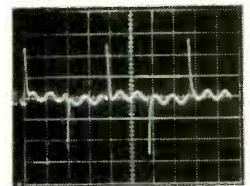
Based on the Surrey Electronics Disc Amplifier 2 and manufactured under licence, two unbalanced outputs are provided enabling Line and DIN level inputs to be driven simultaneously. To facilitate cartridge matching, a wide range of switchable load capacitance and resistance values are provided, together with left and right 20 turn gain presets.

DYNAMIC INTERMODULATION DISTORTION

It is widely recognised that two pieces of equipment may have the same Total Harmonic and Static Intermodulation distortion performance yet sound quite different. Remaining distortion is attributed to transient distortion effects and these can be quantified with a combined square wave and sine wave test signal. The signal used consists of a 3.18kHz square wave through single pole —3dB at 100kHz plus 15kHz sine wave, 4:1 amplitude ratio. The signal after pre-emphasis is shown above. Distortion in the equipment under test will produce sum and difference products and the RMS sum of those below 15kHz quoted relative to the amplitude of the 15kHz sine wave is the Dynamic Intermodulation Distortion.

High (Line) output: Loaded with 10kΩ, 1kHz at —44dBV.7 (5mV) set for 0dBV.7 output.
Pre-emphasised input 500mV pk-pk —70dB, 0.03% measurement limit.

Price: cash with order, UK postage and 15% VAT inclusive £169



Dominus P.O. BOX 1, CRANLEIGH, SURREY. Tel. 04866 6477

Music Laboratory move

The Music Laboratory, official Revox dealers for London, have moved. The company announce the installation of a 'fully equipped' demonstration studio, and the expansion of stock and service areas. Their new address is 74 Eversholt Street, London NW1, UK. Phone: 01-388 5392.

Profit news from LBC

LBC chairman Sir Geoffrey Cox announced an interesting news item at the company's AGM recently. For the first time in its three years of operation, LBC made a profit in the last fiscal year—£50,000 compared with a loss of £132,000 in the previous year. The figure includes transmitter rental from the IBA of some £200,000, waived in the first 18 months of LBC's operation. And things are looking up with the news that over £100,000 surplus has been generated in the first seven months of the current year. Pats on the back went, predictably, to just about everybody but with particular emphasis on radio sales and marketing, which took over all LBC's sales of national and local advertising at the beginning of the successful fiscal year.

Hill amplifiers

Malcolm Hill Associates introduced a new range of amplifiers at APRS, just after our Amplifier Survey had gone to press last month. Two models are available—the *DX700* offers 310W into 8 ohms, 530W into 4 ohms or 700W into 2 ohms from each of the two channels, while the smaller *DX140* provides 80W into 8 ohms and 130W into 4 ohms, per channel. Distortion at 1kHz into 8 ohms is 0.005% and 0.04% at all levels up to rated output. The amplifiers features a high efficiency toroidal power supply, AC coupled driver stage and only require force cooling when driving into loads of 4 ohms or less. Connectors are XLR for both inputs and outputs. Prices range from £395 for the *DX700* with VU meters to £195 for the *DX140* without meters. Malcolm Hill Associates, Sales Office, 6 Lillie Yard, 19 Lillie Road, London SW6 1UD. Phone: 01-381 3446.

Sony Broadcast

Having operated briefly from Holland, Sony Broadcast has now moved its European marketing operation to Basingstoke in England. The new headquarters

Digital disc

The latest developments from the Philips Eindhoven wizz kids have produced more than a minor stir within the music industry. The talking point is the digital-based *Compact Disc* domestic record replay system which is basically an audio version—albeit with a much smaller 11 cm record—of the Philips video disc system.

Although no one has yet officially heard the system in action, the claimed dynamic range of 85 dB puts it quite a long way ahead of conventional microgroove records. In spite of the small size, Philips states that playing times in excess of an hour are quite possible. Further, heavy bass modulation does not reduce the playing time.

The system encodes the programme material as a 14-bit serial digital code in a linear format; no comparison is employed. There have been no statements about pre-emphasis although it seems likely that a top end time constant is used.

Leaks of information suggest that the pulse train is recorded as a series of vertical depressions on the vinyl playing disc. The system reads these pits in the surface through a process of interferometry using coherent Ga/As laser light. As such, the pickup arm incorporates a mini laser in conjunction with a suitable photodiode. The assembly tracks the radial position of the modulation depressions through purely optical means; the record has no grooves as such. Because there are no grooves, the record can carry a completely flat playing surface. This enables the disc to carry a protective lacquer surface layer making it immune to all the usual things that kill records such as cigarette ash, coffee and fingers.

Playback equipment comprises

will also house advance research laboratories, sales administration and customer training. A separate warehouse is to be constructed additionally. Although Sony Broadcast are initially concentrated on the new range of high quality *U-Matic* video cassette recorders and cameras for broadcast television, doubtless products of interest to the audio industry will eventually arrive.

Sony Broadcast BV, City Wall House, Basing View, Basingstoke, Hampshire, UK. Phone: 0256 55011. Telex: 858424.

a turntable which has a varying rotational speed depending on the pick up arm radius; this is to maintain a constant tangential modulation velocity. A digital processor and d-to-a converter sorts out the channels in a stereo format.

Record manufacture is very similar to that of conventional records. One would assume that the usual mastering lathe has to be replaced by an optical laser cutter to place the modulation with sufficient precision. However, the production of a metal mother with the subsequent vinyl pressing follows traditional patterns. There is an extra process to coat the discs with the protective lacquer.

Philips estimates that the cost of the software 'will be comparable to existing microgroove records'. Likewise, the disc player will have a similar price tag to an up-market record turntable. At present the one-hour records are single-sided, although there is a prospect of double-sided software.

If proved viable, the *Compact Disc* system will pose more than a few problems for both recording studios and the record companies. The former will have to invest in expensive—and as yet rather scarce—digital recording equipment, if only to match the apparent potential of the new system. The latter will have to sort out the problems of treble inventory (conventional discs, cassettes, compact discs and did somebody mention quad?) not to mention the extra funding required for new record manufacturing plants.

Most people will have to wait until 1980 before they can make their own subjective judgments on the system. However, it would appear to have much more of a chance than four-channel sound ever had.

Frank Ogden

SAM82 portable mixer

SATT Elektronik AB of Stockholm has introduced a small mixer with eight mic/line inputs and two main outputs which has been finding applications in Nordic broadcasting organisations. Each channel has a female XLR connector, with 48V phantom, switched sensitivity, phase reversal, low cut, HF and LF EQ, pan, cue output (pre or post), and echo or PA output. In addition to these eight mic/line inputs, there are two echo return channels and two monitoring inputs

which feed the monitoring switch. Outputs include two separately floating outputs from each of the two master channels, aux outputs for cue and echo, talkback out and a 32-way multipin connector with bus bars, inserts in master channels, test tone output, inputs to monitoring blocks and internal voltages. Two monitoring blocks switchable to master channels, monitoring inputs or the aux outputs, each have a PPM, XLR output and medium impedance headphone outlet (stereo). Other facilities include a 1kHz test tone generator and optional battery operation from 15 HP2s. Basic price is Swedish Kroner 19,000. SATT Elektronik AB, Box 32006, 12611 Stockholm 32, Sweden. Phone: 08 810100.

AWA test instruments

Marconi Instruments is now importing a new range of Australian test equipment from Amalgamated Wireless (Australasia) Ltd. The range includes the *G232* low distortion audio oscillator which offers a claimed distortion specification of 0.001% (-100dB) and provides a digital readout of frequency in the range 10Hz to 110kHz, the *F242A* distortion and noise meter featuring fully automating frequency nulling, distortion measurements to below 0.005% and -110dBm to +32 dBm level capability. Numerous accessories are available including weighting networks and AM detectors. Two other units are the *A248* wow and flutter meter which meets DIN, IEC, IEEE and ANSI standards with weighted or unweighted measurements, while the *E247* level meter psophometer reads true rms and quasi-peak for signal level, noise and psophometrically weighted noise and incorporates various weighting networks.

Amalgamated Wireless (Australasia) Ltd, 422 Lane Cove Road, North Ryde, New South Wales, Australia. Phone: 888 811. Telex: 20623.

Marconi Instruments Ltd, Longacres, St Albans AL4 0JN. Phone: 0727 59292. Telex: 23350.

EMS/Feldon deal

The full range of synthesisers and vocoders manufactured by Electronic Music Studios of Oxford are now being marketed in the UK by Feldon Audio, 126 Great Portland Street, London W1N 5PH. Phone: 01-580 4314. Telex: 28668.

APRS 80

WED THURS FRI
JUNE 18 19 & 20

10.00 to 18.00 hours

10.00 to 17.00

**INTERNATIONAL PROFESSIONAL
RECORDING EQUIPMENT**

EXHIBITION

CONNAUGHT ROOMS, GT. QUEEN ST., KINGSWAY, LONDON

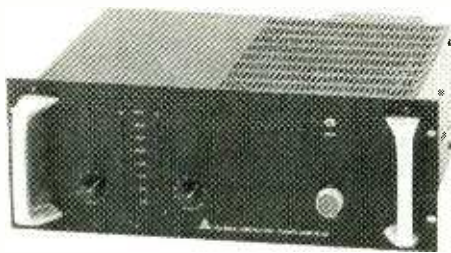
Advanced Music Systems
Audio Developments
Audio & Design
AKG Equipment
Audix
Allen & Heath
Ampex
Alice (Stancoil)
Agfa-Gevaert
Amek
Atlantex Music
Audio Kinetics
Avcom Systems
F.W.O. Bauch
BASF
B & K Labs
Beyer Dynamic
R. Barth
Brodr Jorgenson
Carec Audio
Cetec International
Covemain
CB Electronics
Court Acoustics
Clive & Green
Canford Audio
Cassette Dup. Supplies
Capital Components
C.A. Audio
Dolby Labs
Design Electronics
Don Larkin Audio

EMI Tape
Eardley Electronics
Enertec Schlumberger
Future Film
Feldon Audio
Fraser-Peacock
Fitch Tape
Formula Sound
FM Acoustics
Gulton Europe (Electro-Voice)
H/H Electronic
Hayden Labs
Harman Audio
HHB Hire & Sales
Industrial Tapes
International Musician
Jackson Rec. Studios
James Yorke
John Page
Kark-Teknik
Keith Monks
Lennard Developments
Lockwood
Leevers-Rich
Lee Engineering
Lyrec
Leeholme Audio
3M
Magnetic Tapes
Midas Audio
MCI
Maglink

Mosses & Mitchell
Malcolm Hill
Music Laboratory
Neve Electronics
NEAL-Ferrograph
Otari
Pyrat Magnetics
Penny & Giles
Philip Drake
Racal-Zonal
Recording Studio Design
Raindirk
Shure Electronics
"Studio Sound"
Scenic Sounds
Soundcraft
Sifam
Soundex
SES Studio Equipment
Sony (UK)
Solid State Logic
Tannoy
TRAD
Turnkey
Toa Electric
Tweed Audio
Trident Audio
Turner Instruments
Vitavox
Wayne Kerr (Wilmot Breeden)
Walter Luther

Tickets: APRS, 23 CHESTNUT AVENUE, CHORLEYWOOD WD3 4HA ENGLAND

APRS preview



▲ High speed Sony cassette copier from FPA

◀ FM Acoustics FM800A power amp

●**Capital Components:** range of bargraph visual displays available with various scales and in VU and switchable VU-PPM styles. ●**Cassette Duplicating Supplies:** Crowmay loop-bin and in-cassette duplicating systems and an automatic cassette winder. ●**CB Electronics:** plug-in multi-track modular electronics available as a comprehensive system. ●**Cetec-Gauss:** 1200 Series high speed cassette duplication system which includes a microprocessor for constant system performance surveillance; range of fully automatic and semi-automatic cassette loaders from **King Instruments;** new higher power handling Gauss loudspeakers; range of stereo electronic crossovers including a new 5-way model; and a new instant start broadcast turntable. ●**Clive Green & Co:** multitrack in-line console for recording or broadcast use, developed in cooperation with **Enertec.** ●**Court Acoustics:** range of studio monitoring systems and associated equipment including full range of **BGW** power amps, plus equalisers and analysers from **Neptune Electronics.** Also the company's range of electronic crossovers and the **GE60** stereo 30-band 1/3-octave graphic equaliser. ●**Covmain:** **RCF AFSAI** 1/3-octave realtime spectrum analyser; range of professional loudspeakers and compression drivers; a new studio monitor enclosure; and a range of mics.

●**Design Electronics:** **Cuemix** studio foldback system. ●**Dolby Laboratories:** range of professional Dolby-A noise reduction units, including the **Cat 155/255** units for videotape recorders, and the **CP-200** for the reproduction of encoded stereo films. Also details of the Dolby FM system and the **HX** headroom extension system. ●**Don Larking:** details of the company's new and used equipment retail operation. Also **BEL** flangers and noise reduction units.

●**Eardley Electronics:** **Neutrik Audiotracer 3201** audio response analyser; **AD-4** analogue delay line; plus audio connectors and modular in-line components. ●**Electro-Voice:** full range of professional mic and loudspeaker systems, plus mixers and amplifiers from sister company **Tapco.** New products include the **Tapco C-12** mixer and the **XEQ-1** electronic crossover/equaliser from Electro-Voice. ●**EMI Tape:** range of professional and duplicating audio tapes; plus cassettes and accessories. ●**Enertec:** **UPS-4000** series 24-track automation ready console; **UPS-5000** and **UPS-5100** consoles; **F-462** series of tape recorders; **GCE-4000** series of solid state switching grids; and a cassette broadcasting system.

●**Feldon Audio:** wide range of products including **Syntovox** vocoders; **Pulse Designs Tempo-Check Studio 100** programmable metronome; **Inovonics Model 500** acoustic analyser; **Ursa Major SST-282 Space Station** digital reverb system; **Ortofon** disc cutting equipment; and

Eventide Harmonizers, delay lines, effects units, and realtime spectrum analyser for home computer interface. ●**Fitch Tape Mechanisms:** **T250** range of NAB 'A' cartridge record and playback machines; **T100** replay machine; **T101** record/replay machine; and **T70 Cartette** machines. Also **Audiopak** cartridges and the company's range of **BGM NAB 'C'** cartridge machines for background music installations. ●**FM Acoustics:** **FM 600A** and **FM 800A** power amplifiers. ●**Formula Sound:** **S19G** 2-channel, 1/2-octave, 19-band graphic equaliser and **SG19A** equaliser/analyser. ●**Fraser Peacock Associates:** new high speed cassette copier, plus details of the company's cassette duplication service. ●**Future Film Developments:** comprehensive range of cables, cords, connectors, jackfields, wiring aids and associated components, plus a wide range of audio accessories.

●**Harman Audio:** **JBL** range of monitor loudspeakers and **7510** automatic mic mixer; plus complete range of **Teac-Tascam** units including mixers, tape recorders, and the new **Portastudio** 4-channel mixer/cassette deck. ●**Hayden Laboratories:** **Nagra** portable tape recorders including the new **TRVR** logging recorder; **Sennheiser** mics and headphones including the new **Mikroport** radio mic system; **Sondor** film sound equipment; and **Telefunken** tape machines including a new autolocator for the **M15A.** ●**HHB Hire & Sales:** **Crown/Amcron** amplifiers including the **PSA-2** and **SA-2** self-analysing power amplifier; the **RTA-2** realtime analyser; and the **Badap 1** programmable audio measurement system from **Barclay Analytical.** ●**HH Electronics:** **TPA Series D** and **S500D** professional power amplifiers and the company's **MOSFET** power amps. Also electronic echo units and portable stereo sound control mixers. ●**Malcolm Hill Associates:** new **J Series** modular console, plus the company's **DX** range of amplifiers.

●**ITAM:** **Model 1610** 1in compact 16-track recorder with modular electronics and full function remote control; **Model 806** 1/2in 8-track recorder; and the **10-4** and **Model 882** mixers. Also the **Stocktronics** stereo echo plate; **Revox** mixdown recorders; **dbx** noise reduction; and **Otari** multitrack recorders and cassette copiers. ●**Jackson Recording:** details of the company's used equipment retail operation. ●**John Page:** **Stellavox** range of portable recorders and mixers including the **SP8** stereo/mono recorder.

●**Keith Monks (Audio):** professional and semi-professional record cleaning machines; **Model LS-19** monitor loudspeaker with built-in 10W amp; wide range of audio accessory equipment; and **EDC** radio mics. ●**Klark-Teknik:** new **DN60** 1/3-octave realtime spectrum analyser; plus the **DN27** and **DN22** graphic equalisers; **DN70** digital delay line and **DN71** controller; and the **DN34** analogue time processor.

●**Lee Engineering:** **Ampro** cartridge recorder/replay units; **Audi-Cord 100 Series** cartridge recorder/replay units; **McKay Dymek** communications receivers and broadcast equipment; **TFT** AM and FM modulation extenders; and the **Optimod-AM** and **Optimod-FM** units from **Orban.** ●**Leeholme Audio Services:** details of the company's cassette duplication services.

●**Leevers-Rich:** **Proline 1000** 1/4in professional recorders including the **Proline 1000L**, a new slow speed logging version; **Proline 2000TC** recorder now available with a microprocessor controlled programmable autolocation unit; and the company's demagnetisers, bulk erasers and magnetometers. ●**Lennard Developments:** complete range of **Woelke** professional record, playback and erase heads; plus wow and flutter meters, wave analysers, and bias/distortion meters. ●**Lockwood:** representative units from the company's loudspeaker enclosure ranges and from its monitor loudspeakers. ●**Lyrec:** new-look externally redesigned **TR532** 24-track tape recorder and **ATC** remote controller. Also the company's high speed cassette duplicating system and a new 1/4in recorder.

●**3M:** 32-track digital mastering system; plus 4-track digital recorder; digital delay disc cutting preview unit; and digital editor. Also the **M79** multitrack recorder; **Wollensak** cassette duplicators; and **Scotch** audio tapes including **Scotch 265** digital mastering tape. ●**Maglink:** programmable synchronisation system using **Maglink** code; various accessory equipment including generators, readers, an **SMPTE/EBU** to **Maglink** interface, and a new **EBU** timecode reader with video character insertion and regeneration capability. ●**Magnetic Tapes:** **Chilton** portable mixing desks and the **QM2** range of consoles. ●**MBI Broadcast Systems:** **Series 24A** broadcast/production modular mixer and details of the company's turnkey design and installation service. ●**MCI:** **JH-600** console; **JH-500C** console; **JH-50** automation; **JH-45** synchroniser **JH-24** multitrack; and the **JH-110 Series** recorders in various configurations. Also the **Autolock III** and **RTZ III** locating devices.

●**Midax:** **PR System** mixing consoles in a variety of input/output configurations for sound reinforcement, on-stage monitoring, recording and production applications. Also the recently introduced **TR System** modular theatre consoles available in 24, 30 and 36 into 8-8 formats. ●**Mosses & Mitchell:** range of jacks and jackfields including the **440** range of miniature jack sockets and jackfields. ●**Music Laboratory:** **PSE** range including an echo-reverb plate, spring reverb, **D1** boxes, phantom power supplies, and equipment racks. Also range of amplifiers from **QMI.**

●**NEAL-Ferrograph:** new **Ferrograph Pent-house Studio 8** tape recorder designed for broadcast use; new **NEAL Model 312** stereo cassette recorder with **Dolby HX;** **SP74** 4-channel logging recorder; **Edit 7** replay only editing recorder; **SP7** 1/4in recorder available in a number of customised versions; plus the company's other tape equipment and its audio test units. ●**Neve:** **Model 8108** 56/48 console with microprocessor controlled assignment facility; **Model 5316** broadcast production console; **542** range of 8, 12 and 16-input consoles; the **Necam** fader system; and details of the company's custom and turnkey services.

●**Otari:** **MTR-90** 2in, 16/24-track multitrack recorder; **MX5050** and **MX7800** tape recorders; and the **DP4050** cassette duplication system.

●**Penny & Giles:** first UK showing of the company's digital fader with 8-bit digital output;

APRS preview

mixer and the *QUE-4* studio foldback system. ● **Fraser Peacock Associates:** extensive range of *Sony* and *Wollensak* cassette duplicating equipment; the company's range of blank audio cassettes; plus details of the company's cassette duplication service. ● **Future Film Developments:** comprehensive range of cables, cords, connectors, jackfields, wiring aids and associated components; plus a wide range of audio accessories including 19in racks. Also *Soundex* meters and illuminated studio signs.

G

● **Clive Green & Co:** Cadac multitrack in-line consoles available with modules suitable for broadcast or recording applications. Also a wide selection of ancillary units. ● **Gresham Wood:** range of standardised wood consoles and cabinet racks; plus details of the company's custom building service.

H

● **Harman (Audio) UK:** *JBL* range of monitor loudspeakers and drive units including the recently introduced *4430* and *4435* bi-radial studio monitors. Complete range of Teac Tascam units including the recently introduced *Series 30* 2-, 4- and 8-track tape machines and 8-track mixer. Also the new *Model 244 Portastudio* 4-track mixer/cassette unit. ● **Hayden Labs:** wide range of products from *Nagra*, *Sennheiser* and *Telefunken*. Highlighted products will include the *MX-80*, *MX-80A* and *MX-800* digital tape machines and *MXE-1* digital editor from *Telefunken*; the recently introduced *Nagra TA* tape recorder; and from *Sennheiser* new additions to the range of electret mics and the latest version of the *Mikroport* wireless mic system with *Hidyn* noise reduction. ● **HHB Hire & Sales:** *Crown/Amcron* range of amps and active crossovers, plus the *PZM* range of mics. Also the *Gauss* range of professional loudspeakers and drive units including the recently introduced studio monitors. ● **HH Electronic:** *TPA Series* and *S500D* professional power amps and the company's *MOSFET* power amps. Also electronic echo units and portable stereo sound control mixers. ● **Hill:** *DX Series* of power amps, plus the new *B2 Series* modular mixer, *J2 Series* modular sound reinforcement console, and *M2 Series* on-stage monitor console.

I

● **Industrial Cassette Developments:** *Graff* range of cassette format tape machines including the *HSCD* high speed cassette duplicator and *JM* cassette jingle machine. ● **ITA:** equipment from *Itam*, *Otari* and *D & R* will be shown. New products will include the *Itam Stereo 8 8/2* mixer; the *Itam Location Mixer* PA mixer available in 8/2 and 16/2 configurations; the *Itam 1200 Series* 12/4 mixer with 8-track monitoring; the *Itam Sigma Mk II* 18/8 mixer with 16-track monitoring; an 8-track 1in version of the *Itam 1610* tape machine; the *Otari MTR90-II* 2in multitrack tape machine; the *Otari MkIII-8* 1/2in 8-track tape machine with full function remote and microprocessor controlled transport; and a range of modular signal processing equipment from *D & R*.

J

● **Jackson Recording:** details of the company's

used equipment retail operation. ● **James Yorke:** details of the company's cassette recording, production and packaging services; its tape coating and tape slitting operation; and micro-computer program duplication service.

K

● **Keith Monks:** new studio turntable unit; producer's playback turntable; wide range of mic stands; *LS1/9* monitor loudspeaker with built-in power amp; plus record cleaning machines. ● **Kelsey Acoustics:** *NG4* 4-channel rack mount noise gate; flexible multicore stage boxes; the *Missing Link* multiple crosspatching stereo unit with in-built cable test facility; the *Telex Audiocom* intercom system; plus a wide variety of ancillary equipment including *Swan* mic stands, various connectors, mic splitters and DI boxes, and the *Yamaha* range of power amps and crossovers. ● **King Instruments:** self-feed cassette loaders and various video tape loaders. ● **Klark-Teknik:** wide range of graphic equalisers and effects units; plus the recently introduced *DN772* stereo digital profanity delay unit. Also the *DN60* realtime spectrum analyser and *DN80* 16-bit realtime audio computer.

L

● **Leavers-Rich:** *Proline 2000TC* and *Proline 1000* 1/4in tape machines; plus *Garner* bulk erasers; *Tomcat* cart machines; and *BMX* broadcast consoles. ● **Lennard Developments:** complete range of *Woelke* professional record, playback and erase heads; plus wow and flutter meters, wave analysers, and bias/distortion meters. Also recently introduced cue-track heads for 1/4in tape usage. ● **Lindos Electronics:** *LA1* audio analyser test unit and the *LR1* turntable test unit. ● **Lyrec:** *TR55* 1/4in tape recorder; *TR532* multitrack recorder and *ATC* remote controller; and the *P-2000* high-speed cassette duplicator.

M

● **3M:** 32-track digital mastering system and 4-track digital recorder; digital delay disc cutting preview unit; and digital editor with crossfade facility. Also *M79* 24-track analogue recorder; *Wollensak* cassette duplicators; and *Scotch* audio tapes including *Scotch 265* digital mastering tape. Additionally, new *Scotch 226* audio mastering tape. ● **Magnetic Tapes:** *Chilton* portable mixing desks and the *QM2* range of consoles. ● **MCI:** introduction of the *JH-800*, a compact portable general purpose 12 channel audio console. Also a variety of consoles, tape

machines and autolocates. ● **Mega:** range of sound reinforcement loudspeakers and cabinets. Also the *AV60* active loudspeaker enclosure. ● **Midas:** *PR System* consoles for sound reinforcement applications; plus *TR System* modular theatre consoles. Also, new *Concert Series* with following features: inputs assignable to eight stereo subgroups, eight auxiliary groups, stereo and mono master groups with independently controlled multiple outputs and programmable mute system with non-volatile memory and complete editing facilities. ● **Mosses & Mitchell:** range of jacks and jackfields including the *440* range of miniature jack sockets and jackfields. Also new video jackfield. ● **Music Labs:** *PSE* range of ancillary equipment including effects units. Also the *Master 8* 1in 8-track tape machine.

N

● **Neve:** the company will not be displaying any products this year, but will provide a 'rest' area for visitors. Full details of the company's console ranges including the *DSP* digital console system, however, will be available.

O

● **Otari:** *MTR10* 2- and 4-track tape machines; *MTR90* multitrack tape machine; the *MX5050 Series* of 2-, 4- and 8-track tape machines; and the *DP4050* cassette duplication system.

P

● **Penny & Giles:** recently introduced *3000 Series* faders; plus the established range of faders, including digital faders, and the company's quadraphonic panpots. ● **Philip Drake Electronics:** *7000 Series* broadcast modular amplifying equipment; *Commsbox* ring intercom system; *Mini Mobile* talkback system; and modular OB commentator equipment. ● **Precision Audio Marketing:** *Sound Technology* test equipment including the *1500A* microprocessor controlled test system; the *STL* range of calibration tapes; and radio mic systems from *Cetec-Vega*.

R

● **Radford:** range of audio test equipment and loudspeakers, plus a new range of power amps. ● **Raindirk:** *400 Series* broadcast console; new *System 200* stereo film, TV and general purpose mixer; plus the *Status* range of power amps and preamps. ● **Rebis Audio:** *RA200 Series* compact modular signal processing system; plus the *RA402* parametric equaliser and *RA301* comp/limiter.

82 ▶

REVIEWED IN MAY 1981 ISSUE

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Line level RIAA equalised outputs from moving magnet cartridge inputs.

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APRS preview

E

● **Ernest Turner Instruments:** comprehensive range of VU and PPM meters including bargraph display units. ● **Elliott Brothers:** details of the reconing, installation and design services offered as well as a selection of Tannoy products. ● **Eardley Electronics:** the full range of Neutrik connectors and the Neutrik *Audiograph 3300*, a modular audio measuring system. ● **EMO Systems:** range of products manufactured including DI boxes, mic splitter, 19 in rackmount power distribution unit and an RIAA disc preamp.

F

● **Film Tech Electronics:** range of compact portable mixers for ENG use. ● **Formula Sound:** details of design, manufacture and installation services. Products on display include *S19GA* 19-band graphic equaliser/analyser, *QUE-4* studio foldback system and *PM-80* production mixer. Also on show will be new room equaliser units. ● **Feldon Audio:** products featured will include RTW digital/analogue interface for the Sony *PCM-F1*; Digital Systems *DPU 1610* analogue/digital disc cutting delay unit; Audiotronics *PPEQ-1* programmable parametric equaliser; Eventide *SP2016* digital signal processor plus the full product range; Sony digital recording systems, mics' high speed cassette duplicators, headphones; and products from Marshall Electronics, Ursa Major, Ortofon, Inovonics, Commodore *PET* computer systems, Synton and Pulse Designs. ● **Fraser-Peacock Associates:** details of their audio visual production, audio and video cassette duplication. They will also be demonstrating the improved version of the Sony *CCP 13B* cassette to cassette copier. Demonstration copies of visitors material will also be made. ● **Future Film Developments:** selections from the large range of connectors, cables, patchfields etc that they handle as well as products from Stellavox RTS and Genelec.

H

● **Hill Audio:** new items will be the *DX2000* 1,000 W/channel stereo power amplifier, the *J Series 3* sound reinforcement and multitrack console available in any format from 16/4/2 to 48/16/2; *Series 3* monitor console, the latest version of the *B Series* budget modular mixers and the *DX* range of amplifiers. ● **H/H Electronic:** the *MosFet* range of power amplifiers, *TPA* series and *S500D* amplifiers, the range of drive units and details of their other PA products. ● **HBB:** full range of **Amcron** power amplifiers and *PZM* mics with several new models; selection of **Gauss** speakers; Sony products including *PCM 1610* and *DAE 1100* editor, *PCM F1* and *Compact Disc* players; selection of signal processing equipment from their hire stock plus several new products as yet unconfirmed. ● **Harman Audio:** will be showing the Tascam *50 Series* tape machines with a 58 running in sync with video units, the Tascam *M50* mixing console, the Tascam 16-track, the *Enhancement Series* of processing units and the *JBL 4612* mini PA sound system. ● **Hayden Labs:** wide range of products from Nagra, Sennheiser and Telefunken.

I

● **International Musician:** musician orientated magazines and publications. ● **Industrial Tape Applications:** the complete line of Otari equipment, details of the ITA hire business—mics to multitracks, the Itam *Sigma* console, the smaller Itam consoles and the compact *1610* 16-track on 1 in tape machine. ●

Industrial Acoustics: full range of acoustic control materials.

J

● **John Hornby Skewes:** will be showing the complete range of Audio-Technica microphones for stage and studio applications. Four models are now available with phantom power option. ● **James Yorke:** details of the company's cassette duplication, production and packaging services; its tape coating and slitting operation and micro computer program duplication service.

K

● **Klark-Teknik:** the full range of products will be on display including graphic equalisers, digital delays, reverb system and audio measurement equipment. New items will include the *DN 360*, a 2-channel 1/3 octave graphic equaliser with 30 bands at ISO frequencies using thick-film filters; the *DN 300* single channel version of the *DN 360* with tunable HF and LF filters; *DN 301* 1/3 octave attenuating graphic equaliser; *DN 332* 2-channel 1/3 octave graphic equaliser; *DN 700* low cost digital delay with 3 outputs and 434 ms max delay. ● **Kelsey Acoustics:** wide range of connectors, transformers, mic stands DI boxes, the *NG4 MK1* 4-channel noise gate, stage boxes, Audicom intercom systems, the Yamaha Professional range of power amplifiers and accessories. ● **Keith Monks:** a wide range of equipment including record cleaning machines, mic stands, cable drums and other accessory products. New items include the *MSF3* folding leg stand, a carbon fibre fish pole, and a new mic splitter box. ● **King Instruments:** self feed cassette loaders and various video tape loaders.

L

● **Leavers-Rich:** *Proline* series of 1/4 in tape machines, Garner bulk erasers, Tomcat cart machines and BMX broadcast consoles. ● **Leeholme Audio Services:** details of the company's cassette duplication and cassette supply services. ● **Lennard Developments:** range of test equipment from Woelke Magnetband Technik together with the range of professional recording tape heads.

M

● **Music Laboratories:** PSE range of equipment and selections from the range of products that they carry as dealers. ● **Mike Fraser Film Services:** demonstration of the *CAT* automatic tape splicer and other tape editing products. ● **Magnetic Tapes:** the *Chilton* range of mixing consoles for recording, PA and broadcast use. ● **Mosses & Mitchell:** full range of audio jacks and jackfields. ● **Midas:** *PR System* consoles for sound reinforcement applications; *TR System* modular theatre consoles; and *Auditorium* console system.

N

● **NEAL:** models from the full range of NEAL recording and broadcast cassette recorders. Latest addition to the range to be shown is the *600 Series* dual deck recorders. Facilities offered within this format will allow versions for logging, copying, or dual recording of up to four channels. ● **Neve:** a selection of consoles for recording, broadcasting and film use. Featured will be a *51 Series* console, the new *8128* console available in formats up to 56 channels, the latest fully working version of *NECAM* for post-production dubbing work. Information on the Neve Digital Audio Console will also be available.

O

● **Otari:** full range of tape machines including the *MTR10* in 2-track 1/4 in and 1/2 in formats,

the *MTR-12* available in the same formats as the *MTR-10*, the *MTR90* 24-track also available in 16- and 8-track versions, and the *MX5050* series of tape machines.

P

● **Pilkington Fibreoptic Technologies:** details of fibreoptic products and multiplexing systems. ● **Precision Audio Marketing:** the full range of Sound Technology test equipment featuring the new *Model 1510A* microprocessor controlled tape recorder/audio test system. ● **Philip Drake:** products from their range of talkback/intercom, audio distribution and theatre systems. ● **Penny & Giles:** the range of conductive plastic faders featuring the *3000 Series* faders as well as the full range of other faders and rotary pots.

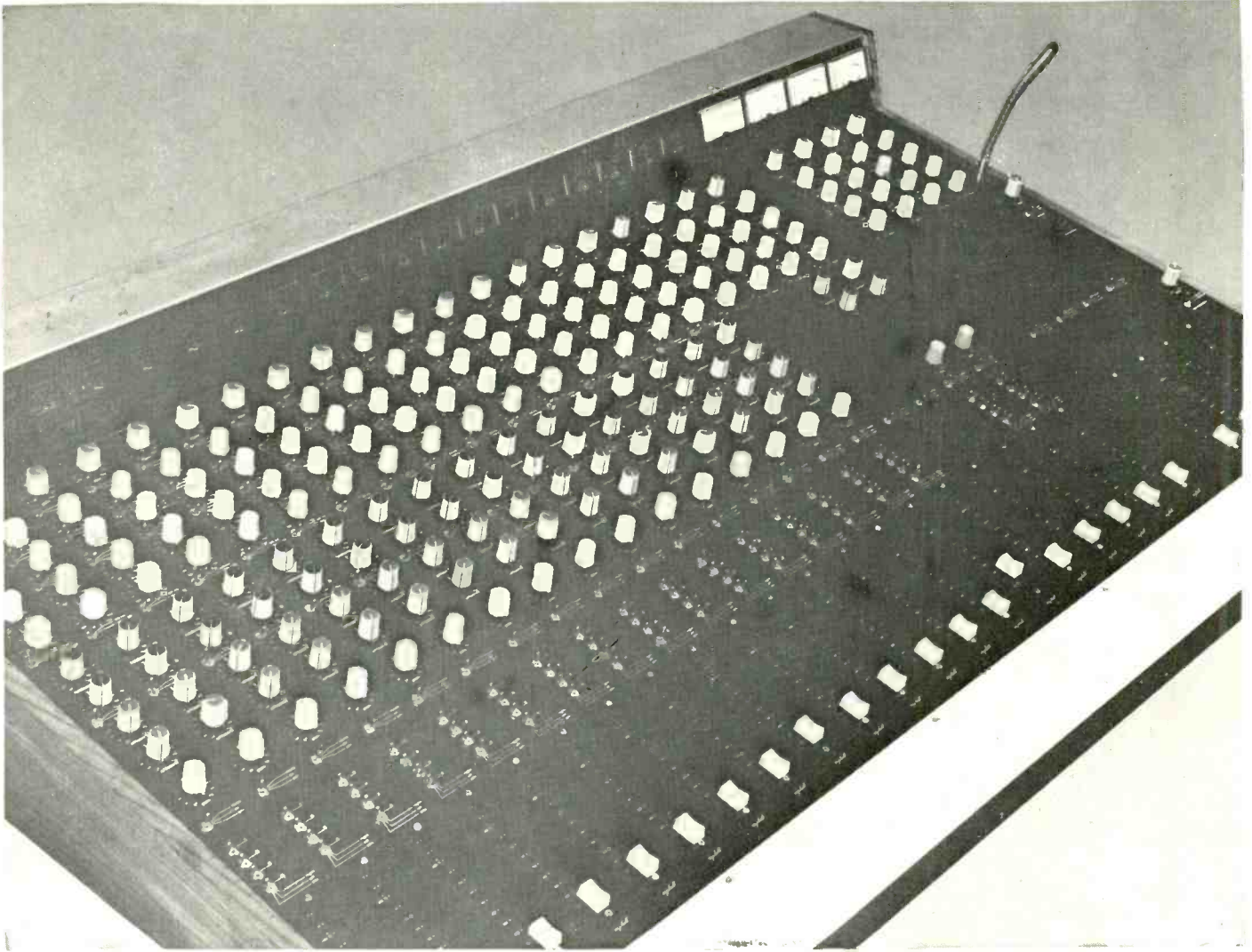
R

● **RE Instruments (Danbridge):** will feature the *RE201* dual channel audio analyser and a sample of other products from their range. ● **Rebis:** full range of modular and rack mounting effects and signal processing units. ● **Raindirk:** examples of the ranges of broadcast and recording consoles together with various periphery equipment. ● **Roland:** wide range of products including the Roland Rack system, the *SDE-2000* digital delay line, the *MC4B* Microcomposer, a range of mixers and power PA units, synthesisers and drum machines.

S

● **Solid State Logic:** the established *4000* series with *Total Recall* and the new *SSL 6000E* series consoles and computer systems. The *6000* is designed for live teleproduction, outside broadcasts and video post production. ● **Sountracs:** featured will be a modular mixer system available from 16/4/2 to 32/12/2 with 24-track monitoring, using a microprocessor for routing and memory allowing full write, store and recall routing externally via a keyboard on one of the modules. The established range of 4-, 8- and 16-track mixers will also be displayed together with a new 26/26/8/2 console. ● **Sifam:** wide range of VU and PPM meters, control knobs, switches and transformers. ● **Swisstone Electronics:** full range of Rogers monitoring systems. ● **Sony Broadcast:** *PCM 1610* PCM processor with U-matic based digital recording systems, *3324* digital multitrack with new autolocator/remote control unit, *Compact Disc* players and professional version, mics, radio mics, ancillary digital units. In addition there will be mixing consoles and tape machines from MCI. ● **Surrey Electronics:** the full range of products for metering, disc preamps, frequency shifters, distribution amps etc. New items include *Stereo Disc Amplifier 4* to accept cartridge outputs and deliver balanced lines, *PPM5* 20 pin dual in-line hybrid, stereo microphone amplifier and a stereo version of the *Stabilizer/Frequency Shifter*. ● **Sonifex:** range of NAB cart machines and small mixers. ● **Scenic Sounds:** will be exhibiting items from the wide range of products that they handle. Items shown for the first time include the Lexicon *200* reverb system, 360 Systems digital keyboard, Deltalab *Effectron* delay lines, btx *Cypher* SMPTE time code generator with video character insertor, jam sync and other options; *Shadow* control unit, dbx *700* digital system, Schoeps capsule *BLM 3* for the Colette range using boundary techniques, Orban *424A* and *422A*, and the Countryman range of miniature mics. Also featured on the stand will be the Amek range of consoles with the centre of attention being the *Angela* in-line console. Modules from the other consoles in the Amek range will also be shown. ● **SRT:** details of the company's disc cutting and disc pressing

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Above is a new Hill 'D' series console. The 'D' series can accommodate up to 16 track routing. Each input module has : gain (mic and line), 4 band switchable Eq., hi and low pass filters, two foldback send (pre or post Eq.), two effects sends, pan, mute/PFL, routing, and 100mm low noise fader. Each foldback master module has : gain, 4 band switchable Eq., mute/PFL, and 100mm low noise fader. Each effects master module has : gain, 4 band switchable Eq., two foldback sends, stereo pan, mute/PFL, routing, and 100mm low noise fader. Each output module has : summing amp gain, 4 band switchable Eq., mute/PFL, and 100mm low noise fader. Additionally fitted as standard : channel level meters, output V.U.'s, talkback, and XLR connectors fitted throughout. Optional extras to clients specific requirements.

Malcolm Hill Associates

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The logo for Hill Associates, featuring the word "hill" in a stylized, lowercase, italicized font. The letters are bold and have a slight shadow effect, giving it a three-dimensional appearance. The 'i' has a dot, and the 'l' is a simple vertical bar.

WaveFrame film mixing

WaveFrame Corporation of Boulder, Colorado, and Magna-Tech Electronic Co, New York, are to jointly develop a new multitrack disk-based recorder/playback system for film-mixing application.

Magna-Tech are well known as manufacturers and developers of sprocketed film recording and playback equipment for motion picture mixing. They will direct the development and marketing of the new multitrack system while a lot of the actual development will be from WaveFrame's Long Beach office.

At the time of going to press we didn't know how far the development had gone and when the product was due to be launched. Only that the system would be sold as a Magna-Tech product.

Magna-Tech's CEO Ed Flinn saw the new development benefiting existing Magna-Tech users, "This new equipment not only enhances our product line, but also extends the useful life of analogue systems in service around the world."

● WaveFrame are also reshuffling their product line with a re-naming of their two main products. The *AudioFrame* will now be called *WaveFrame 1000* and the *CyberFrame*, *WaveFrame 4000*. The reason is that users are now able to run software functions on either system. Post-production editing, for example, was previously only available on the *CyberFrame* but is now on the *AudioFrame*.

The systems are now being presented according to software capabilities. The *WaveFrame 1000* accommodates ten modules and four storage devices. The *4000* accommodates four modules and two storage devices.

Addresses

● **Euphonix** has opened its worldwide sales, service and marketing office at 10647B Riverside Drive, North Hollywood, CA 91602. Tel: (818) 766 3401.

● **Audio Follow** have moved to 73, rue de l'Evangile, CAP 18 Voie D Porte 13, 75886 Paris Cedex 18. Tel: (1) 46 07 26 26. Fax: (1) 46 07 00 26.



CTS Studio One refit

CTS Studios, alongside London's Wembley Arena, has completed an extensive refurbishment of its Studio One control room with the installation by its own engineers of a 60-channel Neve *VRP60* console with *Flying Faders* and recall.

Adrian Kerridge, co-owner of CTS's parent company the Lansdowne Group, says the 80x50 ft Studio One is the UK's second-largest purpose built orchestral recording room, with a maximum capacity of 130 musicians. The refurbishment programme to the 25x15 ft control room has included new acoustic treatments as well as upgraded aesthetic elements.

A major feature for CTS is the *VRP60*'s internal switching matrix,

which allows instant switching between film, video and multitrack recording modes — the three main roles of Studio One. The control room is also equipped with Dolby stereo music mixing and further audio post-production facilities including *Q.Lock* and widescreen projection. The desk joins a Sony *PCM3348* digital multitrack, Studer *A800* 24-track and Sony *PCM1630* recorders, along with ATC *SCM250A* monitoring. Kerridge claims of the new console: "We firmly believe that sonically it outclasses any comparable console; we are equally delighted with its logistics." Studio One has now reopened for bookings.

Mike Lethby

Small runs for CD maker

A new CD mastering and duplication company, Triple Six Productions, has recently opened in the West End of London. The difference between this and other similar companies is that Triple Six offer at the most CD runs of only 10 discs.

Triple Six uses the new Yamaha *YPDR601* Professional CD recorder to produce one-off or short runs from a variety of tape formats. They provide a same-day service at around £60 per disc, excluding VAT (approx \$100), whether the CD carries one jingle track or a full 63 minutes of audio.

Eric Hine set-up the company after he saw the Yamaha machine at this year's APRS show in London, "As far

as I can see there are a number of markets for this kind of service. The songwriters and pluggers, the musicians who want to keep a pristine copy of their work for ever, the audio/visual use in museums, and the radio jingle and station ident work.

"We've already had business from most of those areas including a few copies of the new Kylie Minogue album. We mostly get DAT and 1/2 inch but we have had audio cassettes as well."

If you order more CDs there is a slight discount but Hine thinks that an order of more than 10 discs is not so parctical as costs do not decrease to any great degree.

Triple Six Productions, 34 Pall Mall Deposit, 126-8 Barlby Road, London W10 6BL. Tel: 081 964 4091.

In brief

● Maidstone, Kent, UK: **Statement from Hill Audio.** "Mainly due to losses sustained by our former American subsidiary Hill Inc, which ceased trading at the end of 1990, it has become necessary for us to restructure our finances to secure the company's future. In consultation with our bank we considered a number of options and with their full backing we have decided the most positive option is a voluntary agreement with our suppliers which, with their support, should ensure the company's successful future."

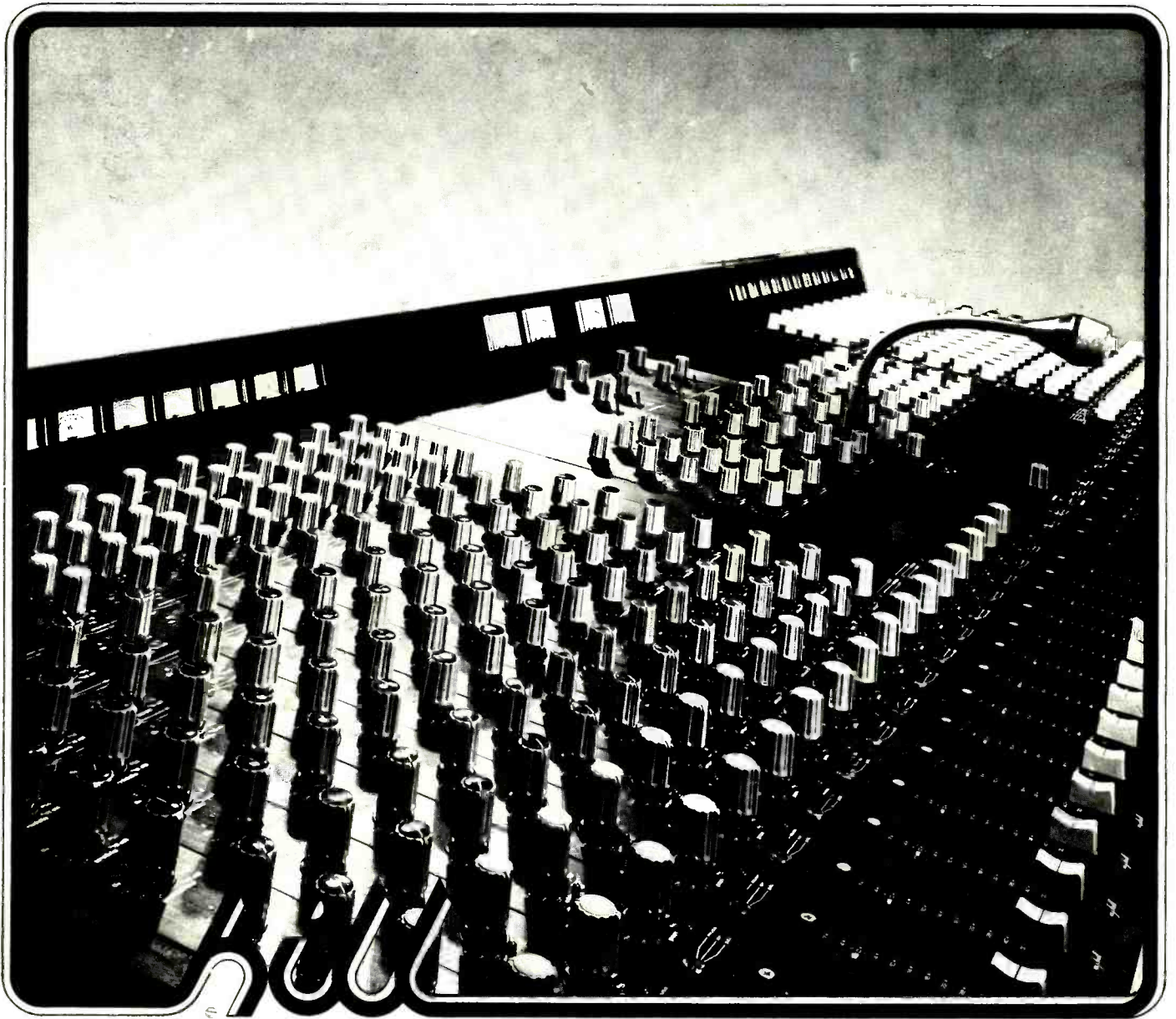
● Nevada City, California: **NVision audio.** NVision has announced the formation of the Audio Products Division. Their strategy is to offer a family of affordable digital audio system-solution products for the broadcast and post-production markets.

● London, UK: **Sypha lectures.** Sypha are now running a series of in-company lectures concerning digital audio technology. Two prepared sessions are — an introduction to tapeless technology and a review of the digital audio workstation market. Contact Yasmin Hashmi, SYPHA, 216A Gipsy Road, London. SE27 9RB, UK. Tel: (81) 761 1042. Fax: (81) 761 8279.

● London, UK: **Employers launch freelance training fund.** ITV, Channel 4, TPA and IPPA have launched the Freelance Training Fund to address some of the problems of who provides and pays for freelance training. More information from Rod Hastie on 071 612 8000.

● Zurich, Austria: **Studer/Digitec.** Studer Revox and French Digitec SA recently entered into an alliance. An agreement was reached for Studer Revox in France to have a controlling interest in Digitec SA by a capital increase, forming a new company Studer Digitec.

● Borehamwood, UK: **Companies join Soundcraft group.** Harman UK, a subsidiary of Harman International and the holding company of Soundcraft Electronics recently announced the acquisition of Allen & Heath, Allen & Heath USA and MBL.



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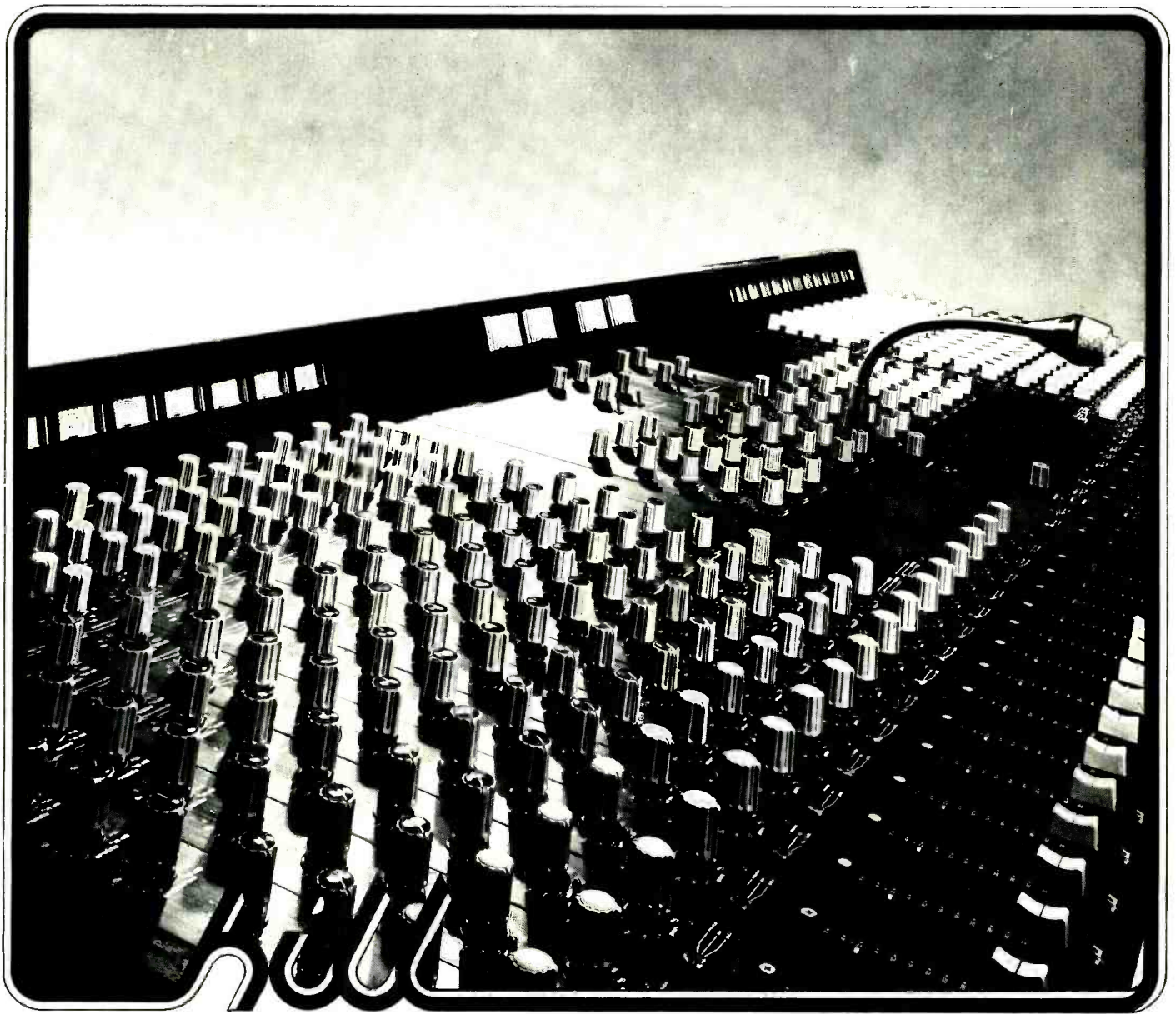
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Synton UK merges with Marquee Agencies

Synton International have announced that their UK arm Synton UK has merged with Marquee Electronics.

The merger is seen as being beneficial to both companies. Says Tim Hammil a director from Marquee, "After talking with Synton it was obvious that we shared the same goals, the two companies complement each other, taking Marquee Electronics' technical strength and combining it with Synton's commercial flair, it just made sense."

This merger has produced an

impressive client listing including Adams-Smith, Eventide, Marion Systems and D&R mixing consoles, the last name being a result of a worldwide distribution deal Synton International signed earlier in the year.

All contact should be made at Synton UK's headquarters at Unit 12, Northfields Prospect, London SW18 1PS. Tel: 01-877 0787. But Marquee Electronics' theatre and conference hire will continue as usual at 90 Wardour Street, London W1V 3LE. Tel: 01-439 8421.

Console rebuild by PASS

PASS, Professional Audio System Services, is a new company founded in 1986 by Steve Butterworth to specialise in the design and customisation of quality recording consoles.

Butterworth, previously a project leader with Neve, has just completed his first rebuild and customisation, a Neve 80 series console for a client in the US.

The work included the complete stripping and rebuilding of the frame and all modules. The original 32-track mixdown section has been

fitted with new modules with dual automated switchable inputs to each channel, which, with the Neve 1081 equalisers, gives a total of 104 inputs.

The original sound has been retained by re-using the original Neve amplifiers and technology as building blocks for the design of the audio paths, and all monitoring, metering and solo functions have been redesigned.

Professional Audio System Services, 9 Fisher Close, Haverhill, Suffolk CB9 0LZ, UK. Tel: 0440 706752.

● HHB Communications have been appointed **Solid State Logic's** first ever independent distributor in the UK but only for the broadcast versions of the *SL5000* series; they're also now distributors of **Soundcraft** broadcast consoles and have become main distributors for **Eventide** products. HHB Communications, London NW10 6QU, UK. Tel: 01-960 2144. Fax: 01-960 1160.

● Cue Systems have been appointed the UK distributor of the complete range of **Klein & Steck Technology Line** loudspeakers. Cue Systems, London N16 7UT, UK. Tel: 01-249 7294. Fax: 01-249 6915.

● **FM Acoustics** have named Firma Killerman-Riedel as their new German distributors. Firma Killerman-Riedel, In der Reuth 163, 8520 Erlangen, West Germany.

● Hayden Pro-Audio are the UK distributors for the **Syrinx USM 09-2** digital automation system. Hayden Pro-Audio, Chalfont St Peter, Bucks

SL9 9UG, UK. Tel: 0753 888447.

● Michael Stevens & Partners have been appointed UK distributors for **np Elektroakustik AS** of Denmark. Michael Stevens & Partners, Kent BR2 9NT, UK. Tel: 01-460 7299.

● **Data Conversion Systems (DCS)** have appointed Syco Systems and Stirling Audio as the UK distributors of the *DCS 900 A/D* converter. Syco Systems. Tel: 01-625 6070. Stirling Audio. Tel: 01-623 4515.

● Beyer Dynamic have been appointed as a UK distributor for **Anner** pre-made cables. Beyer Dynamic. Tel: 0273 479 411.

● First Audio have appointed Britannia Row Sales as main UK distributors of **Crest Audio's** range of professional power amplification products. Britannia Row Sales. Tel: 01-226 3377.

● Autograph Sales have become exclusive UK distributors of French-built **SAJE** consoles. Autograph Sales. Tel: 01-485 3749.

People

● **HHB Communications** have expanded their broadcast systems division with the appointments of Sean Meehan, formerly with the BBC, and Brian Binding formerly at BBC Radio Capital projects.

● **Bose UK** have appointed Colin Cartwright as their new general manager. Cartwright was formerly the sales and marketing director of Cimex International.

● **Video Village**, Bristol, UK, a TV post-production company have appointed Steven Stockford to be responsible for sound dubbing.

● **Agfa** have appointed Dr Klaus Gerlach as new chairman of the

board for Agfa-Gevaert, its UK subsidiary.

● **Marcus Recording Studios**, London, UK, have appointed Nicola O'Leary as their new studio manager, O'Leary comes from Jacobs Studios.

● UK PA company **Martin Audio** have appointed Rob Peck as marketing manager. Peck comes from Audio and Lighting manufacturer Icelectrics.

● **DDA**, Hounslow, UK, have appointed Roger Patel to spearhead the company's customer support group.

Contracts

● Abbey Road Studios have ordered a pair of **Queded Q312B** monitors for their Studio Two.

● Odyssey Studios, London have had HHB Communications supply and install a **Soundcraft SAC200** desk, Sony ¼ inch, DAT and *FI* machines, and Sonifex record/replay cart machines, into their new Operations Centre.

● Recent **Hill Audio** sales include two *Concept* series consoles to a radio station and a live venue in Australia;

a *DX3000* power amplifier to Tape One Studios in London, two *Multimix* rackmount consoles to Signal Radio in Stoke and The Duke Theatre in Lancaster, UK.

● Engineer Renate John has had a **Neotek Elite** console-based package supplied by Music Lab Sales.

● **Amek** have installed an *APC1000* assignable production console at Manta Sound in Toronto and a *Classic 32/8/2/2* configured console at the Nihon Kogakuin Technical School in Nihon, Japan.

● UK Hire company Wigwam

Acoustics have recently used a **Nexo S1200** cabinet system for the Pixies US tour and have also used Nexo equipment for overflow systems on the recent Billy Graham UK tour.

● **AMS** have supplied the Norwegian Broadcasting Corporation with a 48-channel, 48-fader Virtual Console System.

● Recent **Lexicon Opus** digital audio production system sales include Radio Canada, the French programming arm of CBC; Audio Recording Unlimited in Chicago, US; the General Television network in

Detroit, US; Studio Marko in Montreal, Canada; and the new Advision mobile in London, UK.

● Anglia TV, UK, have chosen **Audio Kinetics' ESbus** as part of an upgrade of its post-production facilities.

● Berwick Street Studios have bought a **DDA D** series console for their new programming suite.

● Two **Soundcraft SAC 2000** on-air radio consoles have been bought by Ireland's newest radio station, Atlantic 252, due to start transmitting in the Autumn.

AMS move US office

Six months after the purchase of AMS by Siemens of Austria, AMS's US office has been closed and all operations have been transferred to the Neve North America office in Bethel, Connecticut.

AMS will draw upon the resources of Neve in the areas of administration, accounting, sales/service and advertising/promotion. AMS will relocate their corporate offices from Petaluma, CA, to Bethel, CT.

AMS senior sales manager John Gluck has been appointed president of AMS North America. Gluck commented, "The move to Connecticut and the sharing of Neve North America's well-established

marketing and support resources represents a major boost to AMS activities in this extremely important market. This step is an indication of the many changes made possible by the audio video group's purchase of AMS and illustrates our intent to provide our customers with the highest standard of support."

Also relocating to Bethel are Graham Murray, AMS technical services manager, and Stuart Hirotsu, product support engineer. Both come from the Petaluma office. AMS sales/service will be located in the Neve Los Angeles, New York and Bethel offices. A Chicago sales/service office will be established with Doug Ordon as AMS sales manager.

In-brief

- **Cambs, UK: Cambridge Digital complete Finnish training courses:** Cambridge Digital have recently completed a series of training courses in Digital Audio Technology for the Finnish Broadcasting Company YLE. David Pope, MD, and consultant John Watkinson presented a series of courses designed to guide analogue engineers from fundamental digital audio principles up to a high degree of competence in the subject.
- **San Francisco CA, USA: 100th Sonic System sold:** Abbey Road studios, London, have ordered another digital audio workstation from Sonic Solutions in San Francisco. This will be the third Sonic System delivered to Abbey Road and the 100th system delivered by Sonic Solutions to record

companies around the world.

- **North Hollywood, CA, USA: ASC authorised by Neumann:** Audio Services Corporation have announced that they are now an authorised Neumann microphone service centre. Ron Meyer, ASC's engineering manager, recently completed a one week training course at Neumann's Berlin factory. The training, directed by Stephen Peus, development engineer for Neumann, covered Neumann's entire microphone line. ASC are expanding their services to the recording and music industries. Audio Services Corporation, Service Department, 10639 Riverside Drive, North Hollywood, CA 91602, USA. Tel: (818) 980-9891. Fax: (818) 980-9911.

Contracts

- As part of a major expansion plan Sounds Interchange in Toronto, Canada, have invested in a **Neve VR48** console. Sounds Interchange are a large audio/video production and post-production facility in Toronto. They have also ordered 16 **Audio Kinetics ES.Lock 1.11** units. The ESbus units are being installed in four new studios.
- **BBC Radio Projects** have taken delivery of an **AMS AudioFile Plus** for Radio 1's Steve Wright show. The 8-output unit was chosen for its multitrack facilities and reliability record.
- **BBC Television** have recently bought six **Shure VP88** stereo microphones for their outside broadcast units based at Kendal Avenue, London. The new mics will be used primarily for sports OBs including test cricket, Wimbledon tennis and golf.
- **Clive Green & Co** are to supply a 70-input **Cadac E-type** console for the New York production of *Miss Saigon*.
- **DDA's** French distributors Regiscene have sold their first two **DMR12** recording consoles to Free Son studios and Coppelia studios, both in Paris. Also TF-1, France's largest private broadcasting organisation have bought a **Q** series console. The 24-input matrix version was bought for floor use in live situations.
- **Orinoco**, a London recording studio, have opened their new-look control room for business, following the installation of a 60-channel **Neve VR** console fitted with *Flying Faders*



Neve VR60 installed at Orinoco, London

automation. The installation has gone hand-in-hand with an extensive development programme, which has included the refurbishment of the main studio, the building of a new DDA-based 24-track programming suite, and the addition of a digital editing facility.

● **Adams-Smith** have announced that ABC Television in New York and Fox Television in Burbank, CA, have each ordered a second **2600 E-A/V** audio editor. The unit now contains Super-Sync, which includes Cross-Lock, allowing synchronisation and editing of mixed timecode rates, and Vari-Lock, which synchronises and edits off-speed material.

● **Sound Developments**, a UK audio and video post-production company, have installed a **DAR SoundStation II** digital audio production system in their London

facility. The system is operating as the digital audio recording component of a unique on-line autoconforming system that Sound Developments have developed in collaboration with Andy Newell of DJC Software and DAR's engineering staff.

● **Jeff 'Skunk' Baxter**, Julian Lennon and Joe Perry of Aerosmith have all recently chosen **Allen & Heath** mixers. Baxter has installed a 32-input **Sigma** in his studio at Village Recorders.

● **Pro-Bel**, Reading, Berkshire, have supplied the video and stereo audio switching system for Scottish Television's new eight-camera outside broadcast vehicle. The Pro-Bel equipment is a high density 32x32 video and dual audio system complete with a selection of standard panels and under monitor displays.

● Latest deliveries of the **FRED** tape editor from **Lyrec** include 25 units to

Radio Free Europe; 10 to Swedish National Radio; 15 to Radio Nacional Espana; 13 to Danish Broadcasting; and 10 to Radio France.

● Recent contracts for **Audimation's** new **Uptown 2000** moving fader console automation system include Studio 20 in Tienen, Belgium; Scanax Recording studio in Oslo, Norway; and A-String recording studio in Taipei in the Republic of China.

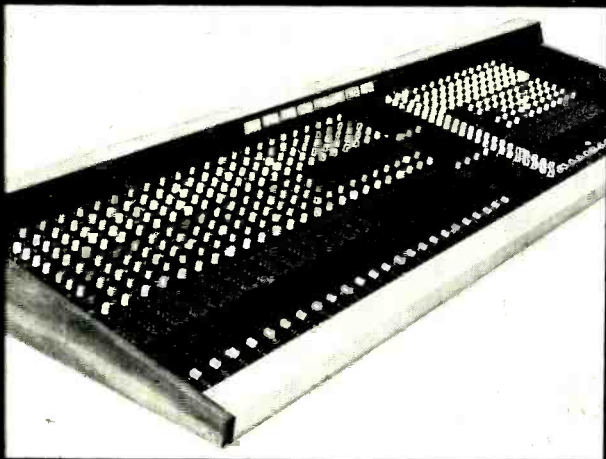
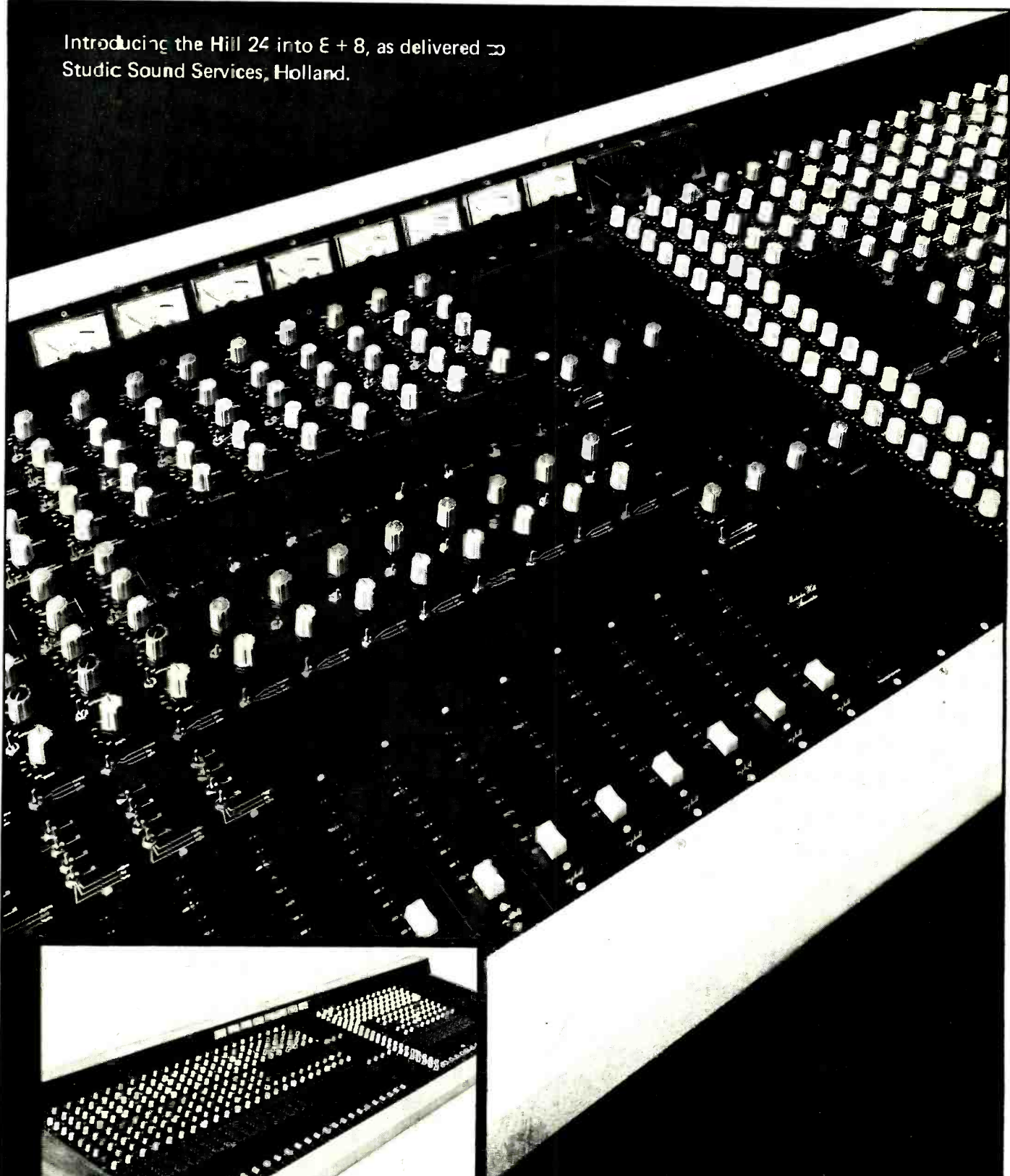
● **DAR's** sale of the **SoundStation II** digital audio production system to Hebei TV marks the first installation of the DAR system in China and the first disk-based digital system to be used in all mainland China.

● Japanese audio equipment distributors **Otaritec** have announced the recent sale and installation of a 40-input **Trident Vector 432** console to Vivid Sound Corporation in Tokyo.

● **Hill Audio**, Kent, UK, have delivered their largest console yet, a 48/48/48 **Concept 8400** series with **Audio Kinetics Reflex** automation, to Future Sound Studios in Soest, Holland.

● **d&b audiotechnik** have recently installed a complex and unusual audio/video installation in Stuttgart. The project was undertaken for Allianz, one of the world's largest insurance companies, and involved d&b in providing audio within a room that itself could be configured in different ways. The system had to be invisible when not in use, and the set-up had to configure automatically and optimise the sonic performance. The system included 12 **E1** speakers installed in the ceiling that could be lowered and turned into position under master control.

Introducing the Hill 24 into E + 8, as delivered to
Studic Sound Services, Holland.

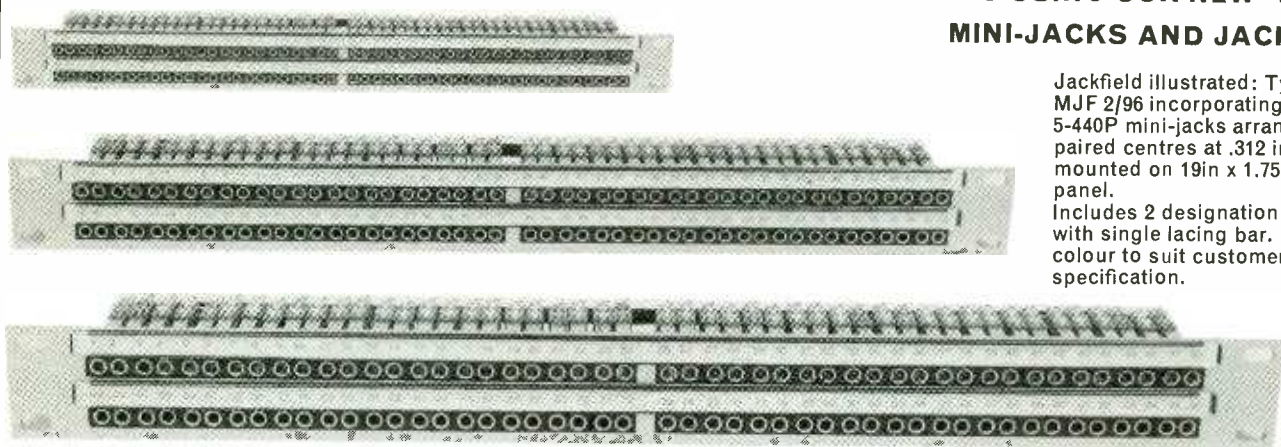


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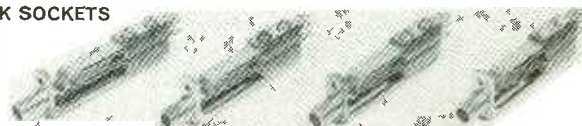
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DX 700

POWER:

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1300w	(2 ohms + 2 ohms)	MAX R.M.S. Continuous.
DX350-400w	(4ohms + 4 ohms)	Rated R.M.S. Continuous.
650w	(2 ohms + 2 ohms)	MAX R.M.S. Continuous.
DX140- 160w	(8 ohms + 8 ohms)	Rated R.M.S. Continuous.
260w	(4 ohms + 4 ohms)	MAX R.M.S. Continuous.

PERFORMANCE:

THD	less than 0.005% rated output, 1KHz; less than 0.04% at all levels up to rated output 20Hz-20KHz.
IMD	less than 0.02% at all levels up to rated output, SMPTE 60 Hz: 7kHz/4:1.

DX 350

DX 140



Malcolm Hill Associates, Head Office, Hollingbourne House, Hollingbourne, Kent, England. (062780)- 556

Peter Moody, Studio/Broadcast, 15 Greenfield Close, Stapleford, Cambridge.
Shelford (02204) 2060.

Ron Blechner, Sound Reinforcement, 6 Lillie Yard, 19 Lillie Road, London SW6 1UD, England. (01)- 381 3446

WORK

design, and can be remotely switched between normal replay and sync replay. Along with MXR flangers and phasers, it's interesting to see a pair of 12-year old Fairchild 670 valve limiters and Teletronix LA2A compressors, for which all cash offers will be refused. Virtually all the mics are Neumann, including a now irreplaceable stereo treasure.

There's an interesting modification on the studio's Studer A80s: the varispeed is controlled by a readily accessible vernier-calibrated pot, and the engineers have drawn up a graph of speed change on the vernier scale against musical pitch in semitones. This way, at one o'clock in the morning when a producer says, 'Let's take it down a semitone', no-one has to mic up the piano to check whether *C* really has dropped to *B*. Equally positive and panic-proof is the cable coding system on the studio floor. Every cable run is identified at each end by a colour and number-coded Hellermann sleeve.

Current day rates at Lansdowne are £39 per hour, and night rates £29 for a minimum of four night-hours and a maximum of eight. Something of an anomaly, which will probably soon go, is that overtime after six and running into the night gets charged at a higher rate. The plan is to abolish overtime rates altogether if a workable scheme can be sorted out.

The wide range of activities has not made for a boring life at Lansdowne over the years. Early on, the studio was into commercials ('You're never alone with a Strand' was one of theirs), and had associations with commercial as well as BBC tv from the early days. Thus, along with the Black and White Minstrels was the old ATV 'Chelsea At Nine' show, for which the prerecorded sound tracks were put down at Lansdowne.

There was also a brief flutter with 'surprise tv'. Under military-style conditions of secrecy, Ivy Benson was booked in to Lansdowne, supposedly to video and audio-record a contribution for a 'Women At Work' programme. But upstairs Eamonn Andrews lurked with a red book. Outside in a mobile, the vtr was laced up with a tape labelled 'This Is Your Life', not 'Women At Work'. At the crucial moment of denouement the vtr puffed expensive smoke. So while Eamonn stayed in hiding, and Ivy Benson killed time in her dressing room, another vtr was raced down from Thames tv's Euston Road

headquarters.

'Okay Ivy', someone finally said, 'let's get on with the job'. 'Ivy Benson — this is your life,' said Eamonn, as he swept in through the studio door—and it was all over. Immediately afterwards, the videotape and the subject of it all were whisked off to the tv studios to finish the programme in front of an audience. It's nice for cynics such as myself to know that those moments of revelation really are genuine.

Adrian remembers another time when diplomacy was necessary. When you eat out, travel in a hotel lift, or relax in a bar, the chances are you'll now hear piped background music. (Frankly I'd cheerfully slit every speaker cone within reach—but that's a personal opinion.) Anyway, contrary to public opinion, not all background music is Muzak—a lot of it comes from Rediffusion... and a lot of the Rediffusion recordings were made at Lansdowne. Also contrary to public opinion, when you hear piped music from a band that sounds vaguely familiar, the chances are it isn't a rip-off, and the originators themselves have specially re-recorded it with a reduced dynamic range.

In this way, over the years Lansdowne has recorded many name bands, including those of Ted Heath, Ronnie Aldrich and Sid Phillips, all for Rediffusion piping. Adrian recalls how he was overawed at his first chance of recording the then legendary Ted Heath and his Music. Ted Heath, you will recall, was a trombonist, and loved trombones. He was also deaf in one ear: 'I can't hear the trombones, young man', he would say to Kerridge, who didn't like to point out that it was because the trombones were on Ted's deaf side. And this presented a problem—how to bring up the trombones on Ted's deaf side loud enough to keep the great man happy, but at the same time avoid wrecking the balance for more average listeners.

The answer was diplomacy itself. Adrian left the musical balance as it was but cranked up the left-hand monitor channel level, and with it the trombones. This satisfied the bandleader. But how do you mix with a left-heavy stereo image? Answer: you hang over the desk in a state of lopsided physical contortion, so that your right ear is inordinately close to the right-hand speaker. It may not look very elegant, but it gets the job done. Only one question remains—did the engineers at Decca have to work the same way when recording Ted Heath's band?

Lansdowne, then, is a studio with

a history that is its strength and weakness. Strength comes from experience and professionalism, business acumen and all-round versatility; weakness comes from the risk that an old established studio will get dubbed old-fashioned. As Adrian puts it, people feel vaguely that 20-year-old notes are still hanging from the walls. Indeed, he makes another interesting point in this context. In ten or 20 years' time, when styles have changed through heaven knows how many more directions, might it be that modern, predominantly rock or pop studios like The Manor will find themselves equally handicapped by memories of their past successes on the Virgin label?

Adrian Hope

Black Country mobile

Most independent radio stations use some form of vehicle to promote the station's identity in their immediate (and sometimes not so immediate) locality. It makes sense to bring the station to the attention of listeners (after all, advertising is sold on listening figures), as well as being a source of low budget programmes; the local fete may be pretty dull fare on site but can be attractively packaged for insertion into a day's programming.

Last October Beacon Radio's chief engineer, Bruce Warburton, and the station's management put their heads together and decided that the station needed to get out and about much more in order to expand its listenership—especially in certain fringe areas where some people hadn't even heard of the station.

Although by borrowing equipment from the studio and hiring pa gear they could do some sort of outside broadcasts, these unfortunately took a lot of planning and manpower to get underway. For this reason Beacon decided to start from scratch, and chose exactly what would be ideal for the job. Their solution was a custom-built caravan kitted out in a similar way to their studio control rooms.

At this stage a number of caravan builders were approached, but it was found that there was only one company willing to undertake the task of building a caravan that could accommodate the weight of equipment Beacon felt it was necessary to carry.

The resultant ob unit, built by Torton Bodies of Telford, is a 7 x 2.1m caravan shell mounted on a heavy chassis. One side of the caravan opens out to form a large stage area with a canopy on top. At one end of the caravan is a

small shop where the whole range of Beacon goodies — T-shirts, badges, posters, etc—are sold; at the other end is a small lines room.

After the caravan was ordered in January of this year, Beacon set about choosing the equipment they were going to install when it arrived at the end of March. Due to the relatively high cost of the caravan unit, it was imperative that the cost of such equipment should be kept as low as possible without reducing its quality. For this reason they decided to build as much of the equipment as they could themselves; in fact, they ended up building the mixer, line-amps, and gram preamps, and purchasing the rest. Bought-in equipment includes two Technics SP10 turntables with Gray arms, three Sonifex cart machines, four 200W Hill pa amps, various bass bins and horn units, and a Technics off-air tuner.

The mixer layout follows as close as possible that of on-air decks, in order to create the least confusion for their presenters.

The desk comprises: two microphone modules with coarse and fine gain, bass cut, pa send button and a 3-position switch for mic on/off and pfl; five stereo line modules with fine gain, pa send, pfl, and remote start; an output amp module; a monitoring module for stereo monitoring on cans and checking the levels of input sources, desk output, pa and off-air signals; and a pa send module. The latter, in conjunction with the pa send buttons on the individual modules, enables the pa output of the desk to be fed from the desk output, off-air, or a separate pa mix. While operating in the 'pa mix' position any channel or number of channels can be routed to the pa mix by simply pressing its particular send button; this also removes that particular channel from the main mixer output. Beacon has found this facility extremely useful when a presenter wants to do a competition for a large crowd of people, but does not necessarily require it to go to air.

Also included in the desk is a talkback module that routes talkback down a separate control line back to the station. Incoming talkback from the on-air studio automatically switches itself into one side of the presenter's headphones. It is also routed to a talkback speaker on the desk, and operates a red flashing 'call' lamp that flashes during the call, and for a further 4s to attract the attention of the presenter (should he have

reviews

and 4-way modes, only the high mid output varying with the mode as should be expected (see **Table 2**).

Remembering that the effective output noise is the sum of the output channels and also that the drive capability is large, a good dynamic range is available. Noise varied in the worst case +3/-1 dB with gain settings and was not affected to a large extent by muting.

Whilst mains hum was always at a low level an undesirable ± 2 mV spurious output at approximately 500 kHz was noted in the mid high and high outputs irrespective of control settings.

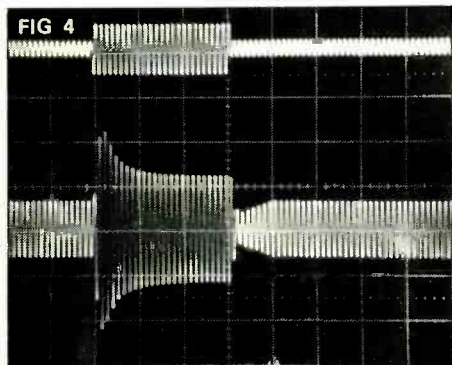
Distortion

In order to measure distortion the outputs of the four filters were summed with a resistive network as measurement of harmonic distortion within a particular frequency band would yield meaningless results in some cases. The second and third harmonic distortion for unity gain and 0 dBm output is shown in **Fig 2** to remain at low levels. At other gains and output levels below clipping there was little change in the harmonic distortion except that the high frequency second harmonic reduced with falling level.

Intermodulation distortion to the CCIF twin tone method using tones separated by 70 Hz produced **Fig 3** at 0 dBm output and unity gain. Whilst the intermodulation distortion is generally at a low level, the low frequency third order products ($f_2 + (f_2 - f_1)$) tended to rise.

Limiters

The threshold of limiting could be accurately set between the maximum output and -3.5 dBm



output which might in some circumstances be inconveniently high. Once limiting was entered there was no measurable increase in output with increasing input level.

The attack and release times of the limiters appeared to be independent of the degree of limiting and the duration for which the threshold was exceeded with the fast attack and release times being measured as shown in **Table 3**.

TABLE 3

Frequency band	Low	Mid low	Mid high	High
Attack time	40 ms	7 ms	2 ms	1.5 ms
Release time	50 ms	8 ms	3 ms	2.5 ms

In the case of the high frequency band the limiter took 0.5 ms to operate and ignored 'overloads' shorter than this. The effect of subjecting the mid high section to tone bursts into 5 dB of limiting is shown in **Fig 4** where the upper trace is the input and the lower trace the output, the scale being 2 ms/division.

Limiting was always free from clicks and other defects with the red limiting LED being rapid in action and the green 'operating' LED becoming illuminated 15 dB below the limiting threshold.

Other matters

The unit sensibly entered the muted mode on switch-on in order to provide loudspeaker protection. Simple external switching connected to the remote socket enabled remote muting of individual channels and also the switching out of individual limiters.

Power line variations down to 200 V had no effect upon the performance and the steel case provided a good hum screen. This, together with the low heat dissipation, should allow units to be stacked into a rack mount without troubles.

Summary

The Brooke Siren unit offers a generally good performance in terms of dynamic range and distortion with the accuracy of the filtering being good.

The limiters were effective and appeared to be free from defects while offering complete loudspeaker protection.

Whilst the mechanical construction was sound the layout was not impressive and the manufacturer must pay attention to the electrical safety of the unit.

Hugh Ford

Manufacturer's comment

We would like to thank Mr Ford for his review of our *FDS340* unit and take this opportunity to comment on some of the points raised.

The aspect of electrical safety needs some clarification, as we are unaware of any danger arising out of the use of this product. After speaking to Mr Ford, the problem seems to rest with the mechanical clearances provided by some of the panel parts carrying the mains voltages, in that their casing—which is at mains earth—is too close to their terminations which carry the mains voltage. Although adequately safe for 240 V operation, they would not resist the 1 kV to 2 kV flash-over test required for safety standards. After consultation with the component manufacturers, we will be taking steps to ensure that future products will use components carrying the full UL, VDE, CSA and BS approvals. We would like to point out that in our opinion the unit is in no way unsafe, as suggested by Mr Ford's comments, as existing users of the product would verify. At this point it is also worth mentioning that full protection is provided against mains over-voltage caused by inadvertent 120/240 V switch setting or the connection to 3-phase 415 V supply, by the fuse and internal VDR components, as proved by some of our customers.

Returning to other points mentioned, we thank Mr Ford for pointing out the error on our wiring diagram for the 'remote' socket switch connections—it is surprising how the obvious errors are the ones that are always missed.

The limiter threshold lower setting point can be reduced to -20 dBV to order, if required. However professional high power amplifiers have input sensitivities of 0 dBV or higher, so the requirement to go lower has not arisen.

The untidy and unimpressive layout is obviously a personal opinion, and thus requires no comment. The unit contains both linear and logic circuit parts requiring careful layout to avoid spillage of the clocking waveforms. The design and layout used achieves excellent performance figures within a simple and professional package which supports the cost effective price.

Finally we apologise for not providing Mr Ford with the full alignment details for the mentioned 12 presets—we hoped that he would not require this information. Inspection of the provided circuit diagrams would have indicated their respective functions. Circuit descriptions and alignment procedures are provided as part of the servicing information released to our appointed servicing dealers.

Hill

international agents

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Illustrated:
Hill J Series

re-stating the Art

The logo for Hill Audio, featuring a stylized, white, blocky font that resembles the letters 'H' and 'A' combined into a single graphic element.

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Classical Renkus-Heinz

The sound hire arm of R G Jones has been helping to raise the presence of Renkus-Heinz *Smart* SR systems in the UK market with a string of classical concerts since early summer.

The two Leeds Castle concerts featured Renkus-Heinz's latest *CIA* cabinets. Those shows sandwiched a performance of Verdi's *Attila* at the Royal Opera House using *M-1*, *SR-2* and *SR-121A* delay speakers, and

were followed by the Henley Arts Festival (with the RPO, LPO and SCO). Their latest concert, say R G Jones, featured Plácido Domingo and Maria Ewing in a Royal Opera House performance of *Tosca* at Kenwood.

Finally, Renkus-Heinz have announced the appointment of Frank E Ostrander as chief engineer in charge of acoustic and electronic research and development projects.

JBL Sound Power on ice

The six-month-old Blackburn Ice Arena has been re-equipped by Venuetech with a new 24 kW sound system, whose major feature is a JBL *Sound Power* cluster. Part of a sound, lights, video and lasers installation costing £150,000 (approx \$250,000), the system was designed by Venuetech using JBL's *SRDS* CAD software to cover the 78 x 54 m hall, which besides skating events is also used for discos, rock concerts and sporting events.

Making up the JBL cluster are 12 *Sound Power 4771A* cabinets, six 2360 horns with 2450 compression drivers and two 4730A cabinets for in-fill. The rig is augmented by four *Sound Power 4788A* subwoofers above the bar area and an outer delay of eight *Sound Power 4726AP* cabinets. The control side includes 20 Hill Audio *Chameleon* amplifiers, a Toa *Saori* digital signal processor, two BSS MIDI noise gates and a BSS compressor/limiter.

Marquee in the theatre

Spencer Brooks, Marquee Audio MD, says the company has dramatically increased its business in the UK theatre installation market — citing four major contracts in recent months by way of evidence.

For the revamped Oxford Playhouse Theatre Marquee provided a 32-channel DDA *Q* series desk and a Martin Audio speaker system including *PM3* 3-way monitors and *CTX* sub-bass cabinets,

powered by C-Audio *RA3000* amplifiers. Another *Q* series (again with DDA's theatre inputs) went into Theatre Clwyd along with Tascam *DA30* DAT and *34B* 1/2 inch recorders.

Northampton's Royal Theatre and the Sedgwick Centre's Conference Forum both took 16-channel DDA *S* series FOH consoles amongst other items — the latter venue's control room also being fully re-wired by Marquee in the process.

Kelsey launch Troupier hire

Kelsey Acoustics, export agents for Troupier Cable Crossovers of Los Angeles, have set up a Cable Crossover hire department. The product in question is a tough plastic cable ducting system — similar in profile to those familiar 'sleeping policemen' traffic-calming bumps — which slot together to provide

unlimited lengths of cable protection against anything from festival-goers' feet to a fully-loaded tractor/trailer.

According to Kelsey's Richard Vickers sales in Europe have surpassed 600 pieces in the last four months. Details are available from Gary Davies at Kelsey Acoustics on 071 727 1046.

On tour

● **Audiolease's** September highlight was the Philip Glass Ensemble's Royal Festival Hall dates, with an 11-piece band, a backstage rack full of MIDI samplers and sound modules and a Meyer *MSL-3* SRS. They were touring effectively, a live version of his two Godfrey Reggio movies — *Koyaanisqatsi* and *Powaqqatsi*, which were screened above the band.

● **Britannia Row Productions** have lately been working with Marillion, Magnum, Frank Sinatra, Liza Minelli, the Gypsy Kings, ex-Adamski singer Seal, Whitney Houston (including a massive 17-night stint at Wembley Arena in September) ending mid October. Says Mike Lowe of the Autumn season: "We've been absolutely stacked out; we've even had to pass on a couple of regulars." Around November 18 and 19, the company's crew and a planeload of *Flashlight* SR head for Oman, on behalf of that country's annual celebration of the Sultan's birthday and the anniversary of his accession to the throne. The 25th anniversary — in five years' time — will, it seems, be something of a monster bash. Lowe adds prosaically: "Our quote for the *Flashlight* was the same as our nearest competitor — but we had half their freight weight for the same power."

● **Canegreen's** most recent shows have been with rising singing star Beverley Craven, the equally hot Black Crowes (concluding a UK tour with Hammersmith Odeon shows in mid October), Nigel Kennedy, monitors for Julio Iglesias — and David Bowie's Tin Machine tour.

● **Encore's** John Tinline espoused a familiar theme in noting the difficulty of supplying advance information on tours. "Everyone is booking late and confirming late," he said. "Promoters are waiting until the last possible moment to see how ticket sales go. But we will be very busy by November — business is definitely improving overall."

● For Entec, Steve King echoed

Tinline's observations on late bookings. His faith in a market upturn, however, is reflected in the purchase of further stocks of *JBL Concert* series SR.

● **Malcolm Hill Audio's** September/October UK tour with Gary Numan featured the company's latest passive 2x10 inch wedge monitor. As yet unnamed, it employs a 10 inch Volt driver and a Tannoy Dual Concentric. MHA say the secret of the monitor's sound lies in partnering it with their new *Chameleon 1U*-high power amplifier. MHA also provided all the monitors, and the Wembley Arena SRS, for Status Quo's record-breaking 'Rock Till You Drop' charity marathon, featuring four shows around the UK in one day.

● **SSE** have put the 2nd Russian Revolution through its stiffest test. Controlled chaos ensued when an extra date was added to the Monsters of Rock tour — in Moscow on September 28, four days after the 'final' show in Barcelona. Says Beale: "It meant shipping everything to Moscow, including generators; the telephone was leaping off the hook and we had people flying back and forth to Moscow — crazy. It was a free show, sponsored by the Government."

Which Government?
"Ahhh . . . Boris's, I suppose."

An audience of up to 1 million was expected, though the venue was unconfirmed at press date. The SSE/dB Sound *MT-4* SRS was due to be supplemented by Hanover-based Rock Sound's proprietary cabinets (since there were no less than 12 outfield delays).

Also on the Monsters theme, *The Sun* newspaper, in a bizarre twist, reported that Donington actually restored one fan's hearing! The youth, whose auditory nerves were damaged in a Rugby accident, stood 10 yards from SSE's SR. In the tautological statement of the year, the paper said AC/DC's deafening music blasted his hearing back into action. The shock must have been mind-boggling.

Studio Sound's Live Sound News is compiled by Mike Lethby

People

- Sony's Pro-audio division have named Osamu Tamura as the new vice-president. Tamura has been with Sony for 20 years and was previously general manager of the Sony Broadcast's UK Audio Division. His new job is based in New Jersey, USA. Sony have named Chris Hollebhone as his successor.
- Hill Audio, Kent, UK, have appointed Derek West as UK sales manager. This appointment is a direct result of Hill Audio's plan to establish a comprehensive UK dealer network. West joins Hill Audio following 10 years at Tannoy as both sales manager and export manager.
- Solid State Logic have announced the appointment of Piers Plaskitt as chief executive of Solid State Logic Inc. Plaskitt was formerly SSL Inc vice-president.
- Orban have named David Roudebush marketing and sales manager for their professional products (the *Blue Panel* line). Roudebush most recently had been sales manager at Otari Corporation.

- Robin Millar, chairman of the Scarlett Group of companies, has appointed Colin Fairley to head **Scarlett Studios**, which includes Power Plant and now Maison Rouge. Fairley had been an independent engineer/producer and before that spent 10 years at Air Studios.
- Amek have appointed Henry Goodman recording product sales engineer. He was formerly Amek's sales co-ordinator.
- Peter Marchant has rejoined the BBC as chief engineer, television. He was previously deputy director of engineering at ITN.
- Bose UK Ltd, have announced the resignation of their managing director of 18 months, Alan Kilford. He is leaving Bose to pursue other interests in related areas of the industry.
- Solid State Logic's film product manager, Chris David, has relocated from SSL's Oxford headquarters to the company's Western Region office in Los Angeles. SSL have also announced the appointment of Dave Collie as product development manager.

In brief

- Farmyard Studios, Little Chalfont, Bucks, UK have been bought by Jetta Studios Ltd. The purchase includes the studio and the name 'Farmyard Recording Studio'. Jetta Studios is a new company headed by classical music conductor and composer, Ahmet Ertegun. Farmyard's only two previous directors, Rupert Hine and Trevor Morais, have been appointed to the Jetta board.
- Transco Mastering Services is a new company formed to service the needs of studios committed to disc cutting, CD preparation and audio post-production. Transco are the exclusive UK distributor of Transco Mastering blanks with stocks of 10 inch, 12 inch and 14 inch masters and 7 inch and 10 inch playbacks now available in the UK. TMS Limited, 250 Hillbury Road, Warlingham, Surrey CR3 9TP, UK. Tel: 08832 2914. Fax: 08832 2606.
- Ensoniq Europe, a member of the Synton Distribution Group, Maarsse, Holland, is no longer

- involved in the exclusive distribution of Ensoniq products in Europe. The US manufacturer, Ensoniq Corporation, has terminated the agreement.
- Pro-audio distributor, Scenic Sounds Equipment Marketing Ltd, have changed their name to **SSE Marketing Ltd**.
- 1989 sees the tenth birthday of the **Revox B77** tape recorder.
- Films of Bristol is a new company which has been formed to provide 'one stop, one invoice, film, radio, video and audio production facilities'. They offer digital sound production based around the New England Digital *Synclavier* system, with on-line effects and music library, controlled via an SSL 32-channel 6000 series console
- Digital Audio Research, Surrey, UK, have produced a demonstration video of the *SoundStation II*. The video, which runs for 15 minutes, will be available to potential *SoundStation* customers. Digital Audio Research. Tel: 03727 42848.
- HHB Hire & Sales, European pro-audio supplier, have changed their name to **HHB Communications**.

Sidechain

Microphones. Where would any of us be without them? Pete Townshend would have had nothing to boot off stage, or Hendrix to slide his guitar up and down. And Rod Stewart would have been empty handed strutting across the stage. And that's just the stands. What would Roger Daltrey have twirled around his head and out over the front rows of the audience. Heaven forbid what might have been the consequences had the star-launched mic jettisoned its cannon and zoomed off into the realms of the outer auditoria. Probably a half-dazed fan waiting at the stage door afterwards to get the bump on his forehead autographed!

But where would those fans have been had the cable returned to Daltrey micless? Great, climactic words such as 'See Me, Feel Me, Touch Me, Heal Me' would never have been sung. Towser would have had nothing to do a scissor jump to. He'd have been, well, legless!

Our poor mic-struck fan would have 'felt it' all right.

That the mic never did, in all those hundreds of performances around the world, set off in free-flight, and always stood up to the twirling and banging sufficient to deliver Daltrey's words with all the sensitivity, or

'loudibility' they deserved says a great deal about modern microphone, connector and cable technology. And one might easily be led into thinking that a microphone is an extremely complicated piece of equipment. It is!

But, it was during a lecture on magnetism and microphones, part of a training course at BBC Langham, that our ears, and minds, were given the most interesting and astonishing treat even better than Ovaltine (trainee BBC producers and studio managers were nicknamed Ovalteenies). When the instructor proceeded to construct a 'microphone' out of only three parts. A ring magnet, a coil and a plastic BBC teacup. He went on to better this by constructing a 'speaker' in the same way.

OK, the quality was a bit 'mashed'. In fact, almost as good as the quality of those early radio broadcasts. So that's how the BBC managed their wartime broadcasting. Next time you're short of a teacup, just look inside an old radio set!

The similarity between mic and speaker construction recalls the story of a young and very inexperienced engineer (myself) who wrongly connected the leads from a pair of 'studio' (not control room) monitor speakers, to the microphone inputs of the console, and then couldn't figure out why he could hear people in the

studio. Ghosts in the machine!

Microphones have a certain mystique, a daunting, almost eerie, 'presence'. Unless one is in control of the console, one never knows for sure whether a mic is actually 'live' or not.

The classic story, almost a legend, is of the day romance blossomed in a broadcasting studio. On that day, in that control room, it was love at first sight for a balance engineer and his lady tape-op.

The atmosphere, after a session is often, not only one of deafening silence and emptiness but one of 'aloneness'. In this case, it was a certain 'we're aloneness'.

Unable to control himself, the young man exercised his arts of seduction blissfully unaware in his unbridled passion that he was also pressing on the button for the console-mounted *D202*, which relayed dutifully and with incredible clarity, every word, sign and heart-felt murmur, into the mix bus and out to the network. Though not on-air, it was nevertheless, by this time, being tuned into by everyone else in the building.

A close encounter of the 'live' kind!

Have modern production techniques signalled the demise of the microphone. Are they destined



to the cupboard next to the echoplate? Come to think of it, is the echoplate doomed?

Will tomorrow's recording engineers ever perceive and be thrilled by the spine-tingling 'eureka' type experience achieved by moving the mic 1 cm, to the left, the right, backwards or forwards, in front of 100 musicians!

Let us raise our plastic teacups and toast our humble begetter.

● Any classical music buff might be appalled to learn that the 4-note signal, used by the BBC World Service to keep its transmitters switched on during long intervals between programmes, is actually taken from the beginning of Beethoven's 5th Symphony.

Now, an enterprising company has 'cocked a snoot' at the BBC, by using the first seven notes of the soap opera *EastEnders* theme tune in a door-chime for laundrettes.

Akademski Studio, Ljubljana

Slovenia is the northern province of Yugoslavia having about two million inhabitants, 10% of whom live and work in Ljubljana, the capital city. In addition, Ljubljana also boasts one of Yugoslavia's few 16-track studios—Akademski Studio (Studio Academic).

Housed in an erstwhile music academy built around 1920, Studio Academic was set up about six years ago and is run by Miroslav Bevc ('Beoots') very much along the lines of a hobby. Miro is a sound engineer at RTV, Ljubljana, where, for production work they only have a maximum eight channels capability. Anything larger is usually done at Studio Academic.

The studio itself is very spacious being more or less rectangular with a drum/vocal overdub booth in the corner. The walls have been treated with wooden acoustic panels, veneered on two sides with a cardboard spacer and backed with mineral wool which is fixed to the wall and in most places the walls are finished with carpet while egg-boxes on the ceiling complete the job. The acoustic screens are homemade using a basic softwood frame with thick foam infill padding and a couple of rolls of heavy curtain material which can be hung to order. Some old Plexiglass doors have been acquired to create a 'live' area.

Capacity is about 30 musicians who, incidentally, would no doubt be intrigued to find that foldback headphones (AKG K16 with separate volume control) are stored on an antique bent iron hatstand. Generally the studio is bigger than average, with its wood/carpet wall

giving a surprisingly sumptuous appearance.

Moving on to the control room, overlooked by a basque relief of President Tito, the home built feel becomes more apparent. Running parallel with the studio, the control room communicates by sound only since a chimney stack runs between the two rooms ruling out the possibility of a communicating window. Originally Miro had planned to rebuild the control room but when he measured the acoustics they were found to be virtually ideal. Equipment is fairly basic but includes an AKG R20 reverb, MXR Digital Delay, Space Echo and two MXR limiter compressors. Miro had originally planned to have a compressor limiter on each channel, but scaled down to a group of about six using Audio & Design Compex electronics in a custom built unit. The tape ma-



Miro Bevc and Siggie Jackson (MCI) with the home built console

chine is entirely homemade and is a hybrid of Ampex heads, Studer capstan, transport, tape guides and varispeed, and Miro's own design of record/replay amps. In fact, Miro designed the electronics such that each of the 16 tracks will accept a mic level input and the machine has been used, on more than one occasion, for direct input live recording. Other tape machines include two old RCA RT21 ½-tracks used mainly for effects, and a pair of Revox B77s. No noise reduction whatsoever is used.

Monitoring is through a Malcolm Hill power amp and combination Tannoy/JBL and Auratones. Before acquiring the R20 reverb system, Miro used a long upstairs corridor having stone walls, floor and concave ceiling with a microphone and speaker at opposite ends. He had to be careful of visitors otherwise footsteps would come across the reverb. That in itself has been put to good use though. On one occasion an RTV radio production had need of running footsteps which they did not have in the sound effects library—Studio Academic duly obliged.

Questioned on the cost Miro tends to answer in terms of months rather than money since only barest essentials have ever been purchased—and then usually second-hand. Bearing in mind that there is very high customs and other additions to any imported items, Miro must have put the whole thing together on a shoestring—which just goes to show that you can have a fully operational 16-track studio turning out a reasonable amount of material provided you are prepared to work at it. Microphones in the studio vary considerably through a

U47 and U49 skulking in the corner to AKG 1200C, some really old RCA mics in the drum booth, Sennheisers, and an M49 Valve type.

Miro's latest accomplishments include a new echo room just completed in the basement. A new Soundcraftsman graphic equaliser and some home designed/built noise gates will eventually be incorporated into each channel on the desk, while on order is an MXR Flanger/Doubler. Future plans include the building of a 24-track machine based on Studer A800 mechanics and the syncing of this to the 16-track. The desk, of course, will be expanded to 40 inputs to match this.

Music tends to be of most types ranging from traditional Yugoslav folk music to some pretty heavy rock. Miro also finds time to master records for RTV Ljubljana which has a department devoted to issuing records throughout Slovenia, some of which may have been originally produced in other parts of the country. Other customers include Hungerphone, Hungary and RTB Belgrade.

All in all, Studio Academic is an excellent example of a studio where money is not forthcoming and all the usual niceties have to be forgotten—it doesn't seem to affect the finished product. Housed in a beautiful old grey stone building typical of the style in the area, Studio Academic's most endearing feature must, for me, be Miro Bevc's modest catchphrase—"small studio, BIG sound".

Harry Mangle
Akademski Studio, Polyanski 6,
Ljubljana, Yugoslavia. Phone: 323123

Live One On The Wire

A recent arrival in the editorial office was a digital live album from Oneiric Records recorded essentially direct-to-disc. The album, called *Live One On The Wire* is a debut album from singer/songwriter Jeff Campbell and was recorded as a live 2-track recording using a Sony PCM-1 digital encoder and a video recorder with no mixdown or editing. The album was produced by Bill Sullivan and engineered by Paul Ratajczak in August 1978 at The Recording Suite, Long Beach, California and is probably one of the first digital recordings of popular music to have been issued. Disc mastering was carried out by Stan Ricker at the JVC Cutting Centre in Hollywood and great efforts were made to eliminate the prevalent 'snap, crackle and pop' pressing syndrome.

Although the album has been available since mid-1979 in the

USA, this was my first contact with a digitally recorded popular music album. So how effective was the album? Whether or not listeners like the material recorded is immaterial, so I will devote my comments to the reproduced subjective quality. Listening to the record over a top quality hi-fi system (Sony 70W/channel amplifier, Gale loudspeakers, Garrard/SME/Ortofon turntable combination) a number of points were immediately apparent. There was a notable lack of pressing faults or static-induced distortion. However, the album appeared to be recessed and lacking in bite. I soon cured this condition though! When firstplayed I listened to the album late in the evening and hence in the interests of my neighbours I replayed it at a reasonable level, (referred to my Sony amplifier's average-reading power meters, average output power was less than 0.5W). At this stage I wasn't over

impressed even though the recording was clear and precise. However, feeling that the recording should have greater impact and an excellent dynamic range, I waited until a convenient moment arrived for me to replay the record with the wick turned-up. The difference was quite startling. With the amplifier's meters indicating an average output power of some 5W and the spl in the region of 90dB, the record was totally transformed. The life and bite of the recording returned and without doubt the nuances of dynamic range and impact which had been obscured at a lower replay level were immediately apparent. To put it simply, it was as though I had been listening to two different recordings of the same material.

As a matter of interest I compared the Jeff Campbell album with a couple of digitally recorded classical records I have. These have

the same widened frequency range and increase in impact and clarity, but the low replay level problem was much less apparent. This begs the question of what cutting level is applicable in the intermediate stage between the availability of consumer digital audio and the present availability of consumer analogue audio? Where professional digital audio is available as an analogue record, and no doubt when completely digital consumer systems are available, it would appear that care will have to be taken in the amount of dynamic range available. Let's fact it not everyone has the equipment (or tolerant/distant neighbours) to allow the full benefits of increased dynamic range to be enjoyed. As a purist I would naturally like to have available as much dynamic range as possible, however, practical considerations

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to the front of the stage; the lead was wrapped around something and he pulled it out of the stage box.

Unfortunately he didn't just damage the lead but also the entrance to line 28 into the stage box, which was one of the main three vocal mic allocations. Mike Robinson had already worked out all his setting and things and on a couple of occasions we found ourselves with the vocal not working just before the artist went on stage. "Bryan Ferry finished up with two microphones on stage. The PA and monitors had the feed of one mic but we hadn't so somebody thrust one of the spare vocal mics into his hand just as he went on stage and he stood there with both of them all the way through his set, not knowing why but fortunately professional enough to just go ahead and do it. It was a bit

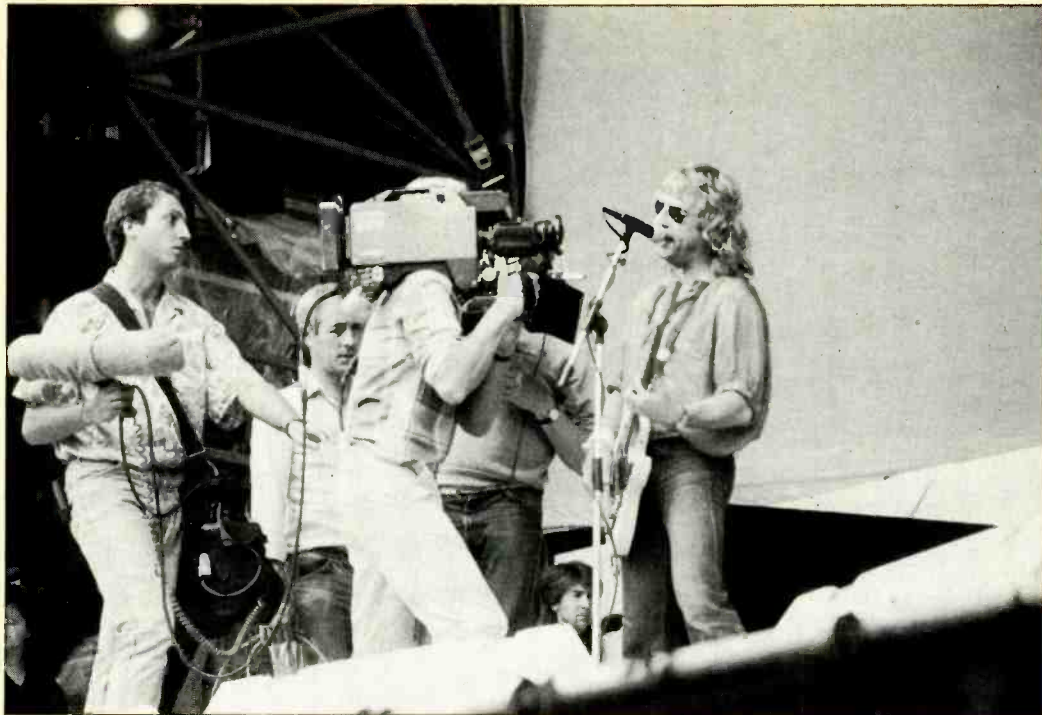
embarrassing for us and it is very bad practice to do something like that nowadays—it's the sort of thing we had to ask people to do 15 years ago.

"Anyway, we then decided to allocate line 3 for vocals; then somebody altered it. So Malcolm Hill went and sorted it out and after that everything remained pretty standard.

Power was lost twice by the BBC. Originally all the television vans were being fed from one particular sub-station in Wembley. The first time it turned out that the 500 A fuse had blown—why, nobody knows. Jeff: "It was just before Bowie went on stage. We switched immediately to the generator and it only took one minute but it threw people. Mike was still selecting everything on the desk as Bowie walked on to the stage.

"After that everything was OK until The Who. Less than one minute after they came on stage and he was just singing *Why don't you all fade away*, which I think is quite funny really because it was just at that point that the generator failed!

"Fortunately, by this time, the 500 A fuse had been replaced. Nobody knew why it had blown, so we went back and all the vans switched off all the ancillary equipment that they weren't using or felt that they could manage without, and in our case it



Smile please—you're on TV

included the cooling system—I don't know if you can remember the temperature on that day but it was very hot, and it wasn't just us that needed cooling, it was the equipment as well. So it was a bit of a gamble but it was OK. We were off-air for a total of five and a half minutes during The Who. Then we came back in as soon as we were sorted out and we started transmitting again immediately.

"Meanwhile, at Television Centre, however, they weren't really sure what was going on. We started transmitting direct sound as soon as we had it, while the pictures that TV Centre were putting out were being picked up off the satellite after they had been to Philadelphia and back, and that is why, when The Who came back on again, we were out of sync with the picture!"

It was a great shame that when Paul McCartney came on stage his vocal mic was not working. It is one of the many unsolved mysteries that happened that day. Both that microphone and the spare had been tested and found to be working just a few minutes before. "Why it didn't work I don't know. We had a spare vocal mic which we had used with Bryan Ferry but we had to check it was still working before we gave it to Paul McCartney because it would have just looked even worse if that one didn't work either. It didn't. By the time they did manage to find one that was working, he was half-way through *Let It Be*."

Meanwhile, the microphone testers were hard at work trying to make sure that all the radio mics were going to work in the grand finale when several different artists were to sing verses from the Band Aid song *Do They Know It's Christmas*. Out in the mobile Dave was desperately trying to find McCartney's vocal and faders were being pushed up all over the place hoping it would turn up somewhere. What was found, however, was James Birtwhistle testing a radio mic. As Jeff says, "Fortunately, I had insisted that they were not to use any bad language all day, just in case something like that did happen! We were using radio communication all the way through and all the people there were using all different kinds of frequencies for the different kinds of talkback as well as the radio mics on stage, so it was quite likely that something would be picked up somewhere along the line. And that's why the world heard James saying 'testing, testing' over the airwaves. Fortunately we did get all those microphones identified and when they started the finale everything was working and we got all the singers, which was very difficult because we had no idea who was going to sing which verse."

The finale was the most complex of all, not only because of the different artists involved but also because McCartney was using Elton John's piano and vocal mics which were set up in front of

the stage. These mics were going into the Scottish van to Dave Dade who was then feeding them into the London van who were receiving feeds from the circular stage with the Boomtown Rats backline with additional drum kit played by Police's Stewart Copeland.

Bristol television's OB unit also played a large role; initially they were stationed at Heathrow to see Phil Collins off on his Concorde trip to Philadelphia. Afterwards they went and set up at Legends night club where the UK links were conducted after Wembley finished and the US bands were on their own.

As the tired and happy crowd wended their way out of Wembley, rushing home to watch as much as they could of the remainder of the show the sound recording crew packed up and went home to bed.

Jeff: "We were emotionally and physically exhausted. A lot of the people involved there had been going all day and they were under tremendous pressure. It raised a lot of money and drew attention to the plight of Africa in a way that has never happened before and won't be forgotten for a long time.

"It was wonderful and I feel immensely privileged to have been allowed to be part of it and I think we all felt the same way. I would be quite happy to do it again and get more of it right!" □



Knebworth 1990: stage courtesy of Upfront Productions

Upfront goes Outback

The production arm of London-based staging and production outfit Upfront is reborn this month as Outback following a buy-out by Upfront co-owner Roger Chopin, along with Martin Crick, Roger Heighton, Simon Lowry and Shane McCarthy. Outback will continue their predecessor's production services while Upfront EGS Ltd maintains the existing hire

stock, the bulk of which will immediately move to Upfront Inc's US production operation, based in Austin, Texas, and headed by Spike Falana. Chopin's partner Roger McCue has sold most of his stake in Upfront to concentrate on his new artiste management project Mix Centre.

Clair's Euro HQ move

Clair Brothers were set to undertake a major reorganisation of their operations in December—relocating their European headquarters from London to Basle to form a new partnership with Swiss rentals company Audio Rent.

London boss Stan Horine says the move has two aims: to cut overheads and to facilitate Clair's desire to exploit their live PA expertise in tackling the UK and European installations market. Installations are increasingly featured in the company's US work and the London

office recently finished their first contract at the Lewisham Theatre in South London.

Clair's US R&D team, meanwhile, have rolled out their latest PA processor/limiter package (to replace the hybrid system currently used in Clair PA racks) and its automated sound reinforcement console project continues apace. In Europe, current major tours include Janet Jackson and The Waterboys. The new telephone number in Basle is +41 61 701 5515.

Samuelson's merger

Samuelson Group plc have brought together their three lighting and sound companies under the guise of Samuelson Lighting & Sound, in a new purpose-built centre at Greenford, West London. The restructured division—with former Kodak Copiers sales chief Roger Dix at the helm—incorporates Vari-Lite Europe Ltd (headed by Brian Croft); Samuelson Concert Productions Ltd; and the Lighting and Sound & Vision

operations of Theatre Projects Services Ltd. Alan Thomson heads up both Samuelson's and TP's lighting operations. The new base has a large training and rehearsal studio and a demonstration showroom; Dix says the new division "is headed for exciting growth in the industry".

SCP has also formed an alliance with leading US trade show and theatrical lighting company Vanco.

News round-up

● **JBL** have launched a complete pre-wired, packaged sound reinforcement system, a simple off-the-shelf concept designed, say Harman UK, for the smaller disco and PA market. The 2 kW JBL *Control Package* includes two *Control 12SR* 2-way enclosures plus stands and one *SB15* sub-bass enclosure, and is designed to be drivable by one amplifier. Larger applications are catered for by two *Sound Power Systems*, both complemented by a dedicated rack, crossover and cabling, and JBL-recommended amplifiers.

● **DDA** have notched up a successful run in the past few months with sales of their new top-of-the-line *Arena* PA console to leading Canadian PA rental firm *Bruit Bleu* (for the latter's New York *Aida* shows) and a contract through *Audix* for seven *D* series and eight *S* series consoles in Birmingham's new International Convention Centre. Its centrepiece is the *Symphony Hall*, new home of the Birmingham Symphony Orchestra.

● **Nexo** have a lengthy list of new activities in Europe—including recent installation and hire systems through Stockholm-based distributor *LEAB* and contracts through *CAMCO* of Kreuztal, Germany.

● **Electro-Voice** note that David Bowie's world tour has featured *N/D757A* (vocal) and *N/D408A* (drum) microphones—at the behest of FOH engineer *Buford Jones*. Jones, named as *Mix* magazine's 1989 Sound Reinforcement Engineer of the Year (why not 'producer'—is there an element of the poor relation here?) notes in typically dry Texan off-hand manner: "I've used *N/DYM* microphones for some time... the *N/D408A* is particularly great for drums."

● **MHA Audio's** new *Hill M6 PA* system, first used by *George Michael* and *Cliff Richard* in the past year, has had its US debut on the *B-52s/Ziggy Marley* 'arena and sheds' tour with supplementary control hardware provided by *The Toy Specialists of New York*.

● **Outline of Italy** have two interesting controller-assisted speaker systems: the *TopFly* 2-box 3-way system and the *FlyOne* 3-way full-range system. Both, say

Outline, have been developed with the latest CAD technology to combine high sensitivity and power handling in medium-sized trapezoidal enclosures. *TopFly* employs custom designed ferro-fluid cooled drivers, hybrid bass loading and a *Quadrplug* loaded MF horn, which achieves 113 dB/1 W/1 m. It's designed for portability and easy assembly in arrays and, claim *Outline*, eliminates comb filtering problems.

● **Canegreen** have a packed schedule embracing the *Grateful Dead's* Wembley shows (using an unprecedented total of 88 Meyer *MSL-3s* plus subs) and UK European tours by *Van Morrison* and *Suzanne Vega* (the latter also venturing into former Eastern Bloc territory) as well as *Aztec Camera's* US dates.

● **SSE** are touring with *The Pogues*, *World Party*, *Del Amitri* and a couple of (legal) *House Raves* with their *MT-4* and *E-V* speakers and *TAC SR9000*, *Scorpion 40/12* and *Soundtracs SPA* consoles. The company's Irish subsidiary, meanwhile, has *Paul Young* and a charity night hosted by former Beirut hostage *Brian Keenan* at *The Point* in Dublin.

● **Sound Hire**, *Richard Leinard's* Meyer rentals company, maintains its impeccable cultural connections with productions for *Pavarotti*, the *Bolshoi Opera* and *Shirley MacLaine*. *Sound Hire* has also invested in three *RAMSA* consoles (two FOH, one monitor), which *Leinard* says represent "a quantum leap in quality and reliability", and a brace of Meyer *MSL-10s*. The latter, 'big brothers' to the standard *MSL-3* enclosure, weigh 440 kg apiece and, *Leinard* states, "are very powerful, very high Q, ideal for large events and the next logical step in our upgrading".

● **Gazza**: We have received a press release announcing *Lindisfarne's* 25-date UK Christmas tour, the highlight of which was a reference to the rap by 'Gazza' (*Spurs* and *England World Cup* soccer star *Paul Gascoigne*) on the band's reworked classic *Fog On The Tyne (Gazza Rap)*. The release, however, coyly omits to mention whether the tearful folk hero himself might tread the boards...

Studio Sound's Live Sound news is compiled by Mike Lethby

INSIGHTS

INSIGHTS

We can consider ourselves lucky that the 'music biz' end of the industry has chosen such an intrinsically good product as the object of its fashion-consciousness. As it happens, it had little choice in the matter from the products available, but the fact remains that it made that decision for the wrong reasons. And a decision based on fashion could change in a moment. It might change to something truly awful overnight. If someone important has a massive hit with a Grimbale 60, we may well find ourselves in a position where we all have to change over to Grimbale 60s and throw out the SLA000s. This could be expensive, and we might not be so lucky next time: the Grimbale 60 may be a load of expensive rubbish. Someone out there owns one of those things now, and it is lurking in the dark of a nearly-forgotten studio, waiting for some producer or other to be unable to get into his favourite SSL studio and to have it recommended by a friend.

Indeed, the 'everyone has got one' syndrome is likely to cause trouble for SSL in itself. I have already been asked to advise more than one studio on what it should get as its new console, and on recommending the obvious, have heard the remark, 'Yes, but everyone's got one... what else is there?' The fact is that at the moment there isn't much else to choose from up at that end of the market. This situation surely cannot last for long. There must be several manufacturers lurking in the background thinking how they could get into a market which is so unnaturally dominated by one product. Calrec, for example, have a very tasty console on the cards, so to speak, which looks as if it might qualify. A major studio (significantly, not in the UK) has already decided to try the idea.

Calrec will need to make some good PR out of everything to do with the design to become a strong contender: they have an excellent record in the broadcast field and in microphone production, but to many studios they are an unknown quantity. Indeed, PR people are going to have a field-day. The only way to get these consoles into the marketplace will be to make them fashionable, however good they actually sound, or however easy they are to use. I don't regard that as particularly healthy.

With a number of other manufacturers working in this area there will eventually be less of an excuse for fashion in coming months, because all these products will be good! This, surely, is just as well. If you buy something like an expensive console because it is fashionable you are asking for trouble. If you have any long-term business acumen, you should buy because it sounds right and works right. Good sounds never go out of fashion (or at least nearly never, but that's another story...).

Rock 'n' rollaround

Engineer John Acock is to be congratulated, for his excellent work on the new Steve Hackett album, *Till We Have Faces* (Lamborghini Records LMG4000). The first commercial Ambisonically-mixed release, it is available on CD as well as old-fashioned vinyl. The CDs are some of the first produced by the new Nimbus Records factory in Wales, and he has managed to pip me at the post as my Ambisonically-mixed CD-only release, *Surprise Surprise* is following on a couple of weeks behind. Although the Steve Hackett album

contains some exciting surround effects (which, due to the inherent compatibility of the system are not lost on the stereo listener) the technology never intrudes on the music. This is of course as it should be, and we may be lucky in seeing Ambisonics take off without loads of meaningless surround ping-pong recordings. The actual album sleeve hardly mentions Ambisonics, and it certainly doesn't note the fact that one track, previously released as a single, is *not* Ambisonically encoded, as it was mixed prior to the album sessions. It will be interesting to see who notices the difference. □

multimix

16:2:1 12:4:2:1 16:4:2:1

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PAEG boycotts Montreux AES

At the second full meeting of the Professional Audio Exhibitors Group (PAEG) held at the meeting room, London Zoo, an initial list of non-exhibitors for the Montreux AES was issued. Support has also been pledged from some US companies who regularly exhibit at AES in Europe.

The following companies have agreed to boycott the Montreux exhibition: Allen & Heath, Amek/TAC, AMS, BSS, Connectronics, DDA, Expotus, Focusrite Audio Engineering, HHB Communications, Harris Grant Associates, Hill Audio, Hilton Sound, Klark-Teknik, Martin Audio, Neve, Philip Drake, Saturn Research, Solid State Logic, Soundcraft, Soundtracs,

Stirling Audio and Turbosound.

Only those companies who have decided to boycott Montreux will be entitled to join the PAEG, which was set up in May with a clear mandate to present the views of previously exhibiting companies to the exhibition organisers. The list of non-exhibitors will be circulated to companies who exhibited at this year's Hamburg AES, and updated at regular intervals to include new members.

Alison Brett of Soundcraft and Graeme Harrison of Hill Audio have been appointed as board members to replace Iain Roche and David Bissett-Powell.

Apple vision

At the recent MacWorld Expo in Boston, MA, USA, Apple's chief executive officer, John Sculley, was outlining some of Apple's ideas and directions for the future. Sculley: "We at Apple intend to expand our midrange products, the SE-30 and IIcx, and bring prices down so that high performance can be offered at lower prices. We intend to make entry-level machines—the Mac Plus and standard SE—available at much cheaper prices, so that many more PC users can afford a Mac."

However, Sculley promised that Apple would not be ignoring the high end user: "We will produce some extremely powerful 'workstation' systems. In short we intend to broaden our base. Mac software will run across the entire product line."

Addendum

Within the contracts section of the September issue we implied that Soundcraft had already installed 3200 consoles in several facilities. This should have indicated that Soundcraft had received orders from the studios listed.

Apologies for the confusion caused.

Agencies

• Pro-audio distributors Audio Systems Components are to distribute the stand-alone radio code clocks made by **Junghans Uhren GmbH** of Schramberg, West Germany. Audio Systems Components, 1 Comet House, Calleva Park, Aldermaston, Berks RG7 4QW, UK. Tel: 0734 811000. Fax: 0734 819813.

• **Amek Systems** have appointed Sonotechnique as exclusive distributor for Canada. Sonotechnique, 2885 Rue Bates, Suite 300, Montreal, Canada. Tel: (514) 739-3368. Fax: (514) 739-8739.

• **Canford Audio**, Tyne & Wear, UK, have recently been appointed the main UK dealer for the **Comrex** range of frequency extending equipment. Canford Audio plc, Crowther Road, Washington, Tyne & Wear NE38 0BW, UK. Tel: 091-417 0057.

• **PRECO** have been appointed distributors of **CRL** audio processors in the UK and Eire.

In brief

• **Mark IV Industries** have acquired the assets of **Electro Sound Inc.** a division of **Electro Sound Group**. The **Electro Sound** audio tape duplication hardware division will become part of the **Mark IV** stable of companies that already includes **Gauss**, manufacturer of high-speed cassette tape duplication systems and equipment.

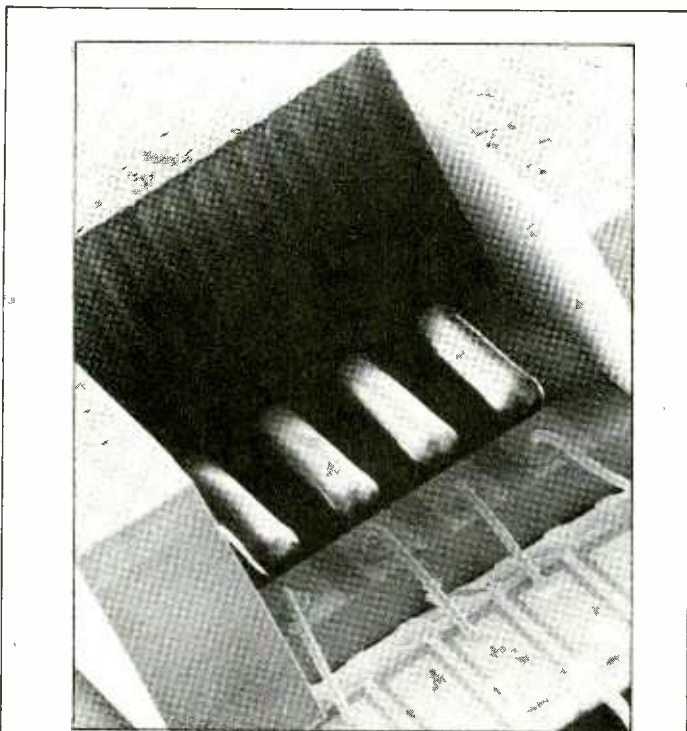
• **Disctronics Inc**, Australia, a manufacturer of optical disks, and **Design Science** of California, USA, have announced that **Design Science** will manufacture and market a line of PC-based CD, **LaserVision**, CD-V and CD-ROM disk analysers, which were developed by both companies.

• A new company, **Action Stations**, has been formed to meet the demand for contract engineering services for radio broadcasters, recording studios and all professional users of audio equipment in the UK. **Action Stations**, London. Tel: 01-281 7281.

• **Electronic Music Studios (EMS)**, Cornwall, UK, have won an award from the Institute of Social Invention for producing a machine that enables handicapped people with minimal movement to control sounds from a synthesiser. The **EMS Soundbeam** MIDI controller comprises up to four linked ultrasonic echosounders, connected to a synthesiser, that detect the presence and range of any part of the body entering the beams up to 6 metres away. Wider applications could include the performing arts and education. For more information contact **Robin Wood**, EMS, Trendal Vein Barn, Ladock, Truro, Cornwall TR2 4NW, UK. Tel: 0726 883 265.

• **Gig Sounds** music stores of Catford and Streatham, South London are holding a competition for budding musicians. Original compositions not more than four minutes long are to be sent to their store in Catford. Among other prizes the winning entries will be compiled and sent to major record companies. All entries will receive a free assessment sheet and should be in by November 15th. **Gig Sounds**, 22 Rushey Green, Catford, London SE6, UK. Tel: 01-690 8621.

• Over 120 applications were received for this year's **PRS John Lennon Award**, and after careful consideration the judges have decided that they cannot recommend any to receive the award due to the disappointing standard of the entries and lack of originality. The future of the Award is now in doubt.



FAST LEAVE: magnified several hundred times is the transmitter section of IBM's experimental optoelectronic computer chip set. The four large 'rods' in the recess are optical fibres about the same thickness as a human hair. On the 'ledge' before each fibre, connected to an electronic line, are four efficient, almost microscopic lasers that convert the electrical signals from a computer into light signals at about one billion light pulses per second. The optical fibres would gather the light from each laser and send them on their way to another computer.

news

Poland

Given the good reception of the First Programme that is now possible on long wave following the introduction of the 2 MW transmitter at Konstantinow, Polish Radio is reallocating former First Programme frequencies on vhf to reinforce those scheduled for use by the new Fourth Programme. The Fourth Programme is now broadcast from Warsaw, Losice, Surpe, Bialystok, Bydgoszcz, Gdansk, Katowice, Czestochowa, Kielce, Koszalin (two frequencies), Cracow, Lublin, Lodz, Olsztyn, Opole, Poznan, Rzeszow, Szczecin, Wroclaw (two frequencies), and Zielona Gora on frequencies between 68.24 and 70.82 MHz. The programme is broadcast 17 hours a day Monday to Saturday and for 16 hours on Sunday. The content is mainly cultural or educational, with news bulletins; music and drama are in stereo. The First Programme is relayed for three hours every morning (except Sundays).

UK Film

The report of the Prime Minister's working party on the future of the British Film Industry was published in January. It makes 39 recommendations, including: a £5 million injection of new funds derived from the present levy on the excess profits of the independent television companies; £1 million annually from the Eady levy—the charge on cinema admission prices normally redistributed by the British Film Fund according to gross box office takings on each film; and the setting up of a British Film Authority to take over the functions now fulfilled by the Department of Trade and the Department of Education and Science.

The working party, whose members included Richard Attenborough, Bernard Delfont, Lady Falkender, a largely absent Carl Foreman, Alasdair Milne and Alan Sapper, was appointed on August 1 last year.

The report says that the levy on the ITV companies' excess profits last year was nearly £21 million, and is expected to be nearly £14 million in the current year. The pro-

posal is that the companies would be exempt from a levy on any of their profits that they devoted to film production. The IBA and Independent Television Companies Association have welcomed the proposal.

The BBC has offered to provide a fund of £250 000 a year for use as "seed-money" or pre-production finance in order to promote feature films designed primarily for showing in cinemas but which would in due course be suitable for television transmission by the BBC. Each project would receive £25 000. 'The BBC will leave the full £25 000 in the film but will be entitled to recovery and a suitable profit share like any other investor. Once the investment has been recovered, the BBC will be prepared in due course to provide a minimum of a further £25 000 for the United Kingdom television rights in the film'. The BBC would administer the scheme, but no permanent BBC staff would be employed on any of the projects. Any profits the BBC made would have to be ploughed back into film making. Unlike the IBA and the ITV companies, the BBC has said nothing.

'Greater efforts', the report says, 'should be made by producers and distributors of British films to obtain better prices for films offered to United Kingdom television.' Alasdair Milne of BBC Television and Brian Tesler of London Weekend Television dissociated themselves from this recommendation, which is hardly surprising, but no-one, not even Alan Sapper, dissociated themselves from the recommendation that the period after which a film can be shown on television should be reduced from five years to three.

Also puzzling is the lack of any incisive comment on one of the abiding evils in the film industry, the monopoly of film distribution by the two large exhibitors. Two, perhaps three of the report's 127 paragraphs refer vaguely to restrictive practices and distribution, but hardly connecting the two, a reticence perhaps inspired by the presence on the working party of Sir Bernard Delfont, boss of the EMI cinema chain.

Reaction to the report has been

predictable. Kenneth More said he would believe the money would benefit movies when he saw new films being made because of it; most of the government money given to films seemed to disappear without ever reaching the shooting stages. Films were often still abandoned half way through because one backer dropped out, he said.

Director Michael Winner thought the new money would be lost just as the NFFC's money had been. Films ought to be put on the same footing as the other arts, and particular productions financed as they were in the theatre, with stars working at less than their normal fee 'in projects of particular merit which might not normally be made in a medium catering to mass taste.' He also said that personal taxation should be reduced to allow film talent in front of and behind the screen to return to this country.

John Dwyer

Sine generator

The latest B & K sine generator provides automatic sine sweeps between 10 and 20k Hz in a continuous linear or logarithmic sweep. The sweep can be controlled manually or from a ramp generator such as those incorporated in the B & K recorders when used for automatic frequency response plots. A five digit frequency display provides 0.1 Hz resolution.

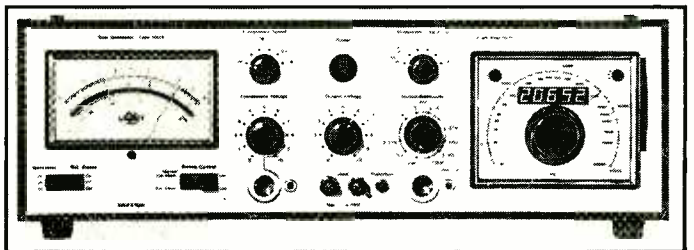
Other features include a low distortion 7W amplifier, a compressor for automatic regulation of output over a 60 dB range, a precision output pad covering 100 dB, built in metering, and provision for frequency modulation of the output. The 1023 generator also provides marking pulses for frequency calibration of recorder paper and tuning signals for an external heterodyne slave filter.

B & K Laboratories Ltd, Cross Lances Road, Hounslow, Middlesex TW3 2AE. Phone: 01-570 7774.

Emergency power

The NEA Lindberg units in the 520 range feature a no break power

B & K 1023 Sine generator



transfer from mains to a bank of storage batteries which power a thyristor inverter. The potential output of the inverter is always kept in phase with the incoming mains so that in the event of line failure, power transfer is effected with as little transient generation as possible. These heavyweights provide a stabilised output in the range 2 to 40 kW in both 2 and 3 ϕ format. NEA Lindberg A/S, Industriparken 39-43, DK-2750 Ballerup, Denmark. Phone: (02) 97 22 00. UK: Avel-Lindberg Ltd, Arisdale Avenue, South Ockendon, Essex RM15 5TD. Phone: South Ockendon 2444. Telex: 897106.

Rogers service facilities

In spite of the liquidation of Rogers Developments (Electronics) Ltd, owners of that firm's audio gear will still be able to obtain after sales service from a new enterprise that has arisen, phoenix like, from the ashes of the old company.

The new concern, Swisstone Electronics Ltd, is staffed by members of the old Rogers company and operates from the latter's factory. Initially, Swisstone will provide maintenance, but plans are in progress to restart the manufacture of some product lines.

Swisstone Electronics Ltd, 4/14 Barmston Road, London SE6 3BN. Phone: 01-697 8511/8627.

Vatican City

The world's largest rotatable aerial is to be installed for Vatican Radio. It will be mounted on two 79m steel towers and fed by a new 500 kW Telefunken transmitter.

Mixers and amplifiers

The versatile range from Malcom Hill Associates offers a choice of two types of mixers and several types of power amplifiers ranging from 100 to 800W.

The simplest mixers manufactured by the company are offered in 10 or 16 input format using a hardwired, non modular construction. They feature high and low Z

APRS Report

The first the *ADO49* portable mixer is a compact 4 into 1 unit, with either a VU or PPM meter, LED overload indicators, and headphone monitoring. Either battery or mains powered, the mixer can also be powered directly from positive and negative earth Nagra recorders without any external switching. The second new mixer, the *ADO60* is a compact 4 into 1 unit designed particularly with ENG usage in mind. Features include external 24V dc powering, XLR inputs/outputs, three input filters, headphone monitoring facility, and LED column output level indication with a PPM characteristic.

Another new small mixer being shown was the *PM-80* compact modular production mixing system from **Formula Sound**. Based on a 19in frame, the system features plug in input (mic/tape/phono) and output modules, remote tape/phono starts, PFL monitor switches, headphone monitoring, and P & G faders.

Moving up in size, the **Hill K Series** console, has been joined by the new *J Series* modular sound reinforcement console. Very similar to the *K Series* in electronics and styling (they were parallel developments), the new *J Series* is available as either 24/8/2 or 32/8/2 with the option of adding 10-channel extensions. The input and effect return module features four effect returns, comprehensive equalisation facilities, pan, mute, PFL, routing switches, 3-way LED metering, and P & G fader. The subgroup module offers all the facilities of the input module without the routing switches. Additionally there is the master/talkback module with all the usual facilities. Price of a *J Series* 24/8/2 console is £6,219, while a 32/8/2 configuration costs £7,486.

Another console making its UK debut was the new **Britannia Series** from **Raindirk**. An in-line design 40/32 console, it features master status logic control with PROM controlled signal switching; 24-track routing as standard (optionally 32-track routing); and optional VCA grouping, Allison *Fadex* automation, and *Param* equalisation. Again full details appeared in our AES Los Angeles report.

The new **Sound Workshop Series 30** modular console which was shown by UK distributor **TRAD** was also fully described in our AES Los Angeles report. Designed to complement the *Series 1600*, the new console features most of the facilities of the older console, but in a smaller console at lower cost. Mainframe sizes range from 12 to 36 inputs with the number of outputs depending on what input configuration is chosen.

Returning to small mixers, **Turnkey** showed the *Seck 62*, *Seck 104*, and *Seck 1480* mixers manufactured by **Bandive Ltd**. Designed with semiprofessional usage in mind the mixers are respectively 6/2, a 10/4 main section with a 4/2 line mixer, and a 4-channel mixdown unit. All the mixers are available in kit form as well as ready made which is an advantage to those diy hobby electronicists among us. While facilities differ from model to model and the mixers offer considerable scope for customisation, the *Seck 104* looks particularly interesting and should become very popular with semiprofessional and hobby recordists.

Tweed Audio introduced two new broadcast consoles at APRS, the *RP1601* and the *BC102/104*. The *RP1601* offers options of up to 16 mic, mono or stereo channels; stereo or mono outputs; two clean feeds; 2x8 remote source selector; talkback; PFL; and comprehensive monitoring facilities. Price of the basic model is £4,138. The *BC102* is a 10 input channel console



BC102 console from Tweed Audio

Ray Moore of Audix with wrap-around broadcast console



with two group outputs, while the *BC104* has four group outputs. Although more compact than the company's standard broadcast consoles, the consoles offer the same circuits and components as the larger mixers. Price of the *BC102/104* is expected to be between £3,500 and £4,000 depending upon which Tweed modules are installed.

Readers might be forgiven for thinking that this year's APRS exhibition was the year of the small mixers, so just to reassure everyone that the larger varieties of console were present it is worth noting that the usual wide selection was on show from **Alice**, **Amek**, **Audix**, **CA Audio**, **Eela**, **Enertec**, **Harrison**, **MCI**, **Midas**, **Neve** (including the first UK demonstration of *Neveam II*), **Solid State Logic**, **Soundcraft**, and **Trident**. Particular mention should perhaps be made of **MBI** who built its stand (combined with **Allen & Heath**) as a mock-up on-air broadcast studio where visitors were able to operate the *Series 24A* console as though they were handling a real on-air production.

Signal processing

One of the highlights of the APRS was the *Param* computer assisted parametric equaliser system distributed in Europe by **R Barth KG**. Once again this was fully described in our AES Los Angeles report, but a few brief details will not go amiss. Unlike conventional equalisers the *Param* uses a central control panel with a keypad and joystick to set the equalisers. Monitoring of the eq curve is via a television monitor. A number of eq settings can be stored in the system's computer memory allowing eq settings to be compared at the push of a button. Use of the system was extremely simple and I mastered the system within a couple of minutes once I had got used to the joystick control and associated control button which has to be kept depressed to enable the joystick. This was a rather fiddly operation but once mastered I encountered no further problems, and the system was a pleasure to use.

Another new item from **Barth** was the *Dynaset U311* (dual limiter/compressor/expander), a novel dynamic processing unit which provides two independent bands of operation through the use of two independent threshold settings. A

feature of the unit is that each band can independently be set to compressor through limiter as well as expander functions, while attack and decay response behaviour can be dynamically adjusted in three ranges. Other **Barth** processing equipment on display included the *MusiCoder* 'music optimised vocoder' and the *Audios* digital delay and pitch change processor.

Audio & Design (Recording) introduced two new units, the *Gemini Easy Rider* stereo rack mounting compressor/limiter and the *Scamp S25* de-esser module. The *Gemini* unit features digital gain metering, stereo or dual mono operation, platformed 'auto' release and dynamically controlled attack; while the *S25* is a 2-channel unit which may be used to de-ess two separate channels or alternatively it can be set to de-ess at two frequencies on one channel.

AKG showed its new *BX5E* stereo reverb unit developed on the torsional transmission line principle. The *BX5E* has two separate inputs and outputs, but utilises one common reverb system. It incorporates a parametric equaliser and delay times of 1, 2 or 3s may be selected. Features include reverb drive level VU-meter readout, switchable input sensitivity selection, and LED indication of signal peak overloads. Also on show was the *TDU7000* modular time delay unit with memory extension module. The *TDU7000* operates with 16k RAMs, employs a 12+2 bit system with floating decimal point, and provides a frequency range of 30Hz to 14kHz with a dynamic range of 90dB. Modules available include input, output, delay extension, and effects.

AMS (Advanced Music Systems) was showing its recently introduced *DMX15-80S* stereo programmable delay, based on the *DMX15-80*, together with a broadcast version the *DMX15-80SB*. Also new to APRS was the *DM-DDS* disc mastering DDL available in two versions with frequency response extending from 10Hz to either 20kHz or 24kHz. All these new units were covered in our July News pages.

UK distributor **FWO Bauch** showed the new **Lexicon Model 122 Series** digital delay system, successor to the *102 Series*. Available in mono or stereo versions, the system offers variable delay,

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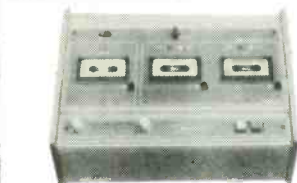
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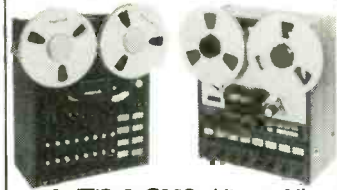
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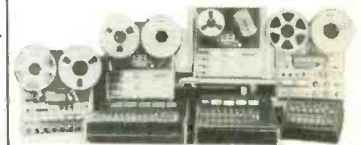
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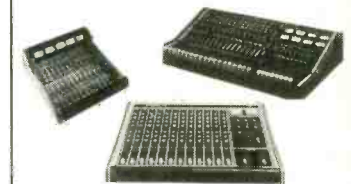


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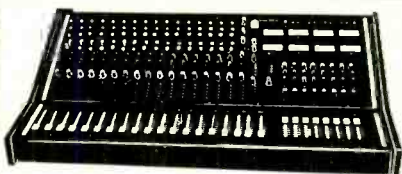


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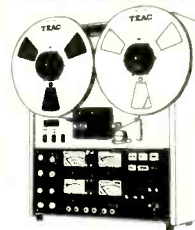
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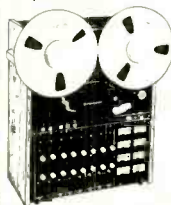


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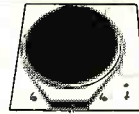
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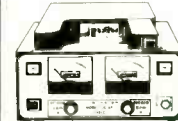
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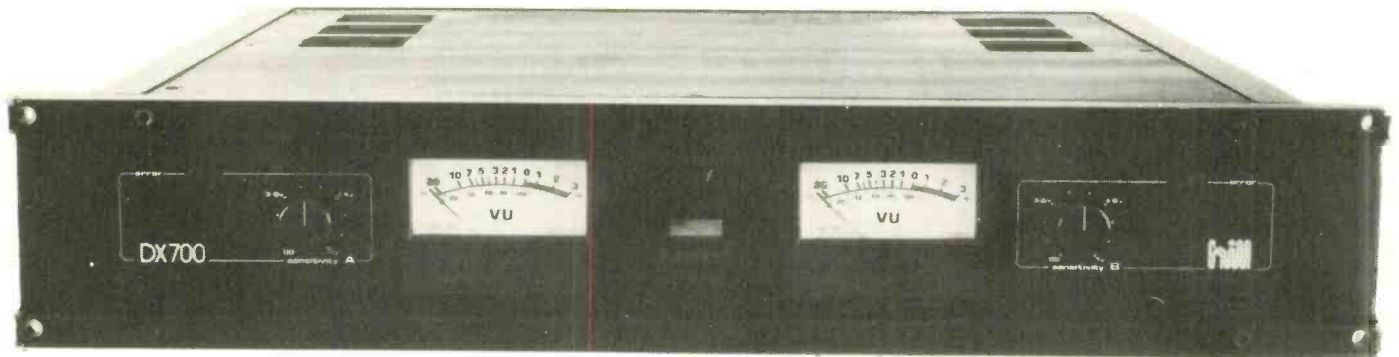
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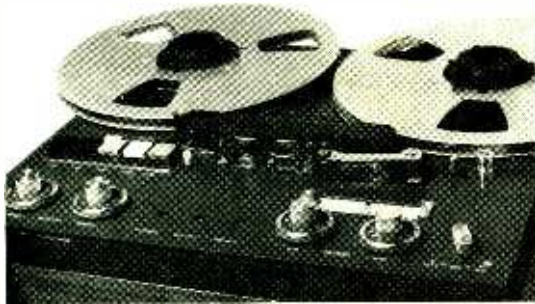
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INDEX TO DISPLAY ADVERTISERS

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Allen & Heath Ltd.	43
Amek Systems & Controls Ltd.	35
Apollo Electronics	8
Audio & Design Recording Ltd.	49, 51
Audio Centre Sheffield	21
Audio Developments Ltd.	10
Audix	45
Avcom Systems Ltd.	11
Bauch, F. W. O., Ltd.	25
Beyer Dynamic (GB) Ltd.	7
Bizarre Audio	21
Brenell Engineering	8
Cadac (London) Ltd.	2
CAE Ltd.	66
County Recording Service	21
Creative Handbook	48
Document Group London Ltd.	12
Dolby Labs Inc.	39
Duplitape	18
Eagle Int. Ltd.	65
Electronic Music Studios	6
E.S. Electronics	18
Exposure Electronics	55
Future Film Developments	27
Griffiths Hansen (Recordings) Ltd.	12
Hammond, C. E., Ltd.	58
Hayden Labs Ltd.	20
Hill, Malcolm, Associates	69
H.H. Electronic	61
Ind. Tape Applications	4, 5
Klark Teknik Ltd.	63
K. L. Sound	74
Leevers Rich (inc Bias Electronics)	65
Libby's Hi-Fi	14
Lockwood & Co.	16
Macinnes Labs Ltd.	31
Magnetic Tapes Ltd.	6
MCI Ltd.	21
Mellotronics Ltd.	10
Midas Amplification	19
Midland Sound Ltd.	59
Miniflux Elec. Ltd.	16
M.M. Electronics Ltd.	20
Monks, Keith (Audio), Ltd.	9
Music Lab., The	12
Mustang Communications	18
NTP Elektronik A/S	47
Page, John, Ltd.	15
Pye TVT Ltd.	41
Radford Lab. Instruments Ltd.	11
Radio Recordings Ltd.	16
Raindirk Ltd.	8
REW	10
Rycote	53
Scenic Sounds Equipment	23
Sescom Inc.	6
Shure Electronics	76
SIS Ltd.	12
SME Ltd.	67
Sonifex Sound Equipment	47
Soundcraft Electronics	13
Sponsor	57
Squire's, Roger	17
Surrey Electronics	60
Trad Sales & Service	7
Trident Audio Dev. Ltd.	65
Turner Electronic Ind. Ltd.	47
Tweed Audio Electronics	15
Ward-Beck Systems Ltd.	75
Wilmslow Audio	53
Zoot Horn	57

Special Issue

Studios; while State Records have only just opened their own studio complex named Odyssey Studios, this again being MCI equipped. Other independent record companies – other than the majors – with their own studios include Bronze Records (Roundhouse Recording Studios), Island Records (Basing Street Studio), DJM Records (DJM Studios), and Virgin Records (The Townhouse Studios). In addition to these it is also becoming prevalent for some studios such as Phil Wainman's Utopia to set up their own independent record labels. These developments have naturally affected the major recording companies by offering competition to them, but it is not quite so clear how this trend has come about. While it obviously makes sense for record companies with enough artists to have their own studios, it appears that only recently has the finance become available. In most cases this is attributable to increased income and profits and a natural reluctance on the part of the independent record companies to part with profits to the taxman when capital investment to the benefit of their activities can result from the setting up of their own studios.

Interestingly with all these new studios now available one is tempted to think that there is too much recording capacity in the UK, but studio bookings appear to disprove this contention.

The general policy of up-dating equipment and refurbishing studios shows no sign of abating. Britannia Row, Konk and Marquee have all been updated, Regents Park Recording have gone 24-track, and the old CTS film and television sound studios have become the basis for the new and still developing Marcus Music UK studios. Meanwhile, Majestic Studios, who suffered

the ravages of a severe fire earlier this year, should be reopening in the near future. Incidentally, both Scotland and Eire have received their first 24-track studios, these being respectively Highland Recording Studios near Inverness and Windmill Lane Studios in Dublin, both studios are MCI equipped.

Another trend in the UK recording scene is the opening of studios out-of-town. Highland are one example who aim to attract artists away from the hub-hub of London, and another new studio is Farmyard Studios based at Little Chalfont in Buckinghamshire. Both these studios are in addition to the established out-of-town, get-away-from-it-all venues of Rockfield in Wales and, of course, The Manor. Another new studio outside London is Rock City at Shepperton and Liverpool has its first 24-track studio, Amazon.

London still remains the orchestral recording mecca of the world for classical recording. With so many top quality orchestras available and the large pool of artistic talent, not to mention highly competitive recording costs, it is unlikely that this situation will change much in the short term. Classical recording, however, is not confined to the major London orchestras alone as the Bournemouth Symphony, City of Birmingham, Halle (Manchester), Scottish National and Northern Sinfonia (NE England) are all utilised.

Looking to the future for UK recording studios is a little like crystal ball gazing. Although it would appear that a recession in bookings is not going to occur it would be foolish to believe that the record companies are not likely to cut back their recording activities to some extent as a part of their

present belt-tightening.

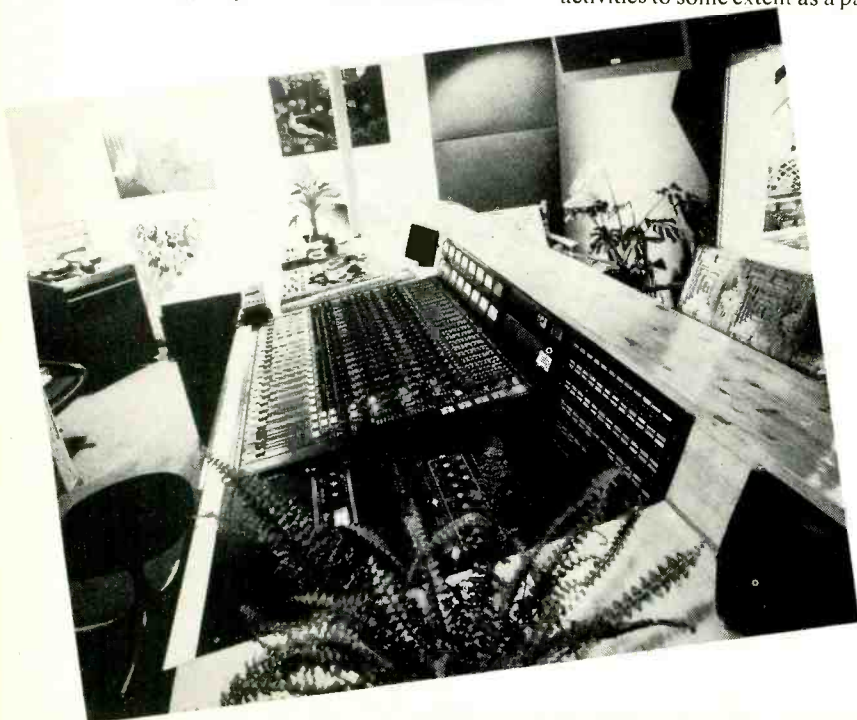
Manufacturers

In the UK the list of manufacturers is almost endless and ranges from console manufacturers such as Neve, Solid State Logic, Trident, Soundcraft, Amek, Raindirk, Alice, Midas, Tweed, Audix, Allen & Heath, and Malcolm Hill; through tape recorder manufacturers such as Soundcraft, NEAL/Ferrograph, Cadey and Brenell; to ancillary equipment from Audio & Design, Klark-Teknik, EMS, Audio Kinetics, Tannoy, Quad, H/H, AMS, Keith Monks, etc. etc. While we have a strong manufacturing base the UK audio manufacturing industry is not without its problems though. Console manufacturer Helios Electronics is presently in the hands of a liquidator although servicing arrangements in the interregnum have been made, and likewise console manufacturer Cadac have also had their troubles and has now emerged as a new company, CA Audio Systems.

Most of the UK manufacturing industry for the future appears to be well equipped to continue its strong presence in the world market. The developments in the digital field have certainly not gone unnoticed and indeed, the UK has not been exactly uninstrumental in many of these developments. However, one possible threat does exist. That is the efforts now being made by the large Japanese corporations to expand into the professional market with the advent of digital recording. For most of these corporations there was little point in trying to break into the market whilst it remained primarily analogue as the returns on capital investment were likely to be low as long as the UK, the USA and Europe had the market tied up. However, the advent of digital recording has created an entirely different ball-game. The UK, accordingly, will have to look to its laurels if it wishes to retain its position in the future.

Summing up

To conclude, the UK music industry is in many ways very healthy, however, as outlined above there are pressures at work which are having a debilitating effect. In particular the record companies are going through difficult times which they do not expect to end in the immediate future. The prevalent view is that over the next 18 months to two years times are going to be particularly sticky. The problems being suffered here are, however, only part of a worldwide recession and the effects of the downturn in the US market (on which many UK companies rely to a great extent) are also being reflected in the UK music industry's performance. However, despite these problems, we British are a durable race and no doubt we will rise from the ashes phoenix-like to continue our major role in the world's music industry. ■



Regents Park Recording Studio

Dear Sir, We are pleased to have been included in your article 'VCAs Investigated'. However, I regret to report that, through no fault on the part of Mr Duncan, *Studio Sound* or ourselves, and owing to a massive failure in communications, we were only informed of Mr Duncan's request for a brief background on our company and our *MTA 1537* VCA IC at the last minute, and we never received, either his request for sample circuits for evaluation or a preview copy of his article for comment, as was provided to other manufacturers. This has resulted in some technical and historical errata which we wish to address.

On the technical side, the article does not reflect our most current application data which has been in print for at least two years. The circuit shown as figure 3c in our data manual uses the *MTA 1537* to realise at least a 6 to 14 dB improvement in dynamic range over any previous Class A emitter-driven VCA or VCAtt realisation, depending on the control range used (including those claiming to be "approximately 10 times better" than the next best available VCA 'in all measurable aspects'") as well as substantially lower distortion.

Letter: VCAs investigated

In this circuit, the *MTA 1537* is operated entirely in the 'current' mode as a pure cascode, which effectively eliminates any slew limitation, whatsoever. The outputs from the gain cell are fed directly to the summing junctions of the following op-amps. Any bandwidth limitation in this circuit is imposed solely by the choice of op-amps, since the unity gain bandwidth (f_u) of the transistors in the IC is 210 MHz. To be more specific, the *MTA 1537* has been successfully used in production circuits at frequencies up to 10 MHz in high speed audio tape duplication and video equipment. The reader is referred to our application manual for more detailed information.

Referring to Mr Duncan's note that our part requires no 'symmetry' trim pot, this quality is inherent in a well laid out Class A VCA IC. The internal mechanisms that require this trim in a Class B VCA require a 'DC shift' or 'control feedthrough' trim in a Class A VCA such as the *MTA 1537*. Maximum residual DC shift in these devices is generally specified after trimming, since the

user would have no control over mismatches and offsets from the external components (op-amps and resistors) which drive the VCA IC, itself.

A less understood design problem unique to VCAs is the fact that critical transistor groups within the circuit must remain matched, thermally and otherwise, over the entire control range of the device. Failure to do so would manifest itself as a signal and/or thermally dependent DC baseline shift in a device such as ours. In a poorly behaved Class B circuit, the 'symmetry' adjust becomes valid only for a very limited range of control voltage, input level and even input frequency. As a manufacturer of VCA ICs we are keenly aware of the implications of transistor geometries and layout. We believe that the known quality, as well as the quantity, of our customers' products speaks to a history of signal and thermal stability in the *MTA 1537*.

I have sent this data to Mr Duncan along with additional notes on the implications of control feedthrough

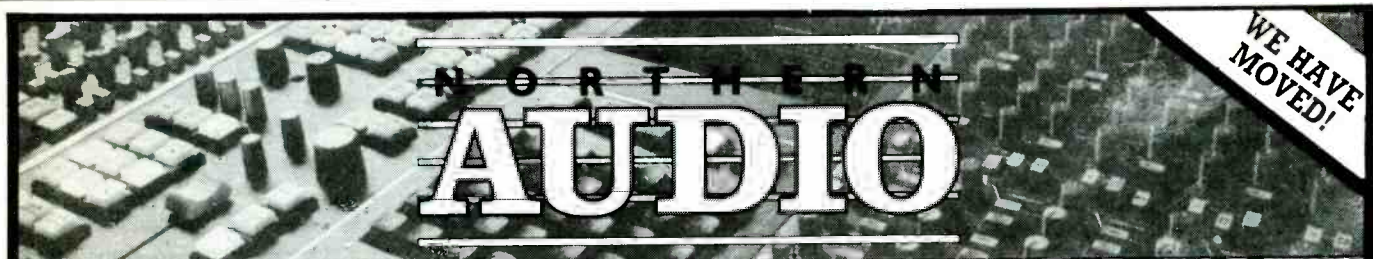
(DC shift) and special thermal considerations relating to VCAs, which may prove useful at a later time.

Historically, circuits using the *MTA 1537* (not just the IC, itself) were designed and patented by myself and David Baskind working through B&B audio, Mr Baskind's company of that time, prior to our association with Aphex. (See the listing of VCA patents at the end of the article in the August issue plus British and foreign patents issued.)

Thank you for allowing us this opportunity to comment on Mr Duncan's article. To this we wish to add our compliments to Mr Duncan for the quality and integrity of his research and, lastly, our sincere thanks to Hill Audio Ltd for providing Mr Duncan with data and a working production circuit in our stead.

Unfortunately, we do not have representation in the UK at this time. Parties interested in our products should contact us directly at our offices in the USA.

Yours faithfully, Harvey Rubens,
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Klark-Teknik Research Ltd

L

Lakeside Associates
Lexicon Inc
Long/Wickersham Associates

M

Magnifax Inc
Marshall Electronics Inc
Martin Audio
Melkuist Ltd
Meyer Sound Laboratories
MicMix Audio Products
Midas Audio Systems Ltd
Mitsubishi Electric Corporation
Modular Sound Systems
Motorola Inc Ceramic Products
MTI Corporation
Music Technology
MXR Innovations

N

Nady Systems
Nagra Magnetic Recorders Inc
Neutrik Products
Neotek
Nippon Columbia Co Ltd
Nortronics Company Inc/
Restoration

O

Omnimount Systems
Orban Associates
Ortofon Instruments
Otari Corporation

P

Panasonic Company PAD
Passport Designs
Peavey Electronics
Penny & Giles Ltd
Pentagon Industries
Phoenix Audio
Professional Audio Services &
Supply Company

Professional Audio Systems
Publison Audio Professional

Q

Quantec GmbH
QSC Audio Labs

R

Rauland-Borg Products Co Inc
R-Columbia Products Co Inc
Recortec Inc
Renkus-Heinz Inc
Roland Corporation
RTS Systems
Rupert Neve Inc

S

Sagamore Publishing Company
(db Magazine)
Saki Electronics
Schell Electronics
Sennheiser Electronic
Corporation
Sequential Circuits
Sescom Inc
Shino Musical Instruments
Corporation
Shure Brothers Inc
Sierra Audio Corporation
Sifam
Solid State Logic
Sony Corporation/MCI
Soundcraft Electronics Ltd
Soundstream Inc
Sound Technology Inc
Soundtracs International
Sound Workshop Professional
Audio Products Inc
Spectra Sonics
Stanton Magnetics Inc

Stephens Electronics
Studer Revox America Inc
Studio Sound & Broadcast
Sound
Studio Technologies
Swintek Enterprises
Symetrix
Synergetic Audio Concepts
Syntauri Corporation
Synton Electronics BV

T

Taber Manufacturing &
Engineering Co
Tannoy Products
Teac Corporation of America
Technical Audio Devices
Technical Products
Tentel Corporation
3M Company
TOA Electronics Inc
Trident Audio Developments

U

Unicord
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V

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Y

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EXHIBITION PREVIEW

series of active monitoring speakers consisting of the 1019A, S30, 1022A, 1024B, and the 1025A. Featured will be the new 1022A speaker—a tri-amped system with a frequency response of 37 Hz to 20 kHz ± 2 dB, 108 dB SPL. The three built-in amplifiers produce 150 W each with overload protection provided by electronic self-checking routines. The cabinet is specially shaped and very rigid to ensure symmetrical radiation, stable stereo imaging and minimal coloration.

● **Giese:** range of SMPTE/EBU synchronisers and timecode generators. ● **Gotham:** wide range of products including items from Amber, Fabec, Lexicon, Switchcraft, Valley People, MRL and Quantum Audio. All equipment on display in demonstration room. ● **Graff:** a number of high speed cassette duplicators will be on demonstration together with playback facilities. ● **GTC:** will be showing the *Editon* audio/audio and audio/video synchroniser using SMPTE/EBU timecode on audio or CTL pulses.

H

● **Harman:** will be showing products from Teac/Tascam, JBL and other lines that they distribute. ● **Harmonia Mundi:** details of the company's digital transfer and production services. Featured item will be the *BW 102* professional digital-audio interface for direct digital transfer between *F1/701*, *1610*, *AES/DASH* to any of these formats. ● **Harrison:** wide range of mixing consoles including two new products: the *HM4* for front of house live work and the *MX-8* rack mounting stand alone or premix input expander. Also on show will be the *TV3*, *TV4*, *PRO7*, *AIR7* and *MR4* consoles. ● **H Haufe:** no information received. ● **Heco Hennel:** range of active loudspeaker systems including the *Activ 2000 K*. ● **Heyna:** range of duplicating systems. ● **Hidley Design:** acoustics and studio design consultancy services from Tom Hidley—now based in Europe. ● **Hill Audio:** wide range of Hill products including high power amplifiers, mixing consoles for sound reinforcement, monitoring and multitrack use; compact rack mount mixer and Hill-designed speaker systems.

I

● **ICM:** wide selection of C-O cassette shells and library cases. ● **Illbruck:** acoustic foam tiles for sound absorption control. ● **Ilsemann:** cassette

manufacturing machines including labelling, boxing and foil-wrapping and a sorting machine for compact cassettes.

● **International Tapetronics Corporation/3M (ITC):** will be displaying their full line of audio cartridge machines. Featured will be the new *Omega* cart machine that offers 'affordable performance'. Also on show will be the *99B* series and the *Delta* line of NAB cart machines. Part of the demonstration will involve a comparison of audio from the ITC machines and a CD player. ● **Ivie:** wide range of products including audio analysis systems, pink and white noise generators, microphones, mic preamps and amplifiers. ● **Ivo Lola Ribar:** no information received.

J

● **JBL:** selection of products from the wide range of sound reinforcement products and studio monitor systems. ● **JVC:** Digitally related equipment, equipment for PA applications and signal processing systems.

K

● **Keith Monks:** wide range of microphone stands, cable drums, monitor loudspeakers and record cleaning machines. ● **King Instruments:** will feature the model *793* fully automatic audio cassette loader with automatic pancake/hub changeover and tape threading, alternator/feeder and display for machine monitoring. ● **Klark Teknik:** the *DN780* digital reverb/processor makes its debut along with the *USA* active monitor loudspeaker system. These and the rest of the Klark Teknik range of graphic EQs and DDLs will be exhibited in their demonstration room, not in the main exhibition hall. ● **Klein + Hummel:** range of compact active monitor speakers.

L

● **Lawo Geratebau:** wide range of modules for broadcast orientated console use. Possible showing of the prototype digitally controlled assignable analogue console. ● **Leonhard:** no information received. ● **LPS:** full range of power amplifiers covering all aspects of sound amplification and PA and monitor systems for studios, TV, radio and cinema. ● **Lyrec:** range of multitrack and stereo tape machines, high speed

cassette duplicating machines and *Fred*—the portable playback and editing machine.

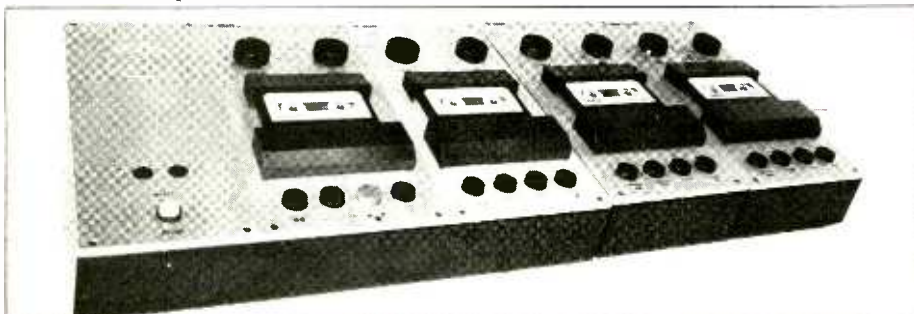
M

● **Magna:** full range of audio and video cassettes. ● **MBI:** demonstration of its turnkey radio studio design, installation and commissioning service enabling visitors to operate the complete studio system. Equipment will include the MBI series *24A* broadcast mixer, the *Sonifex* range of NAB cart machines, ancilliary equipment and an FM stereo transmitter. ● **Meyer:** full range of sound reinforcement systems and the *833* studio monitor. ● **Milab:** the complete range of Milab microphones. Featured will be the variable pattern mic/line level mic *VIP 50*. ● **Mosses & Mitchell:** examples from their ranges of audio jacks and jackfields meeting BT and BBC specifications. Featured will be the *440* range of miniature jack sockets with Palladium contacts and available with wire wrap or solder terminals. The company can also undertake custom arrangements. Also on display will be the *Video Jackfield* with 18 or 20 Musa connectors per 19 in row. ● **MS-Audiron:** no information received. ● **Musicbox:** full range of cassette products including C-O compact cassettes, blank cassette tape, head cleaner cassettes, digital cassettes and short time cassettes. ● **Musik Produktiv:** no information received.

N

● **Nagra/Kudelski:** full range of professional tape recorders including *T-Audio* twin capstan multi-format recorder and the *1V-S* stereo machine with built-in SMPTE/EBU timecode generator record/playback circuit. ● **Neumann:** the complete line of studio condenser mics including the transformerless *TLM 170i* and the short and long shotgun mics. The new Neumann *DMM* stereo cutterhead *SX 84* for *DMM* mastering will be shown as well as the range of microprocessor controlled mixing console modules including the *AME 591* equaliser system; the *AMR 544* fader system and the *AMM 576* remote controllable microphone amplifier system. ● **Neutrik:** wide range of connectors and sockets including the new *X* series of *XLR*-type units. Also featured will be the *Audiograph* modular measuring system. ● **Neve:** precise details not available at time of publication but will include analogue and digital console on display. ● **New England Digital/Turnkey:** on show will be the latest developments of the Synclavier music system including a new velocity pressure sensing keyboard, advanced synthesiser software and music printing enhancements. There will also be full details of the new 16-bit polyphonic sampling system with feature sample rates of up to 100 kHz. ● **Nexo:** semi-modular speaker enclosures for sound reinforcement and dedicated electronics for signal processing. ● **NTP:** will be showing their complete range of

Graff cassette duplication





Akai DD1000

are fitted with an RS422 connector which allows remote control with VCAs. The new JBL vented-gap-cooled speakers have been designed for high powered sound reinforcement, touring and installations. The new JBL 4700A Sound Power Series features the new VGC speakers which improve output capability. ● **Harrison Information Technology:** full range of power amps. ● **Hayden Labs:** showing products from Sennheiser, Nagra and Denon including the Sennheiser *Black Fire 530* mic, *WM-1* portable wireless mixer which permits the signals from up to four wireless mics and one wire bound mic to be mixed prior to transmission to a base station, and a *SER 20* wideband transmitter. From Nagra comes the *Nagra-D* digital recorder and *YMSA 18* noise reduction system. Denon are showing the *DN 970* CD cart player. ● **HHB Communications:** new products from new ranges supplied include the *Stelladat* range of DAT machines; the *Aiwa HDX1* miniature portable

DAT recorder and the Sony *TCD-D10* Pro portable complete with HHB's 48 V phantom power modification. Also new will be Akai's *DD1000* optical disc recorder; the Gentner range of broadcast products, the new *Quad 240* power amplifier and new amps from Amcron. ● **HH Electronic:** complete range of amplification products. ● **Hill Audio:** showing the *Mix* series consoles, a range of 19 inch rackmount mixers, the *Minimix 16/2*, *Multimix 16/2*, *12/4/2* or *16/4/2*, *Omnimix 20/8/8/2*; the *Datum* series modular console range on show for the first time in the UK with 4, 8 and 12 bus versions for recording, sound reinforcement or on stage monitoring in 5 frame sizes; *Concept* series consoles *200* and *400* series; and *LC* and *000* amplifiers featuring two ranges of 8 studio reference power amplifiers with output powers of up to 3 kW. ● **Hilton Sound:** with details of their rental service with bases in London, Paris, and Hilversum, Holland. Equipment list now offers hard disk systems as

well as *DASH* and *PD* tape machines. ● **Home & Studio Recording:** UK home recording magazine. ● **HW International:** new products from Shure microphones include the *VP88* stereo microphone, the first stereo mic to be launched by Shure. Carver are introducing a new range of six amplifiers which completely supersede the existing models. All these amps employ the Carver magnetic field principle which allows for high-power, low-weight units. Other products to be launched will be the range of audio mixers from db Technologies.

K

● **Kelsey Acoustics:** will be launching two new product ranges at the show from new UK manufacturer Rocktorch. Pro-series products include the *SA-31* 30-band spectrum analyser, the *SA-316* digital delay unit and the *PE4* 4-band parametric equaliser. Also from Rocktorch are the new Kelsey range of studio orientated valve products including the *V-1* valve microphone preamplifier, the *V-2* valve equaliser and the *VD1* valve DI box. Established products include the range of patchbays from *Isotrack* and the new range of XLR patch panels, also the range of Kelsey connectors and cables will be displayed featuring the new Kelsey *D* series stagebox system. ● **Kemps:** audio and video directory. ● **KFA:** will be announcing and demonstrating their new innovations in studio design. They're introducing a variation on modular design for larger studios called *The Production Suite*. The new concept incorporates many aspects of *The Box* philosophy but on a much broader scale. Also on



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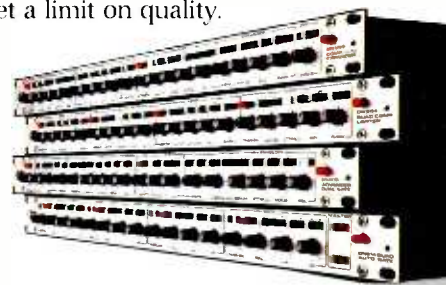
If you're looking for the ultimate in dynamic processing, visit your local Klark-Teknik dealer and find out more about the Series 500. Because at Klark-Teknik, we never set a limit on quality.



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Tel: 05621 741515

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N.Y. 11735, USA.

Klark-Teknik (Singapore) Pte Limited
7500A Beach Road, 05-305 The Plaza,
Singapore 0719



EXHIBITION PREVIEW



Range of RCF loudspeakers from Court Acoustics

Full range of TOA professional products including reference monitors, PA equipment, power amplifiers, radio microphones, audio processing equipment and mixing consoles. ● **Electrospace:** The 'Pressor' will make its first appearance. Preliminary details include compressor knee variable from hard to soft and extremely soft knee where the compressor becomes non-linear; hold facility on side chain variable from 1 to 10 ms; variable threshold, ratio attack, release and gain. They will also show the *Strate Gate*, the *Gate* and the *Spanner*.

● **Elliott Brothers:** Loudspeaker products including Rogers and Tannoy ranges, Elliott Brothers custom stands and broadcast mixer, plus details of systems and installation services.

● **EMO Systems:** Full range of stage and studio ancillary equipment including DI boxes, microphone splitters, power distribution systems and disc amplifiers available standard or customised.

F

● **Fetiver:** No information available.

● **Film-Tech:** The established *Compact* 3- and 4-channel portable mixers for use in film and video production. On show for the first time is the *VTM 12-3* mixer originally designed for use in BBC VTR areas, it is now available in various sizes and configurations to meet audio mixing requirements in video editing and transfer suites. Another new 'product' is the 50 Hz pulse modification to the Sony professional *Walkman* recorder allowing the machine to be used to record film sync sound. They will also be showing equipment from Yamaha, Bel, Sony and Tannoy. ● **Formula Sound:**

Demonstrations of *QUE-4* and *QUE-8* studio foldback systems along with *PM-80* modular production mixer and latest addition to the range of modules. Formula Sound hopes to introduce a new 10-band system equaliser with the established 19-band *SE1* equaliser.

● **Future Film Developments:** Introducing a number of new products including Tannoy monitors, Philip Drake

distribution amplifiers, Neumann microphones, Stellavox *TD-9P* 35 mm transfer machine and *RTS 848* Matrix Intercom System. Also showing will be Canare cables and winders, Stellavox portable tape machines and mixers, audio cables, connectors and patching systems, video cables, connectors and patching systems, Soundex PPM drive cards and a complete range of audio and video accessories.

G

● **Graff Electronic Machines:** Following on from GEM *Diamond* expandable stereo cassette duplicator, the new *Sapphire* one to one stereo copier debuts at APRS. Operating at 8x normal speed, it will duplicate either both or single sides of a cassette, and features automatic gain controls and rewind. ● **gtc:** Range of synchronising products for A/A and A/V applications including *Editon* single/dual/multi-slave synchroniser, a portable timecode reader, and a footage counter.

H

● **Harman Audio:** New Tascam *ATR60* analogue series with *ATR60-2T* stereo with in-line timecode track ½ in machine for stereo high speed, 4- and 8-track formats and a stereo mastering system. The omega transport used on these machines is controlled by Teac microprocessors and have been designed for SMPTE controlled operation. Tascam *M520* console and *112* and *112R* (auto reverse) studio cassette decks are also new. UREI products being introduced include *813C* monitor with new complement of drivers giving high power capability and low distortion. The *Vidikron* projector for large scale TV projection will be shown with, new to Harman, Rauch precision amplifiers for monitor and PA applications ranging from 250 to 1000 W/channel. ● **Harrison Information Technology:** New *DSA* series digital amplifier range using ultra linear pulse width modulation technology

are smaller and lighter than existing amps. New *GP* series graphic equalisers and *AC400* active crossover featuring built-in limiters and adjustable filter cards, and the *SP7* stereo mixer incorporating logic based monitor system will also be shown. ● **Hayden Laboratories:** Showing products from Nagra-Kudelski, Sennheiser, AEG and Dynacord. In addition to established Sennheiser ranges there will be the new *M8* portable mixer, *MKH40 P48* cardioid studio microphone, *MKH20* omni and *EK 2012-90* miniature radio microphone receiver. The Kudelski range will include a new range of accessories for the Nagra *T-Audio* timecode tape recorder.

● **HHB Hire & Sales:** Showing the complete Sony range of low cost digital audio processors: *PCMF1*, *PCM701ES*, the new *SLHF950* Super-Beta VCR and various Video 8 products. The full Sony CD mastering and editing system will be demonstrated throughout the show as will *CLUE* system along with the new Electric Valve Communications *Editing Co-processor* and Audio+Design *Admix*.

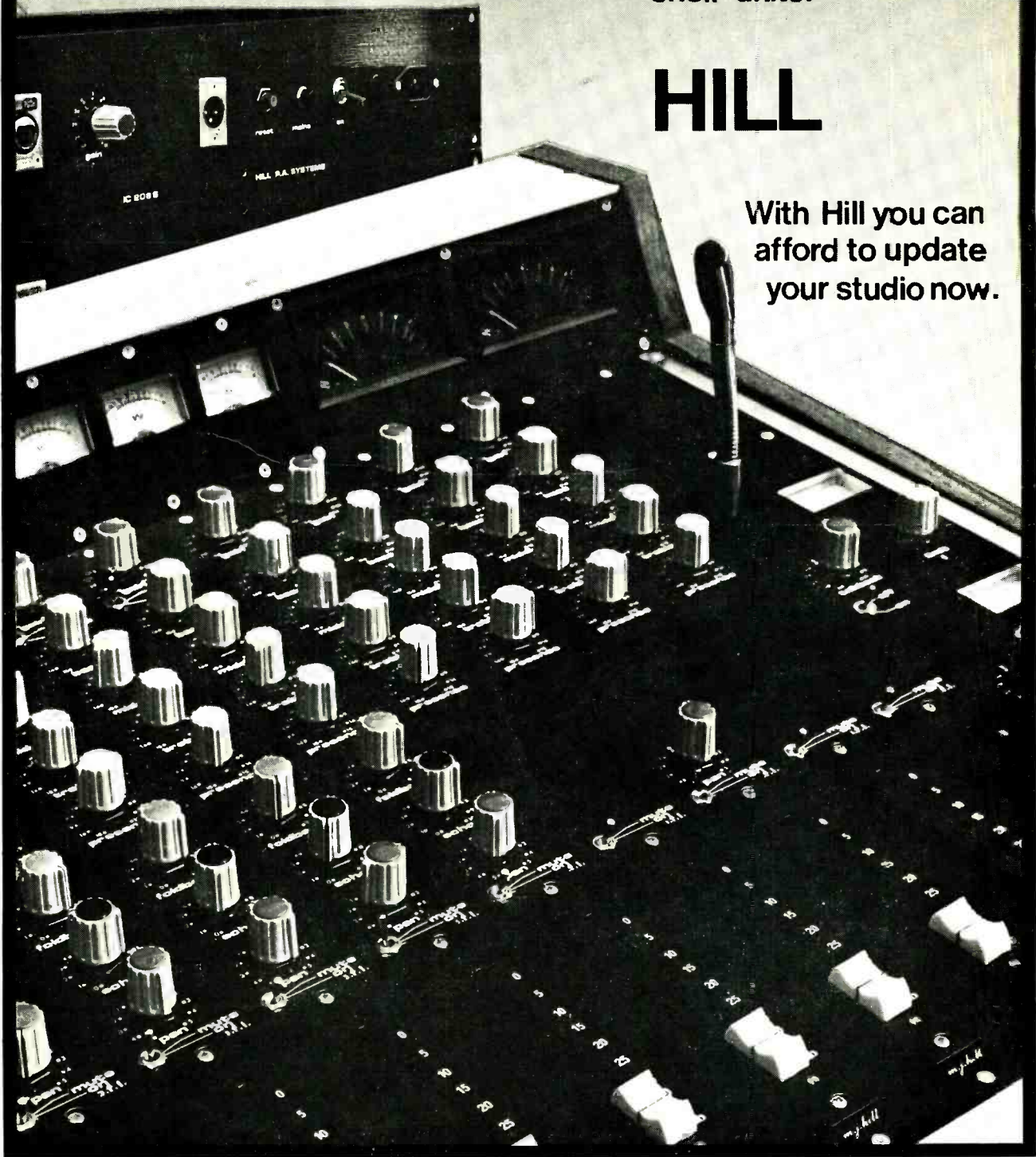
Amcron power amplifiers will include new Micro-Tech *1200*, *1200LX*, *600* and *600LX*. Other new Amcron products will be the Techron *TEF12* spectrum analyser/computer which will be on demonstration and brand new *GLM* microphones. Also on show will be Yamaha *REV 7*, and *SPX90*, AMS *DMX15.80S* and *RMX16*, Drawmer noise gates and compressor/limiters, Amcron *PZM* microphones and *PCC160* phase coherent cardioid mics, TAC *Matchless* console and Sony/MCI *JH2424* 24-track analogue recorder, Fostex *B16* and Allen & Heath *CMC2416* and Gauss loudspeakers. ● **HH Electronics:** The new *VX* range of MOSFET power amplifiers which range from *VX150* 1 U rack-mounting amplifiers offering 75 W RMS/channel (4 Ω) through *VX200*, *VX300*, *VX450*, *VX600*, *VX900* to *VX1200* offering 600 W RMS/channel 2-speed fan cooled 3 U power amplifier. All units feature peak, trip and mono/bridged LEDs. ● **Tom Hidley:**

Details of studio design services including projects recently completed and under construction and the new monitoring systems. Tom Hidley will also be present. ● **Hill Audio:** Two new mixing consoles will be introduced: *Soundmix* (24/4/2 and 16/4/2) and *Rakmix* (8/4/2 rack-mounting) feature four auxiliary sends with four returns, 12-way LED and VU metering, ALPS faders, 48 V phantom powering, 4-band EQ and balanced and unbalanced outputs and inputs. The range of power amps will also be shown from *DX500* (280 W 8 Ω/channel) to *DX3000* (3000 W 4 Ω bridged mono), along with *J* series *3S* modular mixing consoles, sound reinforcement speaker cabinets, crossover and ancillary equipment. ● **HW International:** Will show the full range of Shure microphone and electronic products including new professional condenser microphones: *SM94* for musical instrument use, *SM96* for vocals and *SM98* with very flat frequency response and high SPL, a new *FP32* ENG stereo mixer, *SM1* (single earpiece) ▶

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inputs and standard line level outputs. At channel level, there are the usual facilities associated with pa work including echo and fold-back sends, a-b panning and simple eq. Power comes from four internal 9V batteries.

The modular mixer range offers four stage eq on fixed frequency centres/channel as well as an extra foldback circuit over and above that incorporated in the non modular series. Pfl facilities are standard. These mixers can also be upgraded towards recording applications through custom routing and line level input switching arrangements.

The power amplifiers offer the sort of specification expected from high quality transistor circuits. The following figures are quoted for the 200W version; the manufacturers claim that these are typical for the whole range:

Rated output power: 200W into 8 ohms.

Total harmonic distortion: at 1 kHz better than 0.02%, 10W, .05% at 200W.

Sensitivity: 0 dBm for 150W into 8 ohms.

Noise: below -100 dB re 200W into 8 ohms, bandwidth unspecified.

Frequency/power response: within 1 dB 20 to 20k Hz.

Damping factor: 300 at 40 Hz/8 ohms.

Rise time: 15 μ S.

Malcom Hill Associates, 3 Maidstone Road, Tonbridge, Kent. Phone: 062 785 545.

Dreadnaught

These power amplifiers are big and meaty and much in keeping with the style of large power amplifiers for which America is well known.

The Dreadnaught 1000 offers 250W/channel into 8 ohms (FTC rating) while the smaller 500 version delivers 150W into 8 ohms. Both amplifiers feature full electronic circuit protection for both output transistors and loudspeakers connected to them.

Extracts from the manufacturer's specification. Apart from power output, electrical specifications are identical for both models:

Total harmonic distortion: 0.25% max .025% typical.

Frequency response: 20 to 20k Hz at 250W/channel, \pm 5 dB.

Intermodulation: by SMPTE 0.1% max, .025% typ.

Slew rate: 25V/ μ S.

Signal to noise: 100 dB.

Cooling: varispeed electric fan.

Metering: calibrated front panel meters for each channel.

Dunlap Clarke Electronics, 230 Calvary Street, Waltham, Mass 02154, USA.

New address

The C E Hammond Group, whose agencies include Revox and JBL, has moved to new premises at Byfleet, Surrey.

The move, which took effect from February 1, divides the group into two sections. The address for all matters concerning Revox is

105/109 Oyster Lane, Byfleet, Surrey KT14 7LA. Phone: 41131.

The remainder of the Group, including Cambridge Audio, JBL, Lamb Laboratories, Leader, Meteor Light and Sound, Phase Linear, Sonus and Sound Technology, resides at 111 Chertsey Road. The rest of address and phone number is same as Oyster Lane.

Eye catch

This is the Spectra Sonics 1032-32 console. It provides 32 inputs, 32 outputs, 32 monitor lines and 32 meters for engineers with 32 eyeballs. Without patching, it also offers seven line level cleanfeeds direct to the monitors.

Certainly the console isn't short of majors; neither does it lack for peripherals. There are four echo sends and returns, four quad outputs, two stereo, one mono, four control room monitors, two studio and three cue outputs. Individual attenuator pads are available at channel level and on all subgroup outputs. The covered patch bay at the right hand side of the desk will accept up to 96 inputs with 52 output lines in addition to all the usual system breakpoints in the desk organisation.

Extract from the manufacturer's tech spec:

Frequency response: \pm .25 dB 20 to 20k Hz.

Signal to noise: (mic) greater than 82.5 dB below +4 dBm line out ref=-50 dB source from 50 ohms. Corresponding line figure 87 dB at unity gain.

Total harmonic distortion: less than 0.01% at +18 dBm out (1 kHz).

Intermod: less than 0.02% at +4 dBm.

Crosstalk: greater than 60 dB.

The console, first introduced at the New York AES, costs \$56 576.06 and can be supplied ex stock.

Spectra Sonics, 770 Wall Avenue, Ogden, Utah 84404, USA. Phone: (801) 392 7531.

Belt pack intercom

In its standard configuration, up to 50 stations can be connected on line to two independent channels. Each station features a mic limiter, carbon or dynamic input, flashing call light, two watt headphone amplifier and auxiliary audio input. Using a two wire transmission system, the manufacturer, RTS Systems of California, claims a wide frequency response and low distortion.

With 22 gauge cable, the TW system operates over 700m. Remote power supplies (either PS10 or PS50) will operate up to 10 or 50 remote stations respectively. Both the main and remote stations can be supplied in rack mounting form. Belt packs costs \$150 each. PS10 \$350, PS50 \$500.

RTS Systems Inc, 4167 Fair Avenue, North Hollywood, Ca 91602, USA. Phone: (213) 980 0511.

The control room, Strawberry Studios, Stockport, England. This is the latest facility to undergo the Westlake treatment. It has resulted, claims Strawberry manager Pete Tattersall, in 'a very tight, punchy sound' that everybody is 'absolutely delighted with'.



FRAP

That stands for Flat Response Audio Pickup which is the trade name of the transducer and the foremost of the claims by the manufacturer. Several models are available; the pickup for woodwinds fits into a 10/32 screw thread tapped into the body of the instrument. The manufacturers recommend using an extra mouthpiece suitably modified. For the flute, the transducer is mounted in a specially manufactured silver nickel back plate which replaces the conventional plug. Because both pickups couple directly with the instrument air column, the arrangement is said to eliminate all key, valve and handling noises.

Another version of the device has been designed specifically for use with acoustic instruments: violin, guitar, bass, harmonica, piano, gongs and congas although it is claimed to work with virtually all acoustic instruments. FRAP mounts directly to the instrument by adhesive wax thus avoiding mutilation of the instrument.

friction within any size audio cassette; and the *DOC 110/1* dropout counter which is a 19 inch rackmount unit developed for video tape applications but apparently finding use in the evaluation of tape used for digital audio recording. ● **Estudios Gema**: no information available. ● **Eventide**: full range of sound processing products featuring the *H3000* and *H3000B UltraHarmonizers*.

F

● **Fairlight**: alternating audio demonstrations of the traditional Fairlight *Series III* with the CAPS 80-track polyphonic sequencer; and the post-production capabilities of the system using the *MFX* controller. Both will feature the *Waveform Supervisor* system management computer and the features it allows—8-track recording on a single 360 Mbyte hard disk and the use of an 800 Mbyte WORM disk for voice/FX library storage and programme archiving. ● **Ferrograph**: main exhibit will be the *9500* digital random access recorder/reproducer. Recordings are stored on magnetic disk cartridges which can hold up to 18 mins of stereo audio. Operation is from front panel of via a *Macintosh* computer running dedicated editing software. Also on show will be the *9000* optical recorder, the Ferrograph range of analogue tape machines, the *RTS2* and *ATU1* audio test measuring system and the Ferrograph range of defluxers. ● **Fidelipac**: demonstrations of the complete line of broadcast studio products including the Dynamax *CTR100*, *CTR10* and *CTR30* series cartridge recorders and players, *ESD10* eraser/splicer detector, Dynamax *Cobalt*, *Master Cart*, *300* and *350* NAB tape cartridge racks, test tapes and accessories. ● **FM Acoustics**: featured will be the range of *Forceline* high-energy transfer cables for use between amplifier and speaker. Designed specifically as speaker cables they have very low resistance and high power handling capability. Also the *FM* range of power amplifiers, electronic crossovers and line level interface. ● **Focusrite**: on show for the first time is the *ISA131* dynamics processor module which is a dual channel version of the *ISA130* with the same specifications. The full range of existing *ISA110* and *ISA115* input signal amplifiers, the remote controlled mic preamp *ISA116* and the *ISA* dynamics processor will also be shown. Channel strips from the *Forté* series on consoles will be displayed. ● **For.A**: *Sirius-100* digital audio memory designed for radio station applications. Capable of up to eight channels of audio from up to eight hard disk drives and possible use of recording time extension with bandwidth reduction in speech recording mode. Up to eight user stations on the same system possible. ● **Fostex**: examples from the full range of Fostex products. Featured will be the new professional DAT machine with timecode synchronisation ability. ● **France Cables**: no information available. ● **Full Sail**: details of the Full Sail Center for the Recording Arts including the specialist and general training courses offered.

G

● **Genelec**: full range of active studio monitoring systems from compact biamped nearfield to the large main control room monitor *1035*. ● **Ghielmetti**: matrix programming equipment for routing/switching audio and video signals. ● **Giese**: range of synchronisation and timecode equipment. ● **Gorgy Timing**: timing and display

clocks. ● **Gotham**: professional audio cables featuring the new *GAC-2* 2-conductor cable with double layer Reussen shielding and PVC tube separating conductors and the shields. ● **Graff**: featured will be the *Crystal* high-speed copier in mono and stereo with 8x or 16x normal speed options, and the heavy duty bulk eraser. Also the *Diamond* in updated form and other established Graff products. ● **GTC**: featured will be *Edicom II*, a new ADR system succeeding the *Edicom* but based on a completely new technology and incorporates a simple user interface. Offers graphic representation of a take, prompting by means of wipe bars, A/B mode with two VTRs for fast take sequencing and control of one or more synchronised ATRs for ready to mix sound recordings. Also the *Digiton*, a hard disk recording system with special workstation for ADR, and *CARL* which is a remote control for the Quantec *QRS/XL* audio processor.

H

● **Harmonia Mundi**: digital interface and processing module. ● **Harrison Systems**: *SeriesTen* totally automated console system with the new *Macintosh II*-based hard disk automation system; the new *AP-100* broadcast console series in both tabletop and rackmount versions, the new *MR-20* in-line multitrack recording console with GML moving fader automation, the *TV-4* stereo broadcast console, the *AIR-790* on-air broadcast console and the *PRO-790* broadcast console series. ● **Haufe**: no information available. ● **Head Acoustics**: the new *Aachen Head* with ID equalisation (independent of direction) which makes speaker/binaural compatible recordings. The system consists of a head and shoulder simulation and electronics unit. ● **Heino Ilsemann**: labelling, sorting, packaging and foil wrapping machines for audio cassettes, packaging and foil wrapping machines for video cassettes and packaging machines and handling systems for compact discs. ● **HES**: the *Engineering* series of modules which includes full range of modules for broadcast applications allowing the building of a complete studio system in a 19 inch 3U rack. ● **Heyna**: range of duplication equipment. ● **HHB Hire & Sales**: DAT machines from Sony and Technics with modified versions for specialised applications, digital multitracks from Sony and Akai, a selection of Sony Broadcast video equipment, the Audio Kinetics EBus system, and also wide range of signal processing, microphones, monitors and peripheral products. ● **HH Electronic**: range of power amplifiers with power outputs from 50 to 1200 W. Shown for the first time will be the *TA* series of professional loudspeakers which initially comprises the *TA2* full frequency system in a 2-way compact enclosure, the *TA3* full frequency 4-way system; the *TAS1* compact sub bass unit that can be used to extend *TA* series response below 40 Hz, and the *CI* system controller that performs frequency response alignment, crossover and limiter functions for the *TA* series. ● **Hill Audio**: first European showing of the *LC* series of power amplifiers comprising four models from 200 to 800 W/channel with variable speed fan and new protection circuitry in 2U format. Also the expanded range of modular consoles, the *Remix* console and the '000' range of power amplifiers. ● **Hilton Sound**: details of their Europe-wide hire services with offices in London and Paris. On show will be the PDASH digital format conversion system. Hilton has recently added two Sony *PCM-3348* multitracks, two Mitsubishi *X880*

TASCAM European Distributors

Hi-Fi Stereo Center Kain
Muenchner Bundesstrasse 42,
5013 Salzburg,
AUSTRIA.
Tel: (0662) 37701

Beltronics
Rue de la Celidee Straat 29,
1080 Brussels,
BELGIUM.
Tel: (32) 2 424 0233

So and Hoyem A/S,
Bulowsgarden,
Bulowsvvej 3,
1870 Frederiksberg C,
DENMARK.
Tel: (01) 22 44 34

Studiovox Ky,
Atomitie 5C,
SF-00370 Helsinki,
FINLAND.
Tel: (80) 562 3411

Harman France,
Peripole 243,
33 Av. de Lattre de Tassigny,
94127 Fontenay s/Bois Cedex,
FRANCE.
Tel: (01) 4876 1144

Elina SA,
59/59A Tritis Septemvrious St.,
Athens 103,
GREECE.
Tel: (01) 8220 037

Greenlands Radio Centre,
PO Box 119,
3900 Godthab,
GREENLAND.
Tel: 299 21347

GBC Italiana spa,
TEAC Division,
Viale Matteotti, 66,
Cinisello Balsamo, Milan,
ITALY.
Tel: (02) 618 1801

Hljodriti — Hot Ice,
PO Box 138,
Hafnarfirdi,
ICELAND.
Tel: (01) 53776

AEG Nederland NV,
Aletta Jacobslaan 7,
1066 BP Amsterdam,
NETHERLANDS.
Tel: (020) 5105 473

Audiotron A/S,
Seilduksgt, 25,
PO Box 2068 Grunerlokka,
0505 Oslo 6,
NORWAY.
Tel: (02) 352 096

Goncalves,
Avenida 5 de Outubro, 53, 1,
Lisboa 1,
PORTUGAL.
Tel: (01) 544029

Audio Profesional SA,
Paseo Maragall 120,
Entlo 3a,
08027 Barcelona,
SPAIN.
Tel: (93) 349 7008

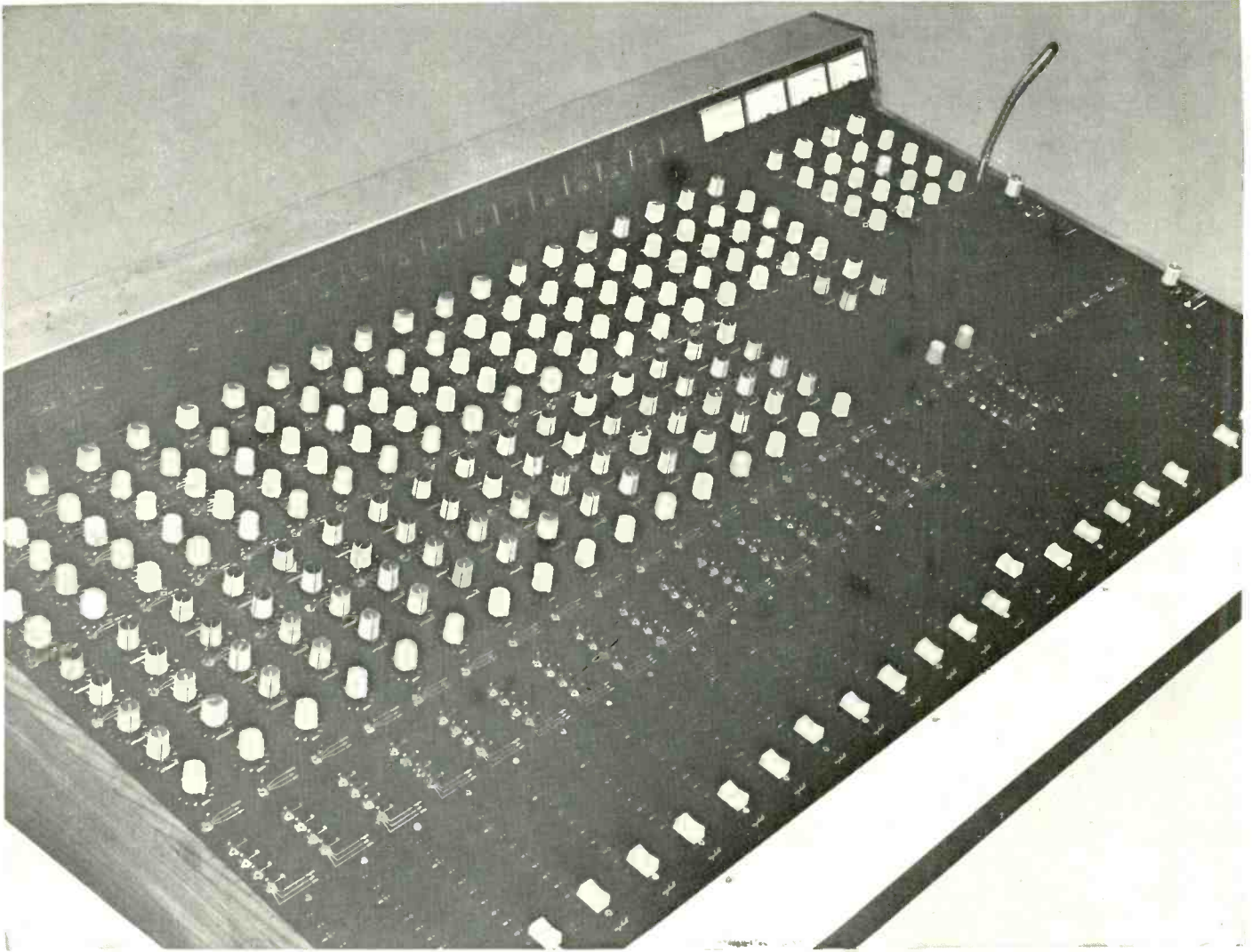
Erato Audio Video AB,
Aeogatan 115,
116 24 Stockholm,
SWEDEN.
Tel: (08) 743 0750

Telion AG,
Albisriederstrasse 232,
8047 Zurich,
SWITZERLAND.
Tel: (01) 493 1515

Teac Deutschland GmbH
Bahnstrasse 12,
6200 Wiesbaden-Erbenheim,
WEST GERMANY.
Tel: (06121) 71580

TASCAM

23 countries now have Hill



Can you afford to ignore Hill?

Above is a new Hill 'D' series console. The 'D' series can accommodate up to 16 track routing. Each input module has : gain (mic and line), 4 band switchable Eq., hi and low pass filters, two foldback send (pre or post Eq.), two effects sends, pan, mute/PFL, routing, and 100mm low noise fader. Each foldback master module has : gain, 4 band switchable Eq., mute/PFL, and 100mm low noise fader. Each effects master module has : gain, 4 band switchable Eq., two foldback sends, stereo pan, mute/PFL, routing, and 100mm low noise fader. Each output module has : summing amp gain, 4 band switchable Eq., mute/PFL, and 100mm low noise fader. Additionally fitted as standard : channel level meters, output V.U.'s, talkback, and XLR connectors fitted throughout. Optional extras to clients specific requirements.

Malcolm Hill Associates

3 MAIDSTONE ROAD, MARDEN,
TONBRIDGE, KENT.
Tel. Maidstone (0622) 831545.

The logo for Hill Associates, featuring the word "hill" in a stylized, lowercase, italicized font. The letters are bold and have a slight shadow effect, giving it a three-dimensional appearance. The 'i' has a dot, and the 'l' is a simple vertical bar.

AES REPORT

using a CRT display offering 27 segments with a 27dB vertical range. A built-in noise generator delivers both pink and white noise. Another unit, the *AFA415SG* is a 2-channel unit that allows frequency response performance of a tape deck to be measured in 20s. It displays 14 highly selective frequency bands in roughly $\frac{1}{3}$ -octave segments with a dynamic range of 27dB and a display tolerance of ± 0.2 dB—it also includes a built-in sinewave oscillator.

Neutrik AG, a Liechtenstein based company, showed a rather interesting *Audio Tracer Model 3210* which weighs only 5 lb but provides a paper frequency response trace. Range is switchable between 25dB and 50dB, paper speed can be varied from 0 to 25mm/s and the oscillator will sweep either 20Hz to 20kHz, or 200Hz to 200kHz. Price is £825 plus £36.80 for a calibrated microphone.

Court Acoustics introduced a new 30-band $\frac{1}{3}$ -band stereo graphic equaliser on standard ISO frequencies from 20Hz to 20kHz. It features XLR balanced inputs (or unbal), a max +30dBm input before overload, and +22dBm output, while individual filters provide ± 10 dB response with better than 1.5dB interaction.

Skatron A/S, a Norwegian company, showed a range of cable drums taking multi-core cables up to 15mm in diameter. When equipped with a recoil starter, the drums are ideal for stacking sideways, and a brake is included for use when uncoiling the cable.

Malcolm Hill Associates will be introducing a range of consoles for the smaller studio in the near future, the *K series*, and these will be available for up to 32-input channels with routing for up to 24 tracks. Price for a 32/24 would typically be from £4,000 to £8,000. The Hill range of power amplifiers has also been broadened and now comprises the dual channel amps *DX700*, 260W £387, *DX350* 115W £280, *DX200* 175W £248, (no drive into less than 8 Ω), *DX140* 80W £226, *TX400* tri-amp 115W £366, *MX50* mono 60W £135, and *QX50* quad amp 60W £45 for the rack and £115 for each amp. Power figures are into 8 Ω with both channels driven where appropriate. Many options are available.

Hes Electronics, a Belgian company, first produced an automatic telephone line balancing unit about six years ago, and intends to introduce a new model that is totally independent of line impedance later in the year. The company also produces intercom systems which feature a remote switching exchange and includes 30dB compression on each microphone amp. Easily pluggable cords on the electronic exchange enable switch designated destinations to be changed very quickly and simply.

EMT-Franz introduced the *Digiphon 466* 'digital signature tune repetitor' which enables segments of speech or music to be recorded, stored for short cycle times and endlessly repeated. Using a MOS RAM memory with approx 2 million bits, the unit is available in three versions, the *446/5* with 5s storage, 12-bit digital word length and 14.5kHz bandwidth, the *446/6* with 6s storage, 10-bit digital word length and 14.5kHz bandwidth, and finally the *446/12* with a full 12s storage with 10 bits and 7kHz bandwidth. S/N is 66dB with 12 bits, and 54dB with 10 bits.

Stocktronics in Stockholm, distributed by ITA in London, introduced the *RX4000* stereo reverberation unit using mechanical excitement



Neutrik
Audio Tracer

Above:
EMT 446 digital
signature tuner repeater;
Below: Tannoy
Buckingham monitor
with electronic time
compensated dividing
network

of a suspended steel plate which provides natural-dimensional reverberation set to approx 3.5s. The *RX4000* is easily transportable and weighs only 66lb—price is about £1,100.

Tannoy demonstrated three units: the *Buckingham*, *Classic Dual Monitor* and the new *Super Red Monitor*. The *Super Red Monitor* has a continuous power rating of 120W below 1kHz and 60W above, with peak handling of 500W and 250W respectively. Sensitivity is 1W providing an average level of 94dB SPL at 1m under anechoic conditions. Tannoy also produces an active crossover and low frequency parametric equaliser operating over the 20Hz

to 200Hz band with variable time delay operational in either the high or low pass channels. Features include switchable 15Hz high pass filter, linear phase Bessel input filter, high pass channel inversion facility, and plug-in card which specifies the crossover characteristics for specific units.

Finally, Kudelski gave the first public demonstration of its long awaited *Nagra T* tape recorder which takes 10 $\frac{1}{2}$ in spools as standard and was initially seen in its instrumentation version offering seven tape speeds and dual capstans. Further details later in the year when the audio version becomes available. ■

ANNOUNCING STEREO DISC AMPLIFIER 3

A reference amplifier for disc monitoring and transfer when replay signals of the highest quality are required.

Based on the Surrey Electronics Disc Amplifier 2 and manufactured under licence, this unit offers the same unmatched technical performance. Intended for situations where the ability to drive balanced lines is not required, two equalised outputs are provided enabling Line and DYN level inputs to be driven simultaneously.

To facilitate cartridge matching, a wide range of independently switchable load capacitance and resistance values are provided, together with left and right 20 turn gain presets.

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TOTAL HARMONIC DISTORTION

-22dBV.7 output 20Hz-20kHz

-80dB, 0.008%

STATIC INTERMODULATION DISTORTION

50Hz, 7kHz, 4:1 -22dBV.7 output

-80dB, 0.008%

DYNAMIC INTERMODULATION DISTORTION

square wave (single pole -3dB at 100kHz)

15kHz sine wave, 4:1.

Relative to 15kHz component.

Pre-emphasised input 500mV pk-pk

-70dB, 0.03%

AES preview

function special effects delay line. ● **Dolby Laboratories**: range of professional Dolby A noise reduction units, including new modules for videotape recorders. Also Dolby Stereo cinema sound processing equipment, plus details of the Dolby-C system. ● **Duncan Electronics**: no information received.

E

● **East Coast Sound**: range of sound systems including own product range of loudspeaker cabinets, wiring harnesses, patch bays and other accessories. ● **Eastern Acoustic Works**: FR-350 horn-loaded loudspeaker system and MR-102 horn-loaded upper-bass reproducer. Also the *State Performance* range of stage monitor loudspeakers. ● **Electro-Voice/Tapco**: *Sentry 100* monitor loudspeaker and recently introduced *Panjo* mini-mixers. Also full range of Electro-Voice mics and loudspeakers, plus the Tapco range of mixers and amplifiers. ● **Eventide**: recently introduced *SP2016* programmable effects processor; plus *Model H949 Harmonizer*; range of plug-in realtime spectrum analysers for use with home computers; the *BD955* broadcast delay line; and the *RD770 Monsterrat* mono/stereo broadcast matrix unit. Additionally, the *Instant Flanger* and *Omnipressor*; the *BPC-101* plug-in card which converts the *Instant Flanger* to an *Instant Phaser*; and the *J1193* and *CD254* DDLs. ● **EXR**: *Model EXIII* signal clarification and boosting unit and *Model SP-1* studio unit.

F

● **Fostex**: *Model 350* 8/4/2 mixer; *Model 250 Multitracker* 4-track high speed cassette unit; and the *A-2* 2-track, *A-4* 4-track, and *A-8* 8-track recorders all using 1/4in tape. ● **Furman Sound**: *RV-1* spring reverb system, plus the *TX-2* tunable crossover/bandpass filter; *PQ-3* parametric equaliser/preamp; and *PQ-6* stereo parametric eq/preamp.

G

● **Gotham Audio**: *EMT 251* digital reverb system; *EMT* reverb units; **Telefunken** tape machines and **Telcom** noise reduction system, **TTM** noise reduction frames; and **Neumann** condenser mics. ● **Grandy**: *Promix 1* adjustable multitrack head assembly with independent control of azimuth, zenith, tape height and wrap. Also replacement tape heads and a range of single crystal ferrite record heads for high speed duplicating.

H

● **Harrison**: *MR Series* recording consoles (*MR-1*, *MR-2*, *MR-3*), plus the *PP1* post production console; an *Alive* console; and the *Autoset II* automation programmer. ● **Harvey Sound**: no information received. ● **Hazelcom**: no information received. ● **Heino Isemann**: *Type KZM3* automatic cassette loader and the *Type ETK-1* and *ETK-IS* cassette labelling machines. ● **Hewlett-Packard**: range of audio test instruments. ● **HH Electronics**: *TPA Series D* and *S500D* professional power amplifiers and the company's *MOSFET* power amps. Also electronic echo units and portable stereo sound control mixers. ● **HM Electronics**: wide range of radio mics and receivers including road-cases and accessories. ● **Hill**: range of consoles and power amplifiers. ● **Hitachi**: no information received.

I

● **ITAM**: *Model 1610* lin compact 16-track recorder with modular electronic and full function remote control; *Model 806* 1/2in 8-track recorder; and the *10-4* and *Model 882* mixers. ● **Infonics**: *200 Series* of tape duplicators including a high speed metal tape cassette duplicator. ● **Inovonics**: range of audio processing, recording and instrumentation equipment including the *Model 500* audio analyser; *Model 201* average/peak limiter; *Model 231* octave-band compressor; and the *Map-II* broadcast audio processor. Also the 'Gordon Headroom Meter' a UK/EBU-responding level meter. ● **Institute of Audio Research**: president Al Grundy and executive director Phil Stein will be available to give details of the Institute's training programmes. ● **Integrated Sound Systems**: no information received. ● **Interface Electronics**: range of mixers designed for recording, sound systems, theatres, stage monitoring and other applications. Available configurations range from 8/2 to 48/16 and features include wide range parametric equalisers. ● **International Audio**: *Alpha* high speed in-cassette copiers. ● **International Consoles**: new audio control console system. ● **Ivive Electronics**: *Gold Standard* range of calibration mic capsules, preamps and power supplies. Also the *IE-17A* microprocessor controlled acoustics analyser and *IE-30A* spectrum analyser.

J

● **Jackson Music**: no information received. ● **JBL**: recently introduced loudspeaker drive units for PA and studio monitoring applications, plus the new *4430* and *4435* studio monitors. Also the complete range of monitors and the *7510*

automatic mic mixer. ● **JRF Co**: no information received. ● **JVC**: *Series 90* digital recording system.

K

● **Keith Monks**: new studio turntable unit; producers playback turntable; wide range of mic stands; *LS-19* monitor with in-built power amp, plus record cleaning machines. Also **EDC** radio mics. ● **Kelsey**: range of PA consoles and ancillary equipment. ● **Kimball**: Bösendorfer and Kimball grand pianos. ● **Kinetic Systems**: no information received. ● **King Instruments**: self-feed cassette loaders and various video tape loaders. ● **Klark-Teknik**: *DN72* memory bank for the *DN70* digital time processor; new *DN772* stereo digital profanity delay unit; *DN30/30* dual 30-band graphic equaliser; *DN80* 16-bit realtime audio computer; plus the company's established range of graphic equalisers and effects units.

L

● **Lake Systems**: no information received. ● **Lakeside Associates**: no information received. ● **Lexicon**: *Model 1200* audio time compressor; *PCM41* DDL; and *122* series of stereo delays. Also the *Model 224* digital reverb system; *Model 92* and *Model 91* digital delay units; and the *Model 93 Prime Time* digital delay/processor/mixer. ● **Linn Electronics**: range of music synthesisers.

M

● **3M**: 32-track digital mastering system; plus 4-track digital recorder; digital delay disc cutting preview unit; and digital editor including the new crossfade facility. Also the *M79* 24-track recorder; **Wollensak** cassette duplicators; and **Scotch** audio tapes including *Scotch 265* digital mastering tape.

74 ▶

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AES Convention Anaheim

preview

Due to the unavailability of a full list of exhibitors until very shortly before going to press, we are unable to offer our usual preview format. Instead, we have collated two sections: a preview of UK-based exhibitors including their products on show, and a full list of exhibitors. We apologise for this lack of information, which was due to matters beyond our control.

UK-based exhibitors

● **Advanced Music Systems:** range of digital delay and reverb units including the new *A/V-Sync* audio delay for video applications. ● **Allen & Heath Brenell:** two new mixer ranges, *21 Series* budget stereo range; *System 8* range of 8-buss mixers. ● **Amek:** new *Angela* multitrack console series; *M2500* system with new *L40A* LED display; *BC01* portable broadcast mixer; sample of new *M1000* multi-purpose system; plus revised *M3000* multitrack and *M4000* post-production system modules and range of TAC products. ● **Audio & Design Recording:** full range of signal processors plus new ambisonic *Transcoder* for surround-sound mixing. ● **Audio Developments:** *AD-062* Minimixer, *AD145* Picomixer and *AD160* ENG mixer will be featured. ● **Audio Kinetics:** *Q-Lock* range of synchroniser/machine control systems plus new *Q-Link* computer-controlled interface linking two *Q-Locks* via RS-232 serial line. ● **Brooke Siren Systems:** new *AR130* phase-checking system plus full range including *MCS-200* modular and *FDS-300* fixed-format 'frequency dividers'; *AR116* active DI unit and *AR-125* lead and fuse tester. ● **Connectronics (Canford Audio):** wide range

of screened cables in a selection of colours including *Musiflex* and *Studiflex* lines.

● **H/H Electronics:** range of professional audio equipment including *MOSFET* power amps and the new *M-900* addition to the range.

● **Malcolm Hill Associates:** new *K-Series* studio consoles, plus *24/8/2 J-Series* PA console and new *M-Series 2* monitor mixer; wide range of power amps.

● **International Musician & Recording World:** range of musicians' and consumer magazines.

● **Jackson Music Group:** first stop in a world tour introducing a wide range of British audio products and services to overseas markets. The range includes *Alice (Stancoil)*, *Bel*, *Lockwood*, *Mobile One*, *Accessit*, *Drawmer*, *Radford*, *Maglink* and *Audan*. List complete at time of going to press and subject to alteration.

● **Keith Monks:** wide range of microphone stands, booms, record cleaning equipment and accessories. ● **Klark-Teknik:** new *DN30/30* dual $\frac{1}{3}$ -octave graphic, matches bands of *DN 60* analyser; *DN 27A* and *DN 22* graphics plus preview of forthcoming *DN-700* DDL and new 30-band cut-only room equaliser.

● **Melkuist:** *GT-800* console automation system plus colour graphics display; new software offering mix-edit facilities; *Events Selector* on demonstration ● **Midas:** *PR System* consoles including *24/6/2* PA unit and *24/8* stage monitor types; *TR System 24/8/8* theatre console; new *Auditorium 30/12/2* console system.

● **Neve:** *8128* music recording console plus two *51 Series* models (*24* and *16* out) and the *542* range of portable consoles.

● **Penny & Giles:** wide range of conductive plastic audio control elements including linear faders of various types and potentiometers, etc.

● **Sifam:** wide range of meters including four

styles of true VU meters and two styles of low-cost VU-type meters, plus PPMs. Full range of collet and push-on knobs ● **Soundcraft:** new *2400* series with automation; new *800B* and *400B* consoles; new *40/8* PA console and *40/16* stage monitor console; plus *Series 1600* unit and *SCM 762* multitrack ● **Solid State Logic:** new *SL6000E* video post-production console and complete package, plus novel *EQ-P* retrofit EQ card which sounds remarkably like a parametric *Pultec*.

● **Soundtracs (Soundout Laboratories):** complete range of PA and 4-, 8- and 16-track recording consoles including *16/4*, *16/4/2*, *24/4/2*, *16/6* monitor, *Omni 16* and *Omni 24* configurations plus modified units aimed specifically at the US market.

● **Tannoy:** the company will be showing the *SRM* series of monitors and a new range of products for the broadcast market ● **Technical Projects:** revamped *MJS 401D* test set; *Series 5000* stereo production console; *Multi-pan* programmable multichannel memory panner; modules for *4000 Series* post-production console; telephone FX generator; distribution amplifiers and LED meter displays ● **Trident:** *Series 80*, *Trimix* and two versions of the new *VFM* budget console system (both versions *16/8/2*: one PA model and one studio version) plus *TSR* multitrack.

● **Studio Sound and Broadcast Sound:** copies of *Studio Sound* will be available, along with the latest issue of *Broadcast Sound* the new bi-monthly aimed at audio people in broadcasting, video, A/V and related fields. Editor **Richard Elen** and executive advertisement manager **Phil Guy** will be on hand at booth B408 and will be visiting exhibitors during the course of the convention. We look forward to meeting both visitors and exhibitors. ■

Exhibitor's list

A
 ABX Company
 Accurate Sound Corporation
 ACO Pacific Inc
 Acoustic Design by Jeff Cooper
 Acoustilog Inc
 Adaptive Systems Inc
 Advanced Music Systems
 Agfa-Gevaert Inc
 AKG Acoustics
 Allen & Heath Brenell
 Alpha Audio
 Altec Lansing
 Amek Systems & Controls Ltd
 Ampex Corporation
 Anvil Cases
 Aphex Corporation
 Association of Sound and Communications Engineers
 Auburn Sound Manufacturing
 Audico Inc

Audioarts Engineering
 Audio & Design Recording
 Audio Developments
 Audio Engineering Associates
 Audioforce Inc
 Audio Kinetics
 Audio Processing Systems Inc
 Audio Services Corporation
 Audio-Technica US Inc
 Audio/Tek Inc
 Audio Video Automation Inc

B
 BASF
 Beyer Dynamic
 BGW Systems
 Big Briar Inc
 Bose Corporation
 Brooke Siren Systems Ltd
 Bruel & Kjaer Instruments Inc
 Bryston Manufacturing Ltd

C
 California Switch and Signal
 Canford Audio/Connectronics
 Cerwin-Vega Inc
 Cetec-Gauss
 Chet Dunn Associates
 Clearcom Intercoms
 Community Light & Sound
 Countryman Associates Inc
 Crest
 Crown International
 Cybersonics Inc

D
 Datatronix Inc
 David Hafler Company
 David Lind Associates
 dbx Inc
 Deltalab Research Inc
 Design Direct Sound Inc
 Dod Electronics

Dorrough Electronics
 Duncan Electronics Corporation

E
 Educational Electronics Corporation
 Electro Sound Inc
 Electro-Voice Inc
 El Mar Plastics Inc
 Emilar Corporation
 Eventide Clockworks Inc
 Everything Audio
 Excalibur Industries
 EXR Corporation

F
 Fender/Rogers/Rhodes (CBS Musical Instruments)
 Fostex Corporation

G
 Goldline Connector
 The Gotham Organization 74 ▶

AES preview

H

Harrison Systems
Hazelcom Industries
Heino Ilsemann GmbH
HH Electronics
Hill Audio Ltd
HM Electronics Inc

I

Infonics Inc
Inovonics Inc
Interlake Audio Inc
Interface Electronics Inc
International Audio
International Musician &
Recording World
IQS Inc
Ivie Electronics

J

Jackson Music Group
JBL
JRF Co Inc
JVC Company of America
JVC Cutting Center

K

Keith Monks Audio Ltd
King Instrument Corporation
Klark-Teknik Research Ltd

L

Lakeside Associates
Lexicon Inc
Long/Wickersham Associates

M

Magnifax Inc
Marshall Electronics Inc
Martin Audio
Melkuist Ltd
Meyer Sound Laboratories
MicMix Audio Products
Midas Audio Systems Ltd
Mitsubishi Electric Corporation
Modular Sound Systems
Motorola Inc Ceramic Products
MTI Corporation
Music Technology
MXR Innovations

N

Nady Systems
Nagra Magnetic Recorders Inc
Neutrik Products
Neotek
Nippon Columbia Co Ltd
Nortronics Company Inc/
Restoration

O

Omnimount Systems
Orban Associates
Ortofon Instruments
Otari Corporation

P

Panasonic Company PAD
Passport Designs
Peavey Electronics
Penny & Giles Ltd
Pentagon Industries
Phoenix Audio
Professional Audio Services &
Supply Company

Professional Audio Systems
Publison Audio Professional

Q

Quantec GmbH
QSC Audio Labs

R

Rauland-Borg Products Co Inc
R-Columbia Products Co Inc
Recortec Inc
Renkus-Heinz Inc
Roland Corporation
RTS Systems
Rupert Neve Inc

S

Sagamore Publishing Company
(db Magazine)
Saki Electronics
Schell Electronics
Sennheiser Electronic
Corporation
Sequential Circuits
Sescom Inc
Shino Musical Instruments
Corporation
Shure Brothers Inc
Sierra Audio Corporation
Sifam
Solid State Logic
Sony Corporation/MCI
Soundcraft Electronics Ltd
Soundstream Inc
Sound Technology Inc
Soundtracs International
Sound Workshop Professional
Audio Products Inc
Spectra Sonics
Stanton Magnetics Inc

Stephens Electronics
Studer Revox America Inc
Studio Sound & Broadcast
Sound
Studio Technologies
Swintek Enterprises
Symetrix
Synergetic Audio Concepts
Syntauri Corporation
Synton Electronics BV

T

Taber Manufacturing &
Engineering Co
Tannoy Products
Teac Corporation of America
Technical Audio Devices
Technical Products
Tentel Corporation
3M Company
TOA Electronics Inc
Trident Audio Developments

U

Unicord
UREI
Ursa Major Inc

V

Valley People

W

Westlake Audio Inc
Whirlwind Music Distributors Inc
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Y

Yamaha International
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ALL YOU COULD EVER WANT IN A CROSSOVER.

DDA
THE CHOICE IS YOURS.

DD1000-STEREO 4, 3, 2 WAY.
DD500-STEREO 2 WAY/MONO 4, 3, 2 WAY.

- All inputs and outputs balanced.
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- Sub-sonic input filters.
- Phase reverse switches on all outputs.
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Unit 7b, Worton Hall, Worton Road, Isleworth, Middlesex TW7 6ER ☎ 01-847 0363

positively unrelated to CD and DAT's Pulse Code Modulation (PCM). Rather, the practical embodiment of this technology is more of a hybrid affair between a switching power supply and an FM radio transceiver. Today's designs rely on MOSFETs, switching at around 500 kHz.

Looking into Fig 6, the essential recipe begins with a triangle wave with a frequency that's much higher than audio, typically 500 kHz, and preferably shared between two channels, for mutual synchronisation. The incoming audio is filtered and limited. The difference between the two signals emerges from a fast comparator (CMP) as a square wave with a duty cycle that's proportional to amplitude, at a 'sample rate' that's much higher than audio. In turn the square wave switches a pair of output devices, hung as usual, between $\pm v_e$ rails. Today's designs rely on MOSFETs because the switching speeds of comparably rugged bi-polar transistors is inadequate. A lowpass filter (LPF) reconstructs the original audio at the same time gobbling up (most of) the sampling hash. With the amplifier's output devices reduced to on-off switches, efficiency should approach 100%.

Scrutiny

At the time of writing, commercial realisations of Class D audio amplification are the first of a new generation. They need careful scrutiny. The calibre of engineering design needed to produce a PWM amplifier that's measurably and audibly on a par with equivalent 'analogue' amplifiers is truly formidable. For example, generous helpings of negative feedback can't be applied to 'kiss it better'. For analogue feedback, we naturally need to 'sample' the reconstructed output. So the feedback is derived after the output lowpass filter. The accompanying phase shift typically limits feedback to just 20 dB at high frequencies. It follows that open loop linearity has to be good to secure respectable THD and IMD figures at HF. Linearity depends in turn on the comparator's incisiveness, and the precise matching of each MOSFET's switching speed at high frequencies.

The makers of Class D amplifiers routinely claim efficiencies of 90% and over, irrespective of

output level. Amplifier efficiencies of this order need careful definition, taking care for example, to exclude the power drawn by auxiliary parts, such as LEDs and relays. Equally, Class D efficiency figures should also be plotted across the audio bandwidth.

At the present state of development, comfortable operation up to 40 kHz is the 'leading edge'. But with first and second generation models, ascending frequency (or for music, increasing HF spectral content) caused switching losses to multiply rapidly. Steep lowpass input filtration above 20 kHz (already necessary to prevent aliasing) appears to be doubly desirable in some designs to protect the output stage from an HF fry-up. In a well-known, UK-made Class D amplifier, the HF response was found to roll-off as 0 dBVR was approached, presumably for protection. Meanwhile, in the US, a switching power supply manufacturer who has diversified into PWM amplification, is even offering pro-audio users an industrial PWM amplifier that's limited to 1 kHz, recommending it for bass amplification. The message is that while crude but efficient PWM amplifiers abound in industry, workable 'audio grade' PWM amplifiers are scarce, presently being limited to Peavey (US), HIT (UK) and Japan (Inc.).

With an RF squarewave let loose among sensitive circuitry, there's plenty of scope for harmonic radiation and modulation. Inside a PWM amplifier, the presence of RF on the comparator's inputs is particularly nasty. The thought of externally conducted and radiated RFI in a studio is even worse. The output reconstruction filter helps, but only so much, particularly without the benefit of a defined and matched load reactance. Loudspeakers are largely protected by the lowpass effect of their voice coil inductance, which leaves the speaker cables to radiate residual RF hash. In Peavey's DECA (Digital Energy Conversion Amplifier) series, representing the most refined Class D technology to date, Peavey quote conformance to FCC regulations for 'A Class B computing device, part 15(j)', with a pk-pk output ripple of <10 mV. The SNR of Class D amplifiers also needs careful assessment, particularly for studio monitoring.

Once the potential shortcomings have been

overcome to everyone's satisfaction, the ultimate outcome *should* be that PWM amplification either sweeps the board, or provides a valued alternative to hi-tech variations of Class G—each having its trade-offs. At best, this will take time, because most of today's large scale users have already invested their 2 to 5 year capital budgets on analogue power amplifiers. Who will be first?

Glossary and abbreviations

Digilogue: circuits containing hybrid functional blocks which are in part both digital and analogue, eg comparators, clocks and modulators.
FTC: Federal Trade Commission (USA).
IHF: Institute of High Fidelity (USA).
MTBF: Mean Time Between Failure(s).
PMR: Peak to Mean Ratio (Crest factor).

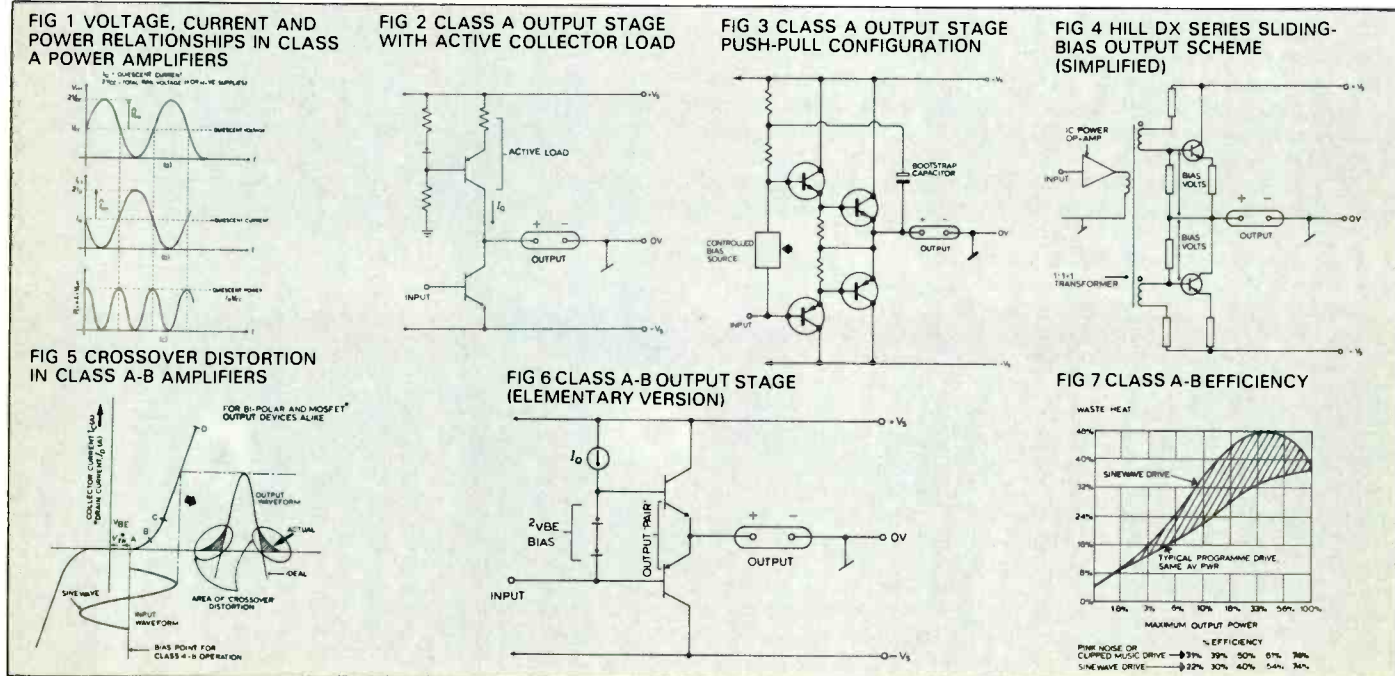
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 *Can any readers enlighten us?

Which amplifier technology—correction: In part one, which appeared in the December issue, the artwork was transposed so the wrong diagrams were related to the captions. Here is the correct version.



Survey

Total distortion: 0.05% to rated output.
Noise: -110dB.
Full power bandwidth: dc to 20kHz \pm 0.1dB.
Price: DC75 £260, DC150A £390, DC300A £595.

PSA2
Type: two channel, hi and lo pass filters, test tone generator, adjustable compressor.
Power: 220W/channel into 8 Ω , 400W/channel into 4 Ω , 685W/channel into 2 Ω , bridging mono 1,370W into 4 Ω .
Total distortion: 0.05% to rated output.
Noise: -115dB.
Full power bandwidth: dc to 20kHz \pm 1dB.
Price: £895 with bal input module, £850 less bal, £1,080 with LED display.

M600/2000
Basically similar to DC300A but single channel with rather higher power, VU meter on front panel. M600 600W into 8 Ω , 1kW into 4 Ω ; M2000 (two M600 bridged) 2kW into 8 Ω ; 1kW into 16 Ω .
Price: on application.

CUSTOM SOUND (UK)
Custom Sound Solid State Technology Ltd, Custom House, Arthur Street, Oswestry, Salop SY11 1JN, UK.
Phone: 0691 59201.

PPA1/2
Type: two channel, bridgable, VU meters.
Power: PPA1 150W/channel into 8 Ω , 300W/channel into 4 Ω , 500W/channel into 2 Ω ; PPA2 100W/channel into 8 Ω , 150W/channel into 4 Ω , 100W/channel into 2 Ω .
Total distortion: 0.1%.
Noise: -96dB.
Full power bandwidth: 20Hz to 25kHz \pm 3dB.
Price: on application.

DB (USA)
DB Systems, PO Box 187, Jaffrey Center, New Hampshire 03454, USA.
Phone: (603) 899-5121.

DB-6/6M
Type: two channel and single channel (6M).
Power: 40W/channel into 8 Ω , 60W/channel into 4 Ω , 6M 140W into 8 Ω , 225W into 4 Ω .
Total distortion: 0.01%.
Noise: -96dB.
Full power bandwidth: 20Hz to 40kHz -1dB.
Price: on application.

DYNACORD (West Germany)
Dyncord Electronics GmbH, PO Box 68, D-8440, Strubing, West Germany.
Phone: 09421 3101.
UK: Beyer Dynamic (GB) Ltd, 1 Clair Road, Haywards Heath, Sussex.
Phone: 0444 51003.
USA: Dyncord Electronics Inc, PO Box 26038, Philadelphia, Penn 19128. **Phone:** (215) 482-4992.

A1001/2002
Type: two channels, LED level indication, bridgable.
Power: A1001 80W/channel into 8 Ω , 120W/channel into 4 Ω ; A2002 170W/channel into 8 Ω , 250W/channel into 4 Ω .
Total distortion: 0.2%.
Noise: 90dB.
Prices: on application.

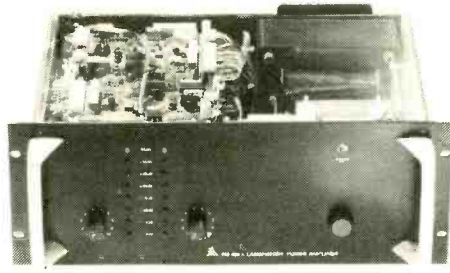
AX303
Type: three channel with electronic crossover, LED level indication, adjustable crossover frequencies.
Power: If 170W into 8 Ω , 250W into 4 Ω , mid and hf 75W into 8 Ω , 100W into 4 Ω .
Total distortion: 0.2%.
Noise: 90dB.
Price: on application.

EXPOSURE (UK)
Exposure Electronics, Richardson Road, Hove, Sussex, UK.
Phone: 0273 777912.

Exposure IV
Type: two channel.
Power: 75W/channel into 8 Ω , 200W/channel into 4 Ω .
Total distortion: 0.01%.
Noise: not stated.
Full power bandwidth: 10Hz to 20kHz, \pm 1dB.
Price: single power supply version £300, separate supply for each channel version £450.

FM ACOUSTICS (Switzerland)
FM Acoustics Ltd, Tiefenhofstrasse 17, CH-8820 Wädenswil, Switzerland.
Phone: 01 780.64.44. **Telex:** 56058 attn FMA.
UK: FM Acoustics UK, 2 Kempston Road, Weymouth, Dorset DT4 8XT.
Phone: 0305 784049.
USA: Win Laboratories, PO Box 332, Goleta, Cal 93017.
Phone: (805) 968-8741.

FM600A/800A
Type: two channel, LED overload indicators.
Power: FM600A 300W/channel into 8 Ω , 350W/channel into 4 Ω , 400W/channel into 2 Ω (special version); FM800A 400W/channel into 8 Ω , 600W/channel into 4 Ω , 850W/channel into 2 Ω .
Total distortion: 0.008% at mid, 'somewhat higher at very low and very high frequencies'.
Noise: -105dB.
Full power bandwidth: 5Hz to 300kHz -3dB at 50W.
Prices: on application.



HARMAN/KARDON (USA)
Harman/Kardon, 55 Ames Court, Plainview, NY 11803, USA.
UK: Harman (Audio) UK Ltd, St John's Road, Tylers Green, High Wycombe, Bucks HP10 8HR.
Phone: 049481 5221. **Telex:** 837116.

Citation 19/16
Type: two channel power amplifiers, LED level indication.
Power: Citation 19 100W/channel into 8 Ω , Citation 16 150W/channel into 8 Ω .
Total distortion: -100dB.
Full power bandwidth: 5Hz to 45kHz \pm 0.5dB.
Price: on application.

HEIL SOUND (USA)
Heil Sound, No 2 Heil Industrial Drive, Marissa, Illinois 62257, USA.
Phone: (618) 295-3000.

Pro-series 200/400
Type: two channel.
Power: 200 150W/channel into 4 Ω , 400 250W/channel into 4 Ω .
Total distortion: 0.09%.
Full power bandwidth: 20Hz to 20kHz.
Price: on application.

HH (UK)
HH Electronic, Viking Way, Bar Hill, Cambridge, CB3 8EL, UK.
Phone: 0954 81140. **Telex:** 817515.

S500-D
Type: two channel, bridgable.
Power: 210W/channel into 8 Ω , 340W/channel into 4 Ω , max 500W/channel into 2.5 Ω .
Total distortion: 0.02%.
Noise: -100dB.
Power bandwidth: dc to 20kHz -1dB.
Price: £450.28.

V150L/200/500/800
Type: V150L single channel, others two channels. MOS FET outputs, peak LEDs. V800 has LED level indication.
Power: V150L 105W into 8 Ω , 150W into 4 Ω ; V200 65W/channel into 8 Ω , 100W/channel into 4 Ω ; V500 150W/channel into 8 Ω , 250W/channel into 4 Ω ; V800 260W/channel into 8 Ω , 400W/channel into 4 Ω .
Total distortion: 0.02%.
Noise: -100dB.
Full power bandwidth: 10Hz to 50kHz -1dB.
Price: V150L £238.70. V200 £299.15. V500 £419.28. V800 £528.55.

AM8/12, TPA25D/50D/100D
Type: single channel, AM8/12 is BBC version of TPA25D.
Power: TPA25D 45W into 8 Ω , 75W into 4 Ω ; TPA50D 75W into 8 Ω , 100W into 4 Ω ; TPA100D 180W into 8 Ω , 240W into 4 Ω .
Total distortion: 0.1%.
Noise: -100dB.
Full power bandwidth: 20Hz to 20kHz \pm 0.2dB.
Price: on application.



HILL (UK)
Malcolm Hill Associates, Hollingbourne House, Hollingbourne, Kent, UK.
Phone: 062780 556.

DX 140/200/350/500/700
Type: two channel, optional VU meter.
Power: DX140 80W/channel into 8 Ω , 105W/channel into 4 Ω ; DX200 175W/channel into 8 Ω ; DX350 115W/channel into 8 Ω ; 190W/channel into 4 Ω ; 255W/channel into 2 Ω ; DX500 185W/channel into 8 Ω ; 350W/channel into 4 Ω ; DX700 260W/channel into 8 Ω ; 425W/channel into 4 Ω ; 625W/channel into 2 Ω .
Total distortion: 0.04%.
Noise: -100dB.
Full power bandwidth: 20Hz to 20kHz -1dB.
Price: DX140 £248. DX200 £270, DX350 £285, DX500 £335, DX700 £407.

TX400
Similar to above, this is a triamp with electronic crossover, one 200W and two 100W amps.
Price: £395.



ICE (UK)
ICElectrics Ltd, 131/132 Blackdown Rural Industries, Haste Hill, Haslemere, Surrey GU27 3AY, UK.
Phone: 0428 2015.

S200
Type: two channel, VU meters.
Power: 115W/channel into 8 Ω , 175W/channel into 4 Ω .
Distortion: 0.01% 'calculated'.
Noise: -110dB.
Full power bandwidth: 20Hz to 20kHz.
Price: £314.46.

Amplifiers

Altec: Altec Lansing, OK, USA. Tel: (405) 324-5311. **UK:** Shuttlesound Ltd, London. Tel: 081-871 0966.

9446A: 2-channel unit rated at 400 W/channel into 8 Ω .

Australian Monitor: Australian Monitor Pty Ltd, Gladsville, NSW, Australia. Tel: 2 816 3544. **UK:** Smart Acoustics Ltd, Newport, Gwent. Tel: 0633 252957.

USA: c/o Grafton Sound USA, Marina Del Rey, CA 90292.

AM1200: 4-channel unit configured as two stereo MOSFET amps. Rated at 200 W/channel into 8 Ω or bridged at 800 W into 4 Ω .

BGW: BGW Systems, Hawthorne, CA, USA. Tel: (213) 973-8090. **UK:** C Hawkins, London. Tel: 081-671 9494.

Model 200: 2-channel amplifier rated 200 W/channel into 8 Ω . *Model 350:*

2-channel amplifier rated 400 W/channel into 8 Ω .

Carver: Carver Corp, Lynnwood, WA, USA. Tel: (206) 775-1202. **UK:** HW International Ltd, London. Tel: 071-607 2717.

PM-120: 1U 60 W/channel into 4 Ω . *PM-300:* 1U 150 W/channel into 4 Ω . *PM-600:* 2-channel amplifier into 4 Ω . *PM-900:* 450 W/channel into 4 Ω . *PM-1200:*

600 W/channel into 4 Ω . *PT-1250:* 625 W/channel into 4 Ω . Replaces *PM-2.0* and designed as a lightweight touring amplifier.

Crest: Crest Audio Inc, Hawthorne, NJ, USA. Tel: (201) 423-1300. **UK:** Crest Audio (UK) Ltd, Royston, Herts SG8 7RQ. Tel: 0763 82465.

4801/6001: electrically identical units to *7001/8001* but down-rated in power.

FA1201/FA901: low cost models rated at 680 W/channel and 440 W/channel into 2 Ω respectively.

FM: FM Acoustics Ltd, Wadenswil, Switzerland. Tel: 01 780 64 44. **USA:** FM Acoustics USA, Benicia, CA 94510. Tel: (707) 745-4444.

FM 1000-1: single-channel amplifier capable of driving loads below 1 Ω supplying power peaks up to 2500 WRMS. *FM 801A:* successor to the *FM 801*.

Furman: Furman Sound Inc, Greenbrae, CA, USA. Tel: (415) 927-1225. **UK:** Shuttlesound Ltd, London. Tel: 081-871 0966.

SP-20: half rack 20 W/channel stereo power amplifier.

Hill: Hill Audio Ltd, Maidstone, Kent, UK. Tel: 0622 880555. **USA:** Hill Audio Inc, Tucker, GA 30084. Tel: (404) 934-1851.

LC400: 2-channel amplifier rated at 120 W/channel into 8 Ω . *LC800:* 2-channel amplifier rated at 250 W/channel into 8 Ω . *LC1200:* 2-channel amplifier rated at 350 W/channel into 8 Ω . *LC1600:* 2-channel amplifier rated at 500 W/channel into 8 Ω . *ML200:* single channel amplifier rated at 120 W into 8 Ω . *ML400:* single channel amplifier rated at 250 W into 8 Ω .

JBL: **UK:** Harman (Audio) UK Ltd, Slough, Berks. Tel: 0753 76911.

6300 series: four amplifier range designed specifically for the European touring market. Completely new design including *Speakon* connectors and RS422 interface.

Peavey: Peavey Electronics Corporation, Meridian, MS, USA. Tel: (601) 483-5372. **UK:** Peavey Electronics (UK) Ltd, Corby, Northants. Tel: 0536 205520.

DPC 750: lightweight 350 W/channel MOSFET Digital Energy Conversion design in 1U format.

QSC: QSC Audio Products Inc, Costa Mesa, CA, USA. Tel: (714) 645-2540. **UK:** Music Lab Sales, London. Tel: 071-388 5392.

MX 700: 2U amp rated at 150 W/channel into 8 Ω .

Ramsa: **UK:** Panasonic UK Ltd, Bracknell, Berks. Tel: 0344 853176. **USA:** Panasonic Professional Audio Division, Secaucus, NJ. Tel: (201) 348-7000.

WP-944: 2-channel amplifier rated at 350 W/channel into 8 Ω .

Rolec: Rolec, London, UK. Tel: 071-281 4776.

Mini-bloc: single channel unit in extruded aluminium casing for attaching to speaker cabinet.

Third Generation: Third Generation Ltd, Southend-on-Sea, Essex, UK. Tel: 0702 420645.

HP200: 1U 2-channel amplifier rated at 100 W into 8 Ω .

Monitors

AESD: AESD sarl, Colombes, France. Tel: 01 47 60 28 13. **UK:** AESD Ltd, London. Tel: 071-323 5748.

Monitor 6: nearfield reference system, active 2-way. *Monitor 8:* nearfield reference system, active 3-way. *Monitor 12:* active 3- or 4-way high power monitor with optional *Bass 15* active auxiliary sub-bass unit. *Monitor 15:* active 4- or 5-way high power monitor with optional active *Bass 18* sub-bass unit.

Altec: Altec Lansing, Oklahoma City, OK, USA. Tel: (405) 324-5311. **UK:** Shuttlesound Ltd, London. Tel: 081-871 0966.

Maestro M300: 2-way system with studio playback applications with 75 W handling. *Maestro M600:* incorporates a 604 drive unit with a rated handling of 150 W.

AR: **UK:** Hayden Pro-Audio, Chalfont St Peter, Bucks. Tel: 0753 888447.

Red Box II: European-designed speaker system based on the original *AR 18* which found applications for studio reference applications.

ATC: Loudspeaker Technology Ltd, Stroud, Glos, UK. Tel: 0285 76561

SCM20: 2-way passive studio monitor of compact dimensions.

Axys: Duran Audio, CB Zaltbommel, The Netherlands. Tel: 04180 15583. **UK:** Palm Audio Systems, Birmingham. Tel: 021-200 1771.

Repro-1: 3-way active medium sized farfield monitor with soft dome tweeter.

BNS: BNS Professional, AX Loon op Zand, The Netherlands. Tel: 041 662434. **UK:** Protape, London. Tel: 071-267 9336.

A-3: active 2-way compact design using ribbon tweeter and narrow vertical dispersion to minimise reflections from consoles etc in nearfield. *A-4:* active 2-way compact design for general purpose use—foldback, nearfield etc with switchable compensation for flush mounting.

Canford: Canford Audio, Washington, Tyne & Wear, UK. Tel: 091-415 0205.

Compact active speaker in diecast casing for general purpose applications. Amplifier rated 10 W.

Eela: Eela Audio, DB Eindhoven, The Netherlands. Tel: 040 424455. **UK:** Dyer Audio Systems, Hoddesdon, Herts. Tel: 0992 468674.

Active 1: small stereo monitoring system, 2-way active—one cabinet containing amp and the other the PSU. Rated 30 W.

Electro-Voice: Electro-Voice Inc, Buchanan, MI, USA. Tel: (616) 695-6831. **UK:** Shuttlesound Ltd, London. Tel: 081-871 0966.

Sentry 30: compact 2-way monitor with magnetically screened casing.

Genelec: Genelec Oy, Iisalmi, Finland. Tel: 77 13311. **UK:** SSE Marketing, London. Tel: 071-387 1262. **USA:** Quest Marketing, Auburndale, MA. Tel: (617) 964-9466.

1034A: high powered active monitoring system, a smaller version of the *1035A*.

JBL: JBL Professional, Northridge, CA, USA. Tel: (818) 893-8411. **UK:** Harman (Audio) UK Ltd, Slough, Berks. Tel: 0753 76911.

Control One series: new additions include *Control 1+* up-rated version of the *Control 1*; the *Control Micro* smaller version of the *Control One*; and the *SB1* and *SB5* complementary sub-bass units.

Klark-Teknik: Klark-Teknik Research Ltd, Kidderminster, Worcs, UK. Tel: 0562 745371. **USA:** Klark-Teknik Electronics Inc, Farmingdale, NY. Tel: (516) 249-3660.

Jade One Mk II: 2-way active reference speaker system suitable for nearfield or as main monitor in medium sized control rooms. Adjustable LF and HF compensation.

Meyer: Meyer Sound Laboratories Inc, Berkeley, CA, USA. Tel: (415) 486-1166.

UK: Autograph Sales Ltd, London. Tel: 071-267 6677.

HD-1: active 2-way nearfield reference monitor capable of producing 118 dB SPL peak.

PAS: Professional Audio Systems, Harbor City, CA, USA. Tel: (213) 534-3570.

TOC Studio Monitor 3: high power handling full range monitor with active 3-way crossover network. Twin 15 inch LF units.

Peavey/Audio Media Research: Audio Media Research, Division of Peavey Electronics Corporation, Meridian, MS, USA. Tel: (601) 483-5372. **UK:** Peavey Electronics (UK) Ltd, Corby, Northants. Tel: 0536 205520.

PRM 206: compact 2-way nearfield reference monitor. *PRM 225:* 2-way nearfield reference monitor, dual LF unit. *PRM 308SL:* 3-way nearfield with switchable reference or equalised response modes.

Quested: Quested Monitoring Systems Ltd, London, UK. Tel: 071-731 7434.

H410: passive 3-way with four LF units and 3 inch and 1 inch soft domes.

Radian: Radian Audio Engineering Inc, Anaheim, CA, USA. Tel: (714) 693-9277.

MS-8: nearfield monitor, 2-way using dual concentric driver. *MM-8:* compact nearfield monitor using same drivers as *MS-8* but in a smaller cabinet.

Tannoy: Tannoy Ltd, High Wycombe, Bucks, UK. Tel: 0494 471177. **N America:** Tannoy North America Ltd, Kitchener, Ontario, Canada. Tel: (519) 745-1158.

System 2 NFM: compact monitor, 2-way, bi-wireable. *System 8 NFM:* 2-way monitor with dual concentric drive unit, bi-wireable. *System 10 DMT:* 2-way dual concentric monitor (10 inch) with adjustable HF response. *System 12 DMT:* 2-way dual concentric monitor (12 inch) with adjustable HF response. *System 15 DMT:* 2-way dual concentric monitor (15 inch). *System 215 DMT:* 2-way dual concentric monitor (15 inch) with secondary 15 inch LF driver.

Westlake: Westlake Audio, Los Angeles, CA, USA. Tel: (213) 851-9800. **UK:** Britannia Row Sales, London. Tel: 071-226 5396.

BBSM-4: 2-way reference monitor with three drive units. □