

August 1988

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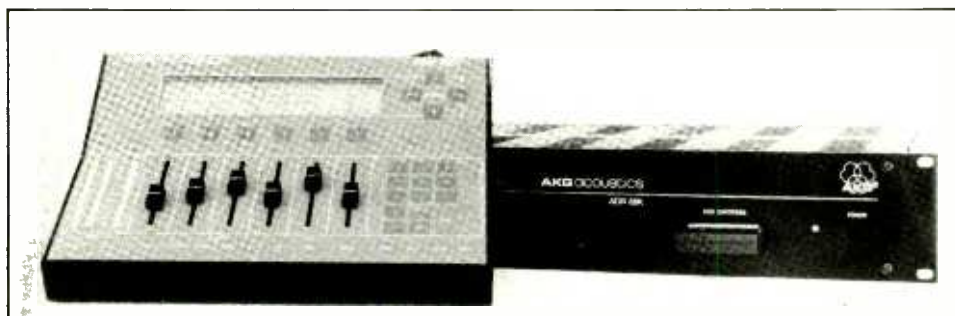
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AND BROADCAST ENGINEERING

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A wealth of experience

Hill Audio is one of a small core of longer-established, stable companies able to supply to a worldwide marketplace and who can draw on a wealth of experience within the audio industry.

THE PAST

The company that was to become Hill Audio was founded in 1972 with the same nucleus of personnel that remain to this day. Initially we started producing custom-made mixing consoles and amplifiers for sale within the UK. As the products became more sophisticated the company began exporting to Europe.

In the early 80's we were one of the first to establish an American based distribution company. MHA, a sister company, was also created to specifically cater for equipment rentals. The entry into the USA raised the profile of Hill Audio, and to this day it remains our largest single market — although in the last four years our worldwide sales have increased dramatically through the establishment of a comprehensive distribution network.

THE PRESENT

Hill Audio has recently updated its products — introducing a comprehensive new range of mixing consoles and power amplifiers. To satisfy the rapidly expanding worldwide market we have moved to a new factory and installed a large networked computer system. Over the last three years our sales have more than trebled.

THE FUTURE

The years of investment in extensive product research and development have given us a firm foundation for the future. In a changing world, quality and reliability with the tradition of personal service and care, make Hill Audio a major name in the audio equipment industry.

○ The '00' and '000' series power amplifiers



● The 'Remix' 24:8:16 recording console



○ The 'Concept' series modular consoles



● The 'Mix' series non-modular consoles



● The Rambert Dance Company — users of a 'Concept' series mixing console



Photograph: Ross MacGibbon



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EDITORIAL

A useful barometer of change within our industry is the language we use. Words are easy to create and if they do not fulfil a descriptive purpose they die very quickly.

They will only pass into mainstream technical language if they fit the job, product, service, action, etc, and are easy to use. They are far quicker to develop than products, and distribution to hundreds can be made in spoken presentations and to multiple thousands in publications. As these changes in words are so easy, and because the English language is flexible, our spoken phrases will parallel the way we think and work.

It is worth noting further how certain products have given their names or names of part of their function to the language so that they become almost generic terms, much to the general annoyance of the manufacturer. It is possible to object to their use in the written word (and protect names with 'TM' and 'Regd', etc) but it is the spoken word that reflects everyday use. One of the best examples of this has to be the word 'Harmonizer' that Eventide involuntarily donated to the language (spoken only) and so closely fits the function of the device. It is an education looking at the lengths other manufacturers have to go to in their literature to avoid using that word for similar products. Other well known examples of this include Ampex 'SelSync' and Cannon 'XLR'.

There has been a tremendous influx of new words over the last few years with the arrival of new technologies. Not all these words are of course new outside our business but let us place ourselves in the position of an operator at a mixing console for a session 10 years ago—just how much of today's language would he be used to.

Firstly the console certainly would not be ASSIGNABLE or VIRTUAL. It almost certainly didn't have MUTE GROUPS, QWERTY KEYBOARDS, ALPHANUMERIC DISPLAYS, PLASMA DISPLAYS, and the MONITORS were only for sound not video. We knew of SMPTE but more for film and video and wouldn't have considered pronouncing it 'Simptee'. We would have had no idea where to start looking for NUDGE BUTTONS and MENUS only came from restaurants. A KEYBOARD was only ever a musical item, a MOUSE was a rodent and TRACKBALLS were things from improbable science fiction films. MIDI, 232 and 422, DATA and SCREEN DUMP, UPLOAD, DOWNLOAD, HARD DISK, FLOPPIES were totally off-the-wall in audio. We would have been familiar with SEQUENCERS although rather different animals from current systems. We would have had quite a different idea of SAMPLES, only being familiar with the term through sample and hold synthesiser functions. To mention SPIN-IN would only have produced a blank stare. All time was REALTIME and the editing ONLINE as we didn't know what OFFLINE was. The list is endless and we haven't even started on digital audio.

Losing words is a much slower process as there is always someone, somewhere using them. We will therefore, think about words that are not heard so often. SPOOLS has been a casualty of the reel-to-reel definition of 'non-cassetted' tape. Strangely, looking through 1977 and '78 *Studio Sound* I could not really find any words that would not be understandable today. I think at some point I will have to look back further although when was the last time you heard FLANGING or DIRECT-CUT?

What was obvious though from those earlier issues was the way in which there has been an increase in international conformity in phrases. So in the UK we hear a lot less about DROPPING IN or OUT and far more PUNCH IN or OUT. BOUNCING DOWN has largely replaced the term PINGPONG although this has had slightly differing meanings. In the UK we have now learnt what US engineers mean when they refer to a BOARD, TRACKING DATES, and ROUTING (but pronounced rau-ting). Other words just have not made mass awareness across the Atlantic and this is something that I confess I am still guilty of forgetting sometimes, and often it is only after I have been listened to very politely I have been asked the question 'What does xxx mean?' When xxx has been fundamental to my speech. Such examples are VALVES and TUBES, which are still worlds apart although VACUUM TUBES are better known if not more clumsy to say.

In the UK a REMOTE is better known as a MOBILE RECORDING. If the operation were large scale in the US it would involve the use of a TRUCK while the UK would prefer a LORRY, generally ARTICULATED. If our mobile recording were for broadcast it would be described in the UK as an OB, which is still REMOTE in the US. For small scale recording the UK would put the equipment in the BOOT or TRUNK in the US.

The beauty of the English language is that it allows two nations speaking the same language to understand and to misunderstand each other at the same time although these 'cultural differences' have to be under threat as we generate a global technical English that can be understood more widely.

I think that when this happens we will be losing rather a lot.

Keith Spencer-Allen

PARAMETRIC PERFECTION



Introducing the New Orban 642B Parametric Equalizer/Notch Filter

Orban's new 642B Parametric Equalizer/Notch Filter offers unmatched versatility, superb specs, and highly musical equalization in a new generation of our famous and widely-used 622 series. The 642B represents Orban's continuing dedication to the art of creating the "most musical" parametric equalizers through the use of carefully designed, series-connected "constant Q" sections which minimize ringing and stridency.

The 642B's superiority over conventional parametric equalizers is particularly apparent at the extremes of its boost/cut parameter and at narrower bandwidths on difficult program material. In situations like these, the 642B's performance provides consistently satisfying results without complications or unpleasant surprises.

	Band 1	Band 2	Band 3	Band 4
Model 642B (Same in both channels.)	25-500Hz	80-1.6kHz	315-6.3kHz	1-20kHz

Special Application Versions

Model 642B/SP	80-1.6kHz	80-1.6kHz	315-6.3kHz	315-6.3kHz
(Same in both channels. Limited frequency range for speech processing, forensic work, notch filtering/feedback suppression, and similar applications.)				
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- Noise and distortion specs significantly better than 16-bit digital

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NEWS

Agents

- Autograph Sales, London, have been appointed exclusive European distributors for Cadac *E-type* consoles.
- **TapeTalk** have appointed Radiotukku, Hoylaamotie 11, 00380 Helsinki, Finland, tel: 90-558484 as their distributor for Finland.
- London-based computer rental company **Micro-Rent** has signed an exclusive agreement to supply Apple *Macintosh* computers to Steinberg Digital Audio which they will in turn supply to their customers.
- The West German company **Brahler ICS** has opened a UK division. Brahler are specialists in conference systems for they manufacture all components from microphones to infra-red headphone systems. Brahler ICS (UK) Ltd, 52 Burleigh Street, Cambridge CB1 1DJ. Tel: 0223 461115.
- The Synthesiser Company are now distributing **Simmons** drum synths, including the new *SDX* computer percussion system, and the **Casio DA-1** portable DAT machine in the UK.
- Syco have been appointed exclusive UK distributors for **WaveFrame** of Boulder, CO, USA.
- **Acorn Computers** have appointed Hugh Symons Distribution Services

- to strengthen their drive into UK specialist markets, including music technology applications, with the RISC-based *Archimedes* systems and other Acorn machines. Hugh Symons Distribution Services, 223-227 Alder Road, Poole, Dorset BH12 4AP, UK. Tel: 0202 745744.
- HHB Hire & Sales, London, UK, can now supply the **Sony TCD-D10** and **PCM-2000** portable DAT recorders. These join the established **DTC-1000ES** and pro model **PCM-2500**.
 - Hilton Sound's Paris office have been appointed **Apogee** distributors for France.
 - John Hornby Skewes are to distribute **DOD Digitech** effects units and **Audio Logic** rackmount products in the UK and Eire. JHS have assigned all rights to their use of the name 'Digitech' to DOD.
 - With effect from July 1st, Kinovox A/S have been appointed to handle the sales and service for **Studer International** for Denmark. They will also handle all existing guarantee commitments. Company A Villadsen will continue to be the agents for **Revox** products although Kinovox will be able to supply Revox to their regular customers.

News from the AES

The summer is traditionally our holiday period and meetings start again in September. The first will be our **Lecture Visit to Solid State Logic** at their factory near Oxford. There will be a lecture on their new digital console and a tour of their facilities.

Next will be the **British Section Annual Dinner**, which will be held on October 13th at the Queen Elizabeth II Conference Centre.

Subjects to be covered later this year and early next will include Loudspeaker Cluster Design, BBC Radio Data Transmission, Uses of Fourier Transforms, Acoustic Modelling, Mixing Consoles, Design of Pipe Organs, Studio Acoustics and Analogue Digital Converters. Details and dates will appear in due course.

Other major events in the calendar

are the **3rd Regional AES Convention** being held in Melbourne, Australia from August 16th to 18th and the **85th AES Convention in Los Angeles** November 3rd to 6th.

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

For further details on any of the above or information on joining the AES, please contact: **Heather Lane, AES British Section, Lent Rise Road, Burnham, Slough SL1 7NY. Tel: 06286 63726.**

TEF course

'TEF Basics and Applications to Transducers and Room Acoustics' is being sponsored by ANT of West Germany in co-operation with Syn-Aud-Con and Techron Industrial Products.

The 3-day course is aimed at TEF *System 10/12* users who would like a refresher course and anyone interested in purchasing a system. Workshop staff are: Don Davis, Synergetic Audio Concepts; Eugene T Patronis, professor of physics at Georgia Tech, Atlanta; Hellmuth Kolbe, acoustician; Don Eger, manager of Crown International's

Techron division.

The workshop will be held on September 6th to 8th and costs DM600.00; bookings must be made by August 1st. The venue is Hotel Mercure, Braunschweig, West Germany, and accommodation can be arranged at an extra charge. The course language is English.

Cheques are to be made payable to ANT Nachrichtentechnik GmbH and sent to Marina Meyer, ANT Nachrichtentechnik GmbH, Lindener Strasse 15, D-3340 Wolfenbuttel, West Germany.

People

- Steve Smith has recently been appointed managing director of **The Sound Department**, Surrey, UK, to head their development in pro-audio sales. They currently specialise in theatre sound design and hire. Smith was previously with Shuttlesound.
- Klark-Teknik, Worcs, UK, have made two appointments within

their Midas division: Peter Cornell as technical support manager and Yoel (Zolli) Schwarcz as product manager.

- Bernard Chevy has resigned as President-Director General of the **Midem** Organisation effective beginning of May. The board of the company has requested that he accept the position of President d'Honneur-Fondateur.

APRS International Course for Studio Engineers

3rd - 9th September 1988

The 1988 course, 15th in our annual series, sees a major innovation: it's not a full week 'residential', but a week-long series of one-day modules - more flexible and more closely answering the special needs of today's studios. Still at the University of Surrey, Guildford, but now in the brand-new studio facility. On-campus accommodation available, if required.

For more details and bookings, contact:

APRS, 163A High Street, Rickmansworth WD3 1AY. Tel: (0923) 772907 Fax: (0923) 773079

MODULES: # Equipment Synchronization and MIDI
Noise Reduction Systems # Acoustics (Studio, Control Room & Instruments) # Video Post-Production
Test Equipment and its Application in Studio Maintenance # Recording - Classical and Pop
Final Mastering - Vinyl, Cassette, CD

FEES: £80 per module (i.e. per day), less for APRS members.

NEWS

BBC RDAT first

BBC Wales broadcast their first complete RDAT radio programme on May 8th and 12th. *Blowing for Gold* was a binaural stereo feature on the European Brass Band Championship in Lucerne, Switzerland.

A portable PCM-2000 RDAT recorder was provided by Sony Broadcast. The producer recorded electronic skip-edit commands on to the tape after the event to save time at the transfer stage before editing.

The programme was edited digitally at BBC Wales' dubbing theatre at Stacey Road.

Radio Cymru's FM stereo service broadcast the programme on May 12th replaying direct from RDAT to preserve digital integrity. The lack of phase jitter offered by digital recording and replay is ideal for binaural stereo, where the listener uses headphones.

Exhibitions and conventions

August 5th to 7th Live Sound Show, Heathrow Penta Hotel, Heathrow Airport, UK. Contact Alan Griffiths (01-688 3161) or Janet Ayres (01-686 2599), *Pro-Sound News*, Croydon, UK.

August 16th to 18th 3rd Regional AES Convention, Melbourne Hilton Hotel, Melbourne, Australia, Convention Chairman: Brian Horman. Tel: 03-329-0162. Fax: 03-328-1424.

September 8th to 12th 22nd SIM-HI.FI-IVES, Milan Fair Pavilions, Milan, Italy.

September 11th to 24th Light & Sound Show, Olympia, London, UK. Contact: Tony Andrew, Secretary, Professional Lighting and Sound Association. Tel: 0323 410335. Fax: 0323 646905.

September 23rd to 27th International Broadcasting Convention '88, Metropole Conference and Exhibition Centre, Brighton, UK.

September 29th to October 3rd International Broadcasting and Telecommunications Show, South Pavilion, Milan Trade Fair, Italy.

September 29th to October 3rd MITAS '88 Show of Technology Equipment and Services for Entertainment (including discotheques, ballrooms, theatres, cinemas, congress centres and organisations), South Pavilion of the Milan Trade Fair, Italy.

September 29th to October 3rd MeM—Mediterranean Market

(International Market of Audio/Video programmes and Services), South Pavilion of the Milan Trade Fair, Italy.

September 30th to October 9th BBC Radio Show, Earls Court, London, UK.

October 5th to 11th Photokina, Cologne, West Germany. Contact KölnMesse, Messe- und Ausstellungs-GmbH. Tel: (221) 821-1. Fax: (221) 821-2574.

October 11th to 13th Sound Broadcasting Equipment Show, Albany Hotel, Birmingham, UK. Admission by invitation. Contact: Point Promotions. Tel: 0734 583086.

November 3rd to 6th 85th AES Convention, Los Angeles Convention Center and Los Angeles Hilton, Los Angeles, CA, USA.

1989

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

March 7th to 10th 86th AES Convention, Congress Centre, Hamburg (CCH), AM Dammtor, D-2000 Hamburg, West Germany.

April 28th to May 2nd NAB, Las Vegas, USA.

June 17th to 23rd ITS Montreux, Switzerland.

1990

March 30th to April 3rd NAB, Atlanta, USA.

Sounds SEARCHers

A new computerised search service has been formed by the amalgamation of The General Booking Company and The Collection Series. SEARCH—The Sound Advice Company can provide Production, Agency and Licensing details by telephone with (on most services) no charge to the client as the fee is paid by the providers of the service.

Studios registered with the service can be identified by console, location, multitrack, outboard gear, floor footage, monitoring, automation, accommodation, in-house chef, atmosphere, local facilities, etc. For engineers, producers and programmers the computer researches musical style, familiarity with desks and equipment, list of credits and more. Performers are referenced by style, instruments owned, vocal range, physical details (for on-camera or live work), etc.

The licensing service contains details of over 200,000 popular songs

and over 15,000 classical pieces, which can be searched for by style, era, composer, artist, record company, copyright, chart position—even a particular linking word in the title.

In summary, contact with a wide range of personnel, services and equipment can be provided to all areas of the music, recording, broadcasting and television industries. Although UK and Europe based an increasing amount of contact is also being made with the USA and Japan as travel, accommodation, visa, etc, arrangements are all part of the service.

The database is held on an IBM System 36 mini computer in conjunction with a 32 bit PC Network.

SEARCH—The Sound Advice Company, Oliver House, 8-9 Ivor Place, London NW1 6BY, UK. Tel: 01-724 2471. Fax: 01-724 6245.

Address changes

• **TapeTalk**, manufacturers of *The Box*, moved to 55-59 Shaftesbury Avenue, London W1 7AA, UK. Tel: 01-494 3131/5.

• **DSP and C-Syrinx** have moved and are now located at Wiener Strasse 291, 8051 Graz, Austria. Tel: 0316 6 22 10.

• **Porky's Mastering Services** have moved to 55-59 Shaftesbury Avenue, London W1 7AA, UK. Tel: 01-494 3131/5.

• **Synergetic Audio Concepts** (Syn-Aud-Con) now have their complete operation—office, research lab and home—in one location at Rt 1, Box 267, Norman, IN 47264, USA. Tel: (812) 995-8212.

Readers' corner

Two new books are to be published this year by A-R Editions of Wisconsin, USA.

Computer Applications in Music: A Bibliography, by Deta S Davis and priced \$49.95, contains over 4,500 references to books, articles and reviews on computer music compositions, composers, and the hardware and software used in digital/audio/computer compositions are included.

The Compact Disc Handbook by Ken C Pohlmann covers basics of digital audio theory, design of CDs

and players, user information and product evaluation.

These books will be part of the Computer Music and Digital Audio Series recently purchased by A-R Editions from William Kaufmann Inc, Los Altos, CA. Titles already published in this series include *Composers and the Computer* (\$27.95), *Digital Audio Signal Processing: An Anthology* (\$35.95) and *Digital Audio Engineering: An Anthology* (\$29.95).

A-R Editions Inc, 315 West Gorham Street, Madison, WI 53703, USA. Tel: (608) 251-2114.

Courses and seminars

September 3rd to 9th APRS Engineers' Training Course, University of Surrey, Guildford, UK. Contact: APRS Secretariat, Rickmansworth, Herts. Tel: 0923 772907. Fax: 0923 773079.

September 6th to 8th 'TEF Basics and applications to transducers and room acoustics', Hotel Mercure, Braunschweig, West Germany. Contact: Werner Keller, ANT Wolfenbüttel. Tel: 05331/83-366.

September 20th to 22nd Digital Processing of Signals in

Communications, Institution of Electronic and Radio Engineers, Loughborough University of Technology, UK.

November 3rd to 6th Reproduced Sound 4, Hydro Hotel, Windermere. Contact: Institute of Acoustics, 25 Chambers Street, Edinburgh EH1 1HU, UK.

November 25th to 27th Noise in and Around Buildings, Hydro Hotel, Windermere. Contact: Institute of Acoustics, 25 Chambers Street, Edinburgh EH1 1HU, UK.

Contracts

● **New England Digital** have supplied two systems to George Michael—a *Synclavier* with 64 stereo voices and 20 Mbytes of RAM as well as an 8-track *Direct-to-Disk* multitrack system. A *Synclavier* system has also been supplied to the Eurythmics. Lavskymusic, New York, have installed a *Synclavier* digital audio system with 96 voices, 64 Mbytes of RAM and an optical disc system capable of storing two billion bytes of on-line sound files, and a *Direct-To-Disk* digital multitrack recorder. NED say this is the largest *Synclavier* system in the world.

● **Otari US** have announced sales of a *DTR-900* digital multitrack to Sunset Sound in Los Angeles and a *DTR-900* to Manhattan Center Studios, New York City. An *MTR-90-II* 24-track, *MTR-12-II*, three *CTM-10* stereo cart machines, an *MX5050B-II* and *MTR-20-T* have all been supplied to the Apollo Theatre in New York while Sound One, a major film sound facility, have purchased six *MTR-90s*.

● **FM Acoustics** have announced the supply of six *FM 1000* power amplifiers for the main monitoring systems in Terra Studios, the new three-studio complex of Toshiba/EMI in Tokyo.

● **Richmond Sound Design** have supplied a *Command/Cue* theatre sound memory programming system

to Det Norske Teatret, Oslo, Norway. The system is a custom 320-channel version that will control levels, fades, panning and routing of sound throughout the theatre and includes a programmer's workstation and a remote operator's touch screen. The system also communicates with the operator in Norwegian.

● **AME Inc** of Burbank, CA, USA, have installed a **Sony PCM-3324** digital audio multitrack recorder for preparation of foreign language versions of feature films. The system has been added to upgrade an existing service that is sensitive to generation loss.

● **Quantum Sound**, Jersey City, NJ, USA, have recently purchased a **Studer A-820** 2 inch tape machine for the *Synclavier* room and an *A-820* ½ inch machine for the mixing suite. Other purchases include three new **TC Electronic** 11 second samplers and two *PCM-42s*.

● **Simmons SDX** computer percussion systems have been purchased recently by Van Halen, Pink Floyd, Spandau Ballet, Howard Jones, Katrina and the Waves and Westworld making the total number of systems now sold to 100. Producer Steve Levine is also using the *SDX* as his main sampling system. A keyboard sampler and MIDI sequencer software for the system will shortly be available.

Changes at Chocolate Factory

Coinciding with their third birthday. The Chocolate Factory in London have formed a new partnership with Park Delta to provide financial backing for a new studio and improved facilities. According to the studio, this move realises the studio's original expansion plans.

Roger Qusteded will install the monitoring as well as taking an active part in the acoustic design, with a special brief to retain the very live qualities of their 'gymnasium' area. Another live room will also be added so each studio will have its own specific area, although any studio will be available to either control room and the specialised mix

room. Keyboards and programming equipment will also be available for use in either room.

The Trident set-up will be retained in the existing control room and alternative equipment will be installed in the new control room and mixing suite.

The new studio will be built without interrupting work in the present studio and recording will transfer there to enable the mixing room to be built and the original studio to be revamped. The work will begin once the building's freehold has been purchased by the company and will continue over a six month period.

Literature received

● **Raper & Wayman** have published their first fully illustrated catalogue offering their wide range of sound and recording equipment. The 55-page catalogue is accompanied by a price list and details of equipment hire rates. These are available free on request from Chris Collings, Sales Manager, Raper & Wayman, 34 Danbury Street, London N1 8JU, UK. Tel: 01-226 7215 or 01-359 9342/3030. Fax: 01-354 4765.

● **Bruel & Kjaer** have launched a

new shortform catalogue, detailing their range of instruments and transducers. The illustrated 64-page volume includes instrumentation for sound and vibration analysis and environmental monitoring, general-purpose equipment for measurement and analysis, and a wide range of transducers and accessories. Contact: Alan Gibson, Bruel & Kjaer (UK) Ltd, 92 Uxbridge Road, Harrow HA3 6BZ. Tel: 01-954 2366. Fax: 01-954 9504.



GATHERING SOUND TO PERFECTION



The Neumann TLM170i is Neumann's first transformerless-design microphone. Whilst retaining the unmistakable Neumann sound, the TLM170i employs new circuitry which enables much quieter self noise levels to be achieved. The dynamic range exceeds 126db and flexibility is ensured with five pattern arrangements; cardioid, super cardioid, hyper

cardioid, omni and figure of 8. These features together, make the Neumann TLM170i an extremely versatile microphone in and around the studio.

For more information on the range of Neumann Microphones, contact Bauch at the address below.

BAUCH

F.W.O. Bauch Limited,
49 Theobald Street,
Boreham Wood,
Herts. WD6 4RZ.
Tel: 01-953 0091.
Fax: 01-207 5970.

Soundtracs In Line

Soundtracs launched a new console at the recent AES Convention, the *In Line*. It is available as the *IL3632* and *IL4832* with 36 and 48 channels respectively. Both consoles have 32 buses and a claimed mix noise with all channels assigned of better than -80 dB on the masters and groups, interchannel line crosstalk at 10 kHz being better than -85 dB with a similar figure being achieved for inter-monitor crosstalk.

The console has been designed primarily for track laying and basic mixing. Dual inputs are provided in addition to the mic input on each channel. The 4-band parametric EQ may be assigned or split between monitor or the channel. There are

eight aux sends—six mono and a stereo send on each channel and monitoring may be either PFL or solo-in-place. There is provision for two mute groups. During mixdown it is possible to use both sets of channel inputs, effectively doubling the number of inputs. There are options for stereo inputs and eight effects returns, which are available on two additional modules. A patchbay is provided as standard.

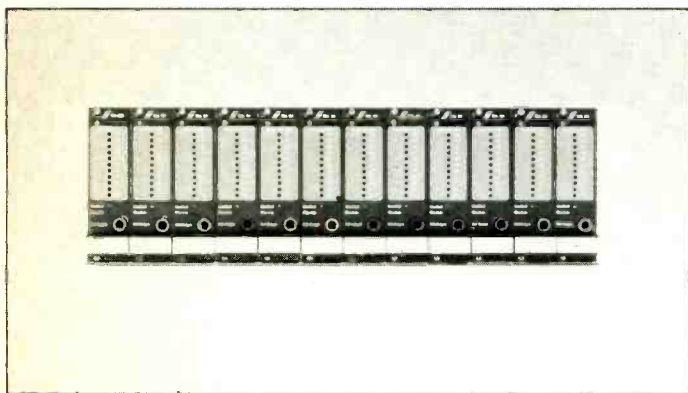
Soundtracs plc, 91 Ewell Road, Surbiton, Surrey KT6 6AH, UK. Tel: 01-399 3392. Fax: 01-399 6821. USA: Samson Technologies Corp, 485-19 South Broadway, Hicksville, NY 11801. Tel: (516) 932-3810.

NEWS

New Focusrite modules

Focusrite have announced two new modules. The first is the *ISA 130* dynamics processor comprising a compressor/limiter, noise gate/expander and de-esser/exciter. Within the module there are individual high- and lowpass filters together with a peaking equaliser offering 60 Hz to 6 kHz ± 16 dB. These functions may be independently assigned to the sidechains of the compressor or the gate or into the audio signal path. The heart of the *ISA 130* is a new VCA that Focusrite describe as featuring low distortion, accurate and

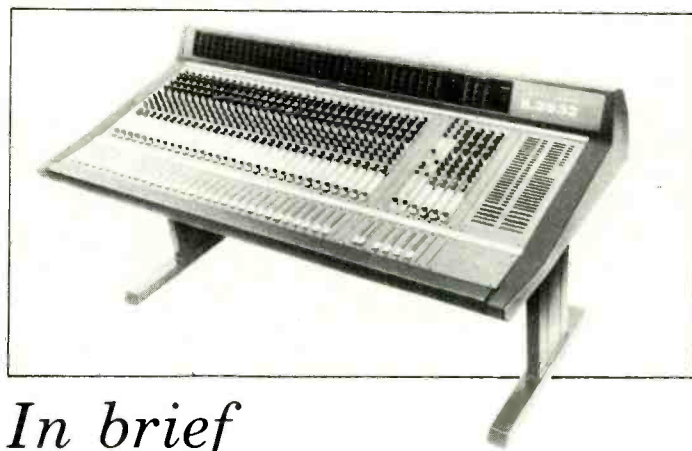
remotely from the mixer in 6 dB steps from 60 dB to unity. Console requirements are just an 11-way switch and some broad tolerance resistors with a balanced line level input or an interface unit is available for unbalanced inputs. Phantom power may also be remotely controlled with the addition of a pushbutton at the console. Quoted specifications include equivalent input noise of -127 dBu; distortion at mid gain settings of 0.002% and bandwidth, dependent on length of line, is from below 20 Hz to beyond 100 kHz.



thermally stable control characteristics and the absence of modulation noise. The unit uses the same racking and power supply as the existing *ISA 110* input signal amplifiers.

The *ISA 116* is a high performance mic amplifier with remote gain setting and phantom power control. Focusrite have designed the unit for use where long lines are unavoidable between the mic and console and for much shorter runs between studio and control room where signal degradation may also take place. The *ISA 116* can be placed at the mic location and feed lines 200 to 300 metres long without degradation, and with greater immunity from hum and noise. Gain can be varied

There is a version designated *ISA 116L* for feeding very long lines or complex networks. Both versions are normally supplied in 3U frames and control boxes with XLR-type connectors available. There is also a special producer's pack available with flight case and control panel for transit. This unit is capable of holding four complete mic circuits. **Focusrite Ltd, PO Box 38, Newmarket, Suffolk CB8 7EG, UK. UK: Harman UK Ltd, Mill Street, Slough, Berks SL2 5PD. Tel: 0753 76911. USA: Focusrite (US) Ltd, 1100 Wheaton Oaks Court, Wheaton, IL 60187. Tel: (312) 653-4544.**



In brief

• **BGW** have announced a slightly smaller version of their *GTA* power amplifier to be known as the Model *GTB*. The *GTB* is identical to the *GTA* except that it has just a single large power supply and a reduced semiconductor complement. The *GTB* is described as giving 800 W with one channel driving a 2 Ω load. In stereo mode the *GTB* delivers 275 W/channel into 8 Ω and 400 W/channel into 4 Ω . All other features and specifications are as for the *GTA*.

• **Audio Services Corporation** has announced a battery power supply made especially for use with the Neumann *190i* stereo microphone. The box provides 48 V phantom powering with switchable 15 dB pad and low cut filter (-6 dB at 100 Hz). The *MP48 PH-Stereo* is manufactured by Professional Sound Corporation and is available through ASC. **Audio Services Corporation, 10639 Riverside Drive, North Hollywood, CA 91602, USA. Tel: (818) 980-9891.**

• **Scholz Research & Development** has introduced a device to place Rockman *Rockmodules* and other effects devices under programmable MIDI control. The Rockman *MIDI Octopus* is capable of controlling up to eight footswitchable functions and storing 100 effect combination programs. Programs may be accessed via a MIDI foot controller, keyboard,

sequencer or front panel controls. The *MIDI Octopus* is a 1U half rack unit. **Scholz Research & Development Inc, 1560 Trapelo Road, Waltham, MA 02154, USA. Tel: (617) 890-5211. UK: Dixies Music, 2 Stocks Walk, Almondsbury, Huddersfield, Yorks. Tel: 0484 512601.**

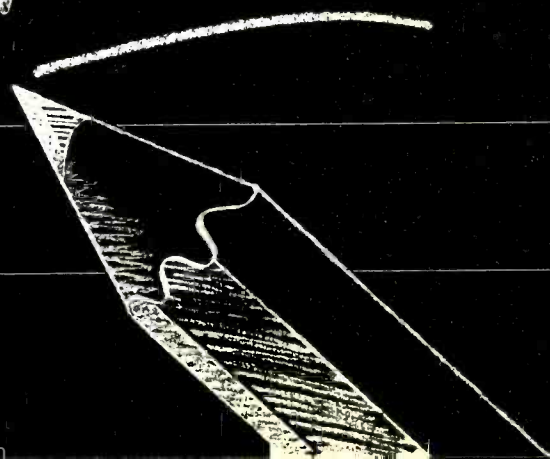
• **Aphex Systems** have announced improvements to their *Compellor* and *Dominator* following the incorporation of the new Aphex *VCA1001* as their dynamics control element. The *VCA1001* has a better audio performance with Aphex claiming a dynamic range of 110 dB and distortion levels below 0.005% at any audio level. The *VCA1001* operates as a class A amplifier at all times therefore eliminating the crossover distortion of class AB and B of other VCA designs. A high degree of temperature stability of all parameters is also claimed.

All *Compellors* and *Dominators* shipped after April 1st, 1988 have the VCAs fitted and Aphex are willing to retrofit existing units at the factory—either complete units or the main audio boards. Costs and further information from Aphex. **Aphex Systems Ltd, 13340 Saticoy Street, North Hollywood, CA 91605, USA. Tel: (818) 765-2212. UK: Sound Technology plc, 6 Letchworth Business Centre, Avenue One, Letchworth, Herts. SG6 2HR. Tel: 0462 480000. Fax: 0462 480800.**

KINDLY NOTE

Studio Spares are moving
to 61/63 Rochester Place,
Camden Town, London NW1 9JU,
on Monday 22nd August 1988.

The move provides customers
with free on-premises parking
and Studio Spares with
6,500 square feet of new
warehouse space.



NEWS

Syncode VMP

Syncode Electronique of Paris have developed a Visual Multitrack Precue system known as *VMP*. This allows instant display on a video monitor of the content of multitrack tapes. Audio from the multitrack together with SMPTE timecode is sent to the *VMP 800S*, which is a 19 inch rackmount processor. This is stored in a solid state memory. On subsequent replay of the multitrack timecode, the *VMP 800S* displays the presence of modulation (recorded sound) on the multitrack tape on the video monitor in the form of different coloured horizontal blocks that move across the screen. This gives 7 seconds of pre-cue-up to the vertical bar that symbolises the tape head. The system will work with any multitrack system that locks to SMPTE timecode.

There is provision for floppy disk back-up allowing high speed copying of the total memory of modulation. There is also provision for an optional computer printout of accurate bar charts.

Systems are available for 8-, 16- and 24-track requirements and there



are apparently various optional extras available. Suggested applications include mixing to picture for film or video.

Syncode Electronique SA, 17 Rue de la Ferme Paradis, 78250-Meulan, Paris, France. Tel: (1) 30.99.69.39.

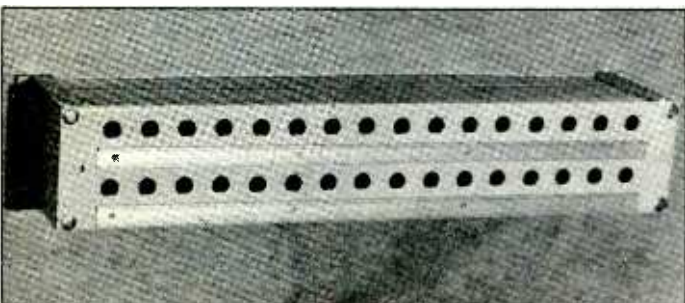
UK: Hutchings Electronics Ltd, 22 Doods Road, Reigate, Surrey RH2 0NL. Tel: 0737 222057. (Also distribute to other English-speaking nations.)

Ossi patch panel

Ossi connectors have just made a low-cost wall-mounted plastic patch panel available. The panel is 2U high and is made of extruded plastic providing good ground insulation. A number of designs for different components will be made including a version for sub-D connectors. Ossi see

applications for the panels where conventional racking is not practical such as within cupboards, etc.

Ossi Connectors Ltd, Unit C2, Priors Court, Priors Haw Road, Corby, Northants NN17 1YG, UK. Tel: 0536 200963.



WaveFrame developments

WaveFrame have continued to make further extensive additions to the *AudioFrame* Digital Audio Workstation. The first addition is the DSP module, which is a general purpose processor that occupies a single slot in the rack and connects directly to the digital audio bus. The module is user programmable and it is software configurable for performing differing tasks such as 24-bit digital mixing with EQ, pan and gain; 24-bit digital effects including reverb and delay; physical sound modelling synthesis and combinations of these functions.

The first application for the DSP module is *DSProcessor* software, which configures the module as a virtual 16-input, 4-aux, 2-output mixer with stereo reverb—each input having input trim, 4-band EQ with two parametric, four aux buses, and subgrouping. The reverb has stereo inputs and outputs with algorithms for Hall, Chamber, Plate, Reverse and others are planned. Controls are for pre-delay, decay, size, gate time, HF and LF decay and effects mix. Effects programs can be stored as presets with disk space being the only limiting factor. This aspect of the system will be developed to include a 16x8 mixer and a multichannel effects processor.

ADC8, an 8-channel A/D converter module provides eight audio inputs on a single card and makes it easy to configure the *AudioFrame* for multichannel mixing and recording. All the inputs are true 16-bit and can be configured for either +4 or -10 dB, balanced or unbalanced operation.

Two new memory modules of 6 Mbytes and 28 Mbytes have been developed to extend the continuous recording time of the Sampling Synthesiser Module to 69 and 370 seconds. With the maximum extension and the internal sample RAM this gives a continuous recording time of over 6 minutes.

The Studio Control Processor Module that also plugs into the rack now has Vertical Interval Time Code (VITC) input synchronisation enabling full operation to picture.

On the software side there has been the introduction of *SoundProcessor*, an enhancement that includes a new user interface, cut and paste audio editing, stereo sampling and *AudioTrigger* for track replacement. **WaveFrame Corporation, 4725 Walnut Street, Boulder, CO 80301, USA. Tel: (303) 447-1572. UK: Syco, 20 Conduit Place, London W2. Tel: 01-724 2451. Fax: 01-262 6081.**

EAW KF600 full range system

The latest addition to the EAW virtual array range of loudspeaker systems is the *KF600* full range system, which provides a constant coverage angle of 60° from 400 Hz to 20 kHz.

The trapezoid cabinet permits precise arrays to be built up in order to provide smooth coverage without hot spots from 60° to 360° horizontal.

The *KF600* is a 3-way system designed for use with the EAW *CCEP* signal processing unit. It can be used as a standalone system or with the appropriate EAW subwoofer in order to extend the low frequency response from 65 Hz down to 34 Hz.

The high frequency section of the enclosure uses a specially-developed horn, the *H641A*, coupled to a high precision 1 inch (2.5 cm) compression driver with titanium diaphragm and edgewound aluminium voice coil.

The mid-bass section is a 10 inch (25 cm) driver loading into a 60° constant directivity horn that is a truncated version of the compound flare and centre displacement/phasing plug technology developed for the *KF850* and ensures flat power

response over the specified coverage angle.

A new concept is the *Bi-Chamber* vented low frequency subsystem. The 15 inch (38 cm) bass driver is mounted in an internal sub-chamber, which is ported through to the front baffle. The cone of the driver radiates into a second chamber, which is slot vented on the front baffle. This in effect provides a vented box within a vented box and gives increased control over the loading of the driver as well as low harmonic distortion and limited cone excursion below system cutoff.

Maximum dimensions of the *KF600* are 33.25x20x19.75 in (whd) and when powered by an amplifier in excess of 250 W/channel can produce an SPL of >130 dB/1 m. The cabinet is laminated birch finished in a black catalysed polyurethane coating, together with a vinyl-dipped perforated metal front grille. Aircraft fittings for flying are also standard. **Eastern Acoustic Works Inc, 59 Fountain Street, Framingham, MA 01701, USA. Tel: (617) 620-1478. UK: Executive Audio Ltd, Kingston-upon-Thames, Surrey. Tel: 01-541 0180**

Panasonic professional R-DAT

Panasonic have introduced two new professional DAT machines. The SV-250 is a portable designed for location recording and weighs less than 3.2 lbs. It measures $8\frac{1}{2} \times 1\frac{1}{8} \times 5\frac{1}{2}$ inches and features balanced XLR-type inputs, peak level metering, headphone monitoring, switch mic attenuation, and 60x high speed search mode. Can be powered from rechargeable batteries, external DC or mains power. A 2.2 hour record capacity is claimed from the rechargeable NiCad battery pack. The record sample frequency is 48 kHz at 16-bit.

The SV-3500 is a studio machine intended for rackmounting, which

has balanced XLR-type inputs and outputs, wired remote control, high speed access and programming functions. Record sampling frequencies are 32 and 48 kHz with the addition of 44.1 kHz for replay. Access time from one end of the cassette to the other is 40 secs approx. Also includes IEC digital interface inputs and outputs. The units are currently being shipped in the USA but at the time of writing there were no announced plans for other territories.

USA: Panasonic Industrial Company, Two Panasonic Way, Secaucus, NJ 07094, USA. Tel: (201) 348-7000.

Valley International Micro FX

Valley International have introduced a new line of signal processors under the name of the *Micro FX* series. All the units use the same circuitry found in Valley's more expensive units although with fewer controls. The range is aimed at cost conscious applications. All the units are half rack width and 1U high.

The *Micro FX* compressor is a single-channel device although stereo linking of two units is possible. There is front panel adjustment for threshold, ratio, release, gain and bypass with LED indication of gain reduction. The unit also features an automatic expander that tracks compressor settings and removes unwanted noise in the absence of compression.

The Attenuator is a stereo unit capable of attenuating +4 dB operating levels to -10 dB or -20 dB levels for proper interfacing of consumer products. Outputs are unbalanced and the two channels may operate independently.

The Booster is a stereo device that will accept -10 dB or -20 dB unbalanced inputs and raise gain, balance and impedance match to interface with equipment requiring +4 or +8 dB operating levels. The two channels may also be used independently.

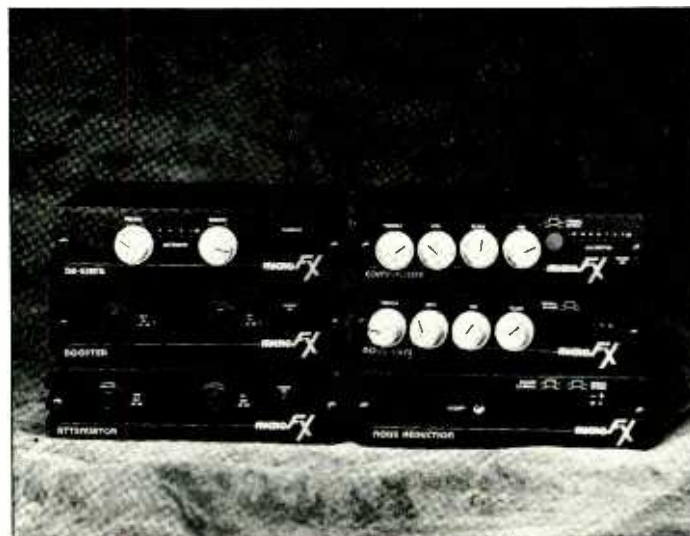
The De-Esser is a single-channel unit with both frequency and sensitivity controls and an LED gain reduction display.

The last of the current units is the Noise Reduction module. This is a single-channel, single-ended noise reduction device and Valley claim up to 30 dB of noise reduction can be attained.

Valley International Inc, PO Box 40306, 2817, Erica Place, Nashville, TN 37204-3111, USA. Tel: (615) 383-4737.

UK: Stirling Audio Ltd, Kimberley Road, London NW6. Tel: 01-624 6000.

International: GEXCO, 317 St Paul's Avenue, Jersey City, NJ 07306, USA. Tel: (201) 653-2383.



Gold Line RT60 meter and headphone distribution

A new portable low cost RT60 meter has been introduced by Gold Line for the measurement of room reverberation. The GL60 has the ability to measure reverb time at six different frequencies—125, 250, 500, 1000, 2000 and 4000 Hz. Gold Line say that there is little need for frequencies over 4 kHz as they are mostly absorbed by atmospheric humidity. There is provision for three sensitivities to allow different

headphone amplifiers in a single rack space with individual stereo level controls, electronically balanced master inputs, a master level control and the ability to provide a common feed to all channels. Each headphone amp has its own separate input that bypasses the master stereo inputs allowing customised monitor mixing. The model HPA-2 features a mic input to allow communication to all six channels. The unit contains the



background noise and room size with measurements being displayed in seconds from 0.1 to 10 seconds in 1/100ths of a second. A microphone is built-in and all that is needed to activate the meter is a sharp handclap. Being portable, the GL60 is powered by two 9 V batteries.

Gold Line/Loft has announced two new 6-channel active headphone distribution systems. Both models, HPA-1 and HPA-2 feature six stereo

necessary logic to allow the use of a mic. Should units be daisy-chained to give more feeds, a talkback logic connector is provided to interface the additional units.

Gold Line, PO Box 115, West Redding, CT 06896, USA. Tel: (203) 938-2588.

UK: Marquee Electronics, 90 Wardour Street, London W1V 3LE. Tel: 01-439 8421.

Equalisers in brief

● **Ashly Audio** have now completed their graphic equalisers line and the GQ series is available in three different versions. The GQ215 features two channels of 15-band $\frac{1}{3}$ -octave equalisation and switchable highpass filter; GQ131 is a single-channel 31-band with tunable highpass filter; and the GQ231 has two channels of 31 bands also with tunable highpass filter. All three models have switch selectable cut/boost of either 6 dB or 15 dB. General claimed features of the range include Wein-Bridge filters and new summing amplifiers to provide a high specification and immunity to magnetic fields, true 'constant Q' response and high slew rate circuitry. **Ashly Audio Inc, 100 Fernwood Avenue, Rochester, NY 14621, USA. Tel: (716) 544-5191. UK:** Sound Technology plc, 6 Letchworth Business Centre, Avenue One, Letchworth, Herts SG6 2HR. Tel: 0462 480000. Fax: 0462 480800.

● **SECA** have launched a new graphic equaliser known as the SE13. This unit can function as a

13-band stereo or 26-band single-channel equaliser, switchable from the front panel. Band gain is ± 15 dB. Other features include 10 dB pad, bypass mode, XLR connectors and the unit is 2U rackmounting. **Aces (UK) Ltd, Featherbed Lane, Shrewsbury, Shrops SY1 4NJ, UK. Tel: 0743 66671. USA:** Power Studio, 13453 Hollo Oval, Strongsville, Cleveland, OH 44136. Tel: (216) 238-9426.

● **Furman** have introduced a new parametric equaliser, the PQ-4, which is described as the successor to the PQ-3. It is a 4-band parametric equaliser with a large gain variation: +20 dB to 'infinitely' deep cut. The design is described as constant Q and there is variation possible up to four octaves. Top and bottom bands are peak/shelving switchable. The PQ-4 has provision for remote switching of EQ, includes a ground lift switch and offers an optional balanced in/output. **Furman Sound Inc, Greenbae, CA 94904, USA. Tel: (415) 927-1225. UK:** Shuttlesound Ltd, London SW18. Tel: 01-871 0966.

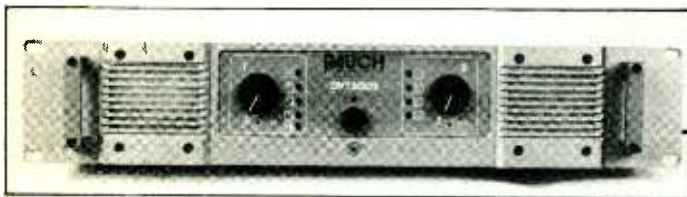
NEWS

Rauch DVT300S

The Rauch *DVT300S* is a compact high power handling amplifier designed with size and weight requirements in mind. It is 2U high and weighs 14 kg. It is capable of delivering 600 W continuously into 4 Ω from both channels or in a bridged mode 1.5 kW into 4 Ω . The design apparently involved scrapping the standard power amplifier design and developing a 1 kW Resonant

slew rate. Cooling is by air blown through an exchanger module into which the power MOSFETs are directly connected.

Inputs are *XL*R connectors, balanced or unbalanced, with RF and DC filtering. The physical construction is robust. Electrical protection circuits are present independently for each channel and there is full LED indication on the



Switch Mode (power) Supply of which there is one for each channel. Rauch describe the RSMS as being an efficient method of supplying power to the amplifier while reducing size and weight.

The amplifier design is a development from the standard Rauch circuitry using an advanced Class A stage driving a MOSFET output stage giving a claimed high

front panel. Front panel level controls can be locked in any position.

Rauch Precision Engineering Ltd,
Blackhill Industrial Estate,
Snitterfield, Stratford-upon-Avon,
Warwicks CV37 0PT, UK. Tel:
0789 731133. Fax: 0789 731075.
UK: Harman (Audio) UK Ltd, Mill
Street, Slough, Berks SL2 5DD. Tel:
0753 76911. Fax: 0753 35306.

EMO Rack Light

The EMO Rack Light is now in full production. Built in a 1U case, light is shone downwards to illuminate the front panels of equipment housed in the rack below it. The case slides in and out on runners and works on the 'fridge door' principle where the light

goes out as the case clicks shut. The light is mains powered and uses 12 V festoon lamps, which are readily available worldwide.

EMO Systems Ltd, Durham Road,
Ushaw Moor, Durham City DH7
7LF, UK. Tel: 091 373 0787.

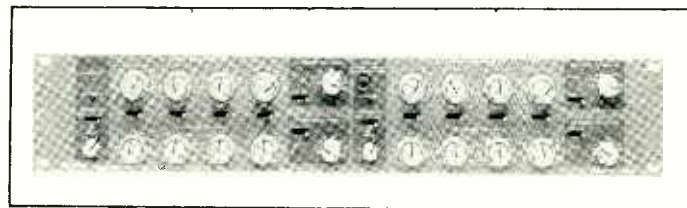


Orban 642B parametric

Orban have announced a new parametric equaliser/notch filter that has been developed from the 622 series. The *642B* features dual 4-band or mono 8-band configurations selectable by front panel switch. Frequency bands can be tuned over 20:1 frequency range with the ranges broadly overlapping. Filters are of a 'Constant Q' design and provide

improved compared to the 622 series with the absolute noise level of the *642B* being better than -90 dBm at the output. The signal path uses no coupling capacitors.

Orban will also be making special versions of the unit—*642B/SP* and *642B/SPX*—with modified filters for special applications such as room and system tuning, speech and forensic



+16 dB boost and 45 dB cut in each band. Bandwidth is variable from 0.29 to 5.0. There is a vernier on each frequency control to allow precise tuning of notches, etc.

There are additional high- and lowpass filters with 18 dB/octave and 12 dB/octave 'Automatic Sliding Besselworth' slopes respectively. Orban say that noise and distortion specifications have been significantly

work where duplication of the lower frequency bands is required giving a format of 80 to 1600 Hz twice and 315 to 6300 Hz twice.

Orban Associates Inc, 645 Bryant Street, San Francisco, CA 94107, USA. Tel: (415) 957-1070.
UK: Scenic Sounds Equipment Ltd, Unit 2, 12 William Road, London NW1 3EN. Tel: 01-387 1262.

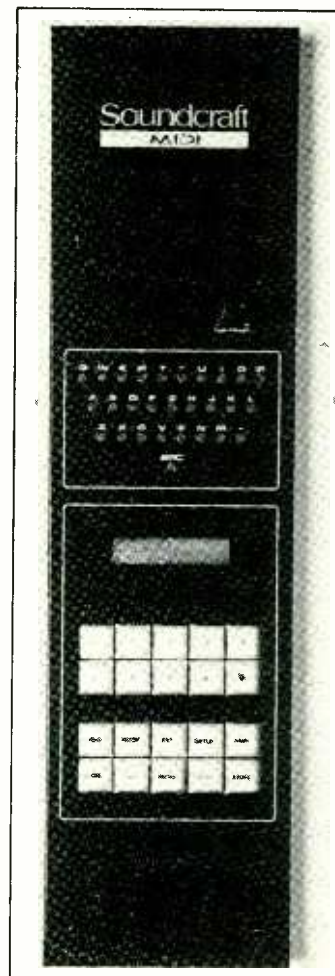
Soundcraft MIDI computer

Shown at the APRS as a module option for the 6000 series consoles, Soundcraft have developed a MIDI computer to provide a versatile mute control system with additional functions. The front panel consists of a QWERTY keypad, numeric keypad, back-lit LCD readout and function buttons. A non-volatile RAM memory can store up to eight songs with each containing 100 patches of complete mute settings. Each song and patch can be individually named with the readout giving all information needed to operate the computer.

Operation has been kept simple with only store and system reset commands needing more than one key command. Any arrangement of channel mutes and extra MIDI effects patches can be stored or copied and recalled in any order or sequence. Within the context of a MIDI facility linked to a sequencer, mute settings are recorded automatically as they are made at the correct moment within the sequence.

Soundcraft Electronics Ltd, Unit 2, Borehamwood Industrial Park, Rowley Lane, Borehamwood, Herts WD6 5PZ, UK. Tel: 01-207 5050.

USA: Soundcraft Electronics USA, PO Box 2200, 8500 Balboa Boulevard, Northridge, CA 91329. Tel: (818) 893-4351.



The workstation



Studer A812 – the efficient new workstation for the hectic broadcasting environment. It is remarkably rugged, fast, and user-friendly. All controls can be programmed from a menu of over 40 functions. This saves time, soothes nerves, and provides flexibility for future applications.

To keep up with your often frantic pace, the A812 function menu offers four “true” dump edit modes, three rollback/locate start sequences, four fader start modes, four record/play speeds, winding speeds from 1 to 12 m/sec, library wind, and three vari-speed display formats, plus shuttle control, microprocessor control of all transport and audio functions, phase compensated audio electronics, and ...

As if that weren't enough, the A812 has a spacious and practical editing section.



STUDER INTERNATIONAL AG

Althardstrasse 10, CH-8105 Regensdorf

Sales Offices:

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 **Stirling**



VERSAILLES STATION

Despite its appearance as a ruined Greek temple, Versailles Station is located in France. Terry Nelson talks to owner/engineer Philippe Besombes

Louis XIV's idea that Versailles would be a good place to go to get away from the hubbub of Paris still holds true today. The town retains its sleepy character (in spite of invasions by tourists) although it has been 'rediscovered' by antique dealers and is becoming rather fashionable. However, studio owner/engineer Philippe Besombes tends to start trends rather than follow them, and has had a recording studio in Versailles for over 15 years.

It could be said that Besombes' career in audio started with a bang at the tender age of eight years. "I plugged one of my father's loudspeakers into the 110 volt mains out of curiosity—the result was quite interesting!"

In common with many engineers, he was first a musician in the swinging '60s and played guitar and keyboards, "However, I have to say though I like guitars, they don't like me! As well as being a rock'n'roller, I was also interested in experimentation with contemporary music and this was quite a spur for me."

Parental disapproval of his musical activities and leanings toward the studio world decided him to pursue, "serious studies in parallel with my studio work and I obtained my PhD in Chemistry at Oxford. My parents were then happy that I had proper qualifications and I was able to go away and do what I wanted!"

The '70s saw Besombes involved with sound reinforcement for contemporary music luminaries such as Xenakis and Stockhausen and by his own admission was tough. In 1975 Besombes put together the basic idea for Les Studios du Chesnay in Versailles.

The Studios du Chesnay were to develop into a group of franchised studios across France, identical in design and equipment, that would work together as a team rather than as competitors. The system was started in 1982 and at present there are studios in Versailles, Nantes, Strasbourg and Lyon.

"The studios are put together with local finance and we assure a maintenance and commercial service. Clients can change from

one studio to another as they wish and find identical working conditions. Though all called Studio du Chesnay, each one is pretty much independent and just pays a royalty on turnover to the central company.

"As far as I know, no one has copied this idea and it certainly seems to work very well."

Philippe Besombes put the basic design together for the Chesnay studios and equipment at present is a Saje *Odyssey* console with Otari *MTR-90* multitrack and Studer master recorders. Outboard equipment is from Lexicon, Yamaha, Drawmer, UREI, Audio+Design, etc. Monitoring is Altec 604s with BGW amplifiers.

In the same building Versailles Station was built.

"We have been in this building for about the last 15 years and since the opening of the first Studio du Chesnay, the possibility of a second studio had been at the back of my mind. The room was there but it would need a lot of work and modification to the building so the project had to be put on hold until the time—and finances—were right."

The studio building is in the old part of Versailles and dates back to the 17th century and though access is directly from the street outside, traffic noise is hardly a problem.

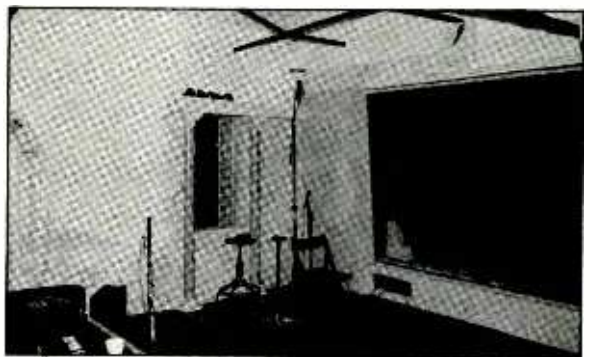
"When this house was built there was no particular plan, which means that floors are at all levels, stairs were an afterthought, etc. However, the walls are 60 cm (2 ft) stone so the outer shell is solid.

"When we came to build Versailles Station we had to do a lot of demolition inside the building and this brought to light features of the original building that had been covered over, such as some very nice wood beams (which are now a striking feature of the studio office upstairs)."

The new studio is more or less at ground level and both the control room and studio feature complex float floors and floated walls built out of Gypsum board.

"Though traffic-borne vibration is not really a problem, I did not want to take any chances, which explains the floor construction. This has been built up with heavy beams placed on the foundation floor and floated on rubber, the spaces were then filled with Rockwool and the beams covered with sandwich layers of Gypsum board and heavy-grade chipboard. The final finish was moquette for the studio and a non-slip rubber floor for the control room."

Once the isolation treatment was installed, the control room acoustics were pieced together bit by bit.



"I wanted to have an overbridge for the outboard equipment and had already decided on UREI *813B* monitors. Once the basic shell was done, we installed an iron frame to house the speakers and provide the main support for the racks. Once the monitors were in position we set up a realtime analyser and checked our progress with each step of acoustic treatment.

"One thing I was certain about—I did not want to see any wood in the studio! I get the impression that all the control rooms in New York look like Swiss chalets. Anywhere wood was used, it had to be painted to blend in with the surroundings rather than stand out."

The finish is mainly moquette with traps in front of the monitors in the overbridge and in the ceiling, which is faced like a slat absorber. One noticeable feature is a large mirror at the back of the room.

"The final readings showed that the carpet finish was deadening the sound too much above 2 kHz. The actual balance sounded alright but the room needed a bit more life. The idea of putting some glass in came up somehow so we put it in to try it

and it worked out fine! Theoretically it should cause all sorts of problems but in practice it was just what was needed.”

While monitor/overbridge assemblies can be useful in that they allow you to listen directly to effects treatment they are notoriously difficult to install without getting all sorts of phase problems. The installation at Versailles Station features quite a sharp angle and follows the inclination of the monitors. The trapping avoids console to ceiling ‘splash’ and the sound is remarkably consistent whether sitting down or standing up—as well as having good stereo imaging.

The control room is 45 m² and this puts the rear wall far enough back—coupled with the angle of the monitor bridge—to be out of direct line-of-fire from the monitor horns.

“The acid test is always ‘does it sound more or less the same outside the studio than in?’ and so far we haven’t had any abusive phone calls from clients complaining about the sound!”

The complete monitor/overbridge assembly houses the two UREI 813Bs, two Sony KX20 video monitors and most of the outboard equipment. A rack has also been mounted between the right monitor and the wall to house a U-matic recorder and Sony 701, Adams-Smith Zeta 3 synchroniser, Technics M222 dual cassette deck, etc. This leaves the floor area uncluttered with just one free-standing rack against the right wall housing a Studer A67 master recorder and Revox A77 for copies.

Recording centres around an SSL 4056 frame equipped with 40 channels and *Total Recall*, and a secondhand 3M DMS digital 32-track recorder. Why 3M?

“Quite a lot of reasons, really! There are quite a lot of Paris studios equipped with 3M and this means that there are also some very competent service engineers. The studio that our machine came from kept it very well maintained and we ensure that this is kept up. Having 3M also means that we are compatible with most of the top studios in Paris as far as ‘roving’ clients are concerned.

“The deciding factor was that the 3M sounds good—certainly the best of the digital machines, in my opinion. I really was looking for a machine to bridge the gap until multitrack hard disk recording becomes viable and I was reluctant to buy a new machine that I might have to change in a short period of time.”

Outboard equipment at Versailles Station includes reverberation and processing from Lexicon, AMS, Yamaha, Roland and virtually the whole Eventide range including some vintage *Instant Phasers* and *Flangers* (“somehow you just don’t get the same sound with the modern processors—I love them!”),



gain reduction from UREI and Drawmer and “very violent equalisation” from Audio Log parametrics (of French origin and no longer manufactured).

Secondary monitoring is Yamaha NS10s powered (as are the UREIs) by a Studer A68 amplifier.

Though the Studios du Chesnay are in the same building, they are run completely separately to Versailles Station. However, the two control rooms are wired together in order to run the 24-track Otari with the 3M using the Zeta 3.

“The Adams-Smith can be patched to run as an audio/audio synchroniser or as audio/video when we do A/V productions.”

One of the most striking aspects of Versailles Station is the studio area: 45 m² and a maximum height of 6 m, the decoration is in the style of a ruined Greek temple on top of a mountain with painted walls enlarging the room with false perspectives.

As well as the wall paintings, there are columns and sections of wall built out of *Siporex*, a kind of light (but hard) concrete made from a mixture of aluminium and silicon. Inside the ‘temple’ is a large isolation booth, open at the front, which can

be used for drums, etc, and at the time of my visit was housing several Marshall stacks belonging to a heavy metal band.

A lighting grid has been built into the ceiling for video shooting—the decor has proved quite popular for this—and as well as standard lighting, ultraviolet lamps are especially effective at night: “You can create some very attractive sunset effects with UV!”

Daylight is very much a feature here and both the control room and studio have windows looking out on to the street: “We find that clients like to look out of the window—they feel more at home and less hemmed in by the studio environment. We do have blinds that can close off the windows if required but we find more often than not that the windows are left ‘open.’”

The windows also include a large skylight in the studio ceiling and this can be closed off by a motorised blind assembly.

“In 1987, opening a studio equipped with SSL and 32-track digital was hardly going to be earthshaking—that already existed in Paris in numerous studios. What had to be different was the atmosphere and style—either homely in order to make people feel comfortable or different enough as to incite creation. The other thing that I felt was important was to hide the technical side of things—not push it in front of people. If you are a professional studio, the clients expect you to be properly equipped so you don’t have to thrust it in front of them, which is why the control room is so low-key.

“We generally find that first-time clients to the studio are quite surprised at first and then happy to be in a different environment to what they are normally used to.”

The studio is quite live without being resonant, which is hardly surprising as no two walls are parallel to one another. The control room window is very large, thus ensuring good visual contact but avoiding the ‘goldfish bowl’ syndrome. A red lightning flash above the window provides an appropriate ‘Recording On’ lamp.

“Some people find this amusing and make various jokes about it—usually involving bum notes and what will happen if you play one! However, some musicians freeze up at the sight of a red light so we can disconnect it when required.”

Microphones are from Neumann (including some valve models), AKG, Sennheiser, Shure and Beyer and the studio is fully wired for MIDI and SMPTE for use with synthesised systems.

“We are in the process of looking into our own MIDI system but the problem is that there seem to be new products every week so it is difficult to make a decision! However, we do have an Atari 1040 computer, which a lot of musicians seem to use with MIDI setups.”

Foldback in the studio is a Koss infra-red headphone system. “In general this is very popular and we can, of course, plug in normal headphones. However, musicians have said that they like the mobility of the infra-red system and not being attached to a headphone socket. The only disadvantage we have found so far is that the actual headphones don’t sound as good as they should and we are in the process of improving them with Beyer DT100 inserts.”

Versailles Station opened its doors in May of last year “and has been doing very well since. It is clear that having the SSL has brought in business—you have to have one in France if you are going to get the work—and the next items on the shopping list will be the extra input modules to fill out the console.

“The work we are doing now is starting to fall 50/50 into records and film music/video sync. However, I don’t want the A/V work to exclude the recording side of things, even if it is lucrative. To put it another way, I don’t want to abandon music! “Though it may sound corny, I really do live for music and rock’n’roll and it is important for me that I am not just a studio manager but also an engineer. You have to keep in touch with what is going on and the best way to do it is to keep on doing sessions.”

Recent productions at Versailles have included Luc Ferrari who is loosely described as a “contemporary musician who uses pop production techniques and the results have been very successful”.

Though not residential, the studio can book accommodation in 2 to 4 star hotels and Versailles itself boasts a selection of restaurants to tickle the most jaded palates. □

Versailles Station, 6 rue Maziere, 78000 Versailles, France. Tel: (1) 39.53.54.10.

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London Office: AMEK at HHB, 73-75 Scrubs Lane, London NW10 6QU. Telephone: 01-960 2144



NEWS



Sony's new digital editor

Sony recently launched their new DAE-3000 digital audio editor at the Hyatt Sunset, West Hollywood. Introduced at NAB, the new editor replaces the DAE-1100A, and is designed to save the user both time and labour in CD master tape

production.

Pictured with the DAE-3000 are (left) Carey Fischer, Sony national sales manager, with Mike Sekiguchi, product manager for digital audio products.

People

- James M Frische has been appointed president of the **Digital Audio Disc Corporation**, Terre Haute, IN. Frische joined DADC in 1983 and supervised design, construction and staffing of the facility, which opened in mid 1984. DADC has a monthly pressing capacity of six million discs making it the US's largest CD manufacturer.
- Mike Julian has become public affairs director of **Grove School of Music**, North Hollywood. Julian has been on the school staff since 1981.
- Marty Blanchard has been appointed senior market research and planning analyst at **Ampex Corporation**, California. Blanchard has been with the company since 1969 and will now be responsible for co-ordinating long range planning and tracking industry activity and trends. She is also chairperson of the International Tape/Disc Association's blank tape committee.
- **Squires Productions** have named

Chris Cassone as chief engineer/producer at their White Plains, NY, audio and video production HQ. He was previously owner and operator of the Reels On Wheels mobile. The company have also appointed Donna Gibbons as account executive overseeing new client projects.

● Janet Stark Krick has joined **CD Studios** of San Francisco as studio manager. She was previously manager of Banquet Studios, Santa Rosa, CA. Former manager at CD, Gary Hobish, has been retained as chief engineer.

● Mike Joseph has been appointed pro-audio market development manager for **Electro-Voice**. He was previously sales manager and installation director for Black Boxes of San Francisco.

● Engineers Corby Luke and Rhonda Bruce have joined **Comfort Sound Mobile** of Toronto, Ontario.

Canadian audio research project

A number of leading Canadian audio equipment manufacturers have joined forces with the National Research Council to develop the science and technology that will lead to a new generation of audio products.

Arrangements are being finalised for consortium members to share in the financing of a projected three year multi-million dollar R&D project, called The Athena Project. Members include Adamson Acoustic Design, Axiom Audio, Calnet Electronics; PSB Loudspeakers, Oracle Audio, Paradigm Electronics, State Of The Art Elektronik Inc, and others.

Dr Floyd Toole, of NRC's Division of Physics, said that the objectives of the consortium are to develop

techniques and devices necessary to control variations in sound caused by the lack of standards for loudspeakers and control rooms. Digital signal processing will be used to examine the perceptual importance of various elements of the sound field in a room, which will help define the electronic and acoustical signal manipulations needed to minimise unwanted variations in sound quality and stereo imaging.

The work will be done at NRC facilities in Ottawa, already extensively used by several Canadian loudspeaker designers and manufacturers.

National Research Council, Ottawa, Ontario K1A 0R6, Canada. Tel: (613) 993-3041.

In brief

● Alpha Audio have reported much interest in **Sonex** foam following the decision of the Advisory Committee of NAMM to limit noise levels during the NAMM show to a maximum of 85 dB.

● David Henderson, manager of **Pro Audio Associates**, has won RAMSA/Panasonic's Eastern Regional Representative of the Year award for outstanding personal effort and co-operation.

● **Ampex** Golden Reel Awards have been made to The Whispers for their album *Just Gets Better With Time*, recorded at various studios. A similar award was presented to Doug E Fresh for hit single *The Show*, recorded at Planet Sound and Rawlston Recording, New York.

● Various users of the **Fairlight Series III** have won major industry awards for music which involved use of instruments. Narada Michael Walden won the Grammy for Producer Of The Year for work with Whitney Houston, George Michael and Aretha Franklin, and has recently written the theme music for the Seoul Olympics. Composer James Horner the Song Of The Year award for co-writing *Somewhere Out There*

from the film *An American Tale*, while Ryuichi Sakamoto and David Byrne received the Academy Award for Best Soundtrack for *The Last Emperor*.

● **Hybrid Arts Inc** have finalised an agreement with the Sound Editor's Union of Hollywood that confirms the Hybrid Arts *ADAP Project* as the standard computer editing equipment for all film and sound editors in Hollywood. A training programme for the *ADAP* has been established for all the union's members to take part in.

● **Kewall Tape Duplicators** of Bay Shore, New York have added new realtime cassette decks to their facility making 50 in total, and also expect to be on line for mass video duplication by late October.

● **The Professional Film and Video Equipment Association** (PFVEA) have helped manufacturers and dealers recover large amounts of stolen production items. For information on this and other services, contact West Coast Vice-President Grant Louckes, Alan Gordon Enterprises, 1430 Cahuenga Blvd, Hollywood, CA 90078. Tel: (213) 466-3561.



Pro-Audio Associates' David Henderson receives Ramsa award

NEWS

Contracts

- **TimeLine** have announced the first deliveries of the new *Lynx* Keyboard Control Units to audio post-production facility Intersound in Los Angeles and to the audio sweetening rooms of AME in Burbank. Both units were supplied through TimeLine's dealer Audio Intervisual Design.
- White Crow Audio of Burlington, VT have completed installation of a GML Servo Automation System on their Neve 8068 console.
- JBL International, distributors for **Soundcraft** have announced sales of two *Series 8000* sound reinforcement desks to Trinity Broadcast, Irvine, CA. Other recent clients include Reliable Music of Charlotte, NC, Club Casino of Hampton Beach, NH, and rental company Sound Southwest.
- Post-production facility Sound One of New York have supplemented their inventory of **TimeLine** products with the addition of six *Lynx SAL* Timecode modules and two film modules. TimeLine have also supplied three *Lynx Video Systems Interface* modules and one film module to Digital Magnetics of Santa Monica, CA.
- Century III production facilities will install two *CMX 6000* laser disc-based editing systems and an *ODC 610A* videodisc recorder at its Boston, MA headquarters. The company have

also been commissioned to build and operate a new facility featuring similar equipment for MCA/Universal in Orlando, Florida.

- **Ampex Corp** have entered into their fourth two-year agreement with MTM Productions Inc of Los Angeles as exclusive supplier of professional audio and video tape products.

- The University of Miami have installed a **Sony MXP-3036** automated mixing console and two *APR-5002* recorders in their studio at Gusman Concert Hall. The equipment will be used by 100 music engineering students on their own sessions as well as to record recitals.

- **Electro-Voice** have supplied a variety of sound reinforcement equipment to Saskatchewan Place in Saskatoon, Canada, a new trade and sports centre. The equipment includes 20 *PI-100* 12 inch 2-way full-range speaker systems; 15 *SH-1810* 18 inch 3-way systems; three *MTH-4* and one *MTL-4* high output Manifold Technology systems; 73 *Musicaster 100* speaker systems with *TR* transformers; four *RE11* and two *DO56L* microphones; and one *8108* portable rackmount mixer for press and house use. Acoustic and sound systems design was by Barron Kennedy Lyzun & Associates Ltd of Vancouver, and installation was by Adams Soundtronics Ltd of Regina, Canada.

Forthcoming events

- **Technical Excellence and Creativity Awards**, November 3rd at the Biltmore Hotel, Los Angeles,

CA. For information call Hillel Resner, at Mix Publications on (415) 653-3307.

Otari new HQ

The Otari Corporation have moved into their new headquarters in the Vintage Park Development at Foster City, California. The facility houses 34,000 ft² of combined office and warehouse space, as well as a new acoustically designed listening room, customer training facilities and a special test room for the laser based Thermal Magnetic Video Duplicator (TMD).

John Carey, Otari's marketing

manager said, "We've grown to nearly 60 employees, added three regional offices in New York, Nashville and Chicago, and substantially expanded our markets. Our new headquarters will facilitate our current and anticipated future growth."

Otari Corporation, 378 Vintage Park Drive, Foster City, CA 94404. Tel: (415) 341-5900.

Logical AMS sale

Following its introduction at the 1988 NAB Convention, the first order for the *AMS Logic 1* modular digital console was made by Szabo Tohtz Studios of Chicago. Studio owner Jack Tohtz placed the order with AMS/Calrec area representative Douglas Ordon and AMS's Stuart Nevison.

AMS Industries have also recently appointed a network of organisations who are factory appointed representatives for the *AMS AudioFile* hard disk recording, editing and playback system, following the opening of the company's own US office earlier this year. Each company owns an *AudioFile* system and can provide a

demonstration by appointment.

AMS Industries Inc, 3827 Stone Way North, Seattle, WA 98103. Tel: (206) 633-1956.

Representatives: ● Douglas Ordon & Company Inc, 230 East Ohio Street, Suite L-02. Chicago, IL 60611. Tel: (312) 440-0500. ● Harris Audio Systems, 1962 NE 149th Street, Miami, FL 33818. Tel: (305) 944-4448. ● Harris Sound Inc, 6640 Sunset Boulevard, Suite 110, Hollywood, Los Angeles, CA 90028. Tel: (213) 937-3500. ● Studio Consultants Inc, 321 West 44th Street, New York, NY 10036. Tel: (212) 586-7376. ● Valley Audio, 2821 Erica Place, Nashville, TN 37204. Tel: (615) 383-4732.



Jack Tohtz with Stuart Nevison and Doug Ordon confirming AMS/Calrec Logic 1 order

NED leasing

New England Digital have introduced a third party leasing programme through Terminal Marketing in New York. According to NED the move makes use of the *Synclavier* and *Direct-to-Disk* systems an affordable reality for small and medium sized studios.

Terminal Marketing has over 12 years experience leasing high end capital equipment to the audio and video recording marketplace. They already represent many other well-known names in the industry as well as servicing over 250 recording facilities throughout the US.

Agencies

- **Soundtracs plc** (UK) have announced a joint venture with Samson Technologies Inc for the sales and marketing of mixing consoles in the USA. Samson Technologies Corp, 485-19 South Broadway, Hicksville, NY 11801. Tel: (516) 932-3810.
- UK company **Paul Farrah Sound**

have established a rentals office and warehouse headed by Ish Garcia at Torrance, near Los Angeles, CA, with a variety of equipment available for theatre, broadcast, conference and product launches. Paul Farrah Sound, 913 West 223rd Street, Torrance, CA 90502.

Making the Most of Midi

Silver Eagle Inc have just released an instructional video under the title of *Making the Most of Midi* with Marc Mann, a musician and computer expert. Along with a brief history and basics there are sections on MIDI devices, using MIDI and the language of MIDI. The tape has a

running time of 60 minutes and Silver Eagle say that it has been approved and endorsed by the International MIDI Association.

Silver Eagle Inc, 6747 Valjean Avenue, Van Nuys, CA 91406. Tel: (818) 786-8696.

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BARRY FOX'S BUSINESS

Each year, in the balmy days of mid May—when Britain now gets a brief summer—the barmy

brown goods industry holds its spring consumer electronics trade show. The brown goods name tag is a hangover from the old days when cookers and fridges were always white and record players and TV sets were a jolly faeces colour.

Similar shows are held all round the world. They give manufacturers the chance to show off their latest wares and dealers the chance to order what they will stock for Christmas. Most countries stage a single show under a single roof, often stimulating consumer interest by opening the doors to the public after a couple of days of trade-only dealing.

Not so Britain. The 'brownies' hire hotel suites dotted inconveniently across London. They then play games to entice the trade and press to visit them. Food, booze, pretty girls, prize draws, days at the races, trips to the theatre, special deals... And gimmicks.

This year Sharp showed a remote control handset for a video recorder which talks to the user with a computer-synthesised voice.

"Now press button A," a Dalek-like voice tells someone who is trying to set the video recorder to tape a TV programme for later viewing.

Very clever but what's the point?

"Well there's is a big market for blind people." said the demonstrator after only a moment's thought.

Specialist record company Mobile Fidelity, now based in Petaluma, California, has always had an eye for something different. Ten years ago Mobile was recutting and re-pressing major title vinyl recordings previously issued by the major record companies. Under licence from Capitol, Stan Ricker re-cut The Beatles' *Abbey Road* at half speed with an Ortofon head. This was then pressed on 'Super Vinyl' sourced from JVC in Japan. JVC had originally developed both the cutter and the vinyl to cope with the high frequency carrier needed for the CD-4 quadrasonic system. Mobile guaranteed not to exceed 200,000 copies of any release, to ensure

good pressings from crisp stampers.

Limited Edition releases included titles by George Benson, Eric Clapton, Neil Diamond, Pink Floyd, Supertramp and Herbert von Karajan. The records came in heavy protective packaging, with a technical description of half speed cutting and the warning that Mobile did not de-horn the metal parts, in order to prevent damage to high frequencies and transients. So the user had to play the disc several times with the stylus acting as a polishing tool, to eliminate random pops and clicks, brushing before and after each play.

Even in those days, the discs cost at least £10 each but hi-fi buffs couldn't get enough of them.

Came CD and Mobile came up with something completely different, *Mr Drums: Buddy Rich and his band live on King Street, San Francisco* is a double album CD taken from the soundtrack of a video spectacular shot with a 7-camera set up at the King Street studios sound stage in San Francisco.

The session was covered by around 20 mics, mostly PZMs, but mixed straight down on to 1610 stereo through a Yamaha desk with flavour of the month *BBE 202* equaliser. Makers Barcus Berry Electronics of California claim with typical US modesty that it 'puts the clarity and sparkle back into amplified and recorded sound', by splitting the signal into three frequency bands (DC to 200 Hz, 200 Hz to 1.25 kHz and 1.25 kHz to 20 kHz) and applying phase correction and amplitude control to correct the phase and amplitude distortion introduced at the interface between an amplifier and loudspeaker by non-linearity in the voice coil.

Producer Gary Reber also used another gadget, which never had the chance to achieve flavour status—an SQ Tate encoder.

SQ and Tate? Those with long memories will also recall that the original CBS SQ quadrasonic system was criticised for its poor positioning of instruments across the sound image. The Tate decoder chip steers sounds to improve positioning. Dolby Labs have used the Tate decoder for cinema surround-sound.

The Mobile CD sleeve note tells how SQ and Tate 'achieve a spherical and 360° symmetrical sound field' and recommend that the recording be played through a 'modern SQ decoder and 4-channel audio playback system'. But recognising the bare fact of life that only a handful of

listeners will have an SQ decoder and 4-channel system available, they add the old rider that 'the soundtrack is fully compatible with every audio playback system—mono or stereo'.

Now Mobile is up and running with a new idea—gold-plated CDs that sell for between \$25 and \$35 each. Why plate with gold instead of the normal aluminium? Mobile claims that gold-plated discs sound better and last longer.

"Our custom pressing plant in Japan, Ultech, is mainly involved in making ROM discs. They are interested in long life and error-free discs, and have carried out rigorous testing," says Mobile, "and the claims hold up. Also we are now getting reports of conventional aluminium discs which have oxidised after three or four years."

Mobile already has eight gold CD titles out, by Pink Floyd, Joe Jackson, Supertramp and Huey Lewis and should have around a dozen titles by the end of the year. Plating is in 24 carat gold, which ups the price but Mobile reckon the \$35 being charged by some shops is unnecessarily high.

By coincidence, I was recently at a seminar run by Technics, the hi-fi division of Japanese company Matsushita. Tadashi Abe, manager of Technics CD player division, had obviously heard about the Mobile gold discs and taken advantage of the fact that Technics has its own CD pressing plant, which is also involved mainly in making ROM discs.

Abe experimented with a range of different metal coatings instead of aluminium. Nickel plated satisfactorily but won't reflect laser light—so a nickel CD doesn't play. Platinum might be ideal but the temperatures needed to vapourise the metal are so high that it destroys the plastics. Both gold and silver plate successfully and the discs play. Abe believes his is the first silver-plated disc ever made.

To check sound quality he recorded the same piece of music (*On The Trail* from Ferde Grofé's *Grand Canyon Suite*) on three discs, one plated with aluminium, one with gold and one with silver. All the discs were made by the same sputtering technique. Error rate was the same for each disc, at less than 20/second, each with random distribution.

When the three discs were played to an audience of hi-fi journalists, no-one could hear any difference. The big question, of course, is what will happen after a year or two.

Philips Du Pont Optical has already answered critics of CD, by pledging that polycarbonate plastic is a very stable material and there is no risk of degradation. But in giving the reassurance on polycarbonate stability, PDO gracefully skates round the question of aluminium stability.

If Technics find that the error rate on the aluminium test disc increases with age faster than the gold and silver samples, the implications could be horrendous. There has already been a 'laser rot' scare on video discs, when bad batches of the glue used to stick double-sided discs together let oxygen through to degrade the reflective layer. The discs became useless. Laser rot is supposedly now a thing of the past and there has been no documented evidence of degrading CDs.

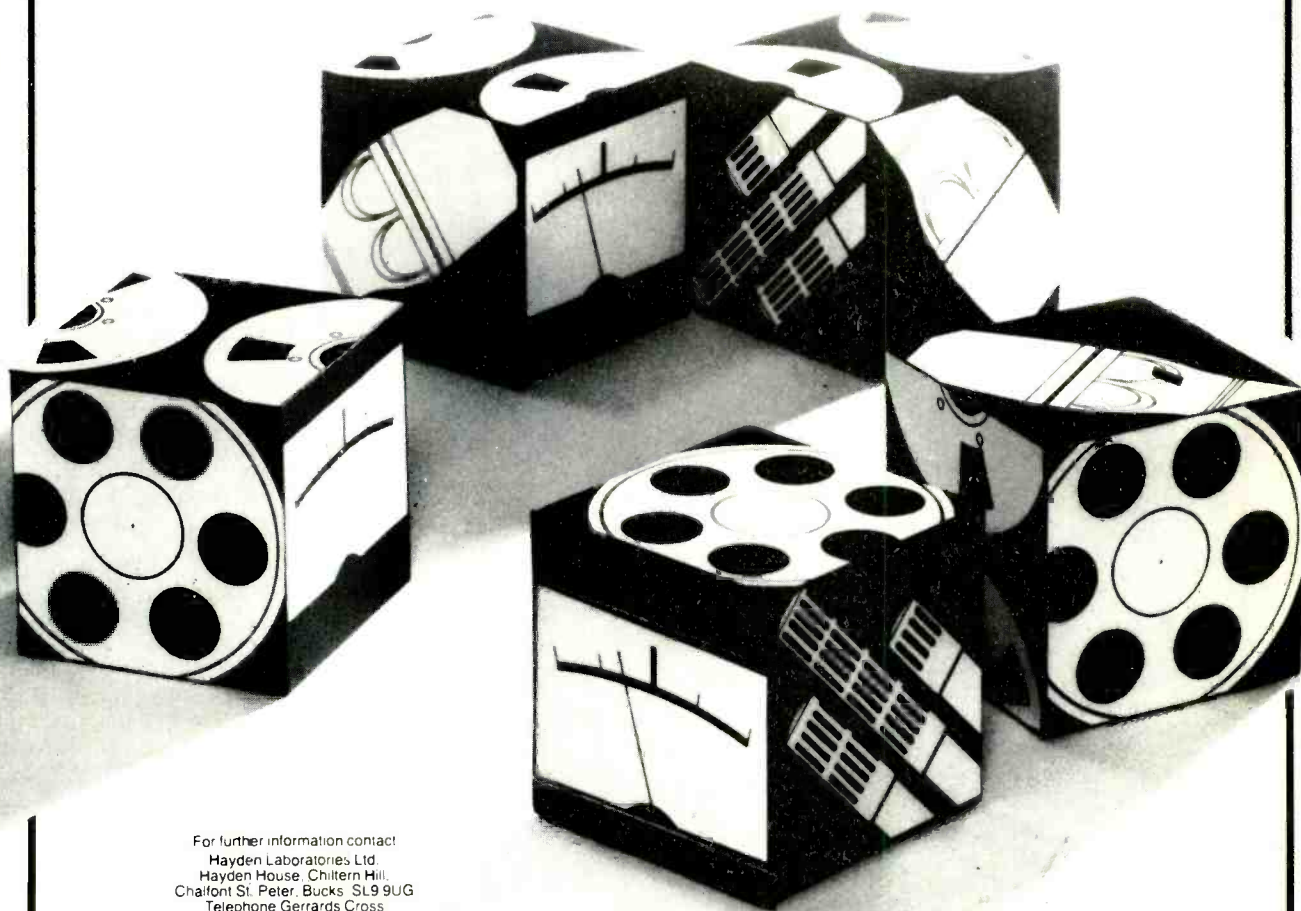
But whereas video disc is an analogue system, which shows degradation as it advances, CD is a digital system, with circuitry in the player first correcting and then concealing errors as they progress. Technics owes it to the industry to keep checking those discs for any increase in error rate. Technics also owes it to the industry to publish the results of those tests, for better or for worse. □

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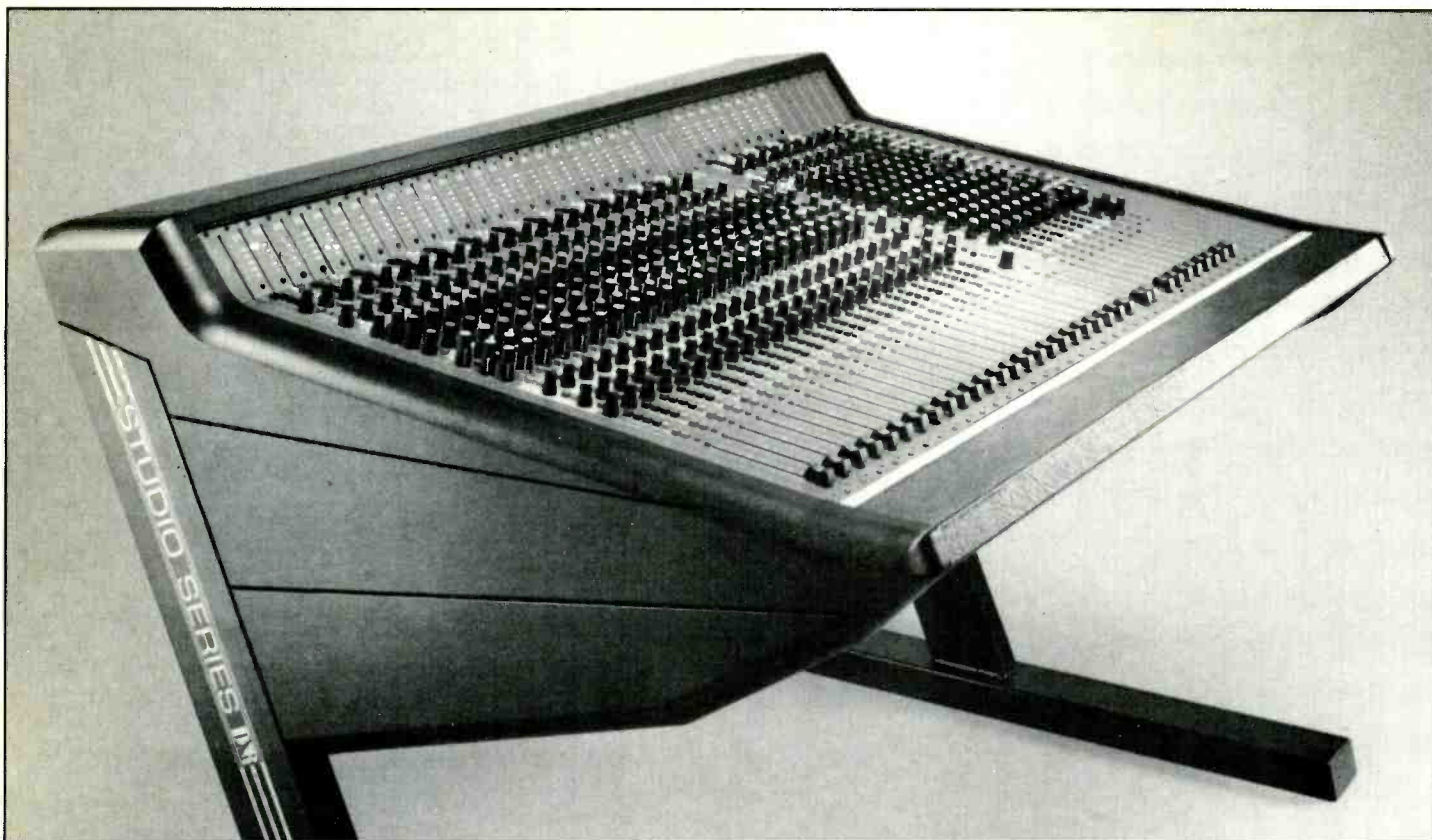
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- An overview of Dayner series features.
- Complete flexible custom design, based upon split or in-line format, or combination of both.
- 48 volt phantom power, switchable individually per channel.
- Discrete transformerless RF-shielded and balanced mic inputs with input pad, trimpot, and phase reversal switch.
- Selectable inputs (line/mic/tape on in-line module and mic/line on split I/O module) accommodate both +4 dBu and -10 dBV levels.
- 4 band EQ with high and low shelving and two sweepable midbands, switchable in/out, with split eq function on in-line module.
- 8 aux send busses pre/post assignable and switchable from either channel or monitor signal path on in-line module.
- Innovative and flexible Floating Subgroup System

(FSS), making subgroup routing to any channel simple with a minimum of switches.

- In-place soloing/pfl and mute switches on in-line and split modules, with led indicators.
- PFL and mute switches on Tape/Effects Return module with led indicators.
- Tape/Effects Return modules accommodate 4 separate balanced inputs simultaneously.
- Prefade insert points on each input.
- Simultaneous multitrack feed outputs for +4 dBu and -10 dBV.
- Master section with 13 segment peak reading bargraph meter and low distortion calibrated oscillator.
- Mono monitor switch, 2 track select switch, and SOLO to PFL switch.
- All connections via XLR and 1/4" ring-tip-sleeve jacks.
- The Dayner series offers more inputs in less space than any other console. Up to 56 modules (112 mix inputs) in less than 1 meter and 80 cm.

If you prefer the traditional split format, the innovative in-line format, or both call the D&R sales/service distributor in your area for a little free consultation or call us at (--31) 2940 18014.

FACTORY/HEADOFFICE.

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

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Phone (817) 5481677, Fax (817) 277 6066.

U.K. OFFICE.

D&R (UK) LTD, 5 Fulmer Drive, Gerrards Cross, Buckinghamshire, SL9 7HH, U.K.,
Phone (0753) 884319, Fax 0753 889133.

GERMAN OFFICE.

D&R Electronica GmbH,
Steinkaulstrasse 21,
D 5100 Aachen,
Phone, 0130-810078
TLX 0031 18503 dr nl,
Fax 0031 2940 16987.



AUSTRALIA, AUDIO&RECORDING, 2019 Sydney, 36-38 Daphne St Botany phone: (02) 6669935. AUSTRIA, KUNL & WURZER, A 4020 Linz, Waidegstrasse 68, phone: 732668125. BELGIUM, ASE pvba, 2800 Mechelen, Kon. Astridlaan 216, phone: 15 421152. CANADA, J-MAR, M4H 1E9 Ontario, 6 Banigan Drive, Toronto, phone: 4164219080. DENMARK, P.S.S. 2200 Kobenhavn n. Aboulevarden 38, phone: (01) 390037. FINLAND, SAH-KOLIKKEIDEN OY, 01301 Vantaa 30, P.O. Box 88 Sahkometsa, phone: 908381. FRANCE, METTLER AUDIO, 75009 Paris, 1-3-5 Blvd de Clichy, phone: 148782911. HONGKONG, JOLLY SOUND Ltd, Tower B, RM 1214-1215, Hungghom comm. centre 37-39, Ma Tau Wei Rd KLN H.K., phone: 36202025. ICELAND, SAMSTARF, P.O. box 1197, 121 Reykjavik, phone: 354153055. ISLD. CANARIAS, MUSIC ACCORD, S. Cruz de Tenerife Puerta Causeco 35, phone: 22-289506. ITALY, PROFESSIONAL EQUIPMENT SRL, 20142 Milano, Viale Famagosta 37, phone: 02-817839/02-8910241/23. NORWAY, VEDUM ELEKTRONIKK, N-1381 Heggedal, Aamotveien 2, phone: 2798990. PORTUGAL, JORSOM AUDIO VISUAL, 1000 Lisboa, Rue Eca de Queiroz 20-3 phone: 19562850. SPAIN, BOSE SA, 28027 Madrid, Aristoteles 3, phone: 4050611. SWEDEN, MONTEZUMA RECORDING, 10265 Stockholm, Kocksgatan 17, phone: 8436291. SWITZERLAND, ISLER AG, 8048 Zurich, Badenerstrasse 808-810, phone: 14321444. VENEZUELA, SOUND AND POWER, 1070 Caracas, P.O. box 76766, phone: 2223201.

REVERBERATION

A round-up of manufacturers and units currently available

AKG

AKG GmbH, Brunhildengasse 1, A-1150 Vienna, Austria. Tel: 43222 95.65.17.0.
UK: AKG Acoustics Ltd, Vienna Court, Catteshall Wharf, Catteshall Lane, Godalming, Surrey GU7 1JG. Tel: 04868 25702.
USA: AKG Acoustics Inc, 77 Selleck Street, Stamford, CT 06902. Tel: (203) 348-2121.

BX5: stereo spring reverb with EQ.
BX25ED: stereo spring reverb, digital predelays.
ADR68K: 16 bit digital sound processor.

Alesis

Alesis, PO Box 3908, Los Angeles, CA 90078, USA. Tel: (213) 467-8000.
UK: Sound Technology plc, 6 Letchworth Business Centre, Avenue One, Letchworth, Herts SG6 2HR. Tel: 0462 480000. Fax: 0462 480800.

Midiverb II: digital reverb with 99 presets.
Microverb II: as above but fewer settings.

AMS

AMS Industries plc, AMS Industries Park, Billington Road, Burnley, Lancs BB11 5ES, UK. Tel: 0282 57011.
USA: AMS Industries Inc, 3827 Stone Way North, Seattle, WA 98103. Tel: (206) 633-1956. Fax: (206) 547-6890.

RMX 16: programmable digital reverb, 99 user memories available with remote.

ART

Applied Research Technology, 215 Tremont Street, Rochester, NY 14608, USA. Tel: (716) 436-2720.
UK: Harman (Audio) UK Ltd, Mill Street, Slough, Berks SL2 5DD. Tel: 0753 76911.

ProVerb 200: digital reverb with 200 presets.

D&R

D&R Electronica BV, Rijnkade 15B, 1382 GS Weesp, The Netherlands. Tel: 02940 18014.
UK: D&R UK Ltd, 5 Fulmer Drive, Gerrards Cross, Bucks SL9 7HH. Tel: 0753 884319.
USA: D&R USA, 1720 Chip 'N Dale Drive, Arlington, TX 76012. Tel: (817) 548-1677.

Model 2: stereo spring reverb with variable reverb length.

EMT

EMT-Franz GmbH, Postfach 1520, D-7630 Lahr, West Germany. Tel: 07825 512.

UK: FWO Bauch Ltd, 49 Theobald Street, Borehamwood, Herts WD6 4RZ. Tel: 01-953 0091. Fax: 01-207 5970.
USA: Gotham Audio Corp, 1790 Broadway, New York, NY 10019-1412. Tel: (212) 765-3410.
EMT246: stereo digital reverb, six basic operating modes with 99 user memories and 90 factory settings. Optional digital interfaces.

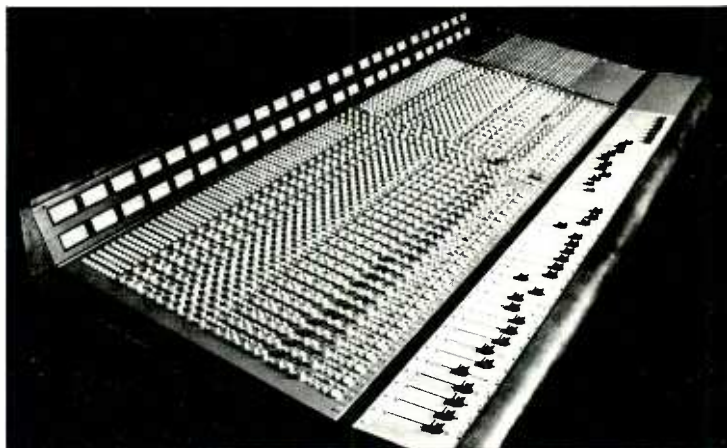
EMT251: free-standing stereo digital reverb, 128 memories with 64 preset.
EMT252: rackmount version of EMT251. Requires EMT252S remote for full parameter access.

Eventide

Eventide Inc, 1 Alsan Way, Little Ferry, NJ 07643, USA. Tel: (201) 641-1200.
UK: Marquee Electronics, 90 Wardour Street, London W1V 3LE. Tel: 01-439 8421.

SP2016: digital programmable effects processor/reverb.
H3000 Ultra-Harmonizer: digital reverb/pitch shifter.

Sshh!



The Raindirk Symphony mixer is extremely low on noise and crosstalk. It has been rumoured that it's actually better than some mixers that are twice the price.

For example, Stereo mixing noise 32 channels routed -90dBvu. Mute attenuation, crosstalk and breakthrough are better than -100db @ 20Khz.

32 groups & 2 stereo groups. 28/60 channels.

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REVERBERATION

Furman

Furman Sound Inc, 30 Rich Street,
Greenbrae, CA 94904, USA. Tel: (415) 927-1225.

RV-3: preset digital reverb enabling 512 settings.

Ibanez

UK: Cougar Audio Technology (CAT), 108-110 St
James Road, Tunbridge Wells, Kent TN1 2HH.
Tel: 0892 515026.

USA: Ibanez, PO Box 886, Bensalem, PA 19020.

SDR1000+: stereo digital reverb with 100 presets
and 100 user-definable settings.

Klark-Teknik

Klark-Teknik plc, Klark Industrial Park,
Walter Nash Road, Kidderminster, Worcs
DY11 7HJ, UK. Tel: 0562 741515. Fax: 0562
745371.

USA: Klark-Teknik Electronics Inc, 30B Banfi
Plaza North, Farmingdale, NY 11735. Tel: (516)
249-3660.

DN780: digital reverb/processor with 20 presets
and 50 user programmable memories.

Lexicon

Lexicon Inc, 100 Beaver Street, Waltham, MA
02154-8425, USA. Tel: (617) 891-6790.

UK: Stirling Audio, Kimberley Road, London
NW6. Tel: 01-624 6000.

480L: digital effects system with 50 user program
setups storable via NVM-Cart.

PCM70: programmable digital effects processor.

LXP1: digital reverb with 16 presets, single
channel, stereo output. MRC controller for up to
four LXPs adds six parameters to each unit.

Model 200: digital reverb with 10 presets and 10
user programmable locations.

Peavey

Peavey Electronics Corp, 711 A Street,
Meridan, MS 39301, USA. Tel: (601) 483-3565.

UK: Peavey Electronics (UK) Ltd, Hatton House,
Hunters Road, Weldon North Industrial Estate,
Corby, Northants NN17 1JE. Tel: 0536 205520.

UniVerb: stereo reverb processor with 30 presets.
AddVerb: stereo multi-effects processor,
programmable with 50 reverb and 50 effects
presets.

Quantec

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

UK: gtc Ltd, Malby House, 5 Fulmer Drive,
Gerrards Cross, Bucks SL9 7HH. Tel: 0753
884319.

USA: Marshall Electronic, PO Box 438,
Brookland, MD 21022. Tel: (301) 484-2220.

QRS/XL: digital signal processor with 90 presets

and 30 user programmable memories, expandable
with CARL remote.

Roland

UK: Roland (UK) Ltd, Amalgamated Drive, West
Cross Centre, Brentford, Middx TW8 9EZ. Tel:
01-568 1247. Fax: 01-847 1528.

USA: Roland Corp US, 7200 Downsview Crescent,
Los Angeles, CA 90040-3647. Tel: (213) 685-5141.

R880: digital reverb with four channels that can
be combined split or cascaded with digital
in/outputs.

Sony

Sony Corporation, PO Box 10, Tokyo AP,
Tokyo 149, Japan. Tel: 03 448-2111.

UK: Sony Broadcast Ltd, Belgrave House, Basing
View, Basingstoke, Hants RG21 2LA. Tel: 0256
55011.

USA: Sony Corp of America, Professional Audio
Division, Sony Drive, Park Ridge, NJ 07656. Tel:
(201) 930-1000.

MU-R201: digital reverb with 99 presets and 99
user memories.

Vestafire

Shiino Musical Instrument Corp, 37-1,
2-Chome, Kamiuma, Setagaya-Ku, Tokyo 154,
Japan.

UK: J & I Arbiter Ltd, JVC House, Eldonwall
Trading Estate, Priestley Way, London NW2 7BA.
Tel: 01-452 1132.

RV3/11: stereo spring reverbs.

RVD901: digital programmable reverb with eight
preset modes.

WaveFrame

WaveFrame Corp, 4725 Walnut Street,
Boulder, CO 80301, USA. Tel: (303) 447-1572.

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

AudioFrame: digital workstation that includes
reverberation processing as one of its functions;
infinitely programmable.

Yamaha

UK: Yamaha-Kemble Music (UK) Ltd, Mount
Avenue, Bletchley, Milton Keynes MK1 1JE. Tel:
0908 71771.

USA: Yamaha International Corp, PO Box 6600,
Buena Park, CA 90620. Tel: (714) 522-9105.

SPX50D: digital multi-effect processor, 50 presets
plus 50 memory locations.

R100: reverb signal processor, 60 effects, limited
programmability.

GEP50: general processor, 50 presets, 50
programmable memories.

REV5: digital reverb, 30 programs, 60 user
programs. □

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BELGIUM.
Tel: (32) 2 424 0233

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

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

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3900 Godthab,
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Tel: 299 21347

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

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

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PO Box 138,
Hafnarfirdi,
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Seilduksgt, 25,
PO Box 2068 Grunerlokka,
0505 Oslo 6,
NORWAY.
Tel: (02) 352 096

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PORTUGAL.
Tel: (01) 544029

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SPAIN.
Tel: (93) 349 7008

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SWEDEN.
Tel: (08) 743 0750

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

Harman Deutschland GmbH,
Huenderstrasse 1,
7100 Heilbronn,
WEST GERMANY.
Tel: (07131) 480202

TASCAM

THE ATR80-24



**Don't just note
check out**

**the good looks,
the features!**

The ATR80-24 is more than just a pretty face.

Yet with all the features you would expect of a Professional 24 track recorder/reproducer, it is easy to overlook one of the most essential: the quality of the heads.

The fact is that we don't trust anyone else to make them for us. So for the last 30 years, we have designed and manufactured our own record/sync, reproduce and erase heads.

This resulted in TASCAM being the first multitrack manufacturer to achieve full playback frequency response in sync mode.

SYNC EQUALS REPRO – means no quality loss during track bouncing or overdubbing.

- High density permalloy record/sync and repro heads with contourless configuration for hard wearing heads and optimum tape to head contact.
- Erase head with overlapping tracks and glassbonded gaps for erasure precision.
- Non magnetic ceramic capstan with high torque motor.
- Smooth transport, controlled by three 8 bit D to A converters, even in varispeed.

- 14 inch reel capacity and a wind speed of 375 ips.
- Interface for external noise reduction system.
- Optional serial interface for external control.
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Run in to the '90s with an ATR80!

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TASCAM
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Tel: 0923 225235. Fax: 0923 36290.
Contact: Martin Capp – Sales Manager

THE FUTURE OF THE RECORDING STUDIO

*Where do I
plug in?*

The recording of music into the computer will probably combine traditional methods, ie miking up and DI'ing, with the ability to input sounds in the form of samples. At present we tend to divorce the two and record live music on tape and individual sounds (usually short ones) into the sampler. The first thing to grasp about this future system is that the two are the same! If we record two minutes of vocals with a sampler we tend to call it a sample. The same vocal on tape would be the vocal track.

Once our minds get around this fact then we can start to visualise the full potential of a digital system since we can move sounds or music around in the same way that we can with a sequencer, and we can keep a library of sounds or musical phrases. In turn, this library of sounds can be played by keyboards, drum pads, guitar controllers, MIDI wind instruments and voice tracking devices. These devices are used with some success today and as they become more refined and expressive they may well be one of the main forms of musical control.

Of course, the playing of samples 'ain't really rock'n'roll' and so for the engineers and producers who want simply to record the musicians then the

With technology changing the way we work, Peter Jostin speculates on the recording studio equipment of tomorrow

For the potential investor or entrepreneur, the thought of opening a recording studio must be about as appealing as lunch with a lion. One look at the amount of competition and the rates they charge is enough to make any sensible person think seriously about getting a steady job.

So why do people do it? Why should someone take such a risk with the odds stacked against them? Well, the fact is, that not many people open a studio with the sole intention of making money, most do it for the love of it.

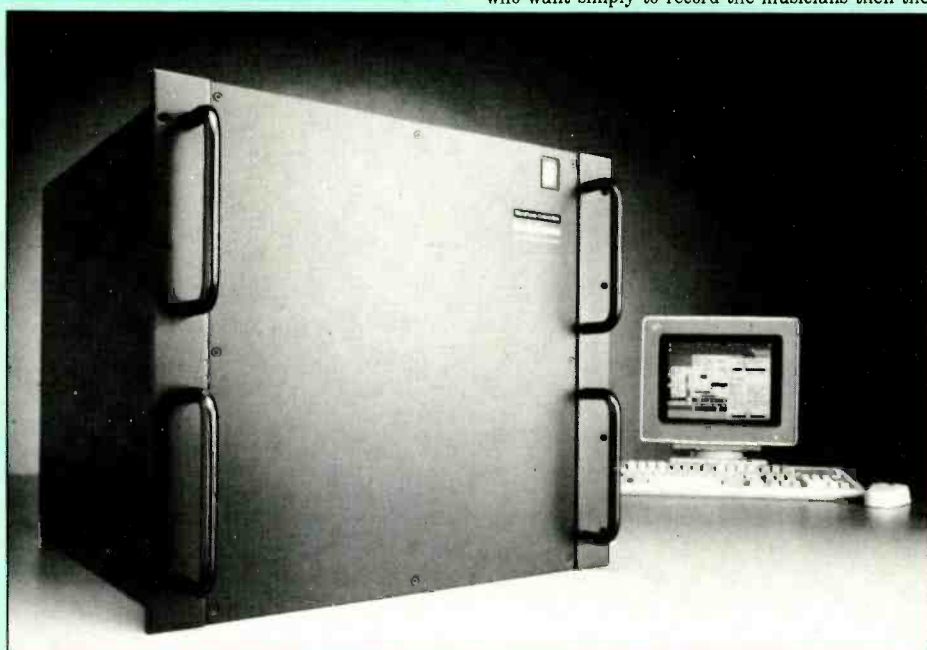
Of course, the 'love of it' doesn't only refer to the music, it also refers to the flashing lights, knobs and switches, high-backed swivel chairs and deep-pile carpets, the things that modern studios are made of. Studio equipment manufacturers haven't been slow to pick up on this fact and cosmetic considerations come a close second to technical specifications.

But as we approach the 1990s, the recording studio of the future is starting to materialise and, in stark contrast, it is likely to contain little more than a QWERTY keyboard and a video monitor. Nowhere in sight is the big glittering mixing console, the well engineered tape machine, or the towering effects rack.

So what will the studio owner do when presented with this alternative studio? On the face of it, it seems unlikely that the studio owner will want to swap all those lights and dials (that look so exciting when the light's off) for a pile of computer junk that looks more at home in an office than a recording studio. But as we look more closely, a world of possibilities opens up that might change the owner's mind.

Black box recording

One of the nicest things about building a studio is visualising the way the masses of equipment will fit in the control room and thinking of innovative ways of combining the equipment with the aesthetics of the room: An alcove for the tape machine, with smoked glass doors; A remote control for the effects rack so that at a push of a



AudioFrame digital audio workstation from WaveFrame Corp

button it appears from a hidden cavity in the wall and glides across the floor to the engineer's fingertips. So how to arrange the QWERTY keyboard and VDU is not exactly the interior designer's dream environment.

Nonetheless, that's probably what you'll get for your £½ million: a computer terminal (bet you it's off-white in colour), a massive rack of computer odds and ends and the odd musical interface thingumajig. The manufacturer could make it look just like your old studio, with all its switches, knobs and lights but it would be twice the price and reliability would be right out the window.

So after about 10 minutes careful consideration as to where to place the computer terminal (ie in the only place it doesn't look silly) and hooking the terminal to the big rack of computer bits and pieces in the broom cupboard you can get down to some serious recording.

system can operate just like a desk and tape machine. An added benefit is that all the EQ, compressor and routing settings can be remembered so that the next time a similar piece of music is recorded the engineer simply recalls the settings.

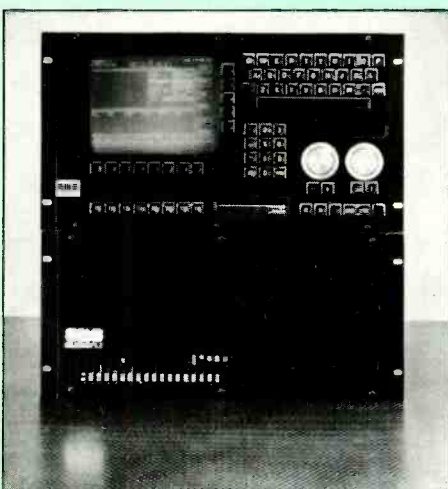
Editing

Editing of the recorded data will be totally flexible allowing adjustments of EQ, level, panning or effects to any track. It will even allow you to change the EQ, level, etc, of any individual sound on a track, no matter how small the sound may be. On top of all that you will be able to move sounds or musical passages around in time.

Imagine recording the drums and getting a perfect take except that the snare on the first bar was a little late. It's a simple matter for the



Audio & Design's SoundMaestro



AMS AudioFile

computer to zoom in at this point of the recording and display the snare beat on the screen, then, using a mouse or light pen, the snare beat can be shifted forward by a few milliseconds to put it into time. Similarly, whole sections of tracks can be moved around or copied using commands similar to CUT and PASTE on a word processor. (This type of editing is available on modern sequencers but in this case we are editing the realtime recording rather than manipulating samples.)

As more tracks are recorded and the song evolves this editing will continue and at any point it is possible to go back and change EQ, level, effects or timing on previously recorded tracks.

Mixing—the good old days

As the session continues more instruments are recorded and edited until finally we have the complete song in the computer's memory, all arranged correctly, the fade ins and outs are in place, effects are applied at the desired points and all the tracks and sounds are EQ'ed. Now, it's normally at the end of the recording that the producer declares that the mix should begin but in this case the recording and mixing are over and yet at no point did a 'mix' take place.

This editing of the tracks as the song evolves implies that mixing is an inherent part of the recording process and is done simultaneously with recording, in fact, the term mixing may disappear altogether. If you think about it, this is what happens when you record a piece of music. You record some tracks, balance them up, record some more tracks, balance the tracks again, add a bit of EQ and so on. Then, with a conventional system, you pull down all the faders and start all over again when you come to mixing.

Whether or not you like the idea of recording in this way it does seem to make a lot of sense. The

fact is that a lot of pressure comes to bear on the mixing stage and it can be the make or break of a song. As for myself, I enjoy mixing after spending weeks recording a song. Life wouldn't be the same without telephoning the hire companies and plugging in hundreds of patch chords. Nonetheless, I've done enough embarrassing mixes in the past to welcome a system that helps me sleep at night. Surely, the mix shouldn't be such a huge leap from the recording stage that anything could happen.

Record companies, which provide the major source of income for studios, have suffered most from this problem and will probably insist that their artists and producers use this new digital system. Too often have they asked the producer for a remix because 'the vocal's too quiet' only to be presented with a mix in which the vocal's fine but 'what happened to that echo effect' they really liked. Console manufacturers, such as SSL, have capitalised on this fact with their semi-automated consoles but even these are not in the same league as the total digital system.

Another spin-off of the digital studio is that the budgets allocated by record companies for mixing and remixing will be redundant and can be spent on the all-important recording. This will be a relief to many studios that own an automated console and only attract mix and remix work. It also gives the prospective buyer more incentive to buy a digital system knowing that it will be hired for longer periods than its analogue counterpart.

Latest developments

Behind the sedate facade that professional audio equipment manufacturers portray there has been a frenzy of activity in an attempt to produce the first all-digital studio. They know that if they do, and establish a studio standard, then they can corner the market and enjoy a monopoly, in the same way that SSL has done over the past five years.

SSL themselves have been one of the major exponents of the all-digital studio and their first system, *O1*, was unveiled at the Paris AES. *O1* is a hard disk based recording system with a small assignable panel providing most of the facilities normally seen on a small analogue console (EQ, faders, aux sends, etc). Although, it's the nearest thing to the complete digital studio that any manufacturer has produced it cannot emulate all the functions of a typical analogue multitrack installation and does not contain any digital effects other than compression and expansion.

Other similar products are Waveframe Corp's *Audioframe* Digital Audio Workstation, consisting of a number of modules communicating via a digital audio bus; DAR's *SoundStation II*; Audio + Design's *SoundMaestro*; and, of course, the *AMS AudioFile*. Few of which contain any major digital signal processing facilities such as EQ and dynamic level control but all of these companies have made it clear that it is their intention to include these facilities in the near future.

There is an area of controversy highlighted by all these manufacturers and that is what sort of controls to provide, it's generally agreed that the end user doesn't want a standard computer terminal (try doing a fade with a mouse or lightpen) and some manufacturers are attempting to lead the market by introducing radically new designs that provide a more user-friendly interface.

Three companies with experience in providing a user-friendly interface between mere mortals and new technology are New England Digital,

THE FUTURE OF THE RECORDING STUDIO

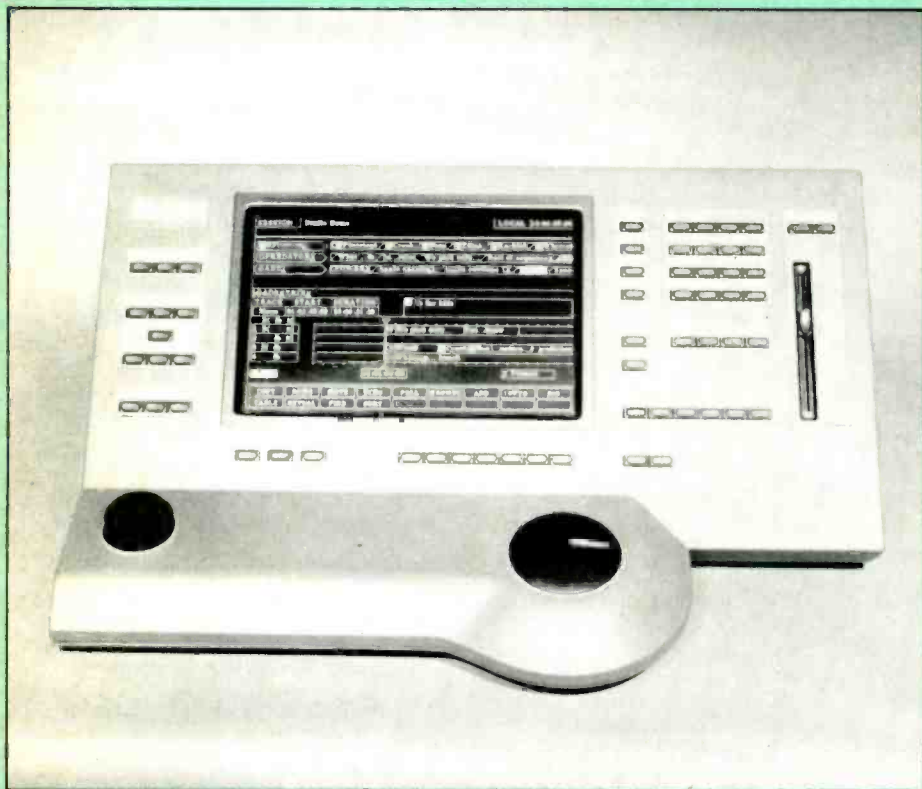
with a personal computer.

Of course, viewed as a whole, these discrete units combine to make a very powerful recording system similar to the total digital studio described earlier. The only problem is that each unit is housed in a separate box and has its own method of storing data, more often than not on its own hard or floppy disk. If you've got 10 disks to save at the end of each session (each with different operating commands) things are going to get a bit hairy and it's just a matter of time before some information is lost. (The MIDI DUMP command has

are set by the digital recorder or sequencer.

Of course, mixers with these specifications have been around for some time—Harrison *Raven*, Trident *80B* and *80C*, Amek *2500*. Some companies have produced new products aimed particularly at this market—DDA with *AMR 24*, Soundtracs with *ERIC* and Neotek with *Elite* and *Essence*.

Lucky for console manufacturers, this type of mixer is in demand for a different reason. Musicians and producers realise that an automated desk such as an SSL is necessary for mixing but is expensive and not always ideal when it comes to recording. A studio with a sonically pure console and an hourly rate half that of a fully automated output studio is possibly far more suitable for recording. More and more people are wising up to this fact and the mid-priced studios are experiencing a boom as a result.



Digital Audio Research SoundStation II

Fairlight and PPG. These have produced hard disk recording systems with some form of editing capability (in terms of time and level) but, as yet, none provide any elaborate digital signal processing. Nevertheless, it's interesting to see this type of company making inroads into the complete studio concept and highlights the fact that the future system may well combine music composition equipment with digital recording technology.

New England Digital have made clear their commitment to the 'tapeless studio' as they call it and must be one of the major contenders in the race to develop the complete digital studio.

There are many other companies producing hard disk recording systems and you can bet that these, and any company with an eye on the future, will have been taking a serious look into digital signal processing.

In the meantime

Due to the amount of man hours it takes to develop something as complicated as the all-digital studio it will be some years before they are in common use. In the meantime, we are likely to see a great many of these advances in the professional and semi-professional markets but as discrete units (hard disk recorders, programmable effects, programmable EQ, high quality samplers, etc) all linked together with SMPTE or (MIDI Time Code) and often controlled

gone some way to relieving this, but using it is easier said than done.)

With so many discrete units there must be some way of combining and processing all the individual outputs—in other words, you'll still need a mixer. In some cases this mixer could be a digital one and this has been made more possible by the recent introduction of the AES/EBU digital standard, whereby all digital equipment speaks the same language, however, a digital console offering all the facilities of a professional analogue console would be prohibitively expensive.

Requirements of the mixing console

It's safe to say that 1987 was the year hard disk recording appeared as a viable alternative to recording on tape and, in doing so, hammered the first nail into the tape recorder's coffin. Of course, the humble effects rack fell to the digital domain some time ago and so the mixing console may be the last item of studio equipment to hit the analogue scrap heap.

But, if it's to survive at all, then its sonic performance must be improved to complement 16 bit digital and the processing it provides, such as EQ, must be as transparent and flexible as possible. The need for recall and level automation become less important since most levels and cuts



Solid State Logic 01

No doubt most studios will not take the leap from analogue to total digital in one go, even if the hardware were available, and so they will run hard disk recording systems in conjunction with 24- and 32-track tape machines. This makes the job of the mixing console slightly more difficult and, ideally, it should have some way of swapping modes of operation to work with each. The logical answer to this is to have software control of the console routing buttons such as the Digital Routing System synonymous with Soundtracs and more recently introduced by DDA.

Conclusions

No-one would argue that the days of the totally digital recording studio are just around the corner. However, software development has a nasty habit of taking twice as long as first anticipated and so it may be some years before a complete system is in common use.

In the meantime the studio will be led to the promised digital domain by the gradual replacement of tape machines by digital workstations. With their incredible editing abilities and musical flexibility, to say nothing of their sonic quality, these digital workstations will probably become the focal point of the modern studio.

The mixing console, which has always taken pride of place in the centre of the control room, will be forced to take a back seat and hand over its automatic control to these intelligent workstations. Its humble purpose will be to provide high quality monitoring, static mixing of tracks and transparent/flexible signal processing.

That is, of course, assuming that studios will want to exchange their flashing lights, knobs and switches for a black box and computer terminal in the first place. I suspect that after they've tried the new alternative it's unlikely that they'll want to swap it for two boxes of their old soap powder. □

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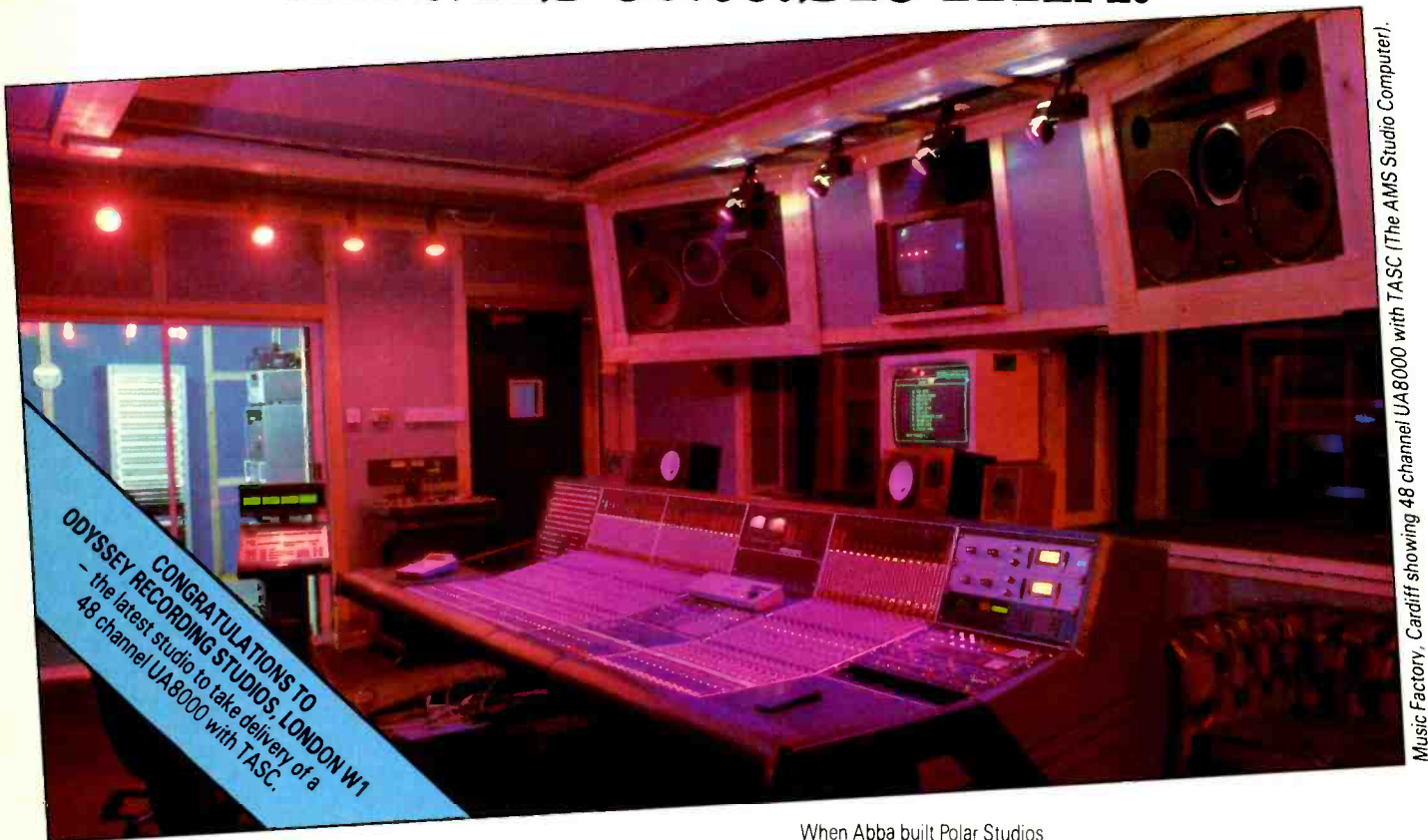
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RECORDING SOUND EFFECTS IN DIGITAL STEREO

Digital technology now offers much more scope for recording and manipulating sound effects. David Mellor talks to Simon Kahn who has had plenty of experience recording effects for the BBC and the English National Theatre

Recording sound effects may sound like a candidate for the least glamorous occupation in professional audio but sound effect users will appreciate the difficulty involved in getting the right effect. Often the sound they want is just not available on disc or tape, and going out and recording it can prove a problem. Sometimes even an accurate representation of the original sound just doesn't work when placed in a film or theatre context. Simon Kahn has created and used sound effects at the National Theatre and recorded them for the BBC's series of effects CDs: "People need to use sound effects to create a sound picture in the same way as you might use a set to create a visual picture. Radio plays are a very obvious example because the sound effects can create an atmosphere without using clumsy literary devices. They can also be a very important part of moving the action on, and helping to create tension.

"Originally people went out and captured the sound effects that they wanted but having gone to an enormous amount of effort to get the effect, they wouldn't then throw it away at the end of that production. They would hang on to it and start to build up a sound effects library of their own. Having done that, other people would get to hear of them and start to use them. For example, even within an organisation, each person might have their own speciality and they could pool resources. Eventually people started marketing them. That's why we have sound effects libraries as such."

Sound effect recordings go all the way back to cylinders and 78 RPM records. Many recordings that originated on 78 are still in current use. Until recently, according to Kahn, the 7 inch 33 RPM disc has been the approved format for sound effects at the BBC. Now, digital technology offers freedom from surface noise and other defects, and

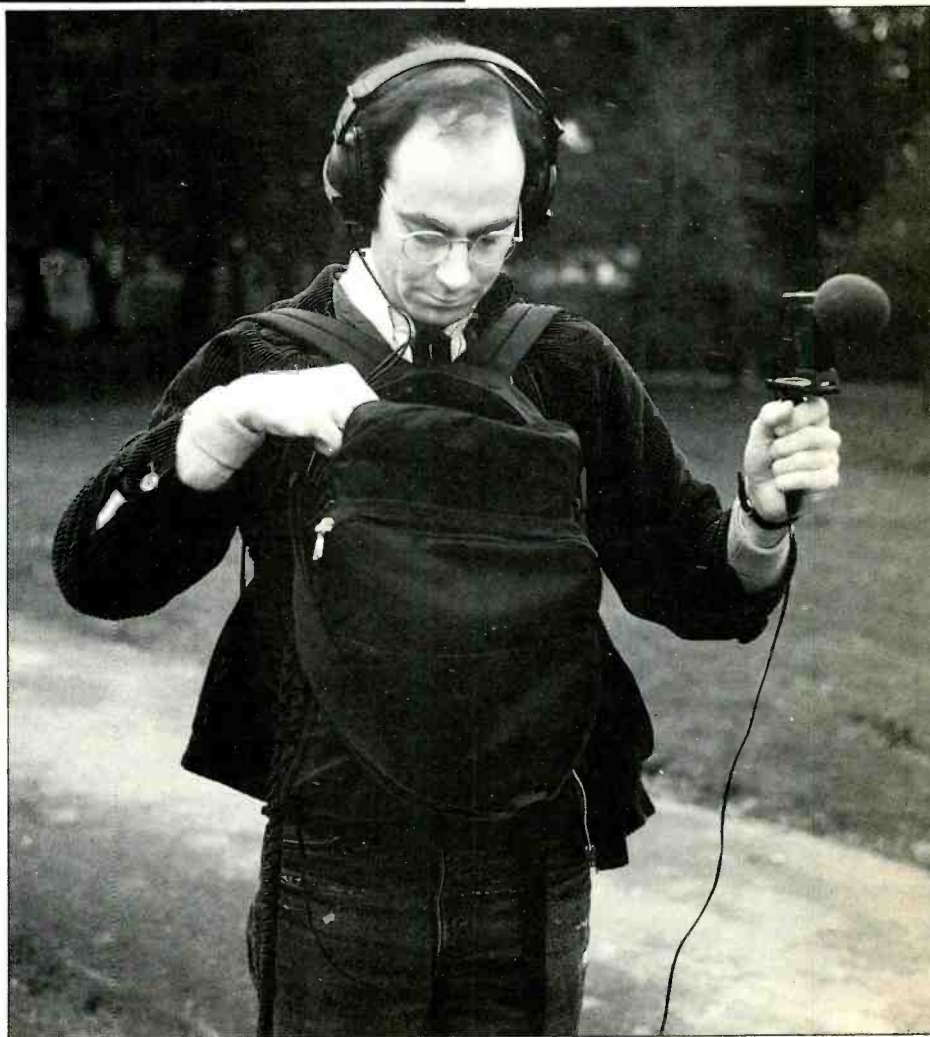
effects, some of which were recorded on 78 in the '30s and have been in regular use ever since, are now being re-recorded. But not all the material is replaceable.

"We can't go back and record the Second World War—which represents a significant proportion of material. A lot of sound effects are identifiable with a particular period, like a tram or an old police car. You may have to be careful when you replace old effects that you don't get the actual present day sound. You have to create what people expect to hear. For example, if you have an old film and don't hear the soundtrack crackling, you could become suspicious that the sound effects had been dubbed on. You can always add the crackle on separately if you want to. Obviously if you see archive film, you would expect to have period sound as well as period sound effects."

Sometimes, a producer might be trying to create a realistic impression of a particular time—as in a period drama. In this case, Kahn points out that our current experience of periods like the 1920s is via contemporary film and sound recordings. We believe, to a certain extent, that 1920s music really sounded like what we hear on the recordings of the day.

"The National Theatre's production of *The Threepenny Opera* was set in the Victorian era, as it should be, and there was to be a van arriving on stage. The vehicle used was electrically powered to avoid fumes but we wanted the sound of a petrol van. I went out and found someone who had an appropriate van of the period and recorded it.

"When we tried to play that back, on cartridge, it didn't sound convincing at all. It didn't sound



RECORDING SOUND EFFECTS IN DIGITAL STEREO

like the classic sound effect of a vintage car. We ended up using something from a BBC sound effect record. Sometimes you need to use something that sounds like an authentic sound effect, rather than the authentic material. That's a balance the user has to strike."

Digital effects

Anyone who has stayed up until the early hours of the morning editing out the scratches from effects taken from records will appreciate the advantages of the CD storage medium. But digital recording of effects has other advantages.

"It has the advantage of transparency. There are a number of cases where you could quite happily use analogue where you are recording a background sound effect. For example if you record a babbling brook, the dynamic range is really very small. The nature of the signal is such

read PPM 6 for transfer to analogue tape, and found that the bell sound wasn't actually showing on the (analogue) PPMs.

"The point is that for a very powerful transient recording like a bell, that transient doesn't show up on an analogue recording. It is something that can't properly be captured with analogue.

"In theatre you are comparing yourself against live sounds. You might have the case that a (real) bell is to be rung on stage and another bell will be rung through a sound effect system just offstage. If one bell sounds beautifully clear and the other bell sounds muddy, the audience will soon know that it is a sound effect.

"The power of the transient effects of sound is wonderful. Digital can capture that, and it can capture the whole transient. You might not be able to use it in the end product because high transient would push the average level too far down. At least the transients are there for whoever is using the sound effects to judge."

Equipment

Simon Kahn's equipment for the recording of sound effects is the Sony *F1* system. For Kahn, R-DAT is not yet a viable proposition. Sony's professional machines are expensive in comparison to the *F1*—especially as two are needed for backing up and compiling material. The *F1* system needs only one processing unit and two Betamax video recorders.

"The *F1* has the principle advantage that it's portable. When I started recording digitally in 1985 it was the only portable system available. The metering is very effective, the overload symbol clearly showing maximum level.

"The microphone inputs are not good. Very often the noise of the mic preamp will be masked by the background noise of the effect you are trying to record. If the situation is more critical, if you want a lot of gain for example, you do have to use a better mic circuit.

"I use two microphone set-ups. The first is a cheap Sony mic, the *ECM 929*, it's discontinued now but it's remarkably clear. It is an MS system microphone, which I have now settled on for mono compatibility. The principal advantage is that it is small, convenient and very robust. The other system that I use for better noise performance, but is slightly less convenient, consists of the Sennheiser *MKH 30* and *MKH 40*, again in an MS pair. I have an external battery-powered microphone amplifier, which I built using Cadac mic amp boards. It's very quiet but it's another box to carry.

"What I would really like is a small four-input stereo mixer, with MS, with particular accent on low noise. Unfortunately, the people who build ENG mixers have been building them principally for broadcast applications. Although they have built-in stereo as a future requirement, broadcasting applications are still not demanding particularly low noise. Getting low noise from

battery-powered equipment is difficult because to make a low noise amplifier you need to draw quite a bit of current. Nobody's found a way round that yet."

Stereo

It is well known in the theatre that using stereo, even though it doesn't necessarily create a good stereo image, does have the effect of getting the sound 'out of the speaker'. Simon Kahn has found that it is possible to pan a stereo effect into place and for it to have some depth, rather than being a mono signal coming very definitely out of one speaker. Kahn is a supporter of the MS microphone system, where the output of an omnidirectional or cardioid mic is combined with the output from a fig-of-eight pattern mic to produce conventional left-right stereo.

"Stereo recordings are, by their very nature, the recording of a sound in an environment, and that's true of any type of stereo recording. If you don't have the environment you don't have a stereo recording. It's possible to make a stereo recording of a bell because you record the bell in the environment.

"I've tried a variety of stereo techniques. You need a fairly simple technique because it has to be transportable. You might be running around with it. You need something you can apply to the majority of situations so you don't get confusion from different stereo images. I try and get some form of compatibility between effects so that users can get to know what to expect.

"MS is very good for field work. For example, trying to record a single bird singing, you would be in the middle of a field with the bird maybe 10 feet away, if you were in a good hide. With coincident crossed pair techniques you would point one microphone to the left of the bird and one microphone to the right of the bird. There is something fundamentally very worrying about that. You rather feel that you ought to have a mic pointing at the bird. With MS, you have that, and at the end of the day, people do want the sound effect and not just the environment."

How long would it take to record all the possibilities from one car?

"If you're lucky and everything goes to plan you can record an hour's worth of material in about two hours. You have to get somewhere that's quiet enough to record it. But on location, you can't listen to it on playback as well as you can in the studio so it's extremely rare to make only one trip."

Kahn draws a distinction between effects for production use and 'archive' effects, where it's what it sounded like on the day that's important.

"If it is a working recording of a sound effect it must be usable. If you have a squeaky seat in the car, it's not usable. If there is any noise that might identify that particular recording, if that recording were to be used regularly, then it is not usable. It might be suitable for a recording of a car with a squeaky seat, if that were required, but not if you were trying to get that car for general use. You have to try and collect sound effects as independent of each other as possible.

"Recording in stereo, you now have the problem of stereo perspective. For example, a car travelling from stage-left to centre could be reversed and used as a car travelling from stage-right to centre. It would be very difficult to use a stereo recording of a car, made at a constant level, to get the effect of a car approaching because you couldn't get the broadening of the stereo perspective just by pushing up faders.



that it will mask tape noise very effectively. There isn't any burning need to use digital recording, but you will still get a better image with digital.

"Among the first things I recorded digitally were some bell sounds. I was quite amazed when I tried to transfer them to tape. Bells come up quite often in the theatre for various reasons. They have an incredible transient energy and if you record them on an analogue tape you actually miss a lot of that. I recorded an ordinary hand bell, like a school dinner bell, on my digital recorder, which was recording right to peak on its bargraph meters. I set the peak level on the *F1* to

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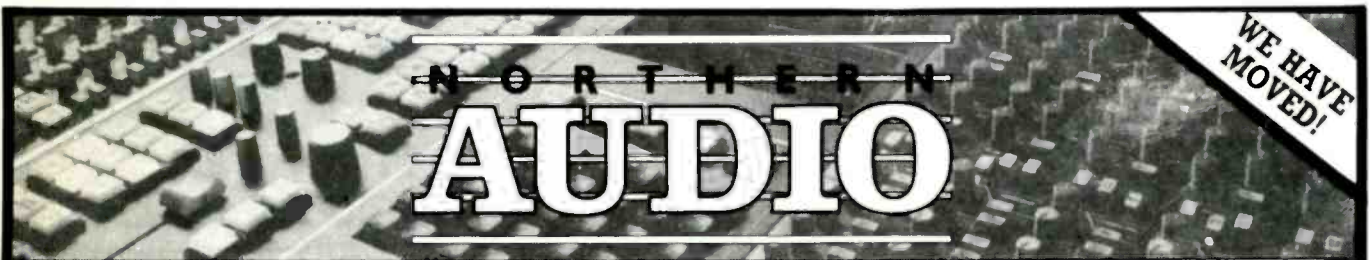
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RECORDING SOUND EFFECTS IN DIGITAL STEREO

Theoretically, 16 bits will be enough because 96 dB dynamic range is reasonably adequate for our needs. But we don't have the full 16 bits available to us. You must think of a sound effect as an uncontrolled sound source, unlike music. You need the dynamic range, not only to cope with the sound as it is but also with the sound as it may be. The headroom I have to allow can reduce the range of the recording enormously.

"If you had a digital system that had a dynamic range of 120 dB, which is probably about the dynamic range of the ear, you would still find yourself having to guess levels. Sound sources don't always conveniently parade themselves in front of you within that dynamic range window."

So advances in digital technology may make Simon Kahn's rucksack slightly smaller and lighter but they won't remove the problem of setting levels for sound sources, which may vary from just audible to levels at which you might start to think about moving further away to protect your hearing. And these are sound sources that don't conveniently respond to calls of, 'One more time, please!'

Simon Kahn's next project is a self-produced CD of sound effects. We look forward to it with the sound effect of bated breath. □

"Worse, if you use a mono recording, the whole of the image is localised. You can't broaden a mono recording into a stereo image. You can always use a stereo recording and narrow it down to mono. A mono recording is intrinsically a point source and you can only create dubious pseudo-stereo out of it. There is a fundamental difference between panning a mono source between two speakers and using a proper stereo image. You can still pan a stereo recording. You might take a stereo recording of a car recorded in centre stage and pan it left or right."

The matter of stereo perspective increases the number of possibilities for recording something as simple as a car. It's simple to fake perspective using mono recordings. Stereo gives a much better result in the finished production but it is more difficult to manipulate. The perspective has to be built in at the recording stage.

Practicalities

The Sony F1 processor and recorder, together with an external battery pack, conveniently fit into Simon Kahn's rucksack—like tourists in London carry.

"I have discovered that if you go out with a large padded bag and a Rycote windshield and a fishpole, everybody thinks you're part of a film crew. That can create a lot of fuss, people wonder what you are doing and they get very concerned about what might be happening.

"People are less concerned with a sound recording but they will still talk to you about what you are doing. You have to explain that you are trying to make a sound recording and talking about it is getting in the way just a little. I try to look as though I'm a tourist and make myself appear less 'professional' and conspicuous.

"The other thing that you find in recording natural situations is that you often have to make a judgement about whether to ask permission to make the recording. If you ask permission, you disrupt the activity and people get worried about whether they should go and ask their bosses or whatever. Even if you do have permission, someone might still ask you about it and disrupt the recording. For example, if you want to record the sound of getting on to a bus, if you get on the bus and the conductor asks you what are you doing, the recording is no good. Having permission doesn't make any difference whatsoever! Even if you have permission, you have got to wait until you find a bus conductor who is not concerned with what you are doing."

Digital limitations

Recording sound effects is one of the most uncontrollable situations known to audio. You can't go and ask the demolition man to do it again if you got the levels wrong first time. Even with a theoretical dynamic range of 96 dB to play with, 16 bit digital may not be good enough.

"In the recording studio you will rarely

experience the full dynamic range of the human ear in any one take. At the National Theatre we found situations where we would want to set up a system that is not going to produce any hiss in a dramatic production, where you can literally hear a pin drop. In the same show you might want to create a frightening thunderclap. So you need a system that almost produces the threshold of pain in its maximum output and yet does not impinge upon the background noise of the theatre, which is generally fairly quiet. Dynamic range is a very serious problem, which the theatre is finding a challenge.

"The problem for sound effects recording is that we have to capture that dynamic range.



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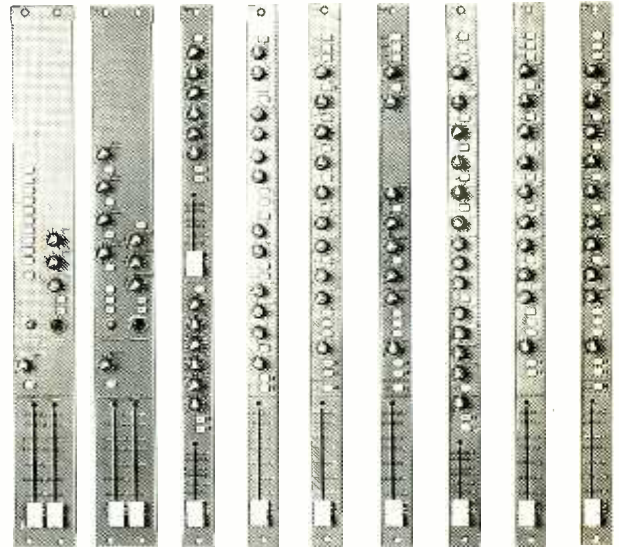
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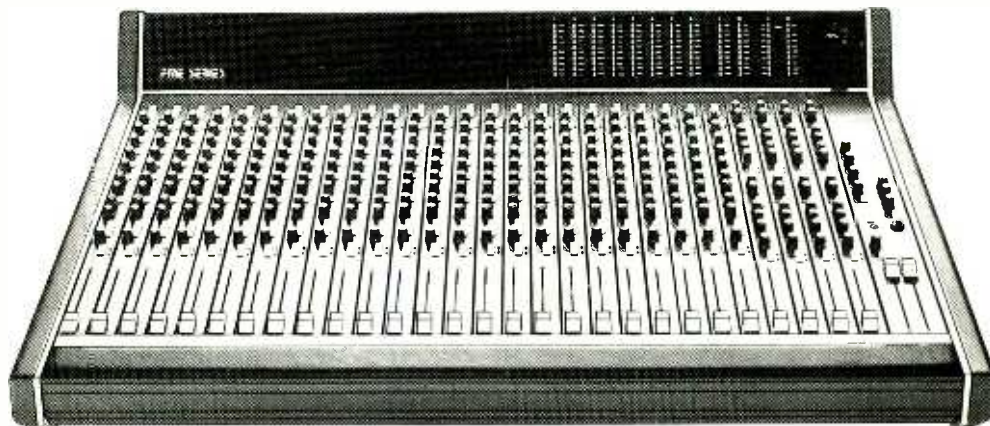


MODULE OPTIONS (LEFT TO RIGHT) MONITOR MASTER. MASTER. MONITOR OUTPUT. SUB GROUP. STEREO INPUT (REMOTE SWITCHING). BROADCAST INPUT. MONITOR INPUT. MONO INPUT. MONO INPUT (REMOTE SWITCHING).

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MARTIN POLON'S PERSPECTIVE

The old house was just off the Fulham Road in London. It was a little out of place, with its late '20s insouciance in a row of homes that Queen Victoria would have felt comfortable in. Parked out front was a cream and blue 1956 Chevrolet convertible, with white leather upholstery and the old 'London' licence plates. In the house, the furnishings were conventional though a tad out of fashion. Though, it was upstairs where the studio was located, one could really feel the power of the place. Ascending the stairwell, one received the powerful feeling that one was about to enter a shrine. For the devotees of analogue, this was a sort of vacuum tube Nirvana. In the control room, there was a number of Ampex tape machines around the walls. Models 300, 350, 351 and 354 were all well represented. Some had their original 1960s tube electronics and some had weird and wonderful new design derivations using newer vacuum tube electronics. Most had state-of-the-art head stacks and some had all new head assemblies. The American tape machines were joined by several Ferrographs and two mint condition vintage monaural Studers with tube amplifiers.

The relay racks in the room carried a large number of familiar studio war horses from the late '60s and early '70s. Pultec equalisers, Fairchild compressors, General Electric limiters and other similar tube devices from both sides of the Atlantic were well represented. The console looked as though it had been home built (it had but the question was, when?). Out in the studio, the number of RCA and B&O and Telefunken microphone devices that one thought would never be seen again was astounding. One looked at the Tannoy boxes and wondered if that 'dual concentric' sound would really be as pleasing as it had seemed in our past. Almost half afraid to shatter some well loved bit of our personal history, we were relieved eventually when the sound from the Tannoys did become as pleasing as we always thought it had been. The Quad amplifiers glowed brightly; seemed to gain brightness during peaks, like in the old days. The studio maintenance man commented that with the prices for tubes being what they were, this place was no bargain by home studio standards. He reckoned that upwards of £2,000 was needed just to retube everything.

The session was simplicity itself. The microphones were placed in front of the artist, who would perform some Welsh folk music. The tape machines rolled in all their analogue tubed splendour and a recording was made on the spot: 2-tracked and balanced then and there. It reminded me of my days with London Decca

where classical recording on location matched great orchestral performances with great classical mixing on the spot. It was a privilege to be in the same room with those Decca mixers. No one could go back later and 'save it with the multitrack'. It had to be done right then and there and it had to be the correct mix or the entire session was wasted.

I felt funny thinking back to that part of my audio past. That was well over 10 years ago. But poking around these old-new studios had made me very nostalgic for the way music used to be recorded and the way it used to 'sound'. Playback of a good LP was a source of wonder to us all since the sound transcended all the hyperbole we had got used to in the audio business. Despite the expertise we all had, we never ceased to be amazed by the experience of hearing the end result of all our labours. With analogue you could look at the grooves through a magnifier and see the peaks you had dealt with in a session. The music had the quality almost of a fine weave of cloth. Silky, yes, but in a way where you felt you could almost touch the fabric. For many, the sound of analogue music was more like a fine tweed; with some roughness but in the end a beautiful mixture of common threads. Most of all it was warm and soft and it seemed to wrap around you. Yes, when it was done correctly, analogue could be very good indeed. Especially vacuum tube analogue. Vacuum tube analogue seemed to be made for listening on a rainy night with a good wood fire crackling in the fireplace and a glass of good sherry by your side. In a way, it was just like turning down the colour control on your TV set to watch a well-loved old movie in black and white.

It is curious how anyone who has experienced vacuum tube analogue is usually reduced to a sort of creative techno-babble about its glories. Such subjective descriptions are less frequently found for digital audio. Consumer research among audio professionals on digital yields some subjective commentary but most frequently digital translates to the listener as music as cold, hard facts or more precisely a constantly sampled series of cold, hard facts. Of course, that is what digital audio is all about. The listeners respect both the process and the integrity of digital recording but tend to view it as 'just being there'. The perfection offered by digital audio is clearly defined to almost everyone in the industry. It is the lack of perfection of vacuum tube analogue that still appeals to a small coterie of users and listeners who are behind the resurgence of interest in alternative analogue recordings and techniques.

The studio depicted above is not so much imaginary as it is a composite of many such studios that have either sprung up or hung on in

most major cities of the western world. The whole movement back to analogue and vacuum tube audio has many dimensions. There is a relatively large and profitable business in making tube power amplifiers for musical instrument usage, home audiophile stereo systems and professional monitoring where some 'colour' is desired for the listening process. Certain tube components have become so desirable, like the old Pultec products, that they are being manufactured new for the tube-oriented recording market. The exposure to this new/old tube analogue marketplace in professional audio and niche record releasing stimulates the whole thought process on the advent of digitisation and its impact on the audio industry. All this brings us back to the basic question that has never left the lips of many in this audio business since the coming of digital. 'Is it really better?'

The answer to any comparison between analogue and digital has to consider that the question itself has been rendered to some extent irrelevant by the passage of time and an inevitable demographic component. A vast majority of those in the audio business today and of those listening to music in their homes have never heard vacuum tube electronics and have never listened to analogue recordings in an optimum setting. The fact is that for mainstream audio work, vacuum tubes were passé by the mid-1960s and obsolete by the mid-1970s. That means anyone born after 1960 or so has never really experienced either vacuum tubes or analogue recordings in an appropriate environment. On the other hand, that vast population demographic (or bulge if you prefer) the 'baby boomers', grew up with analogue and have kept to their existing collections of LP music. It is primarily from this age group that we find aficionados of vacuum tube analogue. This is a fact noted with chagrin by both the CD hardware and software makers who cannot motivate this grouping towards greater sales of digital audio. The sign for the future is clearly away from any analogue-digital comparisons. The population will consist increasingly of those who have only known digital and/or computer sound and who will have no reason to demand analogue alternatives from a past that was not theirs.

This is not to say that there is not a 'niche' or 'boutique' audience for speciality recordings made with vacuum tube analogue techniques. Obviously there is, or we would not be seeing the resurgence of analogue 'tube' studios. There are many listeners who will buy such speciality recordings and it is interesting to find a decent percentage of them are young people who have heard some inherent quality in a re-release of an older recording and preferred that 'tube' sound. But one can argue that unless the listening is done on appropriate analogue equipment, the total experience is still 'homogenised' by semiconductor electronics. So there is a matching resurgence in vacuum tube stereo equipment, with units from Quad, McIntosh and others commanding premium prices on the used equipment market while esoteric hi-fi makers offer new tube units costing thousands of dollars.

Yet it is impossible to continue the discussion of analogue without facing the inevitability of the digital process. Many in the professional audio industry continue to feel that the record companies were unquestionably guilty of hastening the demise of the LP system due to



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La Cinq, Paris

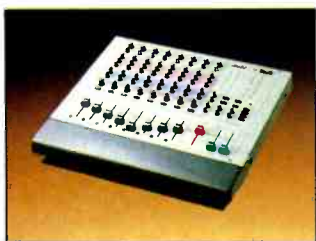


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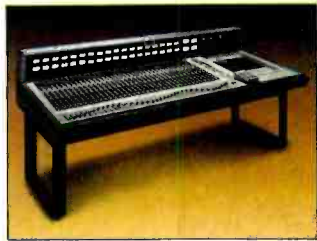
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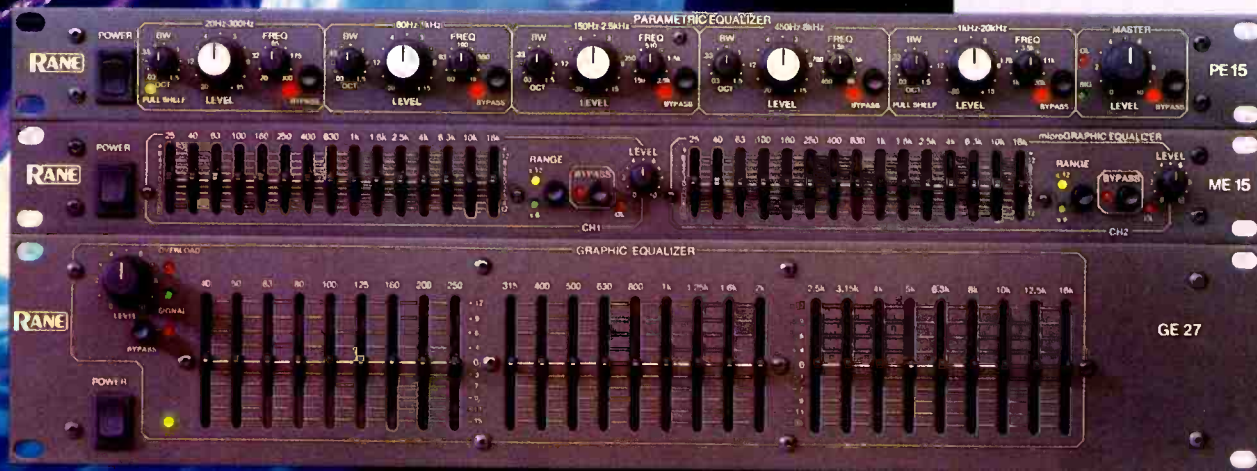


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MARTIN POLON'S PERSPECTIVE

their cavalier attitudes towards quality in the 1970s. A former label executive put it this way, recently: "We began to count pennies. A penny here for a glassine insert between the cardboard sleeve and the still warm disc, a penny there for lessened cooling time for the disc, a penny saved in longer usage of the stamper despite the loss of groove integrity, a penny earned by making records from a veritable witches' brew of old discs, paper labels, dust, dirt, grease and the occasional mouse, rat and/or stray cat to give character to the concoction. You want to talk about surface noise? That mix would do it. We had to save money, you see, to pay for the demands of the super groups. Exotic food, special audio and musical equipment, long stays at luxurious recording 'spas' of which the legendary Caribou Ranch was merely the prototype. You wouldn't believe the food that would be demanded during session and concerts. Hundreds of lobsters, venison, buffalo meat. You name it, those geeks would claim it. And then there were the 'powders'. Let it be said, that among record company staff and recording 'artists' of the late 1970s, there were precious few who thought that 'Great White' was Bruce the shark."

The record exec continued, "Yet to lay all the blame at the doors of the record companies would be far too easy an answer. The entire industry got too fat and too sassy. Where were all the naysayers who so recently surfaced to fight the dreaded Copycode notch when worse horrors were being foisted upon the LP some 10-odd years ago. Nobody said a peep in print, yet lacquer masters were being turned out that were unacceptable. The point is that the variability of the LP life cycle from manufacture through distribution to consumer playback required absolute control of many variables to guarantee any quality. That was just too much to expect. The CD requires virtually no hand holding anywhere in the process

and just a little common sense at home. I think if the industry were smart, it would give a bronze jar of peanut butter to the guy who invented the peanut butter test to show how rugged the CD really is. I would at least settle for a halt in the use of chunky peanut butter on CDs. And so it goes."

Now, to some extent I am 'dancing' away from answering the question of whether I personally find analogue audio preferable to digital audio. As a researcher of the audio industry, I cannot avoid being impressed by the mass market pressures of the drive to digitise all aspects of the audio industry from consumer electronics to studio technology. I felt that way 10 years ago and I still feel that way. Digital has to overwhelm analogue because it offers a promise of perfection in the recording and manufacturing and listening process that was impossible for analogue to sustain. And digital, or the CD if you will, has lived up to its promise. Better than 95% of the LP record players used in homes on both sides of the Atlantic Ocean offer significantly lower quality than the least expensive CD player available in the stores. Better than 95% of all CD releases offer better quality than the average LP releases found in the stores and continue to offer that quality of reproduction without degradation no matter how many times they are played (as long as reasonable precautions are taken with the discs).

So it becomes a war of numbers. For most people, digital offers the highest quality of reproduction. For the minority that cared about analogue and still cares, the results are different. There is something to be said for analogue listening, especially if vacuum tube technology is used. But, the bottom line that strikes my research oriented mind is that it may be a kind of acoustic nostalgia, at least to some extent. For the same reasons that I crave 'retro' foods like

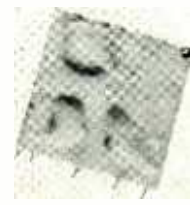
meatloaf and suzy Q potatoes or egg foo yung and Chicago style chop suey, listen religiously to 'retro music' by Fats Domino and Carl Perkins, dream of finding my ultimate 'retro' '56 Chevvy. . . I may find 'tube' analogue attractive or perhaps just equally 'retro' or it may be that the quality of mixing and creative record making was at its zenith when the technical tools were infinitely more primitive. It may be the 'music' and not the medium that I am reverting towards. It is, I must admit, a real conundrum or if you prefer a bit of a contradiction. But, if you talk to most people who worked with audio in its analogue heyday, you will find at least a nostalgia and perhaps a real preference.

On the other hand, it could well be that we were listening 'with' analogue rather than 'through' digital. Analogue was less than perfect, but the act of trying to improve it was part of the whole Gestalt of the audio business from the 1950s through the 1970s. Digital is by-the-numbers perfection. It is virtually impossible to improvise on and certainly does not create an easy environment for technological improvement in the home or in the studio. For those of us who grew up with analogue audio, each step was a quantum jump in quality from the late 1940s when there was no quality other than that of the 78 record. We were simpler then and the pleasure of the music sustained us when the technology failed us. That point was driven home just the other day as I listened to Peter, Paul and Mary sing *Puff the Magic Dragon* on a mediocre car radio. I enjoyed the performance not despite the poor audio/acoustic environment but because I was able to focus on the pleasure of the music and its message.

I think back at times to my beloved Fisher control preamp feeding a 20 W Dyna amplifier that powered my Electro-Voice speakers. A Scott 310D FM tuner and a Garrard changer with a General Electric VRII cartridge completed the setup. My days in high school could not end fast enough so I could return to experiment with my system. My present system in my office, let alone the one in my home could run rings around these things and yet it does not diminish their potency in my mind's eye. I and thousands like me were constantly trying to change and upgrade our systems. The challenge to improve analogue audio was above all the issue. Professionals in recording studios were equally involved in a constancy of change and technological improvisation. The bottom line may be that analogue gave us the option of improvement. I hear frequently from professionals these days how boring the audio business has become. I wonder if the attainment of perfection by digitisation and the 'hands off' complexity of the various computers and computer-driven audio equipment in today's studio world, has not taken much of the challenge out of the audio business. There are no easy answers to any of this but once in a while it seems a good idea to ask a few questions.

In the end, none of this will matter, because the emergence of software-defined systems will allow the producer to emulate the 'soft' sound of analogue for a studio recording or for the home user to put the subtle distortions of tube analogue back into his or her system. It just may be that we are about to enter the best of all possible worlds. We use the perfection of digitisation to record music and then we can instruct a computer as to how we really want our music to sound. In short, we will have the power to customise our listening experiences and our recording experiences. It will be the ultimate extension of the power of digital audio to provide us with the tools to analyse our audio experiences. □

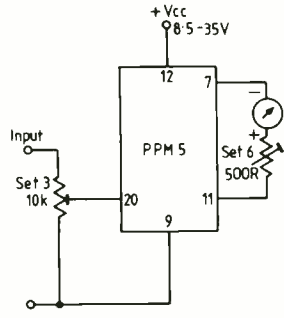
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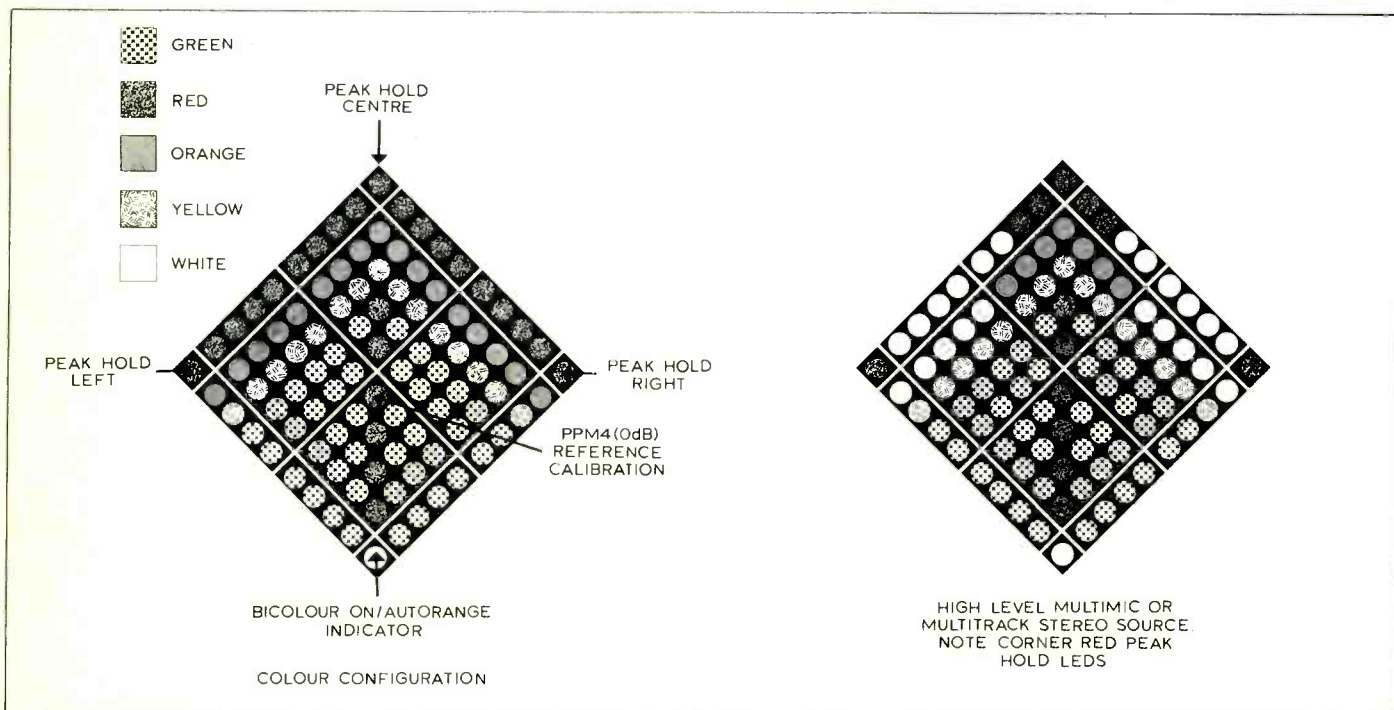
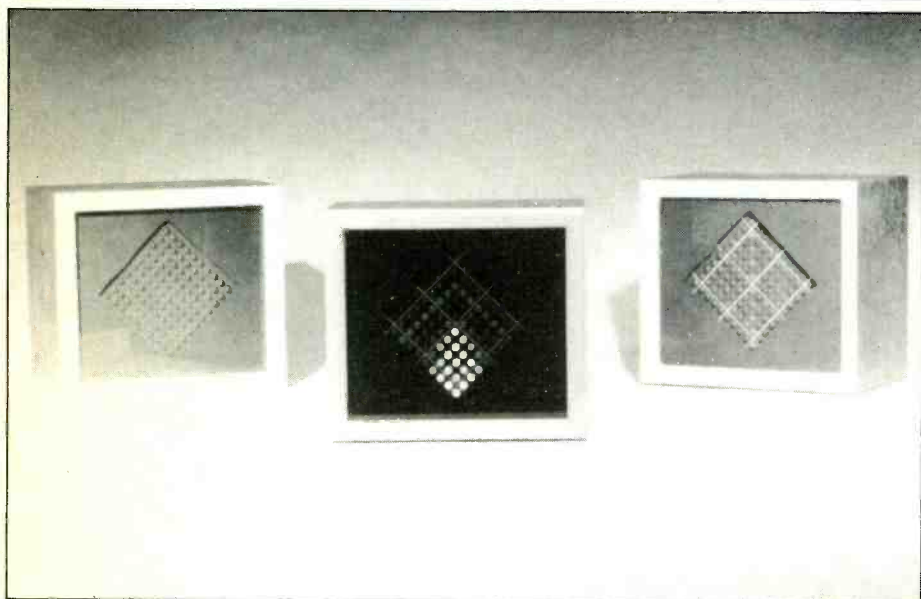
REVIEW

The Box is an unusual monitoring device from Tapetalk. Dave Foister reports

Many audio people are familiar by now with the appearance of Tapetalk's little wooden *The Box* with its distinctive diamond of coloured LEDs making pretty patterns in time with the music. Few, though, outside the small select band of *The Box* converts, are aware of how much information those flashing lights display, or how powerful and versatile a metering instrument it is. The term 'Real-time Soundstage Analyser', used by Tapetalk to describe it, is too woolly to convey the range of detailed information *The Box* shows (and possibly a little pretentious); it therefore comes as something of a surprise to discover that what looks like a scaled-down disco light show can measure levels, phase shifts, stereo width, stereo pan positions, mono compatibility and more, all simultaneously, dynamically, and faster and with more detail than most separate measuring instruments, on a display that quickly becomes familiar and easy to read.

The Box is a wooden cabinet about six inches square, with a black front panel containing the display, a 10x10 square of LEDs standing on its corner to form a diamond. The LEDs are driven by a surprising amount of circuitry, all proprietary and patented, which lights the display in a variety of distinctive moving patterns; the shapes and sizes of these patterns, once you have learnt to recognise them, shows all the information mentioned above at a glance. The rear panel carries XLR connectors for audio in and the DIN sockets for external power supply, together with three controls for level calibration, channel balance and LED intensity. The display brightness should be kept low in order that the different brightness levels can be clearly seen, but *The Box* always remains distinctly visible even from awkward viewing angles.

The best description of the kind of instrument forming the basis of *The Box* is a vectorscope, although it does a bit more besides. At any instant it displays the resultant vector of its left and right inputs, showing their absolute levels and relative phase. It's like a tidied-up version of the display an oscilloscope gives with stereo audio applied to its X and Y inputs. This is easiest to comprehend with a steady single tone, which when panned hard left produced a line along the



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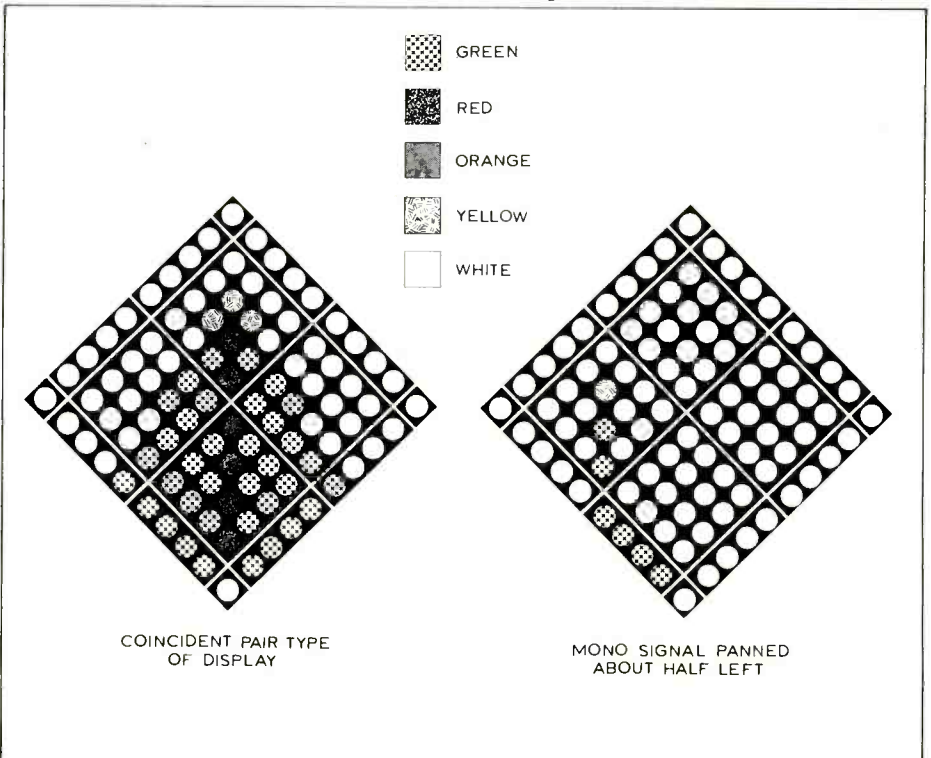
REVIEW

left bottom edge of the diamond (known as the left baseline); panned right it lights the right baseline, and panned dead centre it gives a vertical column, which is red to contrast with the surrounding green LEDs. In all cases the length of the line corresponds exactly to the peak level of the signal—each LED represents an increment of 3 dB, with an easily-calibrated overall 0 dB reference point and each LED has three brightness levels 1 dB apart. While the body of the display consists of green LEDs, those corresponding to levels above +3 dBm are progressively yellow (glowing green), amber and red. As the signal is panned from one side to the other, the display continuously shows the vector produced, so that at any time the precise level of the signal can be seen, along with its exact position in the stereo image. Accurate panning of dynamic musical signals can be achieved more easily with *The Box* than by any other means, particularly for central signals where the slightest deviation from centre will make the LEDs one side of the central column glow, and the accurate reading of levels has been made easier by the recent addition of diagonal graticule lines on the display.

It is a short step from here to understanding how a stereo music signal produces the characteristic 'Christmas tree' or flickering flame

display, whose height shows the overall level and whose baselines show the stereo width, or the amount, in measurable quantified terms, of side or difference information. Even in terms of simple system levels, I soon felt *The Box* was giving me a clearer more intuitive indication of overall level than PPMs or vus. The left, top and right corner LEDs have peak hold circuitry incorporated and on the final production model these are designed to light at PPM 7, with a reference LED immediately below centre calibrated to correspond to PPM 4 or 0 dBm. Once I had satisfied myself that the levels I was reading on *The Box* corresponded with those on the PPMs I normally use, I found myself using *The Box* almost exclusively, hardly looking at the conventional meters. One day I took the plunge and switched off the PPMs, working quite happily with *The Box* alone.

Clearly with the LEDs spaced at 3 dB the window of levels displayed is fairly small—24 dB—so for lower levels to show a meaningful display an autorange facility can be switched in, which increases the range to 40 dB. The autorange is disabled when average levels approach +4 dBu; at this point *The Box* again shows true levels, indicated by the bottom LED changing from green to red. This means that low level signals can still be monitored for width,



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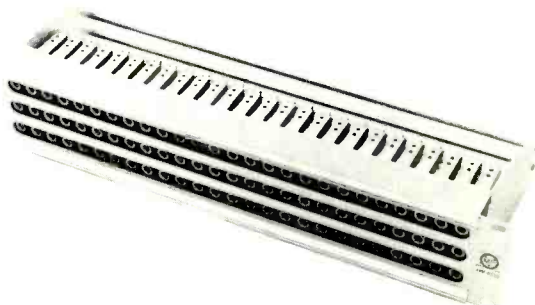
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REVIEW

phase and so on without sacrificing the precise calibration of the important higher levels.

It should be noted that *The Box* is a true peak reading instrument, so that peak levels are always displayed regardless of the signal's waveform. This can obviously produce discrepancies with the equivalent readings on, say, a vu meter, but should be clearer and safer, particularly when recording digitally. At the same time, subjective loudness and HF content—corresponding to the waveform—are indicated by the uniformity of brightness over the field of illuminated LEDs. For instance, a top-heavy display with dim areas or gaps near the bottom indicates a high HF content. The processing circuitry (which incidentally is entirely hardware—there is no software involved at all) operates extremely fast—5.4 MHz—giving a claimed response time 1.5 million times faster than a vu. Part of the reason for this high speed, apart from the need to accurately resolve the full audio spectrum, is the surprising fact that only one LED is ever alight at any given instant; the illusion of a solid continuous display is created jointly by this speed and human persistence of vision.

Phase differences between the two inputs produce distinctive characteristic patterns, appearing as a hook that becomes wider and flatter as the phase shift increases. The base of this hook runs up one of the baselines, and this shows which channel is leading. In the extreme case of complete 180° antiphase, both baselines light with the rest of the display blank. The appearance of these patterns can show up problems with mic placement, phase shifts introduced by signal processors—the results from my compressors and equalisers (although probably not untypical) were quite an eye-opener!—and can also help with setting up stereo delay effects such as chorus, flanges and delay-generated panning, since the speed and amount of movement show dramatically on the display. The phase measuring aspect is useful on the line-up side too; for instance, tape head azimuth can be accurately aligned using much lower frequency, more stable tones than usual. This too can be quite frightening, as *The Box* shows up problems other measuring instruments leave you happily unaware of but at the same time wows, flutters and scrapes all produce characteristic cyclic changes in the pattern, which, since they are much more obvious than with other methods, may lead to easier pinpointing and rectification of faults. In addition, the usefulness of such detailed instantaneous phase information in the cutting room goes without saying, as any out-of-phase components tend to produce undesirable vertical movement of the stylus.

This may seem like a lot of information to glean from one small box but I was surprised how quickly I became familiar with its characteristic patterns and how much I could see at a glance

about the signals I was dealing with. It's an ideal tool for anyone using or experimenting with stereo microphone techniques since mono incompatibility, holes in the middle, off-centre imaging and phase problems show up immediately and clearly. It could also be useful for duplicating microphone setups at later continuation sessions, as I found when I had to patch up a gap in a stereo piano track—*The Box* immediately told me, from its phase-incoherent pattern, that the original track had been recorded not with a crossed pair but with PZMs stuck to the lid. By the same token, coincident-pair, MS and spaced omni setups could be more accurately reproduced, and binaural recordings give a very distinctive pattern, which could help with setting inter-capsule distances.

There's no denying, on a more superficial level, that the display also looks impressive and eye-catching, and this has hidden advantages. At least 95% of the people who have come into my control room while I have had *The Box* have commented on it, guessed (wrongly) what it might be or asked for an explanation, and most have been so taken with it that they have spent their time mesmerised by the pretty flashing lights and have quite forgotten to interfere with what I'm doing, twiddle knobs and ask irritating questions. This leaves me a happier engineer at the end of the day.

If *The Box* has a weak point, it is the image it projects, with its early-BBC style wooden case, its plain anonymous face and its typed label stuck on the back. To say that it has not been aggressively marketed is the understatement of the decade and it has acquired associations with certain purist areas of the industry which lend it an air of esoteric eccentricity. For Frank Fox, its inventor, manufacturer, salesman and everything else, this is apparently quite deliberate; he sees it as his long-term mission to gently persuade the industry that his idea is a good one, and he won't sacrifice his standards, his preferences or his personal touch to speed the process up. In a way this is unfortunate because *The Box* merits wider exposure, and its simple and quirky image belies its power and its widespread relevance. If at first sight it seems expensive, it's worth checking the price of, for instance, twin MS PPMs and proper phase meters, either of which will only do part of what *The Box* does, and remembering that there are two more basic models compromising little on the spec of the *RSA-1*. Any facility taking itself seriously enough to be concerned about its metering, to worry about its products' external compatibility, or to consider augmenting its metering in any way, would do well to take a close look at what *The Box* can do.

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REVIEW

Dave Foister looks at the Scholz R&D Rockmodules, a set of effects boxes which could prove useful in the studio



I know several guitarists who turn up at the recording studio with more outboard equipment than some small studios possess, along with several highly expensive amplifiers and row upon row of pedals. Sometimes this works well, sometimes it produces the most horrendous lash-up of inappropriate equipment, plaguing the engineer with hum, noise and level problems for an end result that could easily have been achieved with the studio's own gear. I also know some who arrive with nothing more than a *Rockman*, Tom Scholz's ubiquitous box that grew in stature so rapidly from a portable headphone practice amp to a standard studio treatment device, and most engineers are now familiar with its operation and capabilities. Unfortunately, many now feel that the *Rockman* sound has become as familiar and recognisable as some of the more frequently used *DX7* presets, so perhaps a happy compromise between the two extremes is a selection of the five Scholz *Rockmodules*. These offer a range of effects, some specifically tailored for use with the guitar and some more general ones that could provide the basis for a simple multiple effects system in the studio. The designs of all five obviously share several common features, such as styling, the use of suggested 'normal' settings for many controls (indicated by small white triangles), the use of variable 'drive' levels affecting input and output gains, and the provision of footswitch selection for many of each module's functions.

Modules

The most obvious specific guitar effects are the *Sustainer* and the *Distortion Generator*, which will probably have few other applications apart from occasional use with organs and electric pianos. The effects produced by these units will probably be familiar enough, providing a wide range of control over sustain and distortion from clean through various semi-clean stages to extreme heavy-metal distortion, and allowing the use of good old controlled feedback even in the control room. There are several differences between the two modules, and the *Sustainer* is the more elaborate and versatile, featuring two independently-configurable channels (selected by footswitch), each with several different degrees of distortion (including the trademarked semi-clean and auto-clean settings) and what Scholz call a Smart Gate, which appears to be a dynamic filter, attenuating high frequencies at low signal levels. This works well on the kind of signals the device is likely to encounter and is easier to set up than a conventional level-only gate. However, I was surprised to find that on one (admittedly very old and basic) guitar I tried with the *Sustainer* there was insufficient gain available on the preamp to properly drive either the sustain/compressor section or the gate, although I suspect that few instruments would present such problems.

The *Distortion Generator* module provides fewer of these features but adds facilities purely for getting the most out of the powerful distortion generating circuitry, which almost always sounds more like the effect of a real amplifier (minus the hum and noise!) than an electronic box. These extra sections include pre-distortion EQ, control of the harmonic content of the distorted signal and a footswitch-activated Lead Boost circuit. It is of course very easy to go completely over the top with this unit but fortunately subtlety and variety are also possible—this is much more than

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REVIEW



outputs; the same slider simultaneously adjusts the left channel between 75 and 300 ms and the right between 125 and 500 ms, and a flashing LED shows the selected RH repeat rate. The specification does not say what kind of processing is used in this module but suffice to say the bandwidth reduces to 4 kHz at maximum delay. The manual passes this off as an attempt to simulate a concert hall or tape echo, and really with many guitar sounds the top end is not greatly missed. Feedback is thoughtfully adjusted in terms of the number of repeats, and can be set to infinity to produce a howlround, which even Scholz suggest could damage speakers and ears!

The remaining module is the *Instrument Equalizer*, a graphic whose centre frequencies and bandwidths are deliberately not spaced evenly across the spectrum in an attempt to make the module more useful in conjunction with instruments. Thus the full complement comprises a 62 Hz shelving control, standard octave frequencies at 125, 250, 8 k and 16 kHz, and seven narrower band controls from 500 Hz to 4 kHz, all controls giving a claimed ± 12 dB adjustment range. This certainly seems to give good control over the important areas of the guitar, and indeed the choice of centre frequencies may be a good compromise between octave and $\frac{1}{3}$ -octave EQ in many applications. The equalised sound is smooth and clean, avoiding most of the phasey honk of many cheap graphics.

Construction

A surprisingly disappointing aspect of the whole range is the quality of construction. The cases are mostly plastic and the controls are rudimentary to say the least. The sliders are bits of flimsy plastic sticking vulnerably through the panels and neither they nor the slide switches have anything behind the front panel slot to protect the switches and pots from the inevitable ingress of dust and muck. I would call the construction lightweight for studio use—for a product aimed at road use I would certainly expect something more substantial.

Presumably, however, the modules would be better protected if rackmounted using the optional mounting kit; each module is half a rack width and 1U high, making a collection of them quite neat and compact. All modules derive power from an external adaptor, and unfortunately although all run at 12 V there is no provision for linking power supplies through the units, necessitating the use of a separate transformer for each device.

Conclusion

Having said all that, being plastic, battery powered and less than rugged hasn't hurt the original *Rockman*, so probably won't hurt the *Rockmodules*. They would appear to form a pretty complete kit of parts for a comprehensive treatment system for the average working guitarist and I can well envisage them becoming an essential part of a studio's outboard complement, not only providing an extra set of useful general purpose effects but enabling engineers and guitarists to work together on their sounds using equipment with which they are both familiar and comfortable. □

Scholz R&D Inc, Dept J, 1560 Trapell Road, Waltham, MA 02154, USA.

UK: Dixies Music, 2 Stocks Walk, Almondsbury, Huddersfield, Yorks.

a mere fuzzbox. Most important with this and the *Sustainer*, the sound is under control, which is rarely the case when using amplification and acoustic means to achieve similar results.

The *Stereo Chorus* module is of course designed to complement either of the distortion-based units to produce the kind of end result expected of *Rockman* equipment. Its four preset stereo direct/chorus panning configurations provide more versatility than most dedicated chorus boxes and, unlike many budget chorus units, it does not have a particularly distinctive colouration to its sound—it adds a rather more subtle chorus, which is particularly effective on the distorted guitar sounds produced by the other *Rockmodules*, as well as on rich synthesiser sounds. In common with the other non-distortion modules the Chorus controls are extremely simple, comprising the

stereo switching already mentioned, a sweep speed slider and a Long Chorus switch, which halves the selected sweep rate. This doesn't exactly make it the most versatile effect in the world but most common variations are available and it is extremely quick to set up. Obviously it was designed that way with the stage in mind but there are sometimes advantages in the studio to simple devices with a minimum number of controls to twiddle, especially (dare I say it) when certain non-technical personnel are attempting to find the effect they want.

The same can be said of the *Stereo Echo* module, whose only controls are echo time, feedback and stereo routing switches similar to those on the chorus module. The stereo effect of this simple delay line is produced by having different delay times on the left and right

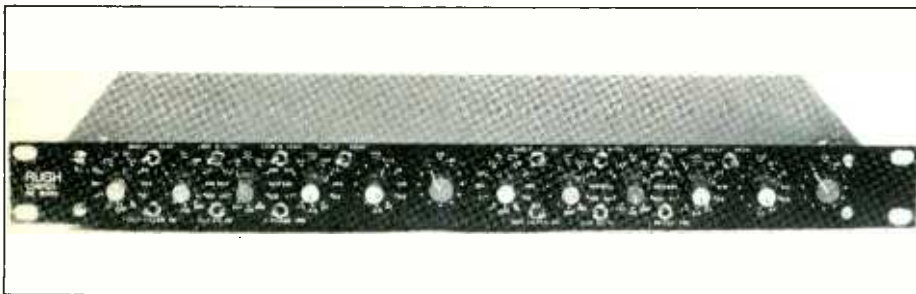
REVIEW

A technical evaluation on the RE15249 equaliser from Rush Electronics by Sam Wise

Rush Electronics RE15249 2-channel outboard equaliser contains two independent 4-band equalisers with switchable high- and lowpass filters and variable gain. The equaliser functions and the sound quality are said to match those of the older Neve 1081 and 31105 channel modules. These statements by the manufacturer have not been verified.

The RE15249 is designed to meet market demand for a channel equaliser with a different type of sound character to that found in many of

today's mixing consoles. The equaliser design is based on a passive circuit using a resonant inductor/capacitor pair to create the basic filter shape. The centre frequency is changed by switching different capacitor/inductor tap combinations into a traditional Baxendall type of boost/cut circuit. This contrasts with current practice where the resonant filter shape is generated by various electronic means, which are cheaper, smaller and lighter, as well as being very flexible in terms of filter shape variation. The truly parametric equaliser common today is simply not practical using the older style



Manufacturer's specification

Input Impedance 10 k Ω , transformer isolated, balanced and earth free: maximum input level +20 dBu. Optional electronic balance or microphone level input available.

Output Impedance 75 Ω , transformer balanced and earth free: maximum output level +26 dBm into 600 Ω . Optional electronically balanced output available.

Distortion: not more than 0.01% at +20 dBm from 50 Hz to 15 kHz.

Frequency response: ± 0.5 dB, 20 Hz to 20 kHz, -1 dB at 10 Hz and 35 kHz.

Noise: output noise < -80 dBm at all settings of the gain control.

Gain: line input version (as tested) adjustable 0 dB to -20 dB on front panel control. Gain range can be further adjusted internally. Mic input version -80 dB to -20 dB in nine steps. Gain pot on front panel works as above.

HF: five switched frequencies, shelving or peaking, continuously variable 17 dB cut or boost at 3.3, 3.9, 4.7, 5.6, 6.8 and 8.2 kHz.

HF presence: 10 switched frequencies with continuously variable 17 dB cut or boost, high or low Q selection. Peaking at 1.5, 1.8, 2.2, 2.7, 3.3, 3.9, 4.7, 5.6, 6.8 and 8.2 kHz.

LF presence: 10 switched frequencies, continuously variable 17 dB cut or boost, high or low Q selection. Peaking at 220, 270, 330, 390, 470, 560, 680, 820 Hz, 1 and 1.2 kHz.

LF: five switched frequencies, shelving or peaking, 17 dB cut or boost at 33, 56, 100, 180 and 330 Hz.

HP filter: five switched frequencies, 18 dB/octave at 27, 47, 82, 150 and 270 Hz.

LP filter: as above but at 3.9, 5.6, 8.2, 12 and 18 kHz.

EQ switch: selects equalisation in or out of circuit.

Filter switch: selects filter in and out of circuit.

PH switch: gives 180° phase change at the output.

Other HF and LF frequencies and filters: available to special order; HF presence: 2.0, 2.5, 3.2, 4.0, 5.0, 6.3, 7.0, 8.0, 10.0 and 12 kHz; LF presence: 100, 140, 200, 300, 400, 500, 630, 800 Hz, 1 and 1.4 kHz.

The remote psu contains the mains transformer, rectifier and smoothing capacitors, and filtering on the mains input is incorporated to prevent mains borne interference. The DC supply regulator is in the main equaliser unit.

An alternative model, the 15250, is also available. Specifications are as 15249 but output +24 dBm; shelving only on HF and LF; no Q on Presence controls; no high and low filters or phase reverse.

Dimensions: (whd) main unit—19 \times 1 $\frac{3}{4}$ \times 10 $\frac{1}{2}$ in/483 \times 44.5 \times 314 mm; psu—5 \times 4 \times 10 in/125 \times 100 \times 250 mm.

Worldwide distribution: MTR Ltd, Ford House, 58 Cross Road, Bushey, Herts WD1 4DQ, UK.

FIG 1 HP AND LP FILTER FREQUENCY RESPONSES
HP FILTER AT 27, 47, 82, 150 AND 270 HZ
LP FILTER AT 3.9, 5.6, 8.2, 12 AND 18 KHZ
ALSO SHOWING FREQUENCY RESPONSE WITH FILTERS OFF

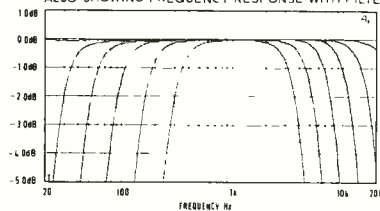


FIG 2 LF EQUALISER RESPONSE
UPPER CURVES SHOW FULL BOOST SHELVING FUNCTIONS AND LOWER CURVES SHOW FULL CUT PEAKING FUNCTIONS AT 33, 56, 100, 180 AND 330 HZ

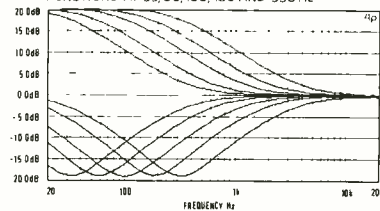
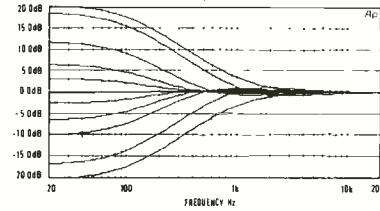


FIG 3 LF (100HZ) EQUALISER RESPONSE LAW



technology. But it is true to say that although the reasons are not yet clear, these different equaliser types do not sound the same. For those who know and love the sound of the original Neve equalisers, the Rush equaliser may be a way to have some in the studio without giving up the obvious benefits of modern mixer technology.

The unit is housed in a 1U high rack-mounting case. Rubber feet are fitted for free-standing use. The chassis is aluminium, while the covers are of steel, everything finished in black eggshell paint. Unpainted ventilation holes drilled in the case sides give the unit the look of a prototype, as does the quality of the white screen printed legend, which seems well stuck on but not so well printed. Since the audio transformers are mounted in the back of a rather deep case, rear supports are recommended for mobile use but the unit is otherwise sturdily built.

Front panel controls

All the equaliser controls use deep concentric knob sets, with the switched frequency at the rear and the fully variable boost and cut control at the front. At the left end of the front panel an LED indicates the presence of DC power on the unit. To the right of this are the high- and lowpass filter switches, highpass at the rear. Each allows the choice of five frequencies plus an off position. These filters each roll off at 18 dB/octave. Fig 1 shows the resulting response curves, which accurately match the specification. Below and to the right is a FILTERS IN/OUT toggle switch affecting both filters.

Next are the low frequency band controls, covering the range from 33 to 330 Hz in five switched steps and providing a specified ± 17 dB of boost/cut range. Above and to the left of this is a SHELF/PEAK toggle switch allowing the selection of the required filter shape. Fig 2 shows the response of this equaliser in the full boost/full cut condition. Note the breadth of the peaking filter response, this is one likely cause of what the

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REVIEW

manufacturer describes as a 'smooth, musical sound'.

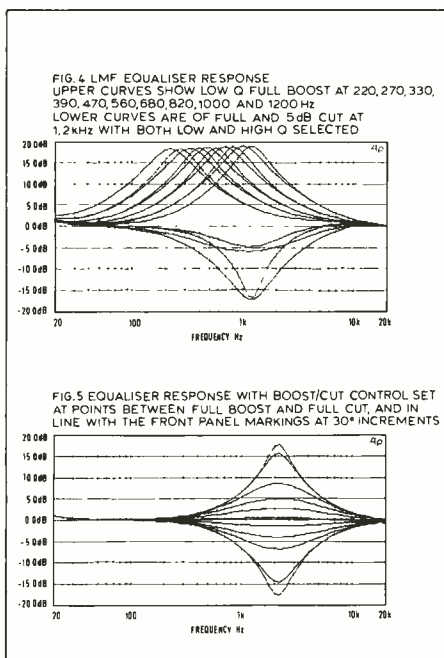
Fig 3 shows a further beneficial design characteristic. Each of the curves represents increments of 30° of boost/cut pot rotation. Note that there is an increasing effect as the pot is wound up as shown in Table 1. Thus it is easy to get a subtle amount of boost or cut if required, with a very broad almost inaudible curve leading into and away from the centre frequency. As a voice or instrument moves in frequency up and down the curve, there will be no sharp transition point to make a harsh sound. As shown in these curves the actual control range exceeds the manufacturer's specs, reaching ±20 dB in shelving mode and ±18 dB in peak mode. The specified frequency centres are again accurate.

Pot rotation	Change between curves
30° CW	3 dB
60° CW	4 dB
90° CW	5 dB
120° CW	6 dB
150° CW	2 dB

Moving further along the front panel, the next pair of controls cover the low mid and upper mid equaliser regions. Both provide 10 frequency selections and OFF. Low mid covers the range from 220 Hz to 1.2 kHz, while the upper mid covers 1.5 kHz to 8.2 kHz. Each is provided with a toggle switch to select Low or High Q filter shapes. Again the specified control range is ±17 dB. Fig 4 shows the measured response curve of the low mid section. Note that even in the low Q position, these curves are narrower than those of the LF equaliser, while still being quite broad. As with the LF equaliser, the frequency centres are accurate and the boost/cut range is better than specified. A check of the boost/cut control law of the high mid section in Fig 5 shows much the same as the LF control law, gentle control over the smaller adjustments, with increasing effect for more violent adjustments.

The last equaliser is the high frequency section. Like the LF section this has five frequencies and OFF, with an associated SHELF/PEAK toggle switch. The frequency range covered is 3.3 kHz to 15 kHz. On the unit tested all four of the SHELF/PEAK switches were mounted back-to-front, self selecting peak and vice versa. This is a simple assembly error that should have been caught during manufacture. Fig 6 shows the response curves for the HF section.

Beneath the low mid controls is an EQ IN/OUT toggle switch affecting all four equaliser bands. To the right of this is a PHASE INVERT switch. The last control in each section is the gain control, which has a range of 0 to -20 dB. The remaining



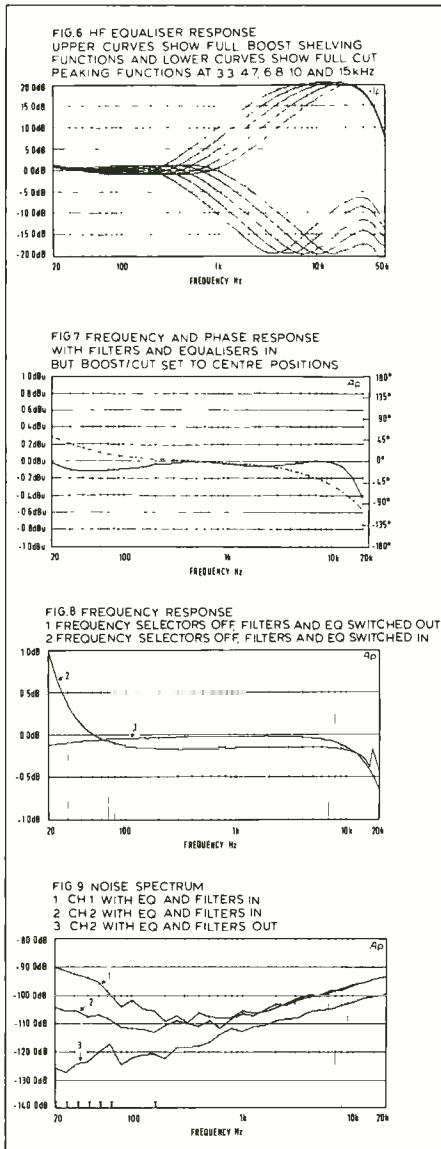
front panel controls are a duplicate of the first set for the second channel.

One unusual feature of the equaliser is the orientation of the boost/cut controls. Instead of having the 0 position at the top as is usual, this is located at the bottom of the pot. Clockwise rotation boosts the frequency band as expected but a quick glance at the control knob could lead to confusion since it points left rather than right. Having once designed a large mixing console like this myself in order to make the knob calibrations more readable by the operator, I am not sure that it is a good idea since the norm is the other way up. The control layout also takes some getting used to, particularly relating the toggle switches to their correct controls. Perhaps coloured slip-on caps for the toggles to match the respective knob caps would help.

Frequency and phase response

The frequency response of a device that is intended only to bend frequencies is not critical

Channel 1	Channel 2
-82.5 dBu	-86.9 dBu
-86.6 dBu	-87.6 dBu
-75.9 dBu	-76.8 dBu



when the equalisers are switched in. In this case, visually centring the knobs resulted in a response variation of up to +0.8 dB. A little tweaking gave the result shown in Fig 7, which is within ±0.1 dB throughout the audio range. The phase response shown in this figure is smooth, ranging from +45° at the LF end to little more than -90° at the HF end due to the useful built-in high frequency roll-off. In Fig 8, curve 2 shows the frequency response with frequency selectors set to their off positions and equalisers switched in. The former is outside the manufacturer's specifications, but unlikely to be audible.

Noise performance

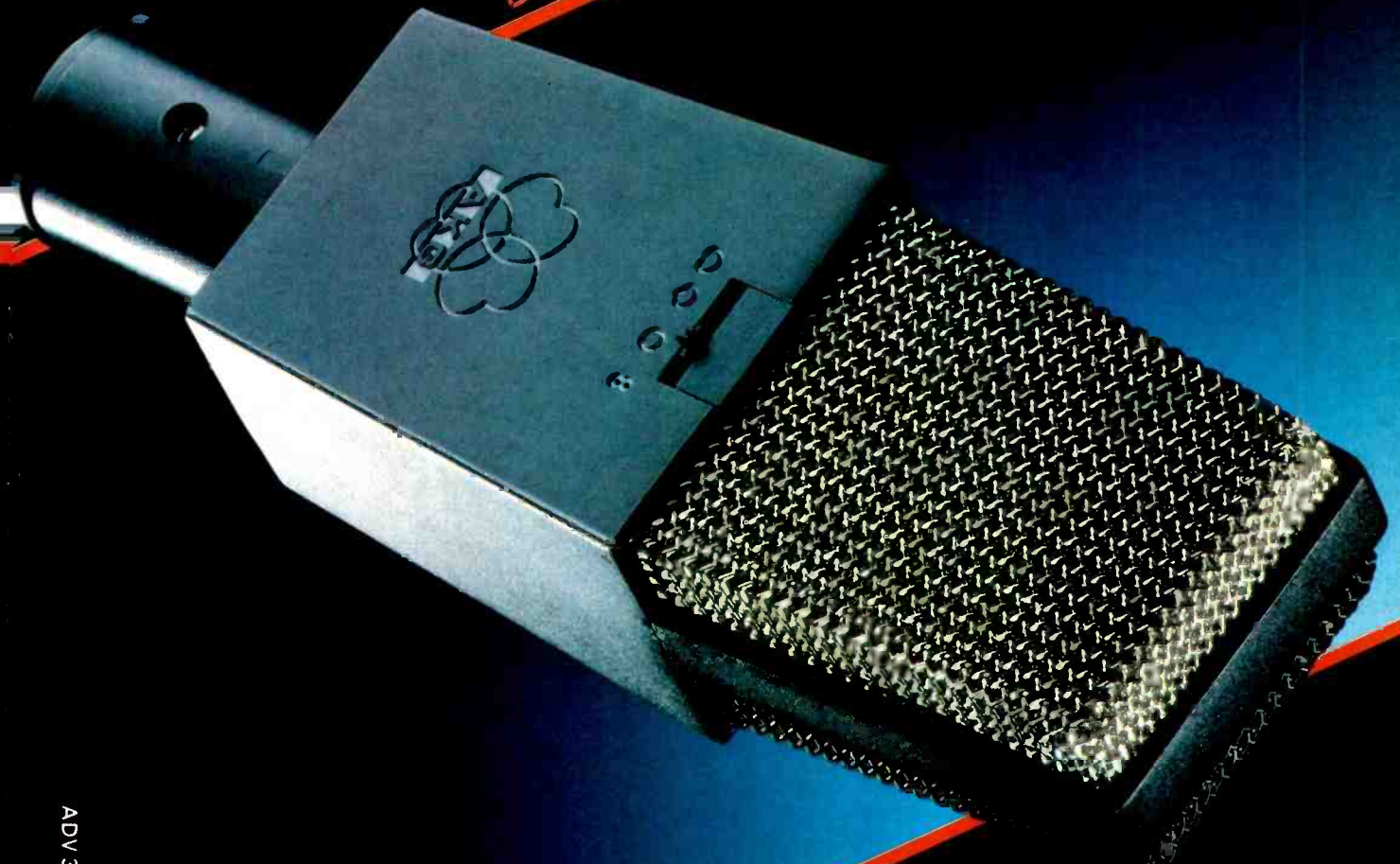
Fig 9 shows the 1/2-octave bandwidth noise spectrum for the unit. There is no evidence of any mains power components in these curves, which is to be expected since the raw DC power supply is externally mounted. One of the two channels, however, exhibited excess low frequency noise, probably due to a substandard IC. Curves 1 and 2 show the difference between the two channels at

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the LF end. With the filter and equalisers switched out there is a decrease in noise as would be expected. Table 2 shows the broadband noise performance of both channels. For RMS measurements the unit meets the manufacturer's specification, while weighted CCIR measurements exceed it. Both are acceptable. As will be obvious later, this gives a useful dynamic range of over 110 dB.

Distortion and headroom

Measured distortion is well outside the manufacturer's specification of $\leq 0.01\%$ from 50 Hz to 15 kHz at +20 dBm. Curve 4 on Fig 10 shows that under these conditions the distortion never even went down to this level at any frequency. The same was true for both channels. Reducing the output loading by replacing 600 Ω with 100 k Ω , gave the measurements shown in curve 3, while at lower output levels curves 1 and 2 resulted. Most of the distortion was second harmonic (and therefore relatively musical) except at high levels and high frequencies where the third harmonic became more evident. All methods of IMD measurement yielded very low residuals, of the order of 0.005%.

What is unusual about this device is that it is almost impossible to overload, these distortion figures are a real worst case. To test the input overload point, +30 dBu was input and the gain control set to unity. Measurements were made at 100 Hz, 1 kHz and 10 kHz. For this test, the output level was +29.7 dBu into 100 k Ω . Distortion was less than 0.004% at 1 kHz, rising to only 0.04% at 100 Hz and 10 kHz. It was impossible to overload the input of the Rush equaliser using the available test equipment, which has a higher output capability than most professional audio equipment.

To confirm the output clipping point, the equaliser controls were turned up until a distortion level of 0.7% was reached. This occurred at +34.4 dBu at 100 Hz and 1 kHz, and 33.8 dBu at 10 kHz. Then to check the internal clipping level, the gain was turned down to minimum at -20 dB, and the equalisers wound up to reach clipping again. This occurred at an output level of +29 dBu. Further tests of the output under 600 Ω load conditions were not made since this is unlikely to occur in practice with this type of equaliser. What this means in summary is that no matter what you do, this unit will not squeal, something somewhere else is likely to give first. This will undoubtedly give transparency to high level transients compared to many modern

mixers, which have severely limited headroom. If it truly represents a feature of the design of the early Neve input channels, it may be one of the reasons for their fame, because the channel fader will soak up this extra level silently unlike following electronics. Since the output transformers are probably used to give the extra voltage gain, this advantage might be reduced in electronically balanced versions.

Impedances were as specified, measuring close to 10 k Ω on the input and 75 Ω on the output.

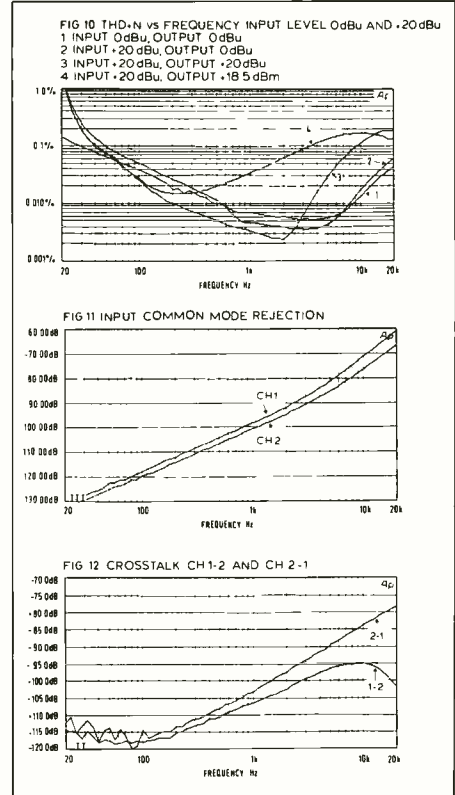
Common mode and crosstalk performance

Fig 11 shows the input common mode rejection of both channels. Both are good, especially so at low frequencies corresponding to mains interference. As shown in Fig 12, there is little to worry about, either, in terms of crosstalk between the two channels.

Internal construction

Each equaliser channel is mounted on a separate PCB occupying half the unit's width. These are securely mounted on aluminium cross rails. Each set of the front panel components are hand-wired on to flying sockets that plug into the PCB for ease of service. The rotary and toggle switches appear to be gold plated, while the connectors are not. A further PCB holds the power supply regulators, the raw DC coming from the external power supply unit. The assembly appears to be of an acceptably high standard. There is no layout legend printed on the PCBs, nor were any layouts, circuits or servicing instructions provided with the unit.

Rear connections consist of a 4-pin XLR for

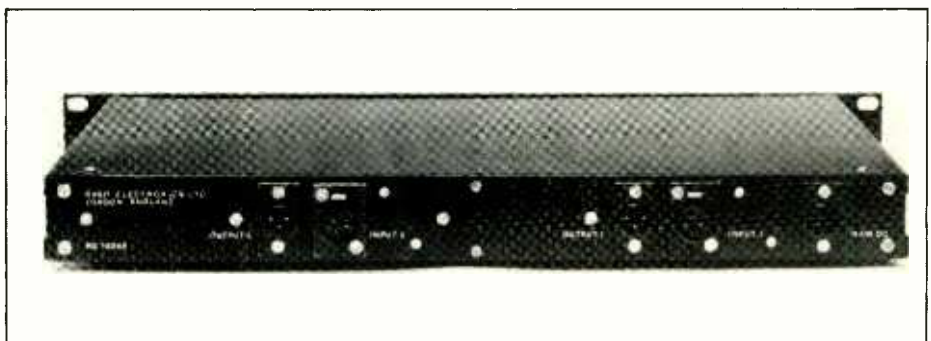


incoming power, and standard 3-pin XLR-types for the balanced audio inputs and outputs.

The separate power supply box is a free standing unit, which also looks like a prototype externally, complete with Dymo tape label. Internally, it is quite well made with a single PCB containing all major components. A front panel mounted LED indicating the presence of low voltage AC, and an ON/OFF switch are the only external features. Mains input and raw DC output cables are retained to the unit. Both voltage selection and the mains fuse are internal. None of the markings required by BS415 are on the unit, so voltage and fuse ratings are a matter of guesswork.

Summary

The Rush Electronics RE15249 appears well made, if a bit prototype-like in its present form. As an external alternative to a mixer's equaliser section, the test is in the ear of the user. Certainly, it is unlikely to change its sound character with any level thrown at it. The broadness of its filters and the ease of making relatively subtle equalisation changes will probably contribute to its success in bringing clarity without harshness to musical recordings, particularly to the human voice. Does the means of achieving these with real inductors make any difference? That is at this point difficult to say, wouldn't it be interesting to know for sure? □



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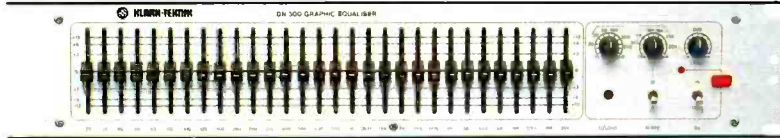
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30 band 1/2 octave graphic equaliser - Frequency response $\pm 0.5\text{dB}$ (20Hz - 20kHz), Distortion (+4dBm) $<0.01\%$ at 1kHz, Equivalent input noise $<-90\text{dBm}$, Auto-bypass failsafe, Low and High pass variable filters, Balanced XLR input and output.

Also available for stereo applications DN360 Dual Channel 30 band 1/2 octave graphic equaliser.



DN300

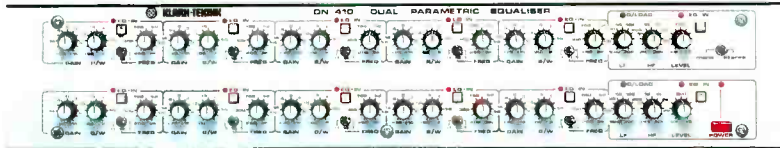
GRAPHIC EQUALISER



Why the world's leading sound system designers confidently specify Klark-Teknik

Dual channel 5 band parametric equaliser - Frequency response $\pm 0.5\text{dB}$ (20Hz - 20kHz), Distortion (+4dBm) $<0.01\%$ at 1kHz, Equivalent input noise $<-90\text{dBm}$, 100% Frequency overlap for each filter + variable bandwidth, Bypass, XLR inputs and outputs.

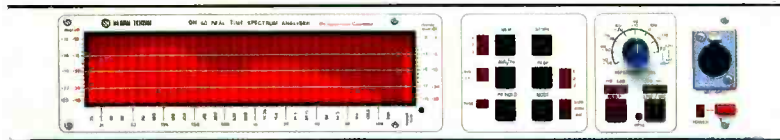
Also available DN405 Single Channel 5 band parametric equaliser.



DN410

PARAMETRIC EQUALISER

Real time audio spectrum analyser - 30 band 1/2 octave + overall level, LED display, Pink noise source, Mic/line XLR input, AT1 measuring microphone, X-Y plotter output, Add-on reverbation analyser available.



DN60

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They rely on

■ Klark-Teknik's proven ability to consistently manufacture products which meet or exceed the most stringent system specifications

One input-three outputs digital delay line - Frequency response $\pm 1\text{dB}$ (20Hz-20kHz), Distortion $<0.01\%$ at 1kHz, Dynamic range $>90\text{dB}$, Minimum increment 20 micro sec, Delay range 0-1.311 sec, Digital conversion 16 Bit Linear, XLR terminated input and outputs.

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■ Engineering integrity that guarantees the most durable and outstanding product quality in the industry

Digital reverbation system - Bandwidth (reverb model) 20Hz-12kHz, Distortion $<0.03\%$ at 1kHz, Dynamic range 85dB, Digital conversion 16 Bit Linear, Arithmetic processor 32 Bit, Stereo processing, Balanced XLR input and outputs, 7 parameter control, 28 programme library, 50 user memories, Midi interface, Updatable programming, Remote control.



DN780

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■ Consistent ability to satisfy supply schedules

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The first name with sound system designers

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For a 16 or 24 track studio owner, the future looks very good.

With MIDI systems and digital outboard, you can already achieve extremely sophisticated productions.

But it's very hard to find a recording console to match that standard, without spending a small fortune.

That's why we've developed the new Series 6000. An evolutionary design that demonstrates how far Soundcraft are thinking ahead.

Behind the classic layout is a revelation in performance and facilities.

For a start, it's equipped with enough buses and routing options to make adventurous production a pleasure, rather than a chore.

It's a full 16 or 24 bus console, plus six

auxiliary sends per channel. Each of the tape returns has EQ, which with its 'split' format naturally means they'll double as extra inputs.

We've also provided each input with push-button routing, EQ by-pass and programmable electronic muting that gives you none of the clicks ordinary switches produce.

There's even true solo-in-place, sadly lacking on many more expensive desks.

But it's the 6000's sonic performance which really puts the competition in the shade.

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So nothing will change your sound, except our acclaimed, four-band sweep EQ.

In a word, purity.

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The Series 6000 is simply the most comprehensive production console in its class.

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Soundcraft
6000

If only more expensive desks performed as well.

