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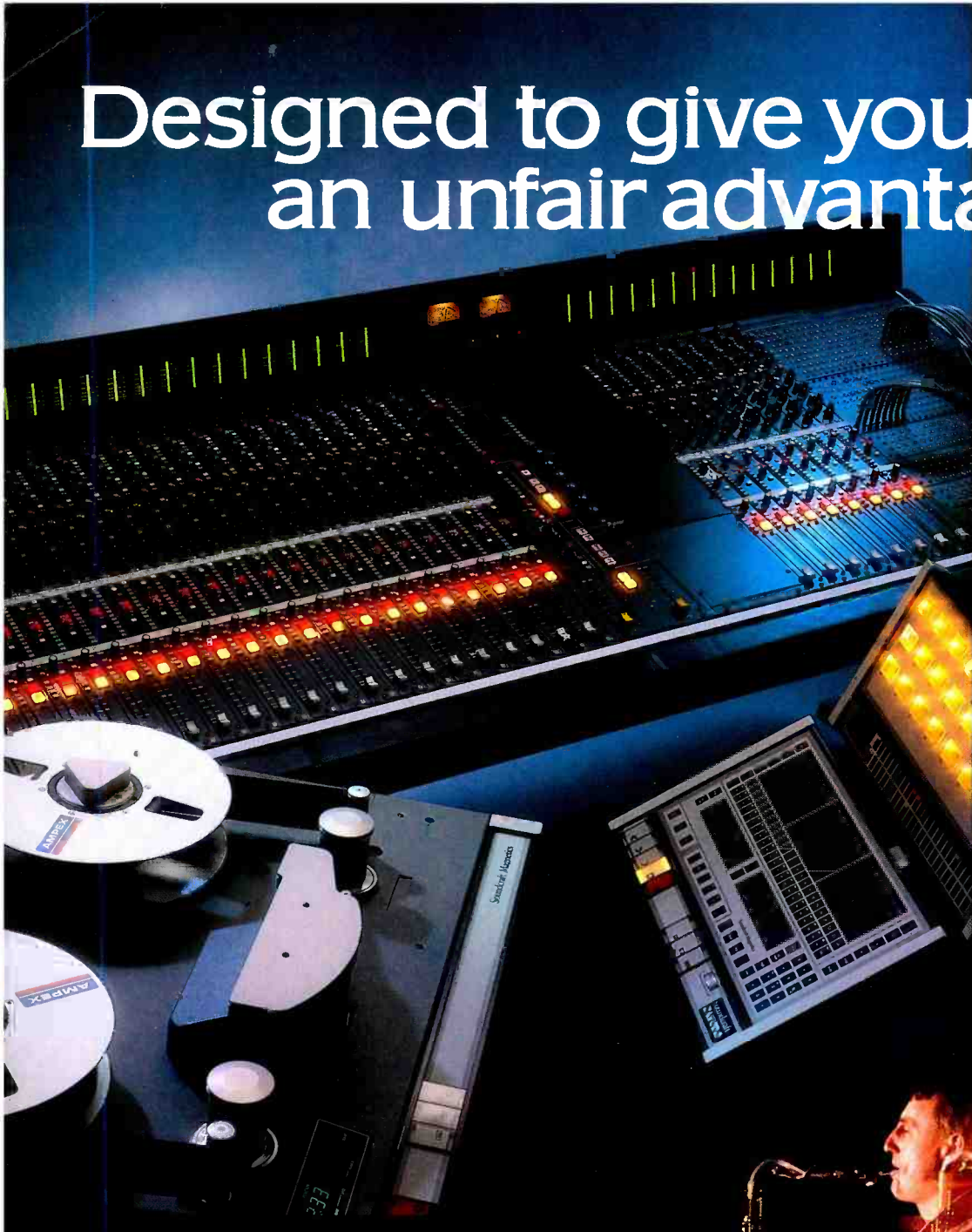

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Soundcraft USA (213) 453 4591. Soundcraft Canada (514) 685 1610. Soundcraft Japan (03) 341 6201.

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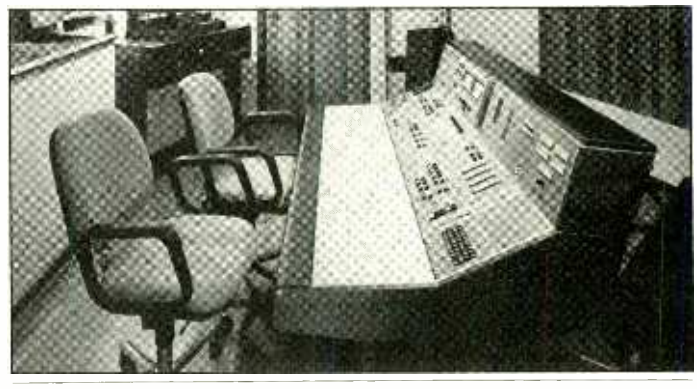

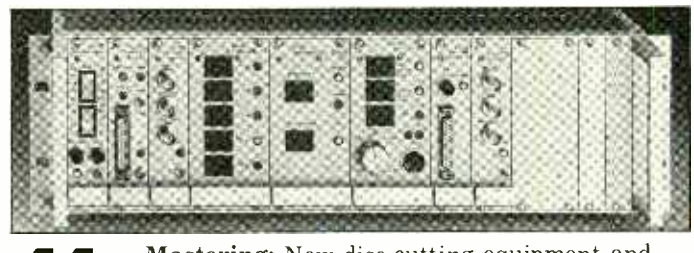

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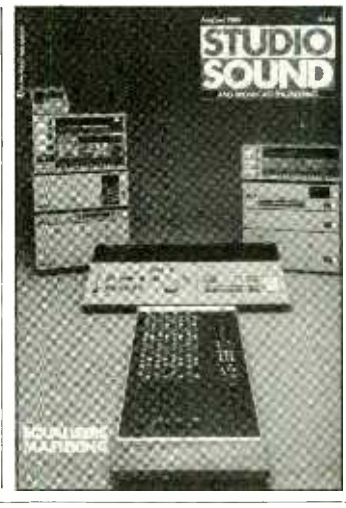

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EDITORIAL

EDITORIAL

This month's comment from Carl A Snape

The mix they couldn't fix

It's interesting to speculate on just where precisely the recording engineer's responsibilities finish these days. Most engineers and studio owners would no doubt say with the satisfactory completion of the master tape and therein lies the rub. Just what precisely is a satisfactory master tape? Is it simply the take that the producer is happiest with, or does the recording engineer have a responsibility beyond that? The master may be the definitive statement as far as the session is concerned but that doesn't always mean that it will transfer satisfactorily to tape, disc or CD.

In the early days of recording, recording engineers were all too familiar with the problems of tape to disc transfer: they had to be for in many cases it would be they who cut the acetates for the artists, publisher and record companies. With the coming of the compact cassette the need for recording engineers to be adept at disc cutting has all but disappeared. In many ways this is a great pity because a year or so working in a disc cutting suite would almost certainly teach a novice engineer more about good and bad recordings than any other form of training. In the course of a few weeks, the average disc cutting engineer is exposed to an unbelievable variety of master tapes and in a short period of time will quickly develop an intuitive feel for what types of recordings transfer well and which cause problems.

Nowadays the role of the disc cutting engineer has been extended. In the early days with few independent recording studios the major record company studios worked closely with the disc cutting engineer. In a lot of cases all that was required was a straight 'one to one' transfer—a precise (or as near as possible) duplication of the original master tape on disc. Then with the coming of the multitrack machine and the 'fix it in the mix' syndrome things started to change and the typical cutting room moved into the area of audio sweetening or post-production.

Now I'm not a firm believer in the idea that thousands of engineers across the world are forever saying they will fix it in the mix. There are occasions, however, when things end up on the multitrack that shouldn't have. Things also finish up on the master tape that shouldn't have and there is many a disc cutting engineer who will tell you tales of desperate producers trying to salvage something usable from a particularly fraught mixing session. This is life. What is not so funny are the master tapes that on the surface may seem okay but for a whole host of reasons won't necessarily transfer well (or even at all) to vinyl without at least some compromise either in level or frequency response or stereo integrity.

Phase is and always will be a problem simply because of the electro-geometric relationship of the cutting process and now with the proliferation of keyboard instruments the thought of what a random 20 Hz out of phase signal could do to the geometry of the groove is enough to make the average disc cutter's toes curl. The same applies to high levels of extended high frequencies. They may sound great on the monitors but they will inevitably cause problems later on at the disc cutting and/or manufacturing stage.

With perhaps eight or nine synths all chained together the chances of finding something out of phase could be quite high. Especially if the equipment has been connected together with just any likely looking lead that appeared to work. Even small amounts of out of phase signals can diffuse the stereo image and the accumulative effects through equalisers, op-amps, azimuth settings, replay amplifiers and crossovers will undoubtedly take their toll on the sound in the control room and the final replay of the disc. Keeping the phase as coherent as possible right from the start would seem the best form of defence.

Perhaps there is even a reasonable case for fitting a post EQ 'phase trim' pot on each input channel during recording and remix to ensure that the sound stays as coherent as possible then at lease any subsequent degradation and likely problems for the disc cutting engineer would tend to have, overall, a far less dramatic effect and the mix they couldn't fix may well, for some producers, become a thing of the past.□

STUDIO SOUND
AND BROADCAST ENGINEERING

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It also lets you practice anywhere, at any volume without a rehearsal studio or eviction notice. Because instead of amps and speakers, you use headphones. Just plug the HC 6 into the mixer and you can play at earshattering levels, without feedback. At Rane, we never say never. Are you listening to us, Mick?

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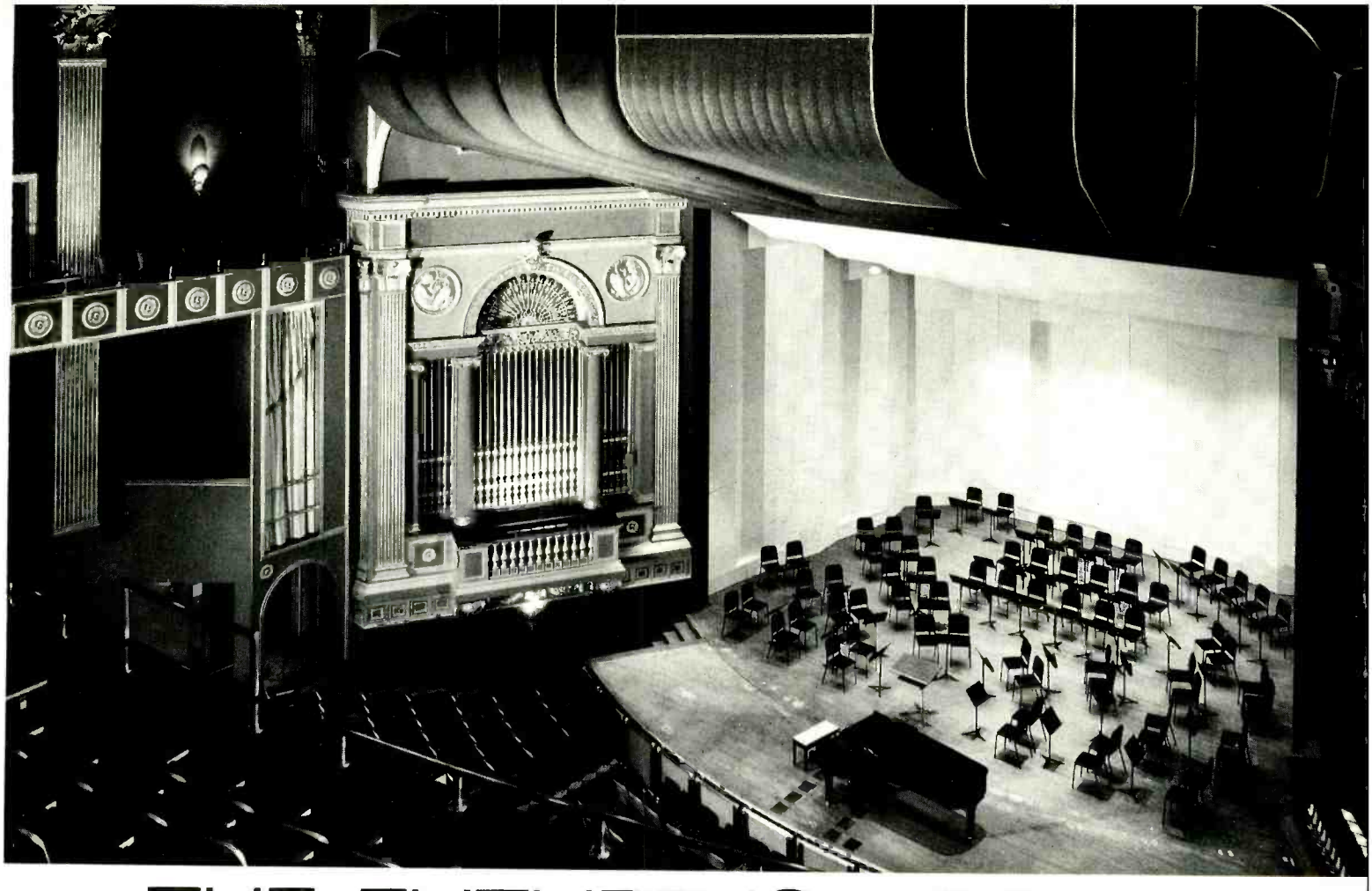

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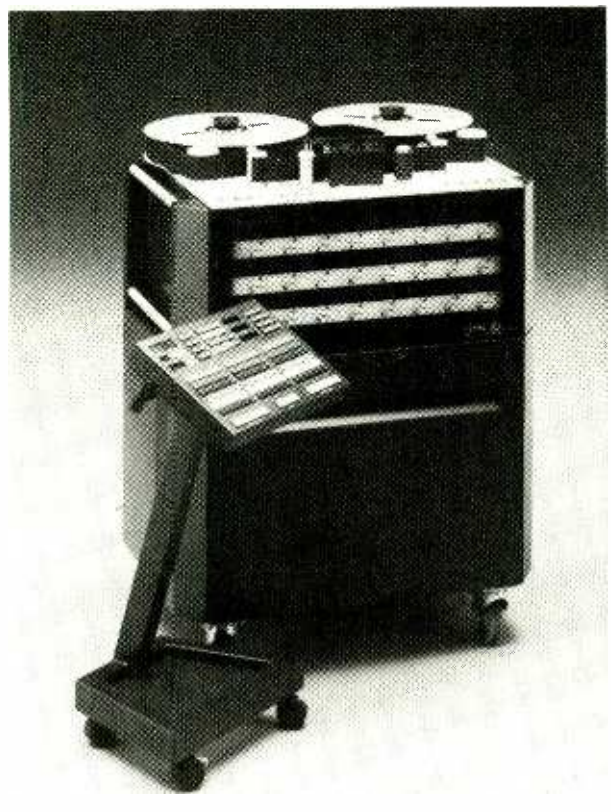
Lyrec TR 533

'BUILT'

The one word that describes, not only our engineering, but also our concept of uncomplicated design solutions.

Technology where it counts – and only where it counts – is Lyrec policy. We have gone to great length to ensure that high technology and "bells and whistles" are kept out of designs unless really required. Micro-processors, for arguments sake, are only used where they are at their advantage. Uncomplicated and easily understood solutions to design problems are always preferred as long as performance remains uncompromised. Readily available and well proven components keep production and end user maintenance costs down.
The Lyrec TR533 is available in 16 or 24 track versions on 2" tape format and with two metering options.



The standard version has its VU meter panel built into the compact mainframe, thus reducing overall size.
Optionally the machine is available with its metering panel mounted in the more traditional overbridge fashion.

- User friendly tape transport logic.
- Servo controlled solenoids.
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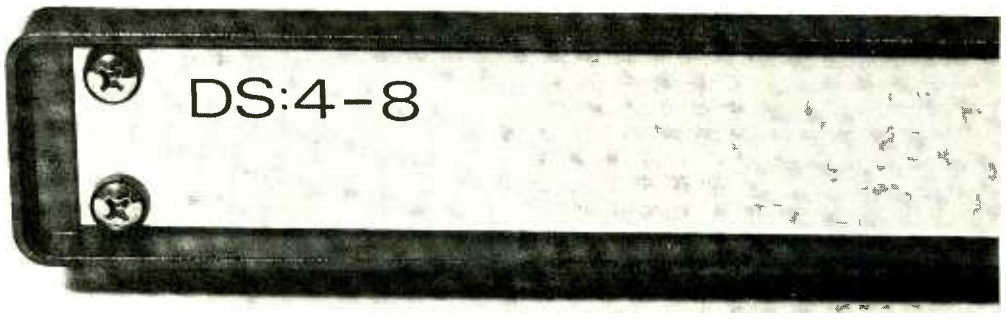
Technology where it counts

DS:4-8



The DS:4-8 is a 16-Bit linear sampler/sequencer with 8-voice, 8-channel plus MIDI outputs. The sampling frequency is 44.1 kHz and the sampling time is 12 seconds. A double memory model is available with 24 seconds capability.

The host computer is the APPLE II and existing DS:3 owners will already have the computer and peripherals required. Large capacity disk drives are available ensuring excellent sound storage facilities.

Software controlled digital delay programs allow the full 16-bit quality of the DS:4 to be used in the studio in addition to the very powerful sampler/sequencer facilities.

The DS:4 is a system. Software updates and new programs will ensure continuous development and progression and will, like the DS:3, demonstrate Greengate's commitment to a policy of non-obsolescence. We do not believe in the concepts of 'Last year's model'.

12 second model:	£1,500
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The flexibility is remarkable – 63 programmes in full stereo, everything from plates to massive halls, decay time from 0.2 secs to 20 secs, and nine gated and four reverse room programmes, *so clear,* they will astound you.

Easily interfaced with most mixing desks, instruments and home recording studios, the MIDIVERB can be used stereo in/stereo out or mono in/stereo out. The reverb programmes in the MIDIVERB can be changed rapidly either manually on the unit, or from another MIDI device through any of 16 selectable MIDI channels.

Specifications

Frequency response	20Hz to 10kHz
Dynamic range	80dB Typical
Programmes	63, Preset
Inputs	Stereo & Mono, Phono Jack, 50 Ohms
Outputs	Stereo, Phono Jack, 600 Ohms
Controls	Increment Prog/Midi Decrement Prog/Midi Midi channel select By-pass Mix (on rear)
Midi Connections	Midi In, Midi Through

New Digital Reverb Design

All this has been made possible by a new design approach, borrowed from the most recent trends in computer hardware: RISC Architecture (Reduced Instruction Set Computer). RISC designs provide the programmer with a very small set of possible instructions that execute very quickly as opposed to more complex machines that offer more apparent power but operate slowly. RISC machines are simpler and less expensive and even though at first glance seem to have limited power, they often out-perform their bulkier counterparts.

The MIDIVERB uses an extremely specialised instruction set that runs at 3 million instructions per second, much faster than most systems on the market today.

Contact Sound Technology for your nearest dealer, or send £1 for a demonstration cassette.

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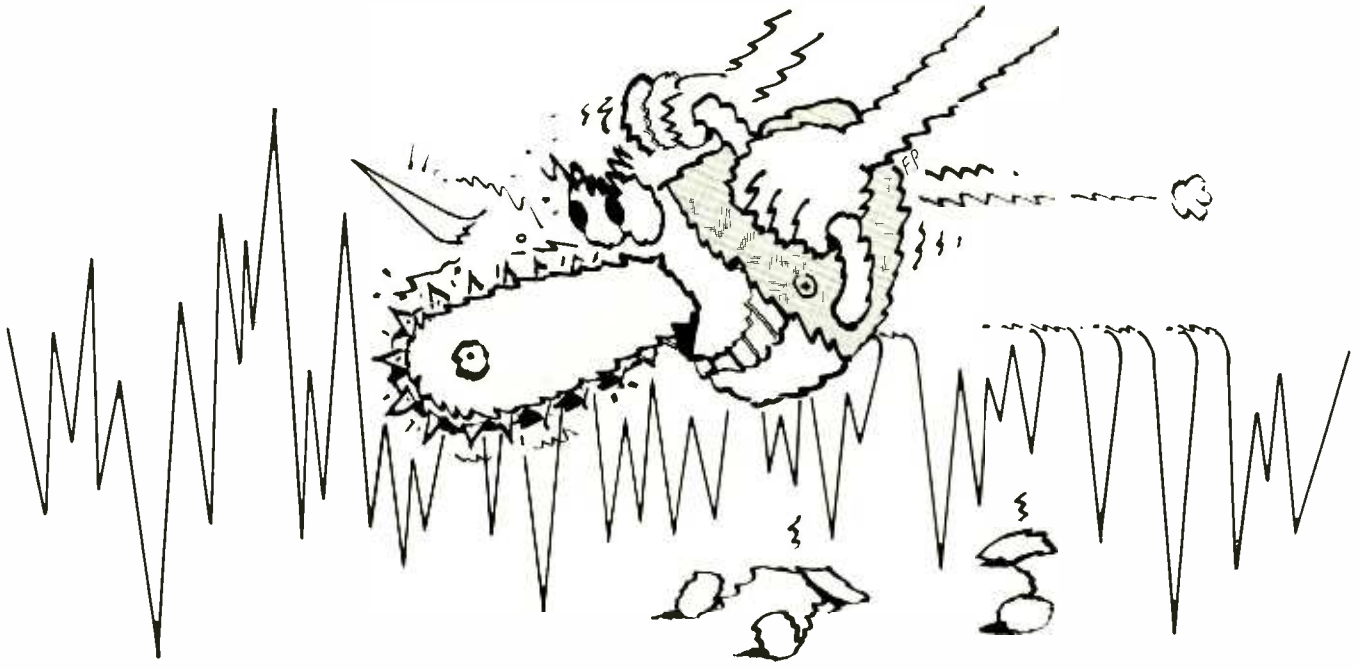

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Most limiters are far from perfect...literally chopping up your sound. The new Aphex Dominator™ is the perfect solution.
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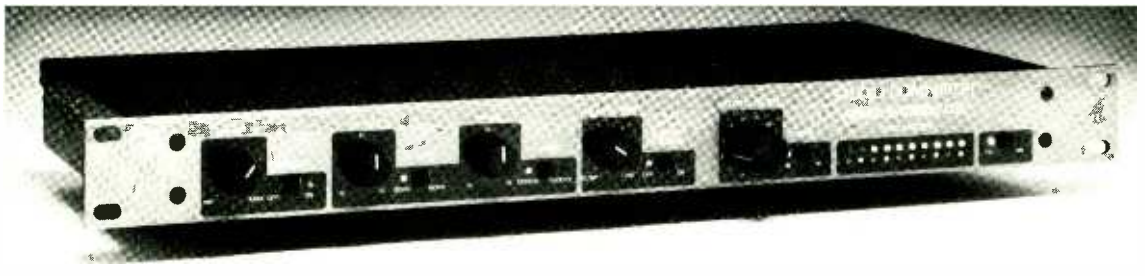

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People, events, services

TV and recording consultancy

Audio Facilities Ltd is a company set up to provide a professional service for the television and recording industries. To this purpose they have recruited a team of technicians whose experience encompasses all areas of audio production and post-production.

Services provided include consultancy, provision of all types of audio equipment, planning, design and installation work in all areas of professional audio and operational staff from one boom operator to a team of operators experienced in digital audio for television.

Audio Facilities, Limehouse Studios, Canary Wharf, West India Docks, London E14 9SJ. Tel: 01-987 2090.

K-Tek purchases M&A

K-Tek has recently purchased the entire rights to the M&A series *4* mixing console and has moved the business to the company's Surbiton, Surrey, UK base. All series *4* components will remain available with modules now being available in kit form. With the series *4* it is possible to build a mixer up to 70 modules with 4 aux sends as standard but with user modifications allowing an increase to 6, and up to 16 output groups.

The series *4* system has been in production for five years and there are currently around 200 such mixers in use in the UK and a further number in other countries.

K-Tek, PO Box 172A, Surbiton. Surrey KT6 6HN, UK. Tel: 01-399 3990.

Teac DASH in

Teac has joined Sony, Studer and Matsushita on the DASH standards committee by announcing a commitment to producing DASH format digital recorders within two years. Tim Frost of Harman UK (Teac's UK distributor) explained that one of the reasons for the decision to go with DASH was that it offers a distinct format advantage for 4-, 8- and 16-channel machines allowing for ¼ in 8-track and 16-track possibilities later this decade. Parameters covered by the DASH format are tape speed, tape width, sampling frequency, track formation, number of channels and writing format. Manufacturers are free in all other design respects to produce their own facilities and performance characteristics.

Teac feels that by 1987/8 the principle of digital multitrack will be well accepted by the recording industry and it should be possible to produce somewhat more attractively priced systems by then.

Pop Music Recording Diploma

Salford College of Technology in Manchester launches a new higher diploma in popular music recording, commencing September. Courses in this area have been offered since 1982; they are now streamlined to appeal to the musician whose orientation is towards popular/jazz idioms within a recording studio context, studio projects are an integral feature throughout. For more information and application forms contact Mrs B Cohen, PMR Course, Salford College of Technology, Peru Street, Salford M3 6EQ.

IBC Brighton

To cope with the increased number of exhibitors at this year's IBC the exhibition has expanded into three separate sites—the Metropole Conference Centre, the Brighton Centre and the Grand Hotel. The three sites will be linked by the outside display of OB vehicles along the sea front. The exhibition floor space has increased from 11,000 to 13,500 m² and even that has proved insufficient to house all the possible space applications.

Literature Received

- European edition of the Instrument Society of America's 1986 Publications and Training Aids Catalogue, available in Europe through American Technical Publishers Ltd, 68a Wilbury Way, Hitchin, Herts SG4 0TP, UK. Contents include references and training materials, instrument technician training programme, standards and recommended practices, directories, periodicals, reprints, other ISA services.
- The latest electronic components product guide is available from Argosy Components Ltd. Products include those by Neutrik, Radiall, Cambridge Connectors, Spectraship and other wiring and PCB accessories. For further information contact Mike Purnell, director, Argosy Components Ltd, PO Box 137, Beaconsfield, Bucks, HP9 1RJ. Tel: (04946) 3491.
- Microlease Electronic Equipment Rental has produced a new '86/'87 hire catalogue of over 1200 items of test and measurement, computer and development systems and audio and video equipment. From video cameras to microphones, mixing desks, loudspeakers, equalisers, amplifiers and mobile communications equipment to Marconi 2955 Radio Test Set. Copies available from Sandie Petrie, Microlease plc, Forbes House, Whitefriars Estate, Tudor Road, Harrow, Middx. Tel: 01-427 8822.
- Alpha Omega Instruments has published an A to Z of Instruments and Accessories. They are a new company specialising in lower cost instruments and accessories via this free direct mail order catalogue detailing some 80 items. For copies write to Unit 5, Linstock Trading Estate, Linstock Way, Wigan Road, Atherton, Lancs M29 0QA, tel: (0942) 873 448.
- Semiconductor Supplies International has brought out a new data guide and product price list with active and passive components through mechanical components such as plugs, sockets and switches to complete computer systems.
- From FWO Bauch Ltd the EMT Courier Special Issue One—20 pages of 25 years of reverberation, looking at the development of artificial reverberation.

AES London meeting

BBC Radio—Digital Control Vehicle Systems, is the subject of the next AES London meeting on 8 July 1986. The speakers will be John McErlean, Brian Binding and Sean Meehan of the BBC Radio Capital Projects Department. Design and constructional details will be covered including some novel techniques involved in the provision of high specification OB vehicles. These will be specifically related to the systems and the mixing consoles used in both the recent Stereo Control Vehicles and the Digital Control Vehicle.

The lecture starts at 7pm at the IEE, Savoy Place, London WC2, tea at 6.30 pm. If you wish to join AES you can apply at one of the meetings or write to The Secretariat, AES (British Section), Lent Rise Road, Burnham, Slough SL1 7NY. Tel: (06286) 63725.

Plug makers take note

A significant change has been made to the British Standard for 13 A plugs which now specifies insulating sleeving on the line and neutral pins. This has been done to prevent the risk of electric shock to users caused by physical contact with the pins during insertion or removal of plugs. Details of the new requirements, including additional tests, have been published as an amendment (AM 5052) to BS 1363 13A Fused plugs and switched and unswitched socket-outlets.

Since the amended standard is likely to become mandatory under new government regulations now being considered, some manufacturers may need to modify their plug designs. ▷

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URGENT

John, These people stock everything and ship out in an hour. Phone 01-482-1692 or collect a catalogue from their trade counter. Better get an account opened NOW! Thanks, Adrian

STUDIO SPARES 1986

DIARY

People, events, services

In brief

The magnetic tape division of **Agfa-Gevaert Inc**, Teterboro, New Jersey has donated a $1,000 scholarship to The Society of Professional Audio Recording Studios (SPARS) to be awarded to a promising young student who demonstrates potential in the recording field and has challenged other SPARS advisory associated members to match this gift... Due to the name Digitec being a registered trade mark of **J Hornby-Skewes** in the UK, the DOD Electronics range of rack-mount processors previously marketed under the Digitech name will in future be known as DOD Effects within the UK... **3M's** Magnetic Media Division and the Mitsubishi Pro Audio Group have recently announced approval of the new Scotch *275* digital audio mastering tape for use in Mitsubishi 32- and 2-channel digital tape recorders... **Odyssey,** Paris is the first French recording studio specialising in music computer systems. Built on the LEDE principle, Odyssey is equipped with SAJE *ULN* Mark *II* automated console, Sony *PCM 3324* and *701* digital recorders, Otari 2- and 4-track, Tascam 8- and 16-track and *MCI JH-24* 24-track recorders among its tape recorder complement. Tel: (1) 47 50 95 64... **Phil Ramone** has been using the new **Dolby SR** spectral recording on mastering work for Touchstone Films production *Ruthless People* at Power Station, NY subsequent to attending demonstrations of the system at MGM screening room, also in New York... **Modern Circuit Industries**—Amek's manufacturing facility has expanded its facilities with a BICC-VERO computer numerical controlled 3-head drill... **BPI** reports that the first quarter of 1986 was fairly flat for the UK record industry with the value of sales (deliveries to trade) increasing only by 3.4% over that of the same period last year; the number of singles shipped to retailers experienced a sharp fall; sales of LPs also fell while sales of cassettes continue to increase, although at a lower rate. The best results, proportionately were in the CD sector where sales this quarter were just over double those for last year. Overall value of recorded music deliveries in this first quarter was £71.9 m, compared with £69.5 m in January to March 1985... **Prime Leasing and Finance Ltd** recently announced a 33% increase in its level of investment. With 60% of the company's business coming from the recording industry and a further 35% from the broadcasting industry this is seen to represent rapid expansion within the industry and greater investment in more sophisticated and expensive equipment. In the company's recently published annual report it was stated that the basic business emphasis is gradually switching from leasing to hire purchase.

Stolen Property

- On the night of April 23, several items were stolen from EGE Sound Studio, Germany. Those with serial numbers were: Roland *SRV2000* (SN:552787), Eventide *H949* (SN:1723), Onkyo *P3060* (SN: 21050813), JVC *HR2200* video (SN: 156L 1221) and Sony *PCM701* (SN: 12736114). Other items included Yamaha *REV7*, UREI *1136* compressor, Lexicon *PCM41* and various hi-fi equipment. EGE Sound Studio GmbH, Kohlplate, D-7953 Bad Schissenreid, West Germany. Tel: 0 75 83/27 68.
- Stolen in California from Danny Wallen, a special custom case containing 10 new Neumann *TLM 170* Jubilee microphones. The serial numbers are 23/100, 24/100, 62/100, 63/100, 74/100, 75/100, 76/100, 77/100, 80/100 and 81/100. Any information as to the whereabouts of any of these microphones should be given to Jerry Graham, eastern sales manager, Gotham Audio, 1790 Broadway, New York, NY 10019-1412. Tel: (212) 765-3410.

Contracts

- Audio Kinetics has installed over 100 MasterMix computer assisted mixing systems worldwide. Recent UK contracts have included Alan Parson's studio with Amek *Angela*, Saunders and Gordon's Amek *2500*, The Tape Gallery's Amek *2500* and Tyne Tees (MCI *JH600*). Japanese installations have included Pioneer Laser Disc with a Calrec console, Sunrise Studio's Neve *V48* and Sound Atelier's Soundcraft *TS24*.
- Amek has completed several recent contracts including two Amek *BC2* consoles to the BBC; 51-input *Angela* to Alan Parsons' studio—other *Angelas* have gone to Peter Hooke of New Order, Steve Lillywhite, the new Planetarium in Paris, and Craig Huxley of the Enterprise Studios in Los Angeles; U2 have hired an *M2500* for two months while working on their new album in Dublin; and AVM Recording in Madras has purchased a number of *BC2* consoles as well as the very first *Classic* console.
- Eastlake Audio has recently completed a record and music to film facility at Sound and Vision OY, Helsinki which features a Harrison *Raven* with *MasterMix* and Otari multitrack and mastering recorders. PWL's second studio—The Bunker; Eastlake is now preparing to construct another studio and isolation room at the PWL complex in South London.

  Other current Eastlake projects include a 48-track mobile facility for touring sound operator Lil Service SA in Barcelona.
- Soundcraft *TS24* mixing consoles have recently been installed at TVi, London, and Lansdowne Studios in Dublin. Stirling Audio supplied TVi's 32-channel desk with *MasterMix* automation for their new post-production suite. Lansdowne's update follows destruction of the facility by fire earlier this year—the original desk was a Soundcraft Series *3B*.
- Kelsey Acoustic has supplied 150 *GPO316* patchfields to Elliott Brothers as part of the worldwide refurbishment of British Forces sound and vision studios.
- Acesonic International has been appointed Otari distributor for the Republic of China/Taiwan. Frank LJ Wang of Acesonic visited the Matsumoto factory for a week of technical training with Haruo Taguchi, manager of the customer service section. Acesonic International Co Ltd, SF1, 147 Lung Chiang Road, Taipei, Taiwan, ROC. Tel: (02) 71688 96.
- Gerr Electro Acoustics of Toronto has supplied a Sound Workshop Series *34* mixing console to Bryan Adams and songwriting partner Jim Vallance for their private studio in Vancouver; the equipment choice was made on the recommendation of Bob Clearmountain.
- London's Swanyard studio has recently installed a Sony *PCM-3324* digital multitrack machine, 24-channels of Dolby *SR*, EAR valve equalisers and valve limiters and four Yamaha *SPX 90*s.
- Recent Studer contracts supplied by FWO Bauch have included a *900* series mixing console to the Royal Northern College of Music fitted with *A* series modules and reverse action faders; a 24-track 2 in *A800* to Central Television; *A800*s to Master Rock studios and PWL studios in London, Jeff Wayne Music, Hertfordshire, Howard Jones, Redwood Studios, Westland Studios, Parkgate Studios and Windmill Lane Studios. Studer *960* series compact mixing consoles have been ordered by NBC London, Voice of America London, EMI Records, Ash International and Regentport. Hollywood Studios has placed an order for the Harrison *MR4* mixing console.
- DDA has received an order from Abbey Road Studios for an 8/8/2 *D Series* console with *Theatre* input modules. The console is being supplied in a 16-input frame and will be used in the film transfer room. A 16/8 *Theatre/Matrix D Series* console has been ordered by the Royal Shakespeare Company for the new theatre in Stratford-upon-Avon.
- Audio & Design Calrec has recently supplied Pioneer Laservision studios in Tokyo with a 48-channel *UA 8000* console complete with *MasterMix* automation. ▷

DIARY

People, events, services

Contracts

● Marquee Electronics has delivered three Adams-Smith chase synchroniser systems to Town House Studios. Additional units have been supplied to Eel Pie Recording, Eden Studios, Central TV in Nottingham and Birmingham and Barclays Bank Video. Other new users include Mullard Laserdisc, Marcus Music, Park Gate Studios, BBC TV music studio, Huddersfield Polytechnic, Southern Films and Air TV facilities, Camden Lock.

● Sound Associates installed the sound system at the first European IMAX film festival at the National Museum of Photography, Film and Television in Bradford earlier this year. The IMAX film system generates large screen pictures on to a screen many times the size of a conventional cinema screen, effectively filling the viewer's field of vision. The accompanying sound quality was required to give wide frequency range, no distortion and very high sound levels. IMAX has sound on a separate 6-track 35 mm film running in sync with the special 70 mm picture, giving tracks for rear left and right, and screen left, centre, right and top. Electro-Voice speakers were used for the screen left centre and right: *DL15W* loaded *606D* bass cabinets and *HP9040* horns with *DH1* drivers. The sub-woofer system comprises four Electro-Voice *3512* cabinets with *DL18W* drivers operating only high signal levels at frequencies below 100 Hz.

● The Mitsubishi Pro-Audio Group has announced sales of *X-850* PD format digital multitrack machines to two London-based studios—Battery, a four studio complex; and Konk where the machine will be installed in a machine room allowing it to be patched between the existing room and the second room currently under construction.

People

● The Music Department of the The City University, London has announced the appointment of Jim Grant as their first lecturer in Music Information Technology. Jim Grant was previously working on the Music Instrument Technology course at the London College of Furniture. He will be teaching on the Diploma course which will be the first aspect of the music department looking for greater collaboration with the music industry.

● Stan Duer recently retired as managing director of Beyer Dynamic UK. Stepping into his shoes is former sales manager John Midgley.

● Gary Hall has joined Martin Audio-Video Corp as sales engineer with dual responsibility for the new Martin Music Technologies division and the company's activities as Sony digital sales representative.

● Joseph E Tibensky has recently been promoted by the Magnetic Tape Division of Agfa-Gevaert Inc, New Jersey to audio products manager. His responsibilities will be for studio mastering and cassette duplication tapes. He was previously technical sales rep at Agfa's Dallas office.

● Audio Kinetics USA announce that Jerry Mahler has taken up the position of national service manager. He was formerly west coast service manager.

● Former vice-president of Coast Recording Equipment Supply Inc, Shelley A Herman has joined BGW Systems as sales manager. With over 35 years in the industry Herman has been sales manager of UREI and Allison Research, has been a recording engineer with a Grammy nomination and has designed, installed and operated many sound reinforcement systems.

● Renkus-Heinz, Irvine, CA. has appointed Jason Larson (Jason Larson Associates) as the new director of marketing.

Glossary

Ambience: A property ascribed to studios that have just had an expensive rebuild (but do not sound any better) in order to justify higher rates.
Ambience mic: (1) A spare mic at the back of the studio that accidentally got recorded on a spare track, that saves an otherwise turgid mix. (2) A non-directional mic (qv).
Assign: The traditional means of distinguishing between say the tape store and the artists' powder room.
Backing track: Anything useful you can salvage from the first six weeks/months of recording.
Bi-directional: American for AC/DC.
Bounce: A primary characteristic of receptionists. Measured in handfuls.
Compressor: A processing device that gives a track more feel by increasing noise and distortion to 1960s levels.
Concert pitch: Wembley Arena, etc.
Cue: A wooden rod used for hitting balls.
Dead sound: The result of doing 37 takes to get the track note perfect.
Echo: The sound of £10,000 of digital ICs crammed into a little black box.
Engineer: Someone who wanted to drive a train when he grew up.
Fader: A control for reducing noise at the expense of increasing distortion, or vice versa.
Figure-of-eight: An exotic form of balanced line.
Headroom: A property of some larger control rooms where the distance between the top of the engineer's head and the bottom of the bass trap has a positive value.
Hertz: What happens to the engineer's ears when the fuses in the monitor amps fail to fail.
kHz: The sound of the producer contemplating tomorrow's session.
Leader: The biggest member of the band.
LED: Heavy metal.
Line input: Nostril.
Maintenance engineer: A studio employee who's never there when anything goes wrong with the equipment.
Microphone: A device that makes loudspeakers scream when pointed at them.
Mixing: Trying to convert a dead sound (qv) into a hit record.
Non-directional: A mic that picks up everything happening in the studio except the instrument in front of it.
Omnidirectional: Likes anything that's warm and wet (of bi-directional).
Overdue: The practice of getting more mileage out of backing tracks by using the same tracks for a number of songs, such as a succession of singles. Particularly popular with Reggae producers who have great difficulty in getting all the rhythm section capable of playing at the same time.
PA: Pain in the neck.
Pad: Place to which an engineer returns occasionally to change his socks.
Panning: The critical response to the end product of vast amounts of time and money spent in a studio.
Panpot: A device that converts mono recordings to stereo.
Pre-emphasis: Increasing the noise level to counteract the effects of noise reduction.
Presence: If your studio has one of these, keep quiet about it. Most clients are paranoid enough without having ghosts to worry about.
Producer: (1) Someone who sits next to the engineer and makes unhelpful comments at awkward moments. (2) Person who takes all the credit for the engineer's hard work.
Reverberation: £5,000 worth of digital ICs in a black box.
Reverberation time: The time it takes to get a studio to pay £13,000 for £5,000 of ICs in a black box.
Route: The heavily worn path between the studio and the nearest pub.
Selsync: A marketing man's explanation for why semi-pro multitracks have one head for recording and playback.
Stagebox: A small upturned wooden box used as a prop by superstars who try to get more feeling in their playing by re-living their early days playing in pubs.
Submixing: Mixing one track at a time so the computer can learn what to do.
Synchroniser: A device used to link two machines for 46-track tape phasing.
Synthesiser: An unmusical instrument.
Unbalanced line: Where the producer takes more than half.
Unidirectional: The type of mic that rotates towards the floor during an otherwise perfect take.

▷

DIARY

DIARY

People, events, services

WDR Neve DSP now in use

The first Neve digital mixing console to be installed outside the UK has been delivered and commissioned for the WDR broadcast network in West Germany. The console is installed as part of an installation within a new concert hall being built as part of a new DM 300 million cultural centre in Cologne which is due to be opened in September. The console facilities include 56 faders, 48 mic/line analogue inputs, 16 line analogue inputs, 32 analogue outputs, 32 digital inputs and outputs for multitrack use. The system also benefits from the inclusion of remote stage input boxes with fibre-optic transmission to the console.

The console was delivered and commissioned on time and was officially launched at a digital seminar held in Cologne in April.

Agencies

● FM Acoustics of Switzerland has reached an agreement with Professional Audio Ltd of London under which Professional Audio will distribute the complete range of FM Acoustics professional products in the UK. They will carry stock, parts, service products and supervise installations etc.

● Theatre Sound & Lighting (Services) Ltd (TSL) have been appointed sole and exclusive UK distributors for the Clear-Com Intercom Systems. TSL are headed by directors Matthew Griffiths and Peter Maciuk. New addition is Zounie Fallil as sales administrator who previously handled the Clear-Com business for TBA. TSL, Queen's Theatre, 51 Shaftesbury Avenue, London W1V 8BA. Tel: 01-439 2441.

● Rhino Distribution has been appointed distributor for American Audio Logic processors including *MT44* quad noise gate, *X324* crossover and *MT66* stereo compressor/limiter featuring dbx noise reduction. Rhino also distributes DOD rack mounting signal processors and instrument effects pedals. Rhino Distribution, Equipment Division, Burnham Road, Dartford, Kent DA1 5BN. Tel: (0322) 74003.

● Kelsey Acoustics are now supplying NEK bulk microphone/instrument and multicore cables. Kelsey Acoustics Ltd, 28 Powis Terrace, London W11 1JH. Tel: 01-727 1046.

● Adams-Smith has appointed Professional Equipment srl of Milan as Italian distributor for the System *2600*. Professional Equipment srl, Viale Famagosta 37, Milano 20142, Italy. Tel: 02-81 78 39. Telex: 843-312239.

● Recently established UK audio equipment sales company Professional Audio has been appointed sole UK distributor for FM Acoustics. Professional Audio Ltd, Professional Audio House, 53 Corsica Street, London N5 1JT. Tel: 01-226 1226. Telex: 24282.

Address changes

● Italian distributor Audio International SRL, has moved to Via Santa Maria, 100, 20090 San Maurizio al Lambro, Milan. Tel: (02) 25 390 121.

● Theatre Projects has changed address to Theatre Projects Services Ltd, 8-34 Blundell Street, London N7 9BW. Tel: 01-609 2121. Telex: 885659.

● Amek and TAC now have facsimile machines in operation. The numbers are: Amek 061-834 0593; TAC 0602 785112.

● Alangrove Builders has moved to Mountbatten House, Victoria Street, Windsor, Berks SL4 1HE. Tel: (0753) 857181.

● Elliott Brothers (Audio Systems) Ltd has moved and is now located at Osney Mead, Oxford OX2 0ER, UK. Tel: (0865) 249259.

● TracSystems has moved to the Archway area of London and has doubled its floor area. The new address is Belgravia Works, G08/157 Marlborough Road, London N19 4NF, UK. Tel: 01-281 4955.

People

● Simaen Skolfield has joined the Amek sales team and brings 15 years experience as a Grammy award winning recording engineer who has worked in many and varied facilities. Simaen will be responsible for introducing London facilities to APC and assisting any customers who visit London. He may be contacted at 218 Bowes Road, London N11 2JH. Tel: 01-361 8552.

● Amek has also promoted Henry Goodman from shipping manager to sales co-ordinator; Richard Hollingworth has taken over as shipping manager and Selwyn Hotz has joined Amek and TAC as financial controller.

● Otari Corporation has appointed three new regional sales managers: James Goodman, previously with Eventide, for Northern States; Emil Handke, formerly with Valley Audio as general manager for Southern States and Bill Ford, previously with Cramer Video, for Western States.

Mark Calice, formerly in charge of Otari Corporation's MTR series technical support has become technical training manager for a newly created training department. Details of Otari dealer/user training seminars may be obtained by calling (415) 592-8311.

● Two new IBC corresponding members have taken up invitations to the position, succeeding TJ Murphy and P Mainwaring who have now retired. K O'Connell is director of engineering at Radio Telefis Eireann and NL Lane is director of engineering at the Broadcasting Corporation of New Zealand. The role of corresponding members is to represent the IBC around the world and lend their support to the IBC UK committees in the organisation of the convention and their liaison with broadcasting and allied industries.

● Soundcraft has promoted Adrian Curtis, formerly senior engineer in Soundcraft technical services, to senior sales engineer to Soundcraft Electronics. His main area of responsibility will be technical sales support to international and direct UK customers.

● Norman Crocker, managing director of Tannoy Ltd, has been elected chairman of the Association of Sound and Communications Engineers.

David Hopkins, managing director of Delta Sound (PA) Ltd, has been elected vice-chairman.

● AMS has appointed John Gluck to sales department taking over sales co-ordination of the company's established range of products.

● Focusrite Ltd has appointed Mike Bowers as sales manager. Formerly sales and marketing manager for Noblelight Ltd, he will be responsible for the 'new' range of professional sound control modules for the recording, broadcasting and film industries worldwide.

● The BPI has appointed Rob Dickins to succeed Maurice Oberstein as the next chairman. Chairman and managing director of WEA Records UK, Dickins has been an active member of the BPI council since 1983.

● Virgin Group has appointed Nick Alexander managing director of SynthAxe Ltd. Previously managing director of Virgin's computer game company he continues with this responsibility including new technology developments and has assumed responsibility for *SynthAxe* as Bill Aitken, who headed the development of *SynthAxe*, has rejoined Solid State Logic Ltd.

● Phill Neighbour has joined Court Acoustics Sales Ltd as sales manager, responsible for the sales of RCF products in the UK and for distribution of Court equipment worldwide.

● Trident Audio Developments has announced Wayne Freeman's appointment as the new president of Trident USA Inc. Mr Freeman previously with Soundcraft Inc in the USA has had many years experience in the pro audio industry particularly in the field of recording consoles.

● David McVittie has joined Elliott Bros (Audio Systems) Ltd as sales manager. He will be responsible for sales to the broadcast sector freeing Bruce Elliott to concentrate on the theatre area. David McVittie was previously International Sales manager with Audio Design Calrec. ▷

Low-cost digital audio comes of age.

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

Sony has acknowledged that this acceptance by professional users necessitates a change of policy towards these products. Accordingly they have upgraded them from the domestic catalogue, and, realising the need for professional support and all that that entails, have appointed HHB as specialist dealers to represent them in the pro-audio market.

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

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DIARY

People, events, services

The role of the programmer in today's studio

The list of credits on a modern album sleeve is growing all the time; along with performers and songwriters it is quite common to see the producer, engineer, session musicians, recording studio and mastering suite included and now a new title has joined the list—that of programmer.

So who is this person hiding behind the vague title and what exactly does he do to deserve getting his name on the sleeve? In reality, he probably hasn't programmed anything at all but is only the user of other people's software and the traditionalist in the computer world would only credit him as an operator or worse as a machine minder.

Whatever we decide to call him, he's the person who understands the world of sequencers, FM and analogue/digital keyboards, expanders, drum machines, MIDI-controlled effects and the various boxes which keep them all in sync with the tape machines. A good programmer combines many of the tasks of both the engineer and producer with the creative qualities of the writer and performer. Those of us who have worked with computer controlled equipment for any length of time appreciate all that a good programmer does.

The shortage of experienced music programmers is partly the result of the speed at which technology is progressing: even the traditional tea boy, tape op, engineer, producer route has changed in recent years. Another contributory factor is the wide range of skills which must be acquired including the ability to read and write music, and perfect pitch is a distinct advantage. Entering musical notation from a manuscript soon brings back sight reading but when the producer sings a bass line—even assuming that you know what key he's in—can you immediately enter the correct pitch and note values in to the step time sequencer? When the keyboard player wants his timing auto-corrected, can you confidently choose between a demi-semi-quaver and a 16th triplet and won't he be pleased if you get it wrong?

One benefit of computer production is speed but if one particular piece has to be played several times in order to practise auto-correction, or if it takes an hour to work out that funky bass line in step time, or if your programmer's on the phone to the Royal College of Music because he doesn't know his andante from his pizzicato, then perhaps it's time to think again.

Programming original sounds into keyboards, particularly the FM kind, can be extremely time consuming and it is probably a job well worth doing away from the studio. However, it is still often necessary, even with a comprehensive sound library, to edit sounds during a session. Again this is where a good programmer will save time, money and frayed tempers, by translating a request for 'more zing' into carriers, modulators and frequencies, or by providing more decay without losing the fundamental sound.

Computer drums are often a controversial subject. Can they sound natural? Should they sound natural? Can they replace the real thing, or should they be regarded as an instrument in their own right? Whatever personal views are, the programmer should be able to provide what each individual producer wants and this ability to create original and interesting patterns and breaks to suit all types of music must be allied to a knowledge of the drummers' limitations, both real and machine. If attempting to simulate a live kit, it should be remembered that a drummer only has two hands—an obvious point but a common mistake. An easy way to spot the machine is listening to the hi-hat tapping continuously eight to the bar, throughout breaks, rolls and entire albums. At the same time it's worth remembering that although the machine can play with many hands and keeps perfect time, if a producer brings in a Scottish country dance band or wants to record the National Anthem, then a quick phone call to the Musicians' Union is perhaps a good idea.

Ever since the music programmer appeared on the scene, the job has grown in importance. At the beginning of 1984, we took the Commodore *64*, which was being discarded by our accounts department and put it in the studio to control the growing number of keyboards (see *Studio Sound* March 1986). Then we were trying to save tape tracks but on a recent production the multitrack contained only two vocal tracks and a sync code, whilst the desk had a further 22 channels of 'live' sound from the assorted keyboards, samplers, drums and effects. The only people involved in the production were a singer/songwriter and the programmer.

With the increasing range of MIDI effects, today's programmer can often find himself with a separate sequencer purely for effects and keyboard patch changes and now that some desks are reading MIDI and SMPTE for routing and switching, the chain seems to be almost complete. The tape machine is at present the only area free from the programmer's attentions but for how long? As the trend towards digital recording gathers speed and hard disk-based systems and even RAM storage become commonplace, it should not be too long before someone decides to process the digital information in the recorder before playback, rather than using external processors involving further D/A and A/D conversion. Imagine a multitrack recorder with an effects unit built into each channel. Now give it user-definable memories with MIDI control and the chain is well and truly complete.

It's interesting to note how experience is helping the music programmer overcome some of the problems of various systems. Let's return to the problem of auto-correction. No one would think of experimenting with a master tape instead of working on a copy and similarly most sequencers will copy a keyboard part in seconds which the programmer can then use for practice.

A common problem with sequencers is that while attempting to overdub a sequence with another part which starts on the first beat of the first bar, the first note never records. Programmers have now discovered how to use a separate track to re-record the first note late and auto-correct it back to the first beat. Systems using FSK code for tape sync can be extremely frustrating when the tape must be started at the beginning of the track each time and why is it that the last chorus always needs 20 takes?

The trick is to run a monitor mix on to tape at the same time as the sync code and use this instead of running the computer each time. Most people would leave a guard track next to the sync code but if the monitor mix is recorded about 20 dB down it will not interfere with the code and can be used as the guard track as well. Any increased noise doesn't matter as the track will not appear on the master. If tape tracks are at a premium, then the monitor mix can be erased later and used as the final track. Sequencers have even been used to provide a form of level automation. Many keyboards have voice output as a programmable parameter and by copying the same voice several times but with different output levels and using MIDI to switch between voices, the keyboards will mix themselves.

So what sort of person are we looking for in the guise of an ideal music programmer? He is obviously a child prodigy electronics wizard who studied classical piano at the Royal College of Music but gave it all up to become the drummer with a funk band before opting for a career as a successful recording engineer/producer. No wonder he gets his name on the album sleeve! In fact the day must surely be approaching when the expanding list of credits begins to decrease once again, until the only names remaining are those of the artiste and programmer.

And who will get top billing? □

Roger Jackson, West Coast Music, Luib, Isle of Skye.

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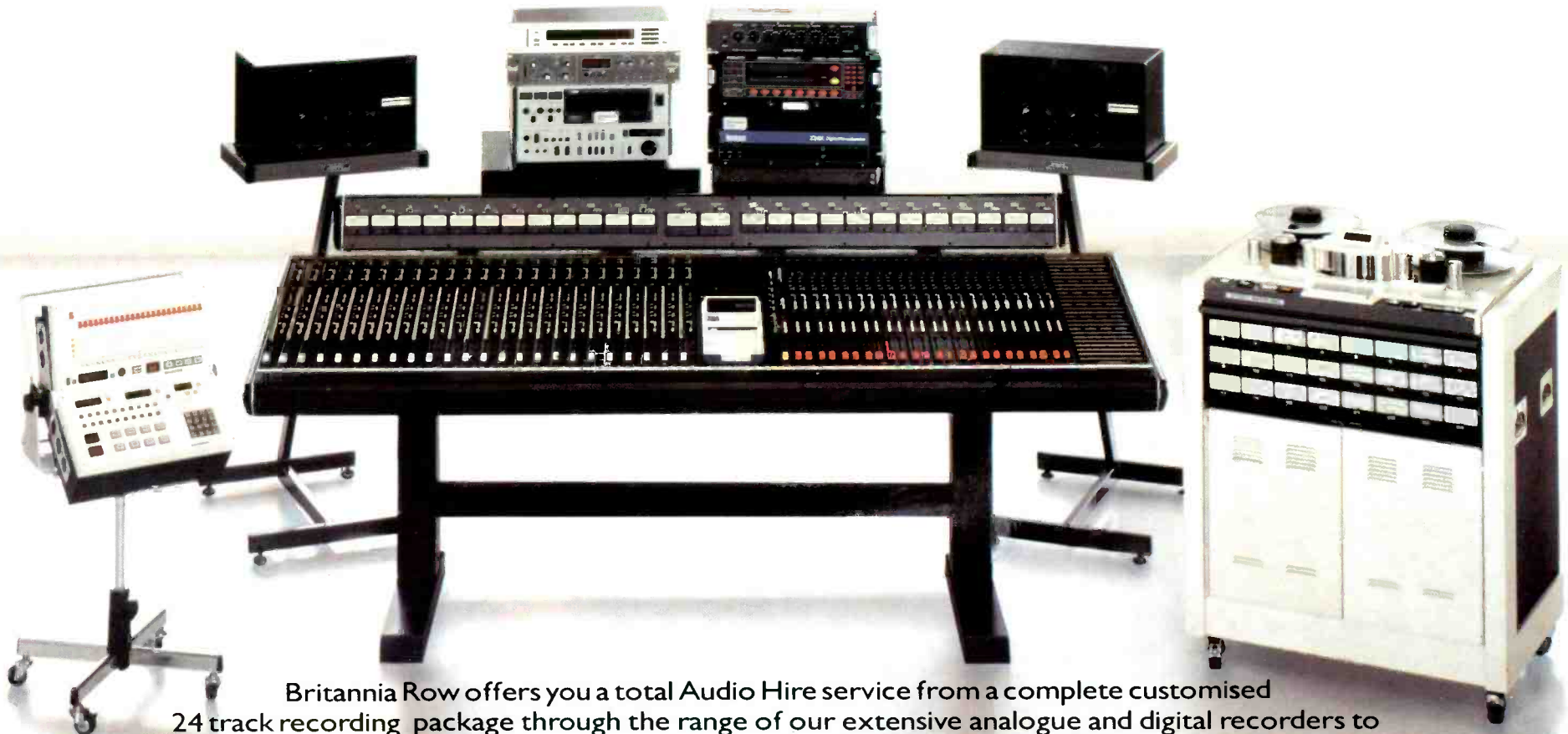

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DIARY

DIARY

People, events, services

Syco and Fairlight

As sole UK distributor for the Fairlight Computer Video Instrument Syco Video is aware that units are being offered on direct import from Europe and possibly America. As sole UK and Irish distributor Syco points out that it is unable to offer service support and software updates for these units. They also point out that these units are not necessarily calibrated and tested for British power supply and although not necessarily hazardous, the software stability of the unit is likely to be affected. If in doubt, contact Syco Video on 01-724 2451.

Music video payments issue

The BPI council decided to seek payment for music videos which had until now been supplied free, or virtually free to television programmers; and to advise BPI member companies to cease to supply free music videos after May 31 1986 unless constructive negotiations were in hand.

Negotiations were opened with the BBC and ITV companies and a proposal from the BPI on the principle of payment was put at meeting with ITCA companies, Channel 4 and the BBC during May.

After the initial meetings BPI legal adviser Patrick Isherwood reported that further meetings had been arranged with the BBC.

The BPI council has reiterated its decision on video payments and will strongly advise members (accounting for about 95% of the UK record releases) to stand by the deadline decision.

Oral History Society opposes tape levy

The Oral History Society has opposed the government's intention to introduce a levy on blank audio tape. The society makes use of tape recorded interviews with older people to produce articles, pamphlets, books and exhibitions based on living memory. The society sees no reason why it should pay copyright to owners of recorded music and has no wish to take on the additional administrative burden which claiming exemption would involve. The society states The Government's proposal to impose a levy on blank tape is a totally inadequate response to the problems of copyright in a period of technological change. As they stand the proposals are unfair and are likely to prove costly and unworkable.'

Contracts

- TracSystems has recently received large orders for their in-cassette duplication systems: from Hany Mehanna Studio, Cairo, Egypt for a six slave 5,000 cassette/day system; a 20 slave system to Jack Carney of TDC Dublin via Sound Control Belfast to meet a current 30,000 cassette/month requirement; and to Richard Garrido SCV in Paris.
- Millbank Electronics has supplied amplifiers from their *PAC System* range for the National Garden Festival, Stoke-on-Trent, Staffordshire, UK. This six month festival takes place on 180 acres of reclaimed land featuring arenas, displays, 80 theme gardens, artificial lakes and theatres. The sound installation was by Animated Projection Ltd of Widnes, Cheshire and is divided in to 12 separate zones.
- Different Fur Recording of San Francisco, has taken delivery of a Sony *PCM 3324* multitrack. This system is owned by Windham Hill Records but will be housed at the studio and will be available to studio clients.
- Unique Recording, New York has installed two Sony *PCM 3324* multitracks for 24 and 48 digital recording. Also the Fairlight *11X* has been updated to a *111*.

IOA at Salford University

The Applied Acoustics department at Salford University opened their new laboratory during the recent IOA conference. Opened by Dr Per Bruel of Bruel and Kjaer it comprises a transmission suite enabling measurement of new glazing systems or lightweight partitions to be measured and an anechoic chamber allows for testing of hearing protectors.

IOA's 4-day conference was attended by over 100 delegates and topics discussed included the latest findings of research in underwater acoustics, environmental noise and building acoustics. Three special lectures were given. Professor Heinrich Kuttruff from Aachen University talked about the design of auditorial; Professor Elfyn Richards from the Institute of Sound and Vibration Research, Southampton University talked on an engineer's approach to the study of noise; and Dr Peter Thorne of the Institute of Oceangraphic Science, Taunton on underwater sediment transport studies.

Salford's Applied Acoustics Department is the second largest university based acoustics group in the UK and the only one which runs a distinctive undergraduate course in electroacoustics.

Awards for Philips scientists

International recognition was recently accorded to Philips research scientists in the form of the Rank Prize Funds Awards. Dr P Kramer, senior managing director of Phillips Research, Mr G Bouwhuis, senior scientist at the Philips Research Laboratories and Dr K Compaan, now retired received recognition for a basic invention in the early seventies which has led to the LaserVision optical disc, the CD and the disc for storage of digital data, along with the corresponding electronic systems.

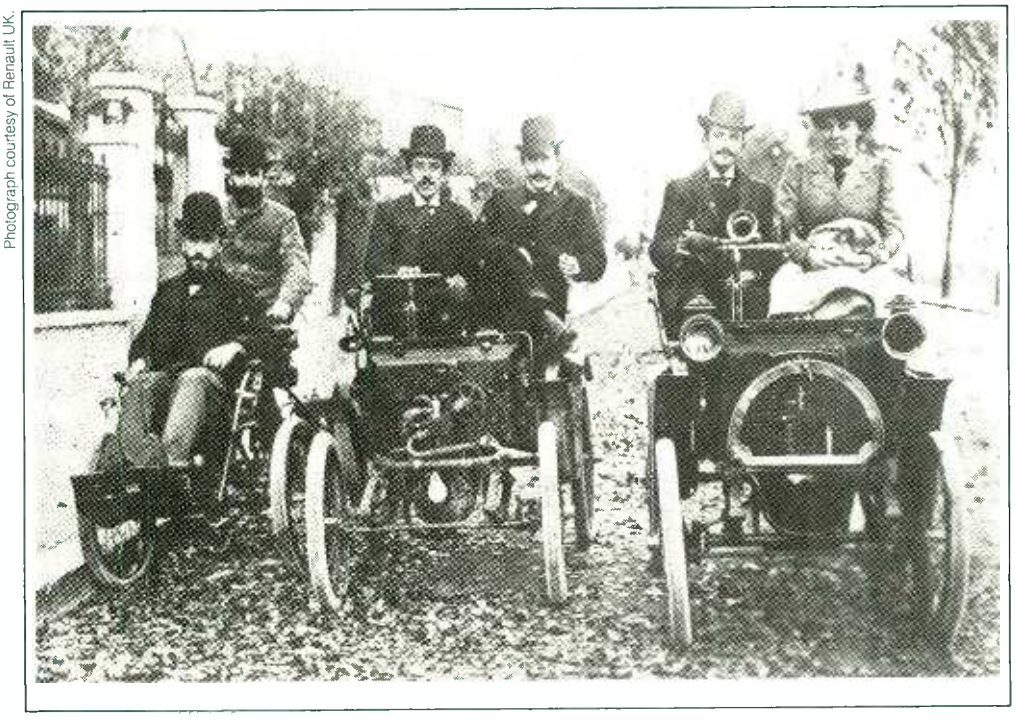
At the end of the sixties, scientists at Philips Research Laboratories embarked on a study intending to record image and sound signals on a disc in such a way that the information could be read without contact using laser light. The three award winners invented a technique for doing this and thus development got underway.

People

- Former Neve area sales manager Tom Belshaw has moved to Britannia Row Equipment where he is now manager of the sales department, working on the company's expansion in the UK and Europe.
- 3M has announced that Christopher Hobbs is now general marketing manager for Magnetic A/V products. He has been with the company for 14 years in marketing and sales, and key account executive for Scotch household products, sales manager for Scotch consumer products, sales and marketing manager for Scotch audio tape and most recently as general marketing manager for home video and household products.
- Soundtracs has appointed Simon Phillips to their technical sales team. Simon was previously with ITA and prior to that Turnkey.

Forthcoming events

August 1 to 3 British Music Fair, Olympia 2, London, UK.
September 19 to 23 International Broadcasting Convention, Brighton, UK.
October 28 Sound Broadcasting Equipment Show, Albany Hotel, Birmingham, UK.
November 6 to 9 Institute of Acoustics 2nd Annual Conference: Reproduced Sound, Hydro Hotel, Windermere, UK.
November 12 to 16 81st AES Convention, Los Angeles, USA.
November 19 to 22 14th Tonmeistertagung Munchen 86, Deutsche Museum, Munich, West Germany.□



Photograph courtesy of Renault UK.

Auto line-up.

This cunning attempt to grab your attention is to let you know about the long-awaited arrival of the Otari MTR20 Series of master recorders at ITA.

The MTR20's unique automatic alignment system employs it s own microcomputer to faithfully reproduce a set of line-up parameters that have been determined by the engineer. In other words, YOU decide exactly how the machine is to be lined-up, and the MTR20 remembers for evermore, faithfully reproducing YOUR procedure every time.

Auto line-up is just one of the features of this most advanced recorder. A massive cast deck-plate, PWM-controlled reel motors, 14" reel capacity, rapid interchangeability between formats; transformerless electronics; serial control; the list goes on.

And of course, things for which Otari recorders are already renowned; utter reliability and ease of maintenance, for example.

The MTR20 is now available for demonstration in your studio; don't delay in making your booking.

ITA was first with Otari 13 years ago, and we

are proud to be first with the MTR20 in 1986. Our commitment to the world's best range of professional recorders has never wavered in between. There are many exciting new Otari products on the way – we'll be there first too.

INDUSTRIAL TAPE APPLICATIONS
PROFESSIONAL PRODUCTS DIVISION

ITA

1 Felgate Mews, Studland St, London W6 9JT. Tel: 01-748 9009 Telex: 21879

Our consoles have always been quiet.

Have we been too quiet about our consoles?

Perhaps we have. Thanks to the success of STUDER recorders, we're often thought of as strictly a tape recorder company. But, STUDER has also been making audio consoles for over 16 years, and hundreds of our 169/269 compact mixers are now at work in broadcast and video production facilities all around the world. Recently, with the introduction of the Series 900, STUDER has become a major supplier of studio production consoles.

So we're not keeping quiet about this any longer.

Name your frame. Series 900 frame sizes from 12 to 50-plus inputs are available for any application, from remote recording and OB vans to sophisticated broadcast production and multi-track recording. Within these frame sizes, we configure the console to fit your requirements. The secret is our wide array of module options.

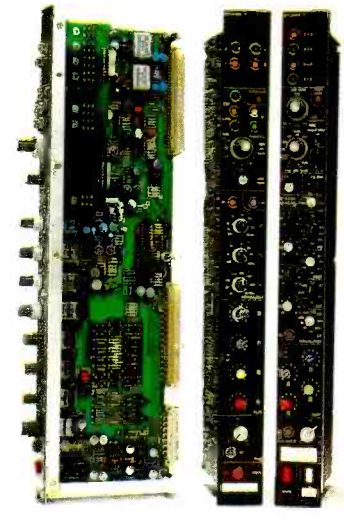
Mix and Match Your Modules. The 900 is a true system console offering custom configurability at standard prices. Choose from 10 different metering modules, 3 multi-track monitor options (including separate monitor EQ), mono or stereo faders, audio subgroups, automation compatible VCA groups, video switcher interfaces, subgroup reassignment modules, up to 3 solo systems, multi-function test generator, input selectors, limiters, compressors, patchbays with bantam or ¼" systems, and up to 10 auxiliary busses.

Basic input modules feature 3 or 4 band EQ, microphone/line inputs, 5 pre/post-fade auxiliary sends, and channel overload indicators. Options include transformerless mic pre amps on a subcard, separate transformerless TAPE input for remix, stereo input modules, stereo EQ, internal stereo X-Y/MS active matrix, stereo blend control, dual line inputs, variable HP and LP filters, user defined panel switches, and the list goes on.

Listen to the quiet. The entire 900 console frame design is consistent with the advanced module design. A completely independent signal reference ground system assures preservation of individual circuit CMRR figures. The result is overall noise performance compatible with digital recording.

As time goes by. All 900 consoles adhere to strict STUDER standards for precision and reliability. The frame is built on a rigid channel and brace structure, and each module uses pin-and-socket Eurocard connectors. Frame connectors are mounted on longitudinal master boards with solid support from horizontal and vertical frame members. All components, switches and pots are commercial/industrial grade from the best US and European manufacturers. In sum a 900 is built to last as long as a STUDER recorder.

For quality, flexibility, and the reliability, it ranks among the world's finest, and you may find the pricing surprisingly competitive.



For more information on STUDER consoles please contact:

STUDER
INTERNATIONAL AG
CH-8105 Regensdorf Telephone (01) 840 29 60

STUDER REVOX AMERICA INC Nashville Telephone (615) 254-5651
STUDER REVOX S A R L Paris Telephone 533 5858
STUDER REVOX CANADA LTD Toronto Telephone (416) 423-2831

F.W.O. Bauch Limited
49 Theobald Street, Borehamwood, Hertfordshire WD6 4RZ
Telephone 01-953 0091, Telex 27502 Fax 01-2075970

NEW PRODUCTS

NEW PRODUCTS

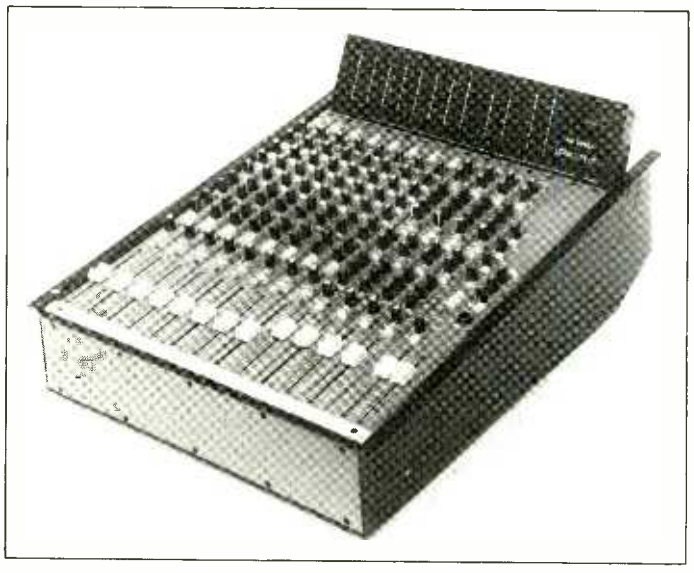
Equipment, modifications, options, software

Daturr shielded racks

Daturr Ltd is able to supply specialised 19 in equipment racks designed to offer full protection against EMI/RFI interference. Manufactured by Daturr's parent company Knurr AG of Munich and fabricated from steel, the complete enclosure consists of a welded rack shielded by a cabinet of detachable panels. The special design allows access to the enclosed equipment without impairing the RF shielding, even when panels are removed for maintenance and special panels are available to cover gaps left between individual pieces of equipment.

The RF shielded rack is available in both fixed and mobile versions and can readily be used with various accessories included for use with the standard steel rack.

Daturr Ltd, Albany Park, Camberley, Surrey GU15 2PL, UK. Tel: 0276 681212.



Soundtracs FM mixer

Soundtracs has announced the *FM* series 19 in rack-mounting mixer which will be available for fixed installations or fitted in a flight case. The steel and aluminium mainframe which is 15 U high can hold up to 14 (1 unit wide) modules. Current 1 unit wide modules include Mono Input; Mono Input with Remote Start; Stereo Input with Remote Start; Monitor Input; Group Output (8-track monitoring; and Monitor Output. Three other modules are available; the 2 unit wide PA Rec Master; the Monitor Master; and a 4 unit wide Group Output with 4-track monitoring.

With the modular system a number of configurations are possible including a 8/4/8/2 recording/PA mixer with mono and stereo inputs, an 8/10 monitor mixer and a 12/2 PA or 12/2 broadcast version with mono and/or stereo inputs. An external 3 U high power supply is also available.

Soundout Laboratories Ltd, 91 Ewell Road, Surbiton, Surrey KT6 6AH, UK. Tel: 01-399 3392.

USA: MCI-Intertek Inc, 745 109th Street, Arlington, TX 76011. Tel: (817) 640-6447.

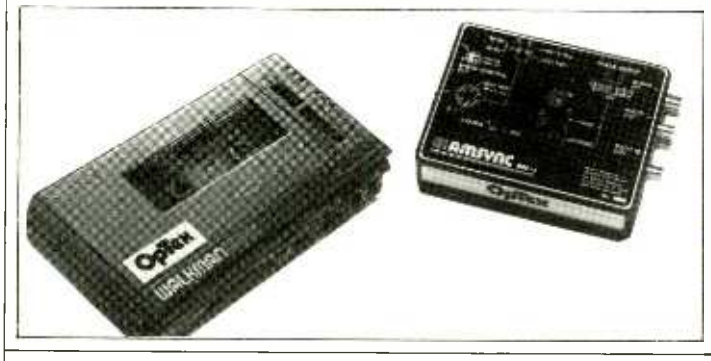
OpTex Amsync audio system

OpTex has developed a compact, crystal controlled stereo recording system for use with either the Sony *TC-D5* portable cassette recorder or the Sony *WMD 6 C Professional Walkman*. The package includes the modified cassette recorder and *APS-1* resolver. The system retains full stereo capability without resorting to one direction only running.

Crystal control is applied as a sub-audio signal and subsequently filtered out by the *APS-1* during transfer. An additional timecode head can be fitted but this prevents turning of the cassette.

While the *TC-D5* provides facilities for powering mics and can be used for recording two separate tracks rather than stereo, the manufacturers suggest using the *WM-D6 C* in combination with an *SQN* mixer providing powering, microphone mixing, PPM level control and Dolby *C* all in a package similar in size to a 4 Ah battery pack.

Optical & Textile Ltd, 22-26 Victoria Road, New Barnet, Herts EN4 9PF. Tel: 01-441 2199. Telex: 8955869.



PatchPrints

The Patch Bay Designation Company is offering a custom labelling service for audio and video patchbays, control panels, racks, consoles, rear illuminated button switches and all field designated areas.

The thin plastic *PatchPrints* are washable and designed not to shrink, stretch or fade. Options include black lettering on a white background or white on black and colour coding.

Correct specification is important and special layout sheets are available from the company.

The Patch Bay Designation Company, PO Box 6278, Glendale, CA 91205, USA. Tel: (818) 241-5585.

Mitsubishi video interface

The Mitsubishi Pro Audio Group has introduced an interface which will allow communications to the recently introduced *IDF* (Intelligent Digital Fader) from a *CMX* editing system or other similar video editing system, providing software for the support of external audio-follow-video devices. The interface will contain protocol information allowing total real-time automation control of fader level and mute commands by an edit system.

The *IDF* system offers 16 groups in four levels of operation and the architecture provides for further interfaces with other automation devices. Each fader is a self contained computer system that provides $\frac{1}{10}$ frame accurate muting and 0.25 dB fader resolution.

Mitsubishi Pro Audio Group, 225 Parkside Drive, San Fernando, CA 91340, USA. Tel: (818) 898-2341.

UK: Mitsubishi Pro Audio Group, Unit 1, Fairway Drive, Greenford, Middx UB6 8PW. Tel: 01-578 0957.

Portasol soldering iron

The Portasol soldering iron is a gas powered, lightweight, variable temperature iron available with either a 2.4 mm, 3.2 mm (supplied as standard) or 4.8 mm tip. The iron is simply filled with standard butane gas lighter fuel; the cap has an in-built ignition system and the working temperature is easily controlled in a range equivalent to a standard 10 to 60 W electric iron. In addition to its portability, an obvious asset is the reduced risk of damage to electrically sensitive components.

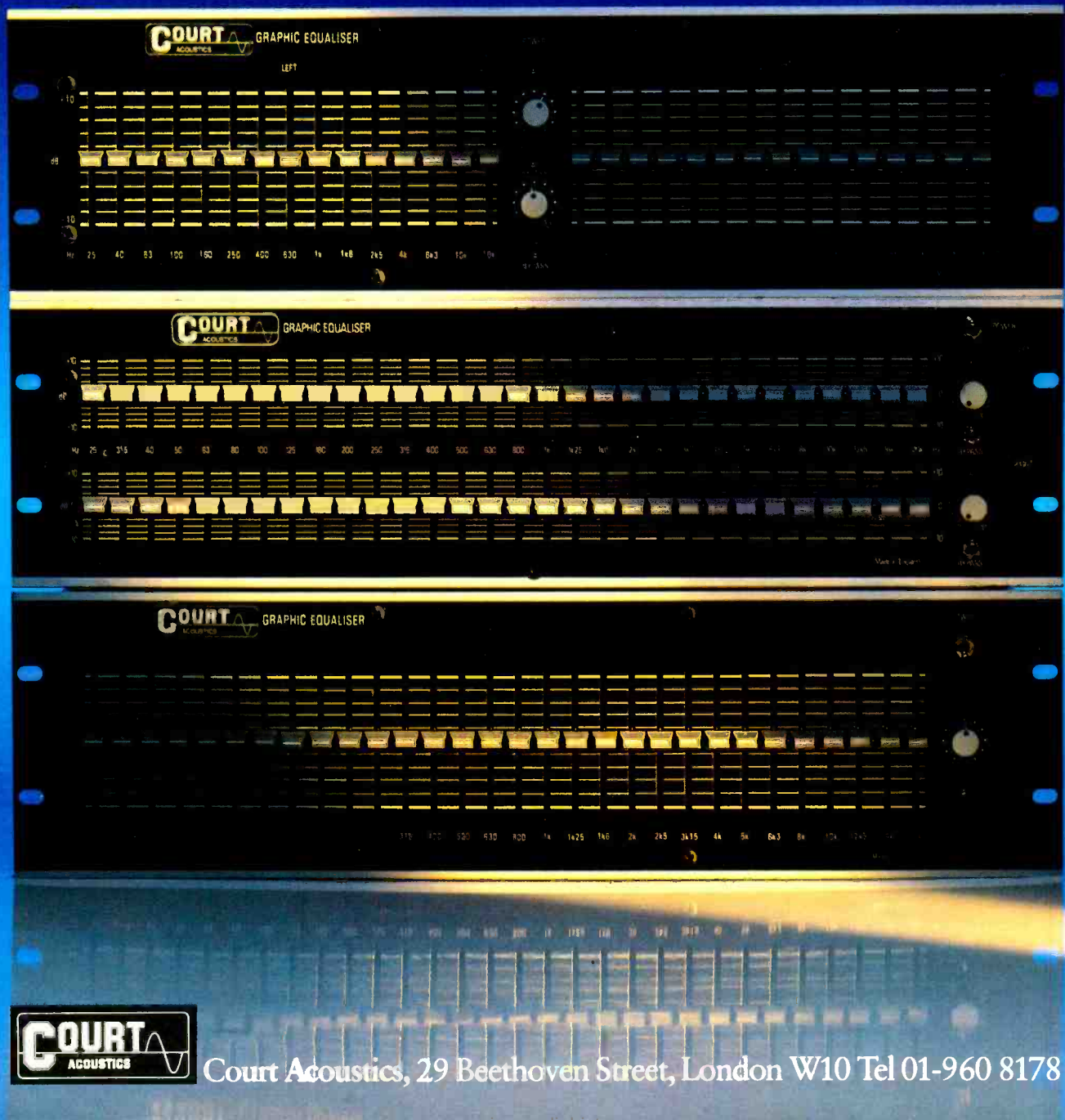
JEM Marketing, 180 Princes Avenue, Palmers Green, London N13 6HL, UK. Tel: 01-889 1415.

A sound choice all round...

Court Acoustics now offer you a range of graphic equalisers, each ruggedly designed for professional life. The GE30 and GE60 mono and stereo 30-band third-octave graphics; ISO centres from 25Hz to 20kHz. The GE1515 stereo half-octave equaliser, with 15 bands from 25Hz to 16kHz, or the GE1515X with additional built-in 12dB/octave 2- or 3-way variable crossover.

Other facilities include 10dB boost and cut with centre detents. Electronically balanced inputs and outputs – XLR and 1/4 in jack – with optional transformer balancing. The relays giving hard-wired bypass in power-off. Top and bottom sliders offer low-pass and high-pass filter characteristics respectively – at 18dB/octave.

Our special 'Uniloop' design makes our graphics unique. The fact that even with all the faders at maximum or minimum, you'll get a largely flat response.



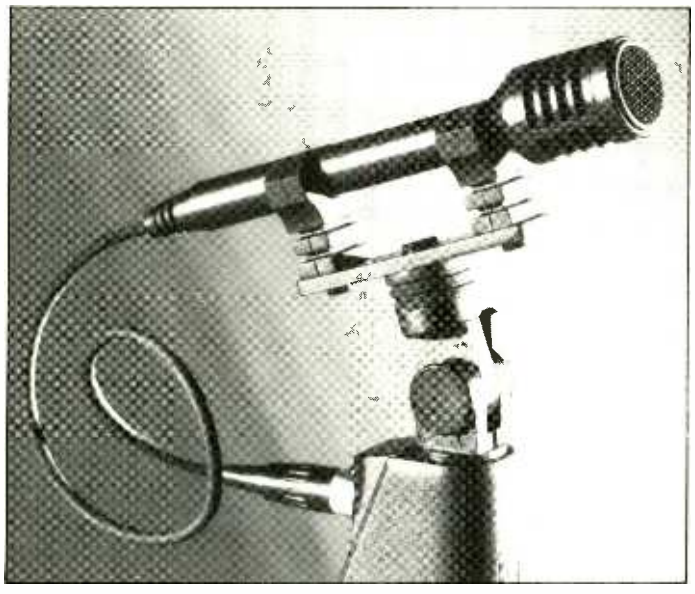
COURT ACOUSTICS

Court Acoustics, 29 Beethoven Street, London W10 Tel 01-960 8178

NEW PRODUCTS

NEW PRODUCTS

Equipment, modifications, options, software



Toa KY condenser mic

Aimed at a variety of on-stage and studio applications the Toa *KY* condenser mic is a modular design featuring a newly developed thin, gold vaporised diaphragm. A *YMM* musical instrument mic capsule is supplied as standard but optional *YMV* and *YFV* capsules for male and female tenor voices are available.

The mic includes a built-in voltage regulator and can be used with external voltages between 9 to 52 V. Other features include a red LED to indicate live status, lockable On/Off switch, removable windshield and a grey matt finish to reduce glare under stage lighting.

UK: Toa Electronics Ltd, Tallon Road, Hutton Industrial Estate, Brentwood, Essex CM13 1TG, UK. Tel: 0277 233882.

USA: Toa Electronics Inc, 480 Carlton Court, San Francisco, CA 94080. Tel: (415) 588-2538.

MS-Audiotron MCA-Multimix

Described by the Finnish manufacturer as a unique computer-controlled audio system for theatre, musical and similar applications, the *MCA* system is part of the *Multimix* audio console. The system is based on a Rockwell *FORTH* microcomputer with a 3.5 in disk drive. Communication is via a *CRT* terminal and the *MCA* system also supports an optional printer. Modifications to the basic *Multimix* console include replacement *GC8* computer-controlled grouping modules on all mic or line channels requiring *MCA* control and an *LCS* level control module fed from the group output.

Software is used to control (via a serial interface) tape machines under direct command of the MCA system. Commands available are start and stop the tape on cue and autolocate. Four relay start outputs (without autolocate) are available for tape machines without serial interface.

The complete system is designed to handle input channel routing, output matrix switching with level control and speaker matrix switching and tape machine control. Subroutings for fade in and/or fade out and multichannel panning are a feature of the software. Panning can be carried out either manually or alternatively the channel sequence, mixing and panning velocities can be saved in the situation memory. In order to facilitate the setting up of theatre sound effects the *MCA* system can be controlled via a portable terminal either on stage or from the auditorium.

MS-Audiotron, Laitilantie 10, 00420 Helsinki 42, Finland. Tel: 90-566 4644.

In brief

TMK Instruments has released details of the *CLM1* and *CLM2* digital cable length meters. In addition to measuring general lengths of at least 2-core or core and screen cable, the new meters can be used to measure a full reel and monitor the amount used over a period of time. Both instruments have three ranges (2 m, 200 m and 2 km) and are claimed to be accurate to within 1%. The *CLM1* is for use with most general purpose cables (capacitance range: 85-275 pF/m) and the *CLM2* for lower capacitance cables (40-100 pF/m). Free accessories include test leads, test prods, battery, instruction manual and carrying case. Harris Electronics (London) Ltd, 138 Grays Inn Road, London WC1X 8AX, UK. Tel: 01-837 7937...**Switchcraft Inc** has introduced a new range of black non-reflective QG connectors with gold contacts. The range is available in 3-pin A and D series connectors... **Ampex** is providing an extra 4 min of tape on its *672* series professional audio C-30, C-45, C-60 and C-90 cassettes. This is primarily to cater for the spoken word recording market's requirements... **Agfa-Gevaert Inc** has announced the availability of *PEM 469* in 5,000 ft lengths. The new 2 in version is wound on 14 in spools...**Yale Audio** has introduced *C-1* and *C-2* self-adhesive vinyl labels for professional users. The *C-1* sheet which is available in either black, red or white contains various positional markers for labelling knobs, switches, pushbuttons, etc. The sheet includes a variety of graphic switch positions, arrows and 'pointing fingers'. *C-2* is for use in identifying cables and includes various symbols, numbers and commonly used letters. Yale Audio of Florida Corp, PO Box 2661, Tampa, FL 33601, USA...**Audio Precision** has just released new optional plug-in filters for its *System One* to allow the individual measurement of second or third harmonic distortion. Commonly used fundamental frequencies (1 kHz, 400 Hz and 315 Hz) are available to order and the new filters can be custom made for any frequency in the audio range. Also new is the wow and flutter option. In addition to NAB, IEC (DIN) and JIS weighted and unweighted measurements the new option has a scrape flutter bandwidth extended to 5 kHz. New routing switcher modules now permit multitrack tape machines, analogue or digital to be connected to System One...**Levell Electronics'** *HM208* digital storage oscilloscope is now available. The instrument can be used as a dual 20 MHz real time oscilloscope or as a digital storage oscilloscope with digitising rate up to 20 MHz. Maximum sensitivity is 1 mV/cm...**Sound Technology** has introduced *Audio Test Software* for use with the *1500A* or *1510A* audio test system and IBM compatible computer. The menu driven software measures 2-channel AC volts, azimuth, 2nd, 3rd and THD, frequency response, flat and weighted noise, maximum operating level and channel separation. In addition to the graphic and general test module there is a tape test module which performs an automatic pass/fail testing sequence for 2- or 3-head tape recorders.

TMK cable length meter

IT MAKES TAPE MORE FLEXIBLE

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

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

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

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

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

The MX70's option list lets you choose between 1" 8-track and 1" 16-track formats. Convert to ½" 8-track. Or even switch between all three options on the same machine.

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

They haven't budged an inch on quality.

OTARI®

For more information on the MX70 or other Otari products, contact
Industrial Tape Applications, 1 Pelgate Mews, Studland Street, London W6 9JT. Telephone: 01-748 9009
Stirling Audio Systems Ltd., 1 Canfield Place, London NW6 3BT. Telephone: 01-625 4515

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

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

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

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

NEW PRODUCTS

NEW PRODUCTS

Equipment, modifications, options, software

JBL 6215 amplifier

JBL Professional has introduced a new power amplifier designed to fit into a single 19 in rack space. The *6215* has a rated output of 35 W into 8 Ω, 45 W into 4 Ω or 90 W into 8 Ω, mono bridged mode and is recommended for use where power requirements are minimal such as driving headphones or small speakers in confined studio or broadcast applications.

The amplifier is housed in a heavy gauge, rugged steel chassis and features fully complementary devices in all pre-driver, driver and output stages. Reduced audible distortion is claimed by using a low transient intermodulation design (pre-driver stage local feedback) with minimal overall negative feedback required to set the overall circuit operating points.

Inputs are standard ¼ in TRS, XL connectors or barrier strip, output terminations feature 5-way binding posts. Individually stepped gain controls allow precise setting of input sensitivity.

JBL Professional, 8500 Balboa Boulevard, Northridge, CA 91329, USA. Tel: (818) 893-8411.

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

Nexo PCLine speaker systems

French manufacturer Nexo has released a new range of small loudspeaker enclosures. Initially three models will be available—the *PC115*, an 8 Ω four unit enclosure suitable for use with 250 to 450 W amplifiers; the *PC212*, a 4 Ω, five unit enclosure for use with 500 to 700 W amplifiers and the *PCSub*, a sub woofer system using a single 18 in drive unit and suitable for 500 to 700 W amplifiers. Wedge versions of the *PC115* and *PC212* are due to be released in the near future.

All the loudspeakers feature five rigging points and with the exception of the sub woofer have provision for stands and brackets.

According to the manufacturer new computer optimised bass loading allows volume reduction and increased low frequency extension. Overall frequency response (±3 dB) for the *PC115* is 55 Hz to 17 kHz; for the *PC212*, 50 Hz to 17 kHz and for the sub woofer 40 to 100 Hz, nominal peak SPL specifications are 130, 133 and 130 dB SPL/1 m respectively.

Nexo Distribution, 154 Allee des Erables, ZAC de Paris Nord 11, BP 50107, F-95950 ROISSY, Charles-de-Gaulle, Cedex, France.

Ibanez SDR1000 reverb

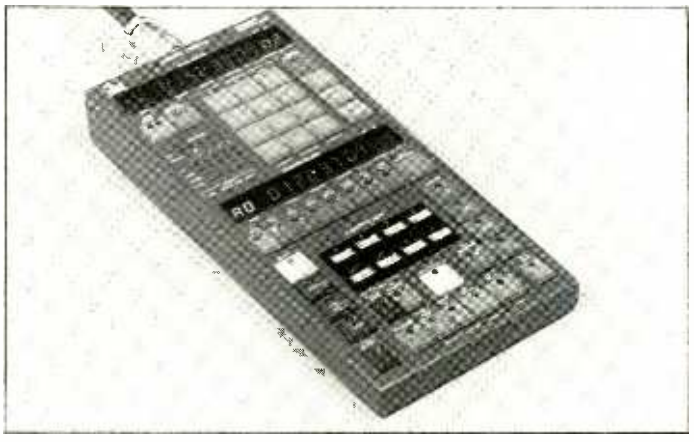
Ibanez has introduced the *SDR1000* stereo digital reverb. Using high speed parallel digital processing the two channels can either be programmed independently using different modes or set for identical reverb characteristics. A choice of 30 preset programs or 70 user-definable presets are provided. Eight overall characteristics: Hall, Room, Plate, Gate, Reverse, Dual Delay, Dual Reverb and Auto Panning provide the basis from which all the presets are derived.

Front panel facilities include 4-band EQ, 12 edit modes and three MIDI parameters, and in-built software allows direct comparison of new sounds against sounds already in the memory.

Input and output levels are quoted at −20, +4 dBV, impedance 47 kΩ (input), 600 Ω (output). The unit is 16-bit linear (26 kHz sampling) providing a 90 dB dynamic range and a frequency range (on effects) from 20 Hz to 10 kHz. Total harmonic distortion is claimed to be less than 0.03%.

UK: C Summerfield Ltd, Dukesway, Team Valley, Gateshead, Tyne & Wear NE11 0UR. UK. Tel: 091 482 2228.

USA: Hoshino (USA) Inc, 1726 Winchester Road, PO Box 886, Bensalem, PA 19020. Tel: (215) 638-8670.



Adams-Smith controller

Adams-Smith recently announced the availability of the new *2600 CC* compact controller. The new controller can operate five tape synchroniser modules and a timecode generator to control and synchronise up to five audio or video recorders. Fully automated previewing, recording and replay can be implemented using only the system in and out points with all offsets, pre- and post-rolls and durations calculated automatically. Other traditional editing functions such as auto cueing, looping, stopping, recording, etc, are also provided.

The new controller also includes eight non-volatile function keys enabling the user to store often used routines; 100-position, 12-digit, non-volatile scratch pad memory; timecode/ft and frames conversion; drop/non-drop frame conversion; ATR varispeed and optional ¼ frame accurate audio punch in/punch out and/or aux equipment turn on or turn off.

The *2600 CC*, which is small and light enough to be held in one hand, can be connected up to 500 ft (150 m) from the *System 2600* chassis and is compatible with other *System 2600* modules.

Adams-Smith, 34 Tower Street, Hudson, MA 01749, USA. Tel: (617) 562-3801.

UK: Adams Smith UK Ltd, Barnwell House, Room 9, Barnwell Drive, Cambridge CB5 8UJ. Tel: 0223 215 366.

Rush outboard EQ

Designed in response to requests from users of computer-controlled consoles who desire the smoother sound usually associated with older desks which have inductors and shelving type circuitry Rush Electronics has announced its new outboard equaliser. The unit features high and low frequency shelving controls each with five switchable frequencies, two mid frequency presence controls each with 10 switchable frequencies and high and low pass filters, 18 dB/octave at five switchable frequencies. Gain is adjustable between −10 and +10 dB and each module has polarity, equaliser in/out and filter in/out switches.

Up to eight individual modules and power supply can be mounted in a 10½ in (265.9 mm) Eurocard frame and either transformer or active balanced inputs and outputs can be specified.

The module is also available with a mic input using a 23 position gain switch (−80 to −20 dB mic/−10 to +20 dB line) in 5 dB steps. On line input a trim control is also provided for fine adjustment. Also available is a single chip microprocessor system which can recall all control settings and has up to 20 memories. An onboard battery backup retains memory information when the power is switched off.

Rush Electronics Ltd, 29 Alexandra Road, London N8 0PL, UK. Tel: 01-889 2200.□

The finest touring consoles never stand still.

Many of the world's top artists regard Soundcraft touring consoles as outstanding.

However, that hasn't made us complacent.

We've made a few enhancements to the Series Four, derived from listening to the people who use it.

And based on the world's most successful live sound desk, the 800B, we've developed an exceptional new touring console – the Series 8000.

Both possess the advanced ergonomics, operational simplicity and reliability you've grown to expect.

Series Four and Series 8000. Classic technology, created for music.

For further information, contact us today.

Soundcraft

PERFORMANCE SERIES

Soundcraft Electronics Ltd, Unit 2, Borehamwood Ind. Park, Rowley Lane, Borehamwood, Herts WD6 5PZ, England. Tel: 01-207 5050 Tlx: 21198 (SCRAFT G). Fax: 01-207 0194.
Soundcraft USA (213) 453 4591. Soundcraft Canada (514) 685 1610. Soundcraft Japan (03) 341 6201.

MUSIC PAGE

MUSIC PAGE

Mark Jenkins on synthesis for the studio

Greengate DS:3 and DS:4

Greengate recently announced major additions to its *Apple*-based sampling sequencer package.

A MIDI card and updated software allows the *DS:3* sampler to be controlled from the Greengate keyboard or to interface with other MIDI devices.

The *MEG-1* board is an add-on memory card which fits inside the system's *Apple* computer to give vastly extended memory facilities. *MEG-1* samples at up to 85 kHz and gives a maximum 148 s sample at around 3 kHz response. The whole sample can be visually edited and dumped to disk even if up to nine disks are required—an alternative is to use the new *Apple* High Capacity disk drive.

In the Performer mode *MEG-1* can hold 32 sounds for full-time monophonic playing or 4-note polyphonic playing of the first 2 s of the sample. Sounds for a live performance can be loaded into the *MEG-1* from disk and pulled down virtually instantaneously.

SYN 1 is a software disk for the *DS:3* which allows the system to synthesise its own sounds from scratch, or combine and edit sampled sounds. Two sampled or synthesised waveforms may be put through an 'in-betweening' process which transforms one into the other during the course of a note. Sound envelopes can be edited or reversed. All sounds are audible during editing.

The *GDX.7* software allows the *DS:3* to be used as an editing and library system for the Yamaha *DX-7*. The display lists all *DX-7* parameters and allows you to edit sounds using the computer's keyboard and to play sounds from the *Apple* keyboard for *TX-7* and *TX-816* FM module editing.

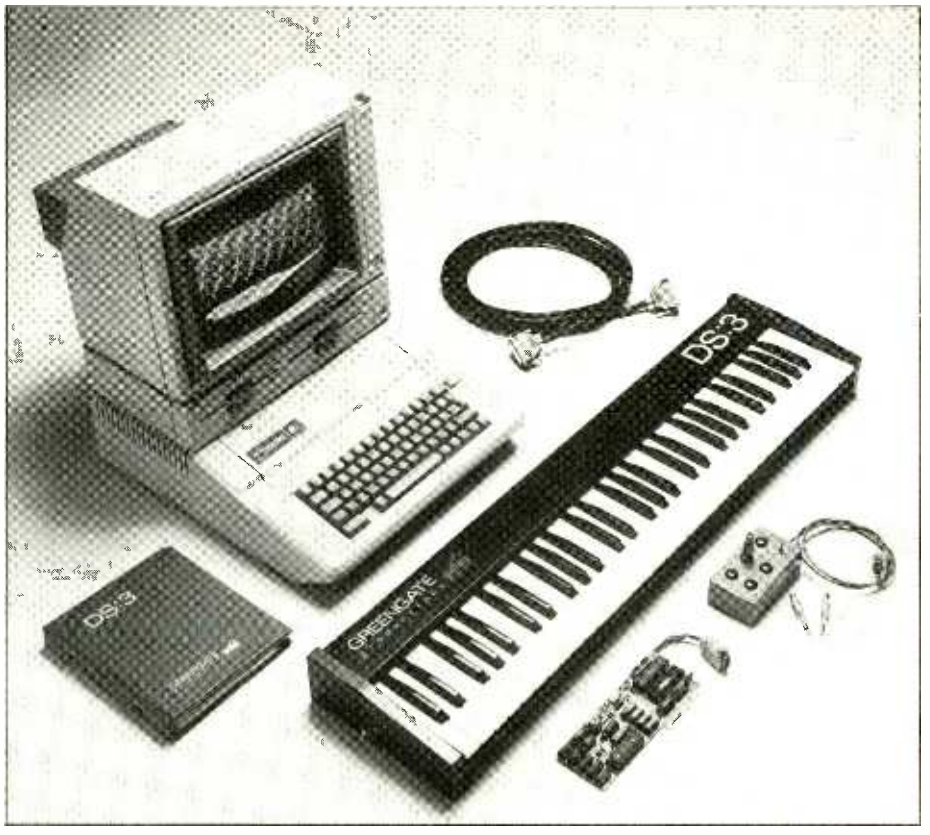
Envelope generators can be copied and voices initialised instantly, and it is possible to enter upper and lower case names into the *DX-7*. Banks of sounds can be re-arranged and it is possible to save 29×32 sounds (total 928) on to a single *Apple* disk.

Soon to be released is Greengate's *DS:4*, a 16-bit, 8- or 16-voice, 12 or 24 s sampler with MIDI, 'intelligent' SMPTE, optional waveform creation and digital delay software.

Greengate Productions, Unit D, Happy Valley Industrial Park, Primrose Hill, Kings Langley, Herts WD4 8HZ, UK. Tel: 09277 69149.
USA: Greengate Productions, 2041 Pioneer Court, Suite 15, San Mateo, CA 94403. Tel: (415) 345-3064.

360 Systems MIDI Bass

360 Systems is now shipping the *MIDI Bass*, a monophonic bass sample-playing unit with interchangeable EPROMs.



Greengate's Apple-based DS:3 sampling sequencer package

Thumb/Slap, Fretless, Gibson, Fender, Synth and many other bass sounds are available and the unit is supplied with picked, slapped, upright and *MiniMoog* bass sounds. Programmable split point and velocity sensitivity are featured.
360 Systems, 18730 Oxnard Street, Tarzana, CA 91356, USA. Tel: (213) 342-3127.
UK: Rod Argent's Keyboards, 20 Denmark Street, London WC2H 8NA. Tel: 01-379 6690.

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C-Lab, PO Box 710446, 2000 Hamburg 71, West Germany.
UK: Sound Technology, 6 Letchworth Business Centre, Avenue One, Letchworth, Herts SG6 2HR. Tel: 0462 675675.

Beetle accessories

The Beetle *PR-7* is an editing device laid out to resemble the front panel of a Yamaha *DX-7* synthesiser. It allows the user to edit sounds on Yamaha's *TX-7* or *TX-816* FM modules without a *DX-7* and has a slot for a ROM or RAM sound cartridge. Beetle's *QR-1* is a 'RAM Disc' which replaces the Yamaha *DX* and *RX*, Casio *CZ* and Roland *TR* series cartridges.
Beetle Inc, 117E Colorado Boulevard #250, Pasadena, CA 91105 USA. □

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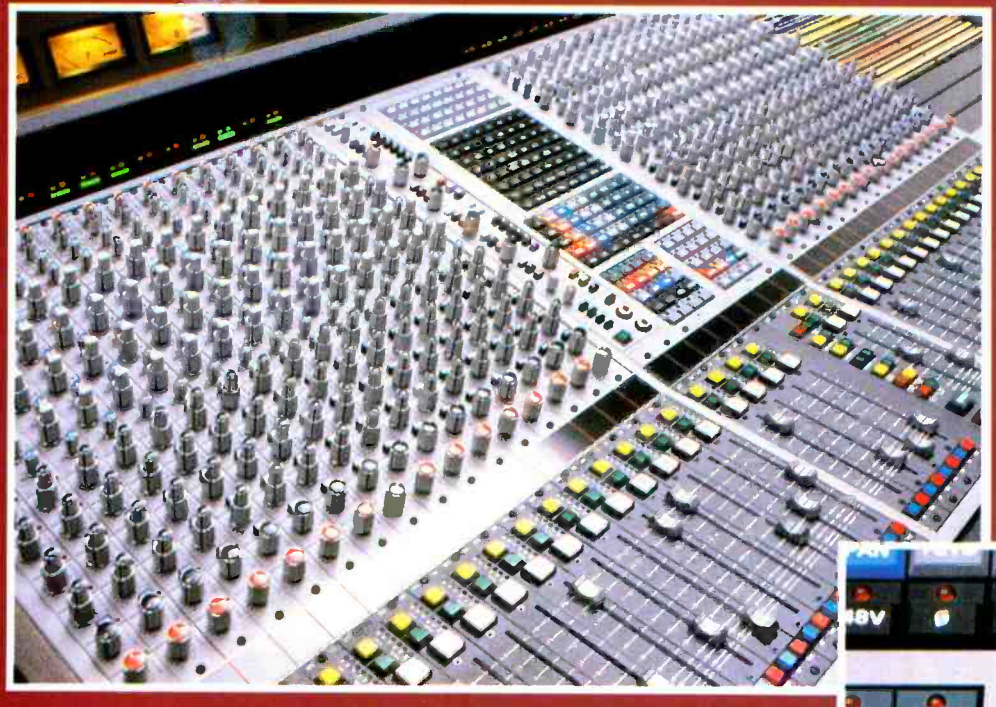

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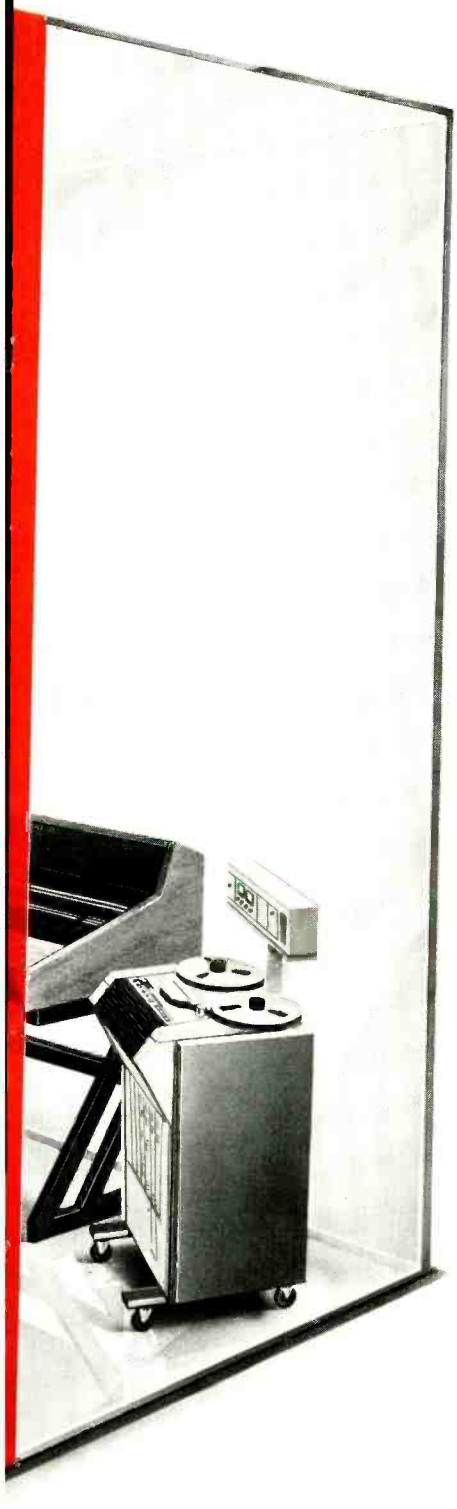

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DIGITAL MASTERING

TAPE ONE

Tape One studios rose to fame when they became the first facility capable of processing digital recordings fully digital. Janet Angus talks to co-owner Bill Foster about their rooms, equipment, and philosophy and his thoughts on digital and the future

Tape One has been in the disc cutting business since 1975 and was therefore well placed to take what at the time, was a very radical, or at least risky step. As early as 1983 co-owners Bill Foster and Barry Ainsworth came to the conclusion that the future of recording was going to be very heavily digitally orientated and they decided to order two digital consoles from Neve. The first took one year to arrive; the other took two. The first to arrive was nicknamed Attila because it looks just like a cash register! Not a conventional multitrack mixing console as such, as it only has two channels but it is capable of providing EQ and level correction in the digital domain. This meant that if you brought in your *1610* digital master cassette it was no longer necessary to go through the previously unavoidable D/A and A/D conversion when mastering.

Bill: "The effect of an all-digital chain is to give greater separation left and right. Look at something like *Return of the Jedi*, which was done at Abbey Road/Anvil. We got it here to cut and as an experiment we bypassed the analogue desk completely. The difference was astounding. That was one of the things that prompted us to go in for all this."

Having already acquired the first Sony *1610* in 1982, they met with a certain amount of resistance from Neve in early 1983 when they put to them the idea of developing a small digital console. "They wanted to make big music consoles, not silly little two channel things like that."

Attila now has its home in Digit One situated in the basement of the Windmill Street premises. The room was formerly a jingles studio with voiceover booth, then it was used for cassette mastering and is now about to undergo the Tom Hidley studio treatment to bring it in line with the other two digital rooms in the building.

Attila is fed from Sony *1610/1630*s, has EQ, limiter/compressor and gain control and gives a *1610/1630* compatible signal out. As a lot of CD work is on the *1610/1630* format this made more sense than converting a digital recording to analogue and back again.

Another radical step was the arrival of a Philips PQ subcode editor around the same time as the Attila, making Tape One the first facility to offer PQ editing outside a CD manufacturing plant. This is installed in Digit Two. Other equipment in Digit One and Two includes Sony *DAE 1100* editor and *PCM 701*.

The new Digit Two and Cutting Room One are located on the top floor, although it is not ideal having the rooms split in this fashion it was preferable to moving somewhere different. Bill: "We were restricted for space and our hands were tied, apart from moving. It would be mad to go though because at least 60% of our clients—the record companies—have W1 addresses. And anyway, to move would be too great an upheaval."

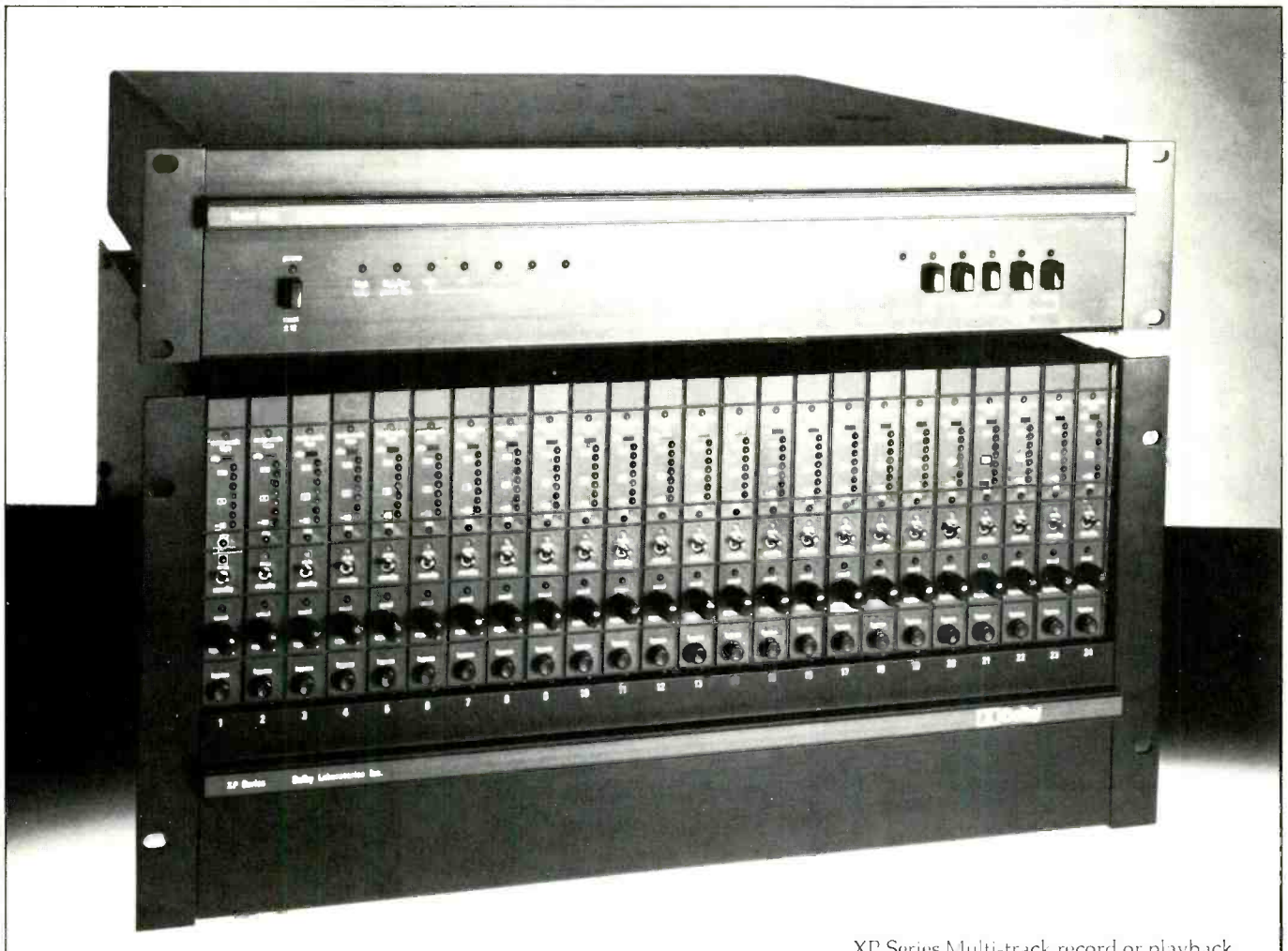
A couple of flights of stairs, however, is no hardship. The only real handicaps were restricted room space and possibly, ceiling height. Cutting Room One was opened January 2 1986. A Tom Hidley '30 Hz Room' ("we would have liked the 20 Hz version but there just wasn't enough room"), it is roughly 14×10 ft with finishes in light oak and white and blue fabrics. At the moment, with the Neve console, Tape One have an advantage over the competition.

"Neve were very bold really. It was a hell of a step to design a digital console from the ground up and the result really is a remarkable piece of equipment. The market in DSP is going to be post-production for the next few years until there are enough digital multitracks in the field. But for post-production—having recorded your master at any studio of your choice—you now have your stereo in digital. Once you reach this stage I don't like to put it back into analogue until the last possible moment; too many D/A and A/D conversions degrade the sound. Nowhere in the chain here does it go into analogue."

The Neve has 48 kHz sampling and there are two custom built sampling rate converters (44.1 kHz to 48 kHz to 44.1 kHz) for *1610*/Neve. The Neumann *VMS80* cutting lathe is controlled from the desk and has all metering and indicators remoted to the desk position. The Neve has a programmable 40-event memory. EQ, compressor, limiter, lathe settings and level may all be stored on a 3 in floppy disk and each album stored on a separate disk.

The monitoring section of the console can input analogue or digital sources (two of each). Copy tape output can be pre- or post-EQ. There are a couple of analogue insertion points ▷

The Dolby XP Series Professional Cost-effective



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DIGITAL MASTERING

TAPE ONE

(no digital echo yet with digital feed 48 kHz) and the desk has the normal dim, channel reverse and all the standard monitoring facilities.

"We decided to have VUs and PPMs as well as digital metering because most cutting engineers are used to using them and they tell a lot about what the cut is going to be like. The basic layout of the console is very much like a conventional analogue disc mastering console.

"I don't think it's the way of the future because engineers of the future who are now doing their O level exams on BBC micros won't need breaking into this sort of equipment in the same way. There is no technical reason why a digital console needs to be this big but if you presented an engineer now with a console that was two feet square it would be very intimidating. It is something that has to evolve over a period of years.

"The main advantage of the *DSP* is that the fewer conversions you have in the chain the better. At the moment the industry is locked into 16 bits. We don't think ultimately, that this is enough. It is fine for CD at the consumer end but to keep going in and out of 16-bit conversions causes problems. Every time you do it you have to do mathematics at the −90 end, it's called rounding or truncating. If you have 20 bits, the bottom four have to be squeezed. Ultimately we would like to see professional recording studios on full 20-bit systems. It will not be achievable for economical reasons for a while.

"By maintaining the signal in the digital domain—even though you are obliged to work 16 bit between various bits of equipment—it is better. When 20-bit digital recordings appear, possibly next year, we will be able to avoid some of these re-calculations/internal conversions.

"Nevertheless, D/A conversions these days are pretty good. There is a massive CD player market which allows money to be spent on research—they have four times oversampling in the domestic market and yet it has only just arrived in the professional field in the form of the Sony *1630*!"

Being the first to take in a DSP and now with their new digital disc mastering console Tape One has gained a wealth of experience. From a practical point of view Bill finds the digital EQ much more precise than the conventional analogue. Rather than sweep EQ, the Neve has selectable spot frequencies which are fairly close. It has variable Q and high and low pass filters.

"For EQ in the digital domain—the same rules apply as in analogue. But it is unlike analogue EQ in that there you are changing a pot against a painted number and depending on the manufacturer having screwed the pot on in the right place to make it accurate—or not.

"But digital EQ has one huge advantage over analogue EQ because it is only a string of numbers. If you were foolish enough to want to put in for example 6.7 dB of boost at 8.3 kHz, you add that to the left hand channel and exactly the same on the right hand channel so you don't introduce any phase error. In analogue it is always slightly different. There is no ringing from the EQs or any other nasty side effects and that exact EQ can be instantly recalled.

"With limiting, because you are processing a digital signal as it passes through, problems such as overshoot are eliminated.

"If you are cutting a vinyl disc, obviously ultimately it is going to be analogue. We feel we would prefer a digital signal to stay that way for as long as possible, ie the front end of the disc cutting amp."

Bill feels that audio post-production facilities will all go digital quite quickly, although at the moment there is not really room for every cutting room in England to have a DSP. During a recent interview at the CBS pressing plant it was suggested that a lot of pressing problems are being created by the misuse of digital recording equipment. Although Bill agrees that this might well be the case he feels that it is a problem for the producer rather than the cutting room. By the time it reaches cutting those sort of problems should have been eliminated.

"Obviously I don't mean that we would just ignore it if it was there. For example we can do different versions for vinyl or CD to change the dynamic range but we are set by the maximum levels of the vinyl noise. Yes digital does allow you to do things which vinyl doesn't necessarily like."

The monitors in Cutting Room One are a Tom Hidley design and feature Kinoshita horns with TAD bass drivers set in concrete. They are driven by an FM Acoustics *800* series amp. Nearfield monitors are Yamaha *NS10*s and they are novelly mounted slung across either end of the console angled in to the engineering position.

All the cabling on the top floor was designed by Rod Duggan of TotalSystems. In the cutting room there are insertion points for three machine positions: standard analogue in/out, parallel remote for the *A80*-type machine, serial remote *RS422* for the *820* and *D820* when they eventually get one (the Neve remote control system is serial), and remote for the *5850* DAs—*1610*-type U-matics; there are three video cables: left, right and clock for *1610*; and an AES/EBU interface in both directions—the latter runs the Mitsubishi *X-80* coupled to a custom built box which converts the Mitsubishi signal to AES/EBU enabling it to plug straight into the Neve without going into analogue.

Other equipment in here includes a Yamaha *REV 7*. "It's a very competent little unit and you can use it to add a bit of echo or if a producer wants anything specific we can hire it in."

Tape recorders include Studer *A80*, *A820* (will be two) for analogue copies, *A710* cassette recorder, Sony *701* and *C9* (seven of which are in the building). There are currently two channels of Dolby *A* although Tape One has ordered a pair of Dolby *SR*s because they anticipate *SR* tapes coming in from the States in the near future. Plans to add the Studer *D820* to this tape machine complement have been abandoned for the time being. Originally marked down for the first UK available machine, Tape One have relinquished their option. "As DASH 2-track appeared so late we are unsure now how fast it is going to be accepted. We felt it would be better if the first machines went to the hire companies. We still have an option but we will bide our time. There is not much point in us having the only machine. Had DASH appeared in 1984 it would have had more impact on the market than it is going to now."

Digit Two is again a Hidley room. Used for CD pre-mastering the room has not been designed to do complete remix work, although it can accept analogue sources. It is generally utilised for working on masters or production masters which are EQ'd and ready to roll.

The console is a DDA *S* series 4-channel with very basic facilities. Any really heavy EQ requirements will go into Digit One. Digital metering, again by TotalSystems, gives a readout of *1610/1630*, level, error correction, peak/hold and overmodulation.

The monitors are Studer *2706*s, driven by an HIT amplifier. They apparently tried out various monitors in this room and eventually came across the Studers which turned out to suit the room perfectly.

Just arrived was another UK first: the *bw102* from Harmonia Mundi for use in CD pre-mastering. Future updates to this will include the addition of EQ.

The procedure in Digit Two goes like this: transfer to tape master; check CD record level; check emphasis status; transfer from *F1* and digitally (with the Harmonia Mundi), adjust the coincident time correction if it is wrong.

Ordered in 1983, the PQ editor arrived in May 1984, the same time as the first Neve *DSP*. This facility is advantageous for a number of reasons. If the CD plant is busy and they have a backlog you may well have to wait two weeks for them to be able to fit your CD in for PQ editing. If you are able to supply the tape master with PQ already on it, it is ready to go straight into production, thus saving an unnecessary wait.

"With PQ code, there is often an artistic point to put the track change and it is not necessarily where the white coated engineer at the CD plant would think. We felt that this was a decision that engineers and producers would like to take part in. Technically it is not possible to overlap between tracks on a CD—what does the player do when you select your tracks? It cuts off and picks up at specific points, you cannot have a crossfade. If it is a complex album we can spend quite some time on this aspect. ▷

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DIGITAL MASTERING
TAPE ONE

"The Sony PQ editor gives you a print out as does this Philips one we have, but the advantage of the Philips is that it also allows you to type in track listings and technical information. You can put remarks at the end for the CD plant. For example, if there is any clicking or hiss you can tell them where it is. Otherwise you may have the thing sent back to you unnecessarily. They are particularly 'unusual' about this in Japan—any little hiss or click and it's straight back.

"This way you can tell the mastering engineer at the plant and save everybody a lot of trouble. There was an example once of a Japanese plant sending a CD master back because it had some noise on it which turned out to be the musicians picking up their instruments. So it saves time and money if you can tell them things like that at the start. Other common things include it sounding like the beginning is chopped off; you can tell them in advance."

The final process is digital verification of the tape with the Sony *DTA 2000*.

"This room was designed for critical monitoring. In here we are listening for audio defects such as image shifting, or granular distortion on some of the earlier digital recording at lower levels. We can also use the room for straight editing."

Being intended for working with digital recording the noise level of these rooms is critical and all machinery which may possibly be housed elsewhere is. The machine room is located in between Digit Two and Cutting Room One. Powered in two halves it contains the DSP computer, two Sony *1610*s, *5850* DA, Sony tape analyser, Editor and Philips PQ editor, three Sony *BVU200* U-matics for Digit Two (considered more robust for CD mastering than the more usual *5850* DAs). Bill: "The third can be assigned to the disc cutting room if they need it." Also housed in here are the analogue input/outputs and sampling rate converters for the Neve.

It is relatively recently that digital work has really taken off outside the world of classical music recording. Although digital recording ultimately comes into its own in that type of recording it nevertheless has a pretty strong case in all types of music recording. For evidence of this you only need to look at the amount and type of work going through Tape One every day.

Classical music accounts for only 40% of CDs now. Classical music will generally either be recorded by the majors (eg EMI where they have their own mastering suite or Decca where they have their own digital system) and it will probably go to either digital multitrack or straight to stereo. They don't usually want to re-EQ because they do that when they are recording. The level of post-production required in classical music with regard to EQ is fairly minimal. Classical engineers coming to Tape One will generally want to simply make copies, get rid of pre-emphasis or correct traffic noise.

Bill: "Digital multitrack will make a difference with pop. You only have to listen to something like Tina Turner's *Private Dancer*. That is probably the best pop CD to come out of this country. On tracks like *I can't stand the Rain*, where the beginning of the track is really quiet, you really notice the difference; it is very apparent. Some of it was analogue I think but it has been very carefully laid.

"*Icehouse* is another one—the clarity on an all-digital album is unbeatable.

"I think digital is very valid in pop. Mixing to digital is perhaps the key, or the first copy from the analogue mix. The problem in post-production is that you go into so many generations. The normal procedure is that you get a master mix or even a collection of master mixes done at various studios which probably have to be copied onto a production master. It is impractical to send that to both the cutting room and the cassette plant—the cutting room might be in London and the cassette plant in Leicester. So you copy the production master for cassette. Then the CD plant will need a dub...

"For purely economic reasons, if a copy tape is sent to England from America they will have that re-copied for Europe. Coming into England, EEC taxes have to be paid. Once within the EEC it can be distributed throughout Europe without the tax being levied again. If the production master is digital, all those copies can be done in the digital domain without degradation. You still have multiple digital generations, but I think that it is accepted that the losses in the digital domain are undetectable.

"When you get producers with digital recordings coming in they want to keep it digital. While you are cutting the lacquer a copy for CD can be made without going back into analogue. You can simultaneously make a separate copy for CD *without* the EQ for the disc."

Cutting Room One may also be used for compiling CDs. A recent example of this was Bryan Ferry's *Street Life*. We transferred it from Mitsubishi *X-80*, EQ'd and made it up. We did the lacquers, cassette master and a 74-minute CD (the longest pop CD ever?) all in digital, all done in here and all in one hit. That is an example of this digital audio post-production set-up working perfectly."

The standard of tapes arriving at the cutting/CD pre-mastering facility has, Bill feels, improved quite a lot in the last three years—indirectly because of digital.

"A lot of pop balance engineers are a bit respectful of digital and are therefore taking more care over things they might hitherto have neglected. They are having to be a lot more disciplined. With analogue you can usually sort it out in the mix; in digital, if you go over the top you've had it, you glitched it and you've lost it.

"There is a growing awareness of digital and some of the early problems (such as undermodulation giving much increased noise floor, bad edits, varying emphasis status), have now gone away. Most engineers are much more aware of the discipline required in digital.

"A lot of the engineers who grew up in the 70s got used to not having to worry about the equipment. It's like driving a car at 70 mph—you can forget that one wrong move and you are dead because the machinery these days is so sophisticated you can do 70 and hardly notice it. When I got my first car, it did 70 but you really knew about it; it rattled and shook and the tappets were flying up through the bonnet. The same thing happened with the early days of recording when you had those consoles with the big knobs. Now we have digital technology and it's back to the goggles and flying hat!□

Neve disc mastering console during installation

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EQUALISERS

A brief look at equalisers introduced in the last year

Have we ever really been aware of how closely interconnected equipment relationships were in the typical recording studio signal chain? Improvements in one area stimulated updates and gradual improvements in other areas. Equally (although less obviously) deficiencies in some areas were covered up by shortcomings either in specific areas or in general performance levels accumulative throughout the signal chain. These observations really hit home when a piece of equipment is introduced into the signal chain that is either quite different in concept or of a completely new generation of development. The items of equipment in question that can upset the internal balance of a signal chain are medium sized high definition monitors, high performance microphones and almost any variety of digital recording.

One of the initially upsetting things when there has been an upgrade in the signal chain is that the equaliser sounds different. Now, of course, the equaliser is still performing the same action but we may perceive the sound differently as the results are not masked in the same way. For reasons such as this the equaliser has become an area of heavy interest again and there has been quite a considerable amount of activity from manufacturers with new ideas and approaches over the last year or so.

Some of the first to respond to this interest were the mixing console manufacturers. With consoles normally being chosen for their sound and the EQ contributing heavily towards this, the logical step for some manufacturers has been to offer EQ options. In the case of SSL there are now three equaliser options which mainly differ in the area of low frequency section. The standard equaliser *82E02* has brown knob caps on the LF section. There is now a new standard EQ, the *82E242* which has replaced the *82E02* for future consoles and this is recognised by black knob caps on the LF section. A further option is the *82E132* 'valve-type' EQ which has orange LF knob caps. Both *82E242* and the *82E132* are available to existing or new clients at extra cost.

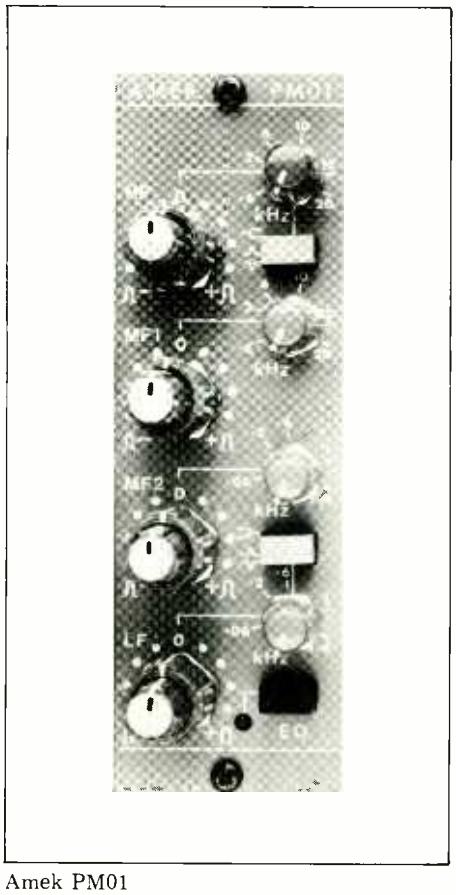
Sony and Quad-Eight have chosen a different path by making their equaliser sections removable in addition to other critical areas of the console. The Sony *MX-P3000* is the top of the range multitrack console and there is a choice of five plug-in equalisers. The Quad-Eight *Westar* and *Superstar* consoles have a similar approach to design, both offer a wide selection of plug-in equalisers. Currently available are EQ modules with 4-band frequency selectable, 4-band fully parametric and 10-band graphic facilities with more units to follow.

Amek has a lot of devotees of the standard in-console equalisers and recently introduced the *RM01* rack mount signal processing system. The *PM01* module for this system is a full 4-band parametric unit that is identical to those used in the *M1000* and *M2500* consoles with fully variable Q, frequency and amplitude on each band.

The power of a popular equaliser is clearly demonstrated by the development of the Neve *V* series console. This is based upon the *51* series console that had a quite persistent reputation for being a 'good equaliser' lasting beyond several new series of dedicated multitrack consoles.

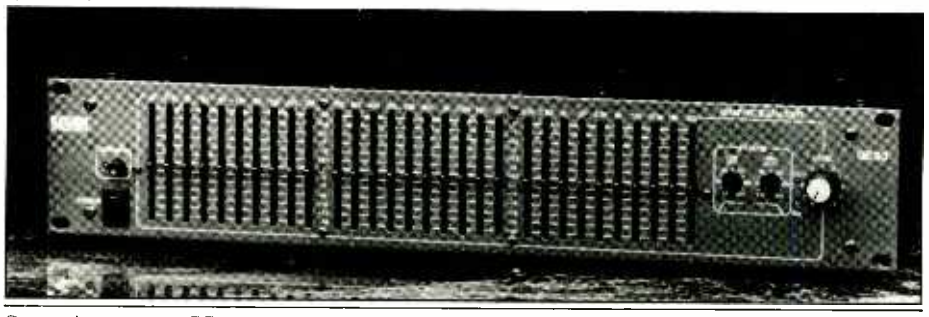
While on the topic of equalisers for mixing consoles, a small US company by the name of Troisi edc has recently shown a number of modular equalisers such as the *FLTR 510* dual parametric filter, the *EQ 517* and *518* parametric equalisers which form part of a modular rack system; a retrofit equaliser for the original MCI *600* series consoles and most interesting the *DQ 520*. This is based upon the *EQ 518* parametric but with the addition of a dynamics feature that allows the introduction of the equalisation at a user predetermined level. The equaliser section is a 2-band design and the threshold is adjustable from −40 to +20 dB. The dynamic control is designed for a smooth transition across the threshold. Further there is a direction switch that selects whether the EQ is active below or above the threshold level. The dynamics can also be triggered internally or by a broadband external source.

In the area of more traditional equalisers, JBL has introduced a new range of graphic equalisers in the form of the *5547* and the *5549*. The *5547* is a 30-band ⅓-octave equaliser with front panel input and output level controls.

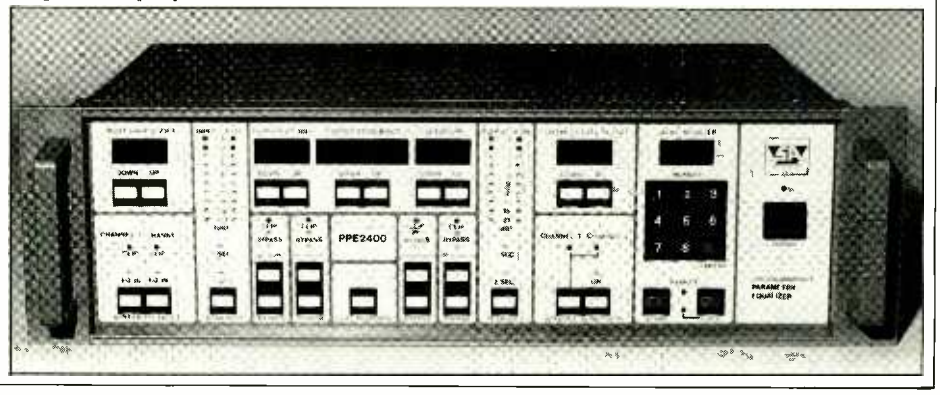


Amek PM01

Rane GE30



Stage Accompany PPE2400



The bands are between 25 Hz to 20 kHz ±12 dB. The *5549* is a room equaliser with the same number of bands but with a cut-only range of −15 dB.

Rane products have become widely available in Europe over the last year and these are interesting due to the company's widely publicised views on constant Q equalisation ('Constant Q' *Studio Sound* October 1985 by Terry Pennington of Rane). In practical terms Rane advocates design of equalisers that have a minimum of effect on adjacent equalisation bands with the Q remaining a constant width independent of the gain setting. Traditionally this approach has been avoided due to the likelihood of large amounts of ripple but Rane takes a different design stance as demonstrated in the article. There have been three recent additions to the Rane range—these being the *GE30* which is a 30-band ⅓-octave graphic with +12 dB/−15 dB in the cut/boost mode or it can be switched to a cut-only mode where the range is −18 dB; and the *ME30* and *ME15 microGraphic* equalisers which are 30-band ⅓-octave and 2-channel 15-band ⅔-octave respectively in single U formats.

French manufacturer Société Nouvelle Etelac markets products under the brand name of Amix. Two new graphic equalisers were recently introduced in the form of the *EMH 127* ⅓-octave 27-band single channel and the *ESH 211* stereo 11-band. The *211* uses octave spacing at mid/high frequencies with ½-octave spacing at the lower frequencies.

In the area of specialised units there are a number of new models that deserve mention. Although designed mainly for room tuning the Meyer Sound Labs *CP-10* is a high quality 5-band 2-channel fully parametric equaliser. Each band may be switched in/out independently. Meyer claims that the complementary phase circuitry creates minimum phase distortion even at extreme situations while maintaining a dynamic range of greater than 110 dB. The unit is a rack mount 2U design.

Although not so new, the Massenburg parametric equaliser has recently become available in the UK and is beginning to find a lot of interest once possible users can come to terms with a hefty price tag. This is a rack mount system which we understand from the UK distributor is being acquired by producers and engineers rather than facilities, which probably explains the appeal of the unit.

While in the area of the esoteric, we should mention the products of the UK company Esoteric Audio Research. EAR introduced two new valve (tube) equalisers about a year ago. The *822Q* is a general programme equaliser and features four low, continuously variable frequencies, five high boost and three high cut frequencies. The *823MQ* provides +8 dB/−16 dB range at switched frequencies between 200 Hz and 5 kHz together with a mid frequency cut at 7 kHz. Both are 19 in rack mount units and have been designed to operate for at least 10,000 hours before valve replacement is necessary.

The West German company EMS/Rehberg has introduced the *Filterbank B1*. This is a free standing unit with eight bands of cut-only from 250 Hz to 8 kHz with high and low pass filters. The amount of attenuation available is very high with the high and low pass filters having 40 dB/octave attenuation and the equaliser bands having 50 dB/octave. Applications suggested are in removal of problem noise from audio such as hum, unwanted tones, etc.

Automated equalisation is another area that is receiving more interest. Aside from automated EQ systems appearing on consoles from SSL, Trident, Harrison and possible automation on the Neve and Amek, there are a number of other products. The Neumann *ame 591* equaliser system is based around a central control panel and with *W 591* modules which show the equaliser status for that particular channel designed to be fitted into a console channel strip. The control unit allows manipulation of three frequency bands together with high and low pass filters. The automated aspect allows 64 channels to be run, stored and reproduced and these settings may be stored on data cassette. There is also possibility of master/slave operation, A/B comparison for each channel with EQ changes being made in real time.

The Stage Accompany *PPE2400* programmable 2-channel 4-band programmable parametric equaliser is now up and running. This is a rack mount device that will soon form part of a larger digitally controlled system. The EQ allows digital control of all variable functions with a memory capable of recalling up to 64 different settings. There are a number of optional interfaces for computers and other data buses. □

MASTERING

New disc cutting equipment and the changing role of the disc mastering facility

While it would be fair to say that recording studios are almost spoilt for choice when it comes to updating their facilities, the same cannot be said for the disc mastering community. Inevitably this stems from the fact that as the sale of discs declines, the amount of technical innovation falls accordingly.

Disc cutting engineers tend to be caught in the middle. It is not the hardware as such that has traditionally been the limiting factor but the raw materials and subsequent processing. In fact, in many ways the Achilles heel of the whole operation is the lacquer. At the moment things seem on a relatively even keel, although recently there have been a number of major scares that have rocked the industry.

A year or so ago, one major lacquer manufacturer couldn't deliver and with essentially only four suppliers of lacquers for the entire world record industry the results were touch and go for a while for many mastering facilities. Earlier cutting engineers had already become somewhat jittery when there was the threat of problems with the supply of aluminium blanks. Put in the context of a recording studio, deciding to update a cutting system would be similar to deciding whether or not to go digital, if for example the supply of recording tape couldn't be guaranteed.

Of course one way round the problem would be to do without tape or in the case of the cutting room dispense with the lacquer. In what will perhaps be the very last major innovation in disc cutting that is exactly what researchers at the German company Teldec did.

Available as the *VMS 82* from Georg Neumann, the Teldec/Neumann DMM (Direct Metal Mastering) cutting system uses copper coated steel blanks: the diamond cutting stylus being used to cut a groove directly into the copper master. The process first appeared in 1981 and to date there are 25 DMM systems in use in various parts of the world including the UK, Austria, East and West Germany, France, Spain, the USSR, Czechoslovakia, Finland, Sweden, America and Australia.

It may be reasonable to speculate that given the eventual decline in record pressing—particularly as a mass market medium—the production of conventional lacquers may well cease leaving only the DMM process as the only means to (un) conventional record pressing. Speculation on how soon this will happen varies, at the moment seven to 10 years maximum appears to be the average expectation.

Given the fact that there is still a demand for vinyl discs the short term prospects for disc cutting look quite healthy and there is a surprisingly buoyant market at the moment for second hand equipment. Tony Batchelor of TAM, a disc cutting facility and specialist disc cutting equipment supplier in North London, reports healthy sales of second hand lathes and ancillary equipment. It would appear that while some of the larger cutting facilities may be reducing the total number of lathes they operate, enterprising studios seeing the chance to offer custom acetates for DJs or special mixes for discos, are picking up a reasonable lathe at a realistic price. Even though this may only be a temporary reprieve for the equipment it is nevertheless an interesting phenomenon—a bit like elephants returning to their spiritual homeland before they die.

Before this update turns into an obituary it must be said that the industry, although realistic about its long term future, is still nevertheless continuing to improve standards in some areas. Neve for example is currently producing second generation digital mastering consoles alongside its analogue *(9022 ADN)* disc mastering equivalent. The new digital systems, *DTC1* (digital tape console) and DDM (digital disc mastering) are applications of the company's *DSP* technology specifically for CD and disc mastering.

Processing of the signal takes place purely within the digital domain and the consoles provide dynamic control, delay facilities and EQ accurate to within 0.5 dB/channel. Should further lacquers be required at a future date, or if a track is being used on a compilation, console settings can be memorised against timecode ensuring accurate repeatable results the second time around.

The crossover between pure vinyl mastering and CD preparation is becoming increasingly blurred. Certainly the emphasis on new products is moving towards digital and products such as the Neve digital console, the Sony *K-1105* digital 8-channel mixing system and the Harmonia Mundi Acoustica *bw102*, probably indicate the way things will continue to develop at least for the time being.

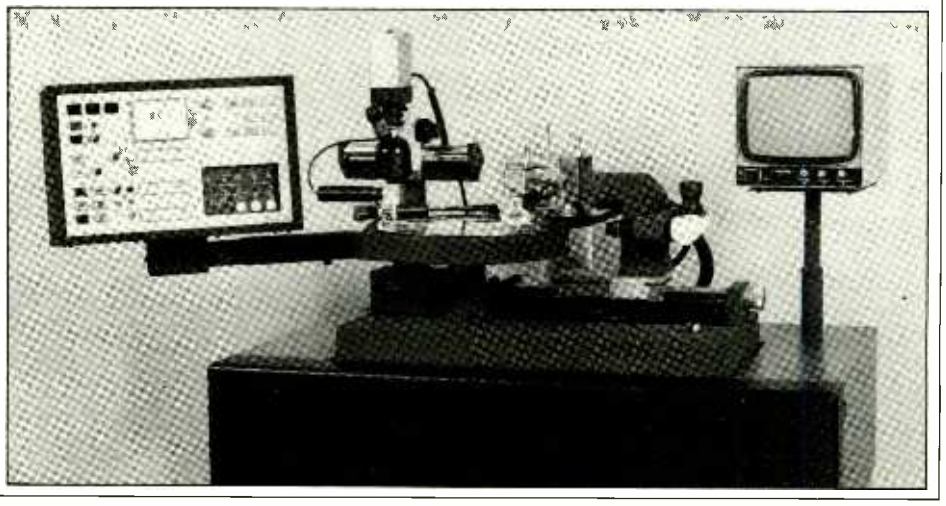
Essentially the *bw102* is a digital processor and at first glance would appear to have little to do with analogue disc cutting but in fact the *bw102* can be supplied with a preview delay module and a high performance digital to analogue converter, thereby allowing analogue discs to be made from virtually any conventional digital source. A rack mounted unit, the *bw102* provides a useful crossover point for disc cutting studios moving towards the digital domain.

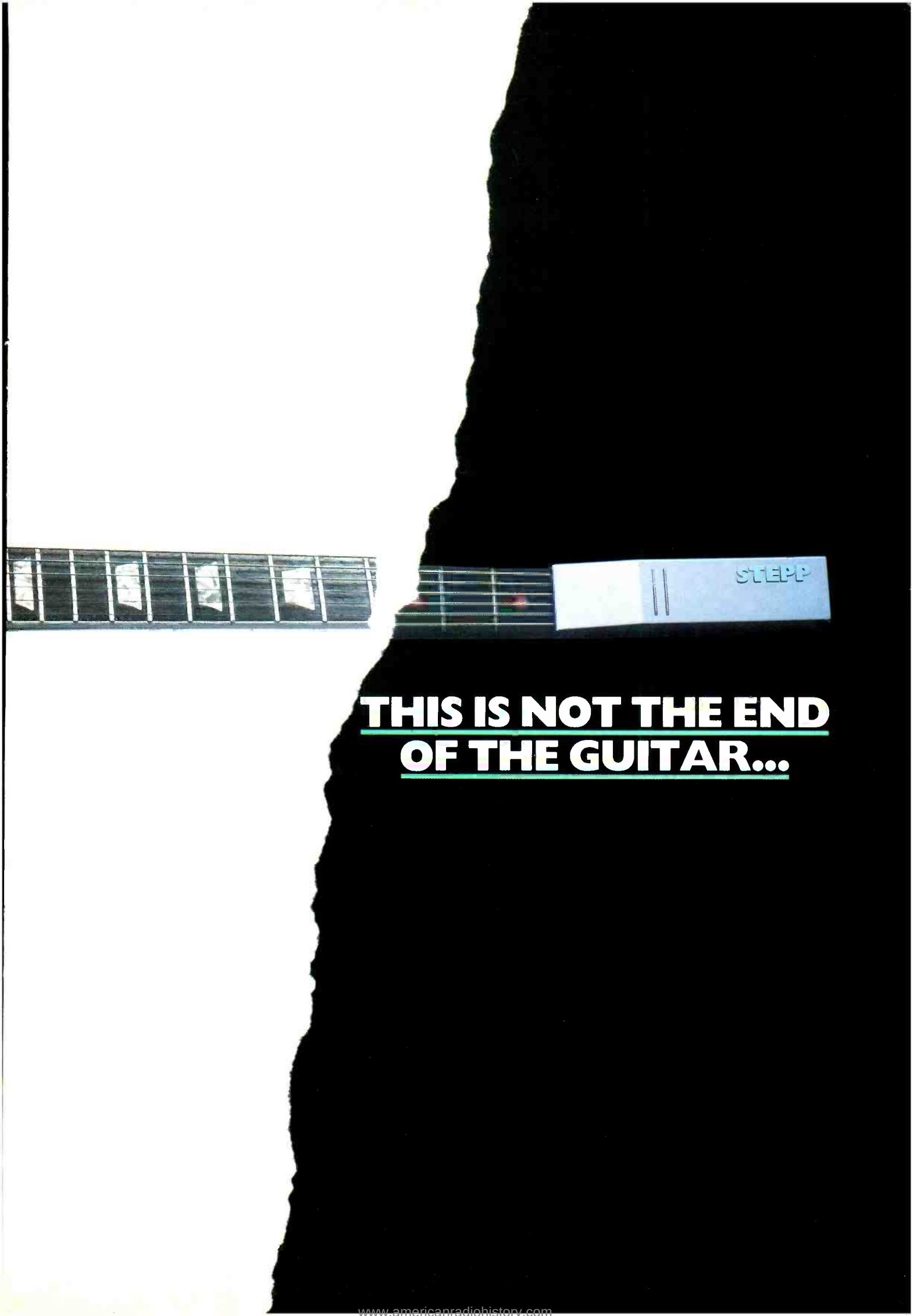
A number of facilities have already taken the plunge and committed themselves to CD mastering but the area is so new that even those involved in it are currently trying to agree on what they should call themselves. At the moment the favourite appears to be pre-mastering engineer and/or facility which basically covers the tape mastering process for CD (roughly the CD equivalent of the conventional disc cutting facility) avoiding the obvious confusion with mastering as in disc cutting, mastering as in tape duplication and mastering as applied to CD manufacturing ie resist master disc preparation.

Interestingly not all improvements in the disc cutting world are spin-offs from the development of digital techniques. According to TAM there is a growing interest in the old Ortofon *661* cutterhead. The 'black' head as opposed to the much more recent *821* 'green' head is finding a new lease of life cutting material where a heavily modulated programme with a persistent bass line is required at above average cutting levels. Repairs and modifications are carried out by TAM and the company even keeps a spare head which can be loaned to customers while work is carried out. Esoteric Audio Research (EAR), who has done a considerable amount of work in the UK on valve-based disc cutting equipment, provides yet another alternative to the conventional equipment list. In addition to cutting system modifications EAR also provides specialist valve programme equalisers including a mid EQ unit, the *823MQ*.

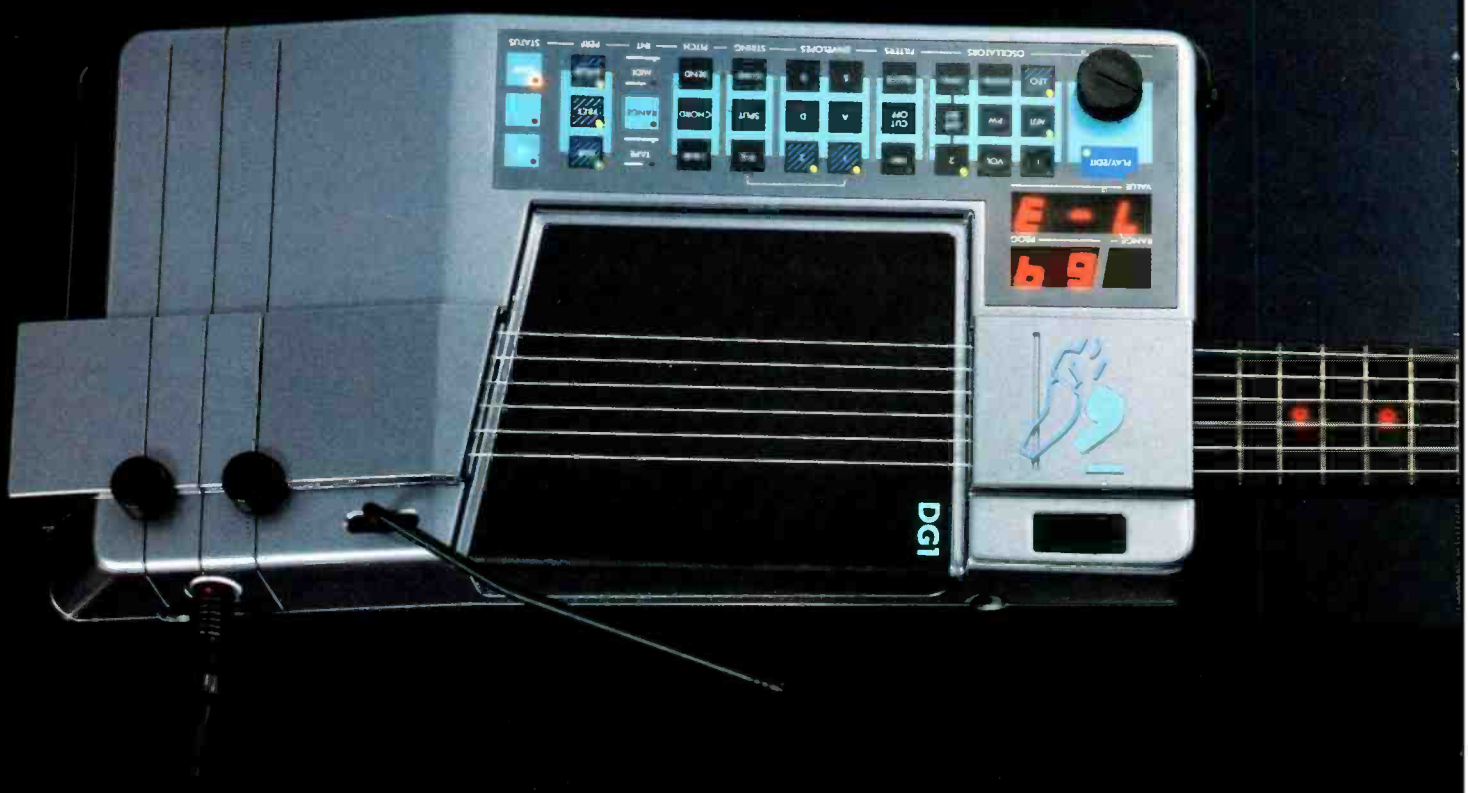
Despite the publicity surrounding digital, vinyl records still have a high consumer profile and although digital replay systems may ultimately kill off the black disc for the time being at least there would still seem to be plenty of life left in analogue. □

Neumann VMS 82 cutting system for direct metal mastering





THIS IS NOT THE END OF THE GUITAR...



The electric guitar hasn't changed much since the 50's. Music has.

Synthesizers and digital technology have revolutionized popular music with the result that guitarists have to some extent been left behind. Quite a few have taken to the keyboard synthesizer only to sound like every other guitarist turned synth player.

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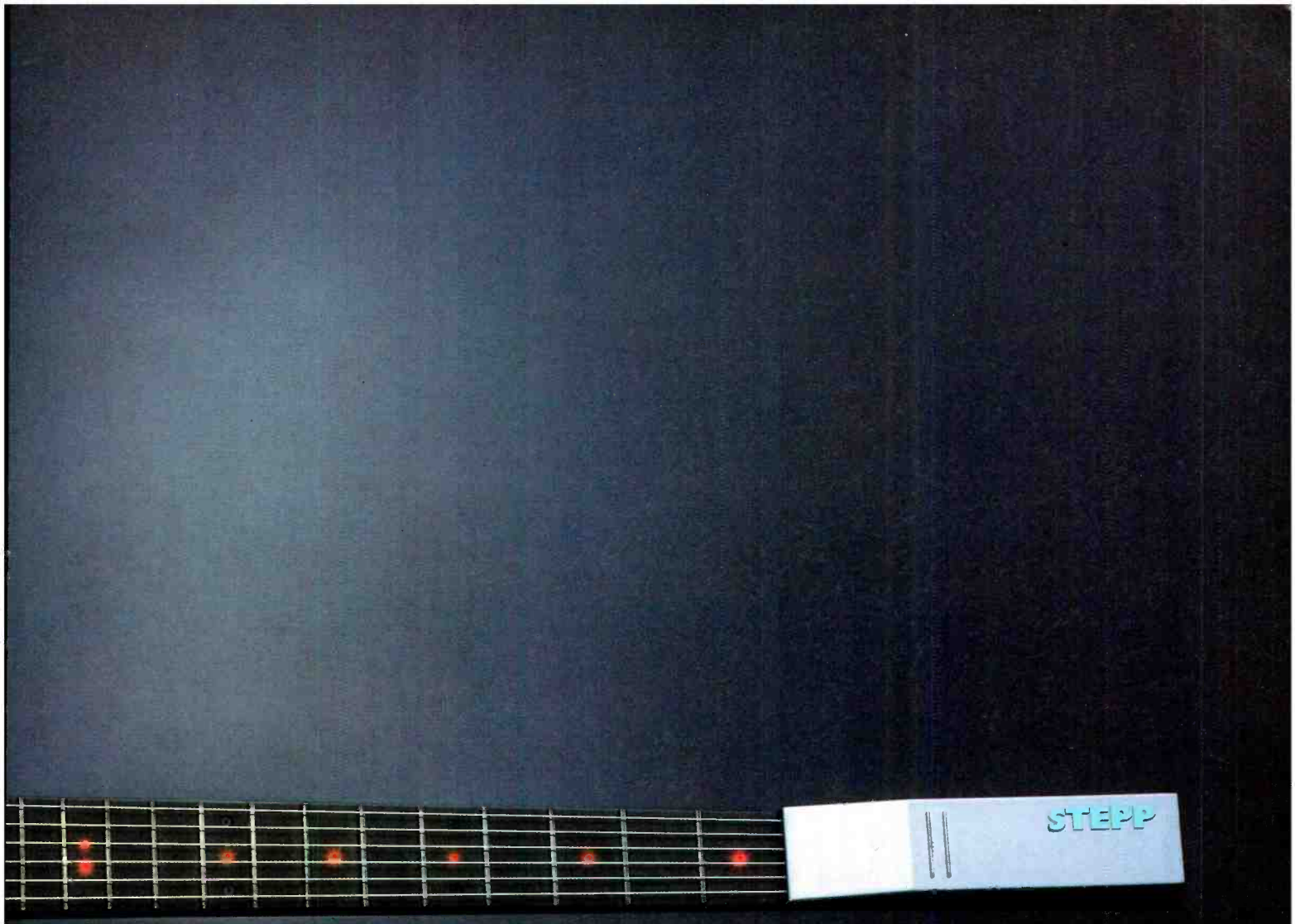

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IN PERSPECTIVE

Comment from Martin Polon, our US columnist

Copy, copy—who's got the copy?

The man warily entered the back room—isolated as it was from the rest of the house. A youngish face belied his appearance. A small walkie-talkie was held firmly in his hand to communicate with the two lookouts outside. The dirty greys and browns of the old building revealed much about their location. The young man had a pleasant face; unlike his compatriots. The girl moved through the doorway to join him. She showed surprise, for the room was not in the least like the rest of the house—no tatty furniture and filthy walls here. The room was painted matte black, with heavy black out curtains at all the windows; a reddish light glowed from the equipment in the centre of the room. Prominent amongst the units was a cassette deck, like the altar of this temple of ageing consumer electronic equipment.

"Where did you get that?" the girl gasped. "I've kept it here all along," he replied. "But the police . . ." was all she could say. Suddenly another man had joined them; he was very well dressed, from silk tie to leather brief case.

"I need this copied for one of my clients and I need it tonight."

He reached into his brief case and withdrew a copy of Mick Jagger's latest album.

The girl wheeled and exclaimed, "Where did you get that?"

The fashionable gentleman eyed her briefly and then ignoring her, spoke to the man with the youngish face: "He's turned 50 you know—Jagger I mean."

The young face continued to flick switches and began to load a cassette.

"This is an unprotected recorder?"

"Absolutely," stated the equipment owner to his client. The rainbow hued CD was placed on to a tray in a compact disc player and the whole assembly rammed home. The recorder was started and then the disc played and the whole room was filled with the rousing melodies that only an artist like Mick Jagger can create.

That was a shame really because the harried warning from the lookouts was drowned out by the cacophony of the music. The young faced man saw a reflection in the corner of his eye. It was the glint of cold steel. He reached into his pocket for the Beretta *93S*. He had 20 good reasons in 9 mm why the police would not win here without experiencing some pain. The girl screamed as the wooden baton struck her lover at the base of the neck. He collapsed. Minutes later he began to see, hear and feel again. The room was swaying a bit but he could see the client and his girl trussed up in handcuffs. The last thing he saw before he lapsed into unconsciousness again was the legend Record Police on the coveralls of the SWAT team member smashing his beloved Revox to dust with a sledgehammer.

One can assume that this scenario is hopefully not a rock and roll road show version of '1984 plus five.' And yet in Great Britain the government has announced a major revision of the copyright laws that would include a 10% tax on blank audio tapes as part of a sweeping away of old laws protecting copyright owners from the threats of 'electronic infringement'. The White Paper from the Department of Trade and Industry is intended to protect copyrights, patent and trademarks from 'advances of technology'. The blank tape tariff would cover cassettes playing more than 35 min and could raise as much as £6 million ($9 million) per year. These funds would be used to reimburse copyright owners and artists for losses due to copying, according to department of Trade and Industry spokespersons.

The carrot that would accompany this particular anti-copying stick in the UK is the unlimited audio copying of broadcasts and pre-recorded materials—as long as the ultimate usage was private. Blank video tapes would remain exempt from any presumptive duties and copying television programming would remain fair game. Copying pre-recorded video material would remain illegal.

In the US, the record industry has been offered a solution to its problem of illegal copying. A major label insider commented recently on the US Senate hearings concerning illegal audio taping. "To hear the US record industry tell the story, illegal copying makes acid rain look a bromo-seltzer in a pond. The supposed losses from copying are rumoured to run into billions of dollars. But while the industry complains of copying, it is suffering from shortages in compact discs. At the same time, the record industry has relinquished half of the classical market or better to European labels. Better the record industry relaxes a little about the losses from illegal copying and puts some energies into building CD plants in the US and supporting classical music production."

Whatever your leanings towards record company complaints happen to be, the US Senate has had enough belief in the hue and cry to hold hearings on a bill (S 1739) imposing a surcharge on blank audio tape and on home recording equipment. At these hearings, the well respected CBS Technology Center with the encouragement of the Recording Industry Association of America (RIAA), has offered up a way to prevent copying by placing a copy code of an 'inaudible notch' in recorded material. A companion chip would be built into all recorders to scan for the coding. If the coding was present, the recorder would cease to record for 25 s at a time leaving another 20 s or so of unaffected recording. The coding system with its notch in the frequency spectrum would be used on CDs, cassettes and LP records. Of course there would be another class of recording made available at a higher price that could be copied because these premium releases would be notchless. Recorder manufacturers would be required to include the chip or pay a substantial royalty fee on products manufactured without the chip.

The recorder chip would be very inexpensive to install in mass production. According to a scientist at the CBS Technology Center as quoted in *Broadcasting Magazine*: "The decoder chip is expected to cost less than $1 when mass quantities are produced and equipment manufacturers are free to develop a compatible integrated circuit that can perform the same functions more efficiently or at lower cost. In any event, CBS has pledged to licence both the encoder and the decoder that it has developed on a royalty-free basis for all hardware and software applications."

Several US senators thought the idea an excellent alternative to imposing fees on blank tapes and machines. One US senator was quoted as saying that he was intrigued by the prospect that "technology might be able to solve the problem that it has helped to create".

For once, this columnist is left without words. Or at least without words for 25 s at a time.□

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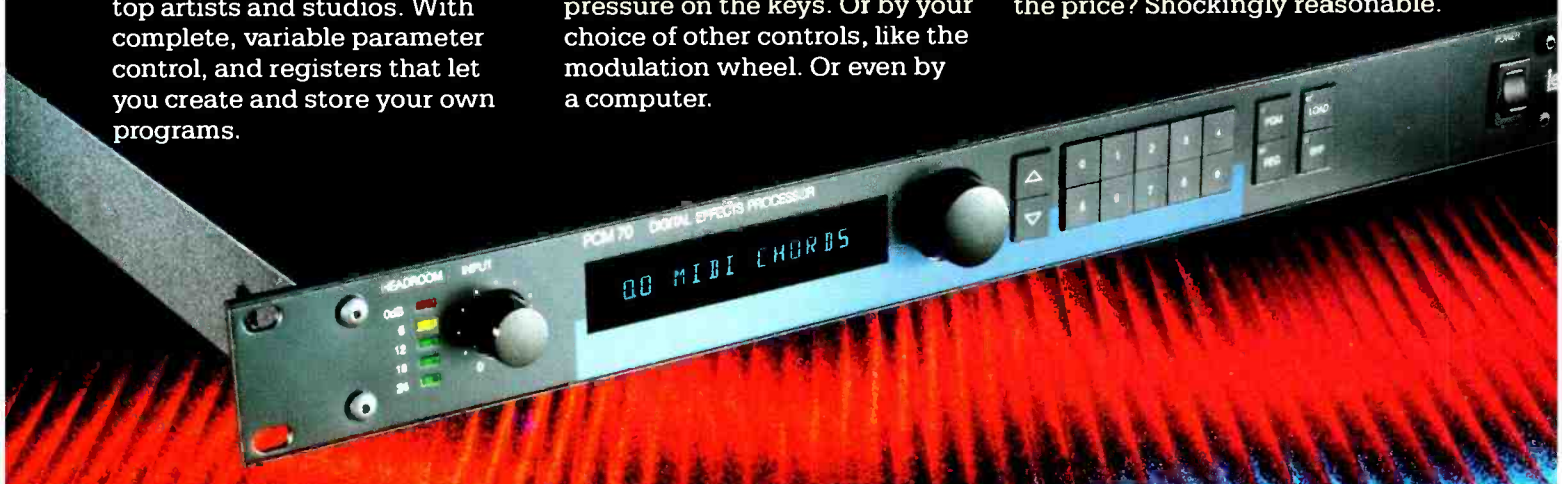

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STUDIOFILE

Sierra Recordings, Athens

Control Room B

Music business is the operative term when applied to Greece as live performance is inextricably linked with the recording industry. Whereas in Europe and the USA studio performers who only occasionally—if ever—perform in public are not unusual, in Greece recording artists are obliged to play concerts if they want to stay in the public eye and ear. This means frequent night club engagements and concert tours all over Greece with just a brief respite between the end of the summer and the start of the autumn season.

The mainstay of the Greek music scene is folk—or popular—music and it would be very rare not to find a bouzouki amongst the instrumentation! But though the traditions are observed performers are not impervious to outside influences. Jazz and rock music have slowly been making inroads and there is a hardcore of dedicated musicians determined to break the lock that popular music has had on the music scene.

As the Greek public is oriented towards live performance it is not essential to have a recording contract to be a star—rare but not impossible. When not touring most artists concentrate their activities in what are familiarly known as 'bouzouki clubs'. These are essentially large nightclubs but with a difference: in Greece it is not unusual to have five or six national stars on the same billing! The general enthusiasm is very high and the atmosphere is quite electric and it is these appearances which promote record sales. It only needs one mention that 'this is my latest record' and the shops will be taken by storm the following day. Airplay on the radio and television does play its part, of course, but forsaking the stage for three months would be tantamount to commercial suicide.

The need for performers to develop such a strong stage presence can be a disadvantage in the recording studio. Records tend to be made very quickly without much experimentation or involved production. The resulting records are not poor by any means but many could benefit from the advantages of modern recording techniques. Things are changing now, however, the movement being spearheaded by Sierra.

Located in what was once a large cinema on one of the main roads leading out of Athens, the studio is away from the centre of the city in an area that houses offices, shops and other distractions. The original cinema foyer has been preserved and doubles as the main office area and waiting room/lounge. At present the studio has no in-house catering but the local restaurant is just a telephone call away—on a private line.

Sierra Recordings is run by three go-ahead young men—two brothers, Elias and Mike Achladiotis, and close family friend, Christos Zorbas. Their close-knit way of working tends to earn them the general nickname of 'the brothers'.

"We all started playing music when we were teenagers—maybe even before that—and in common with a lot of aspiring musicians the world over, wanted to make records. Studios were either very rudimentary or very expensive so we decided the best thing would be to get one of the new Teac *3340* 4-track recorders and a simple console—an Alice—and record ourselves. This way we could take our time and experiment without having to worry about the studio clock.

"After a fairly short time we were getting pretty good results and we even had a couple of songs released as 45s. We had a lot to learn, however, both about recording and music, and we hit upon the idea of all of us going to the Berklee College of Music in Boston. There we could pursue our proper instruments as well as taking classes in the recording programme, thus getting a proper grounding which would stand us in good stead for opening a studio."

For the record, Elias plays drums, Mike is a guitarist and Christos plays keyboards. There is also quite a bit of instrument doubling.

Mike: "Berklee was a very good experience for us from many points of view. We all got a good education musically and an introduction to the finer points of recording. However, I think the big plus was being in America and having the opportunity to meet and play with so many other musicians, as well as being able to visit working studios and get a real idea of what the music business was all about. We wanted to go back to Greece armed with the knowledge that we could operate a modern recording studio and our time in Boston provided us with that."

Sierra Recordings got off to a rather dramatic start. The original owner wanted an up-to-date studio with no expense spared and it seems the acoustics were designed by Tom Hidley and built by Westlake Audio. The evening before the studio was to open its doors, someone forgot that the fumes from the carpet glue were highly inflammable, lit a cigarette and the studio became a flaming success! All that was worth saving was the premises and some of the equipment in the control room. The brand new Neve desk had some burns but still performed perfectly. Armed with loans from their respective families, 'the brothers' went to work to rebuild the studio.

"The previous owner had just lost interest in the whole thing so we were able to make a good deal for the premises and the equipment that was worth taking over. Of course, the console was given a full overhaul by the Neve engineers who made it just like the day it was made."

Tom Hidley was called back and the studio rebuilt by Eastlake Audio—together with strict fire precautions.

The main studio—Studio A—is built where the auditorium used to be with the control room wall roughly falling where the screen would previously have been. The studio floor is 2000 ft^2 and includes a large isolation room, a vocal booth and 'open' drum cage. The first impression one gets on entering the studio is of space, aided and abetted by the very high ceiling. Though not quite a small concert hall in feel, the studio atmosphere can be changed from fairly intimate to quite live by use of floor to ceiling drapes positioned at various key points around the room. There is a fair amount of trapping of course but just ▷

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STUDIOFILE

enough to keep the sound under control rather than sucking it all out; instruments carry in the room enough for separation but can be heard acoustically if you don't like cans.

The floor is about two thirds carpet, the remaining area in front of the control room being composed of two sections, one of marble and the other parquet. The studio walls consist of the aforementioned drapes, rough marble tiling, a lot of bark and an attractive sloping wooden hood over the control room window. The isolation booth is accessed through sliding glass doors and is very live with marble flooring and glass panelling on the walls.

"The room has a great sound for strings and brass or for any other situation where you want a very lively sound on the instruments. Loud guitar amps also sound good; the room does not necessarily restrict you to acoustic instruments. The drum cage is very large with movable screens across the front and the drummer has a very good view of the rest of the studio. Even if we use the front screens he still feels part of the group as there are no windows cutting him off. Leakage from the studio has never been a problem—or vice versa—and we are able to vary the sound quite a lot by using the rear drapes. We can go from very matt to bright with no trouble and make good use of how the drums actually sound before messing about with EQ and effects."

There is a good selection of instruments: Yamaha 7½ ft grand piano, Hammer harpsichord, Hammond organ with valve (tube) and transistor Leslies, Gretsch drum kit, Simmons electronic drums, Premier vibes, Hohner *D6* Clavinet, Synergy synthesiser, Yamaha *DX7*, Moog *Memorymoog*, guitar amplifiers from Marshall, Boogie and Fender plus lots of latin percussion to shake about. There are also various Rhodes electric pianos.

A large pair of Lockwood monitors are mounted in the wooden hood over the control room window to save everyone trooping into the control room to listen during large sessions. Orchestras are easily catered for owing to the large space available "...and rock groups like it as it gives them room to move around as if they were on a big stage!"

Sierra, continued

The microphone complement includes Neumann *U87*, *U67* and *U89*, Telefunken stereo microphones (used a lot for orchestral sessions), AKG *414* and *451*, Sennheiser *MD441*, Electro-Voice *RE20*, Beyer *M88* and others. Distribution to the control room is via large *XLR* panels which parallel up all the microphone lines going to the control room, as well as foldback feeds and tie lines.

Access to the control room is either from the studio or from the wide corridor that runs around the outside wall of the studio and connects with doors at each side of the control room. In comparison with the studio the room is fairly small. We really could have done with a bit more depth but it would have meant modifying the basic structure which would have been very expensive."

Centrepiece is the Neve *8078* console fitted with 40 inputs to 24 groups and 32-track monitor section. The desk is also equipped with *Necam* automation. "We find that the visual aspect of the *Necam* system makes it very easy to use. You can see at a glance where you are and updating just happens naturally. We like it a lot."

The bulk of the recording is done with a Studer *A800 Mk 3* 24-track machine but there is also an *A80* 16-track recorder for the enthusiasts. The two machines can also be locked up for 38-track working if required. Mastering is on Studer *A80* and *B67* recorders with two Revox *PR99*s for general duties. All recorders including the multitracks have Dolby.

Monitoring is the Eastlake 3-way system with TAD drivers for the bass and mid frequencies. Secondary speakers include JBL *4311*s, Auratones and the in-built elliptical speakers in the console. Power is provided by Bryston amplifiers.

The design is fairly typical of Eastlake with a wood panelled monitor bridge and side walls with bark facing together with some rough marble tiles next to the outside edge of the speakers. All the tape machines are soffited at the rear of the room keeping the floor area clear of obstruction. The floor is carpeted with a parquet area underneath and behind the console. There are heavy drapes that can be pulled in front of the control room window to minimise front to back reflections during mixdown.

Though there is rack space in the soffits, the majority of the outboard gear is housed in low profile wooden racks to the left of the console. Equipment includes Lexicon *Super Prime Time* and *model 93* delay line, Publison *Pitch Transposer*, dbx and UREI compressors plus Audio & Design *Compex* compressors/gates, Valley People rack with *Kepexes* and *Gain Brains*, UREI graphic and parametric equalisers and Orban de-essers. Aural excitement is courtesy of Aphex with reverberation effects from three EMT *140* plates (two matched for stereo) and a Lexicon *224X*. In order to keep everything handy the machine remotes are built into

Control Room A

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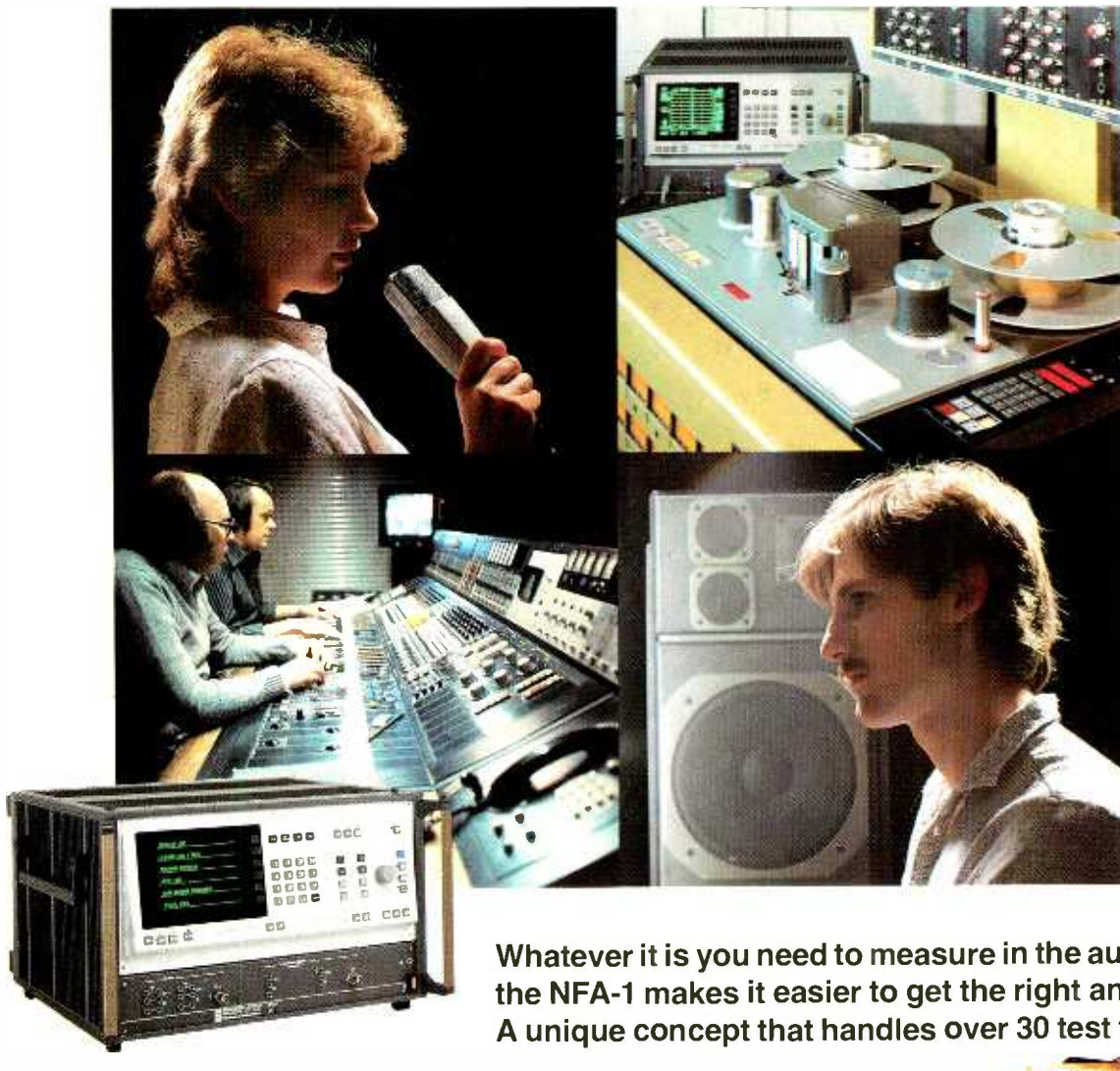

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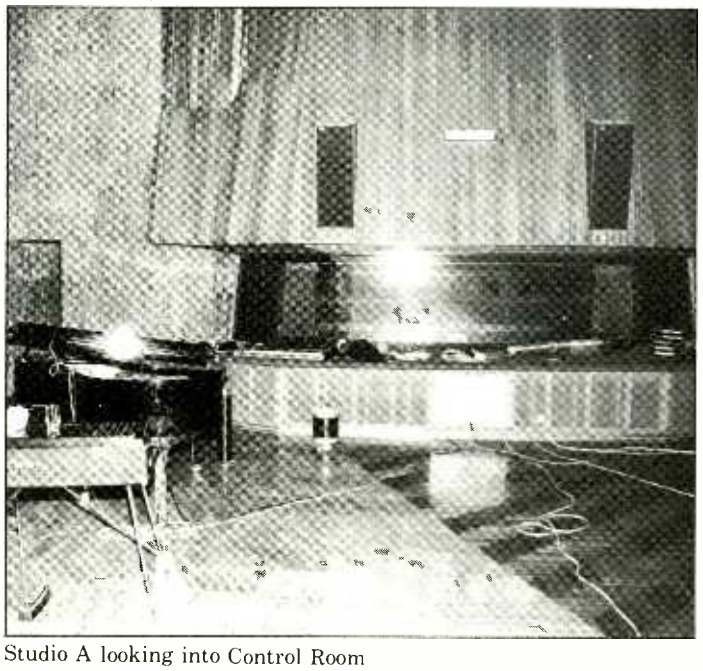
a small console at the other end of the desk.

At the time of our visit a jazz-rock album was being worked on. The sound came over very cleanly with a lot of drive, stereo imaging was good along the length of the console with no surprises when one sat down or stood up.

More recent is the upstairs studio, Studio B, which is situated roughly over Control Room A and the adjoining space. The acoustics were designed and built by Lakeside Associates and provide a very worklike atmosphere with light coloured wood panelling and fabric covered trapping. The monitors are Lakeside 2-way with TAD drivers and driven by Hafler amplifiers. Secondary monitoring is the same as Studio A though the Auratones seem to be used more in Studio B. The room has a floor area of around 425 ft² and due to the greater front-to-back depth (either real or apparent) has a slightly more 'roomy' feel to it than Control Room A. The sound was controlled in most parts of the room with the monitors sounding clean over the whole frequency range—the mids were especially good with no trace of honkiness.

Recording centres around a Trident *TSM* console with 32 channels and 24 groups plus monitor section and a Studer *A 80 Mk 3* 24-track. An *A 80* 2-track carries out the mastering duties. Outboard equipment is the same as for Studio A. "A lot of our customers like to swap between the two studios—

Sierra, continued



Studio A looking into Control Room

either for mixdowns or tracklaying—so we found the most convenient thing to do was duplicate the effects equipment for the two rooms. That way people could work in either and feel at home. Though there are slight differences in sound and atmosphere, we find that people adjust very quickly and we have had no problems in this area."

Adjoining Control Room B at 90° is the studio, with a floor area of 740 ft². The room is large enough for most rhythm sections and has a very lively sound, which makes it popular with rock and rollers. The main décor—and treatment—is wood panelling matching that in the control room and parquet floor with strategically placed trapping behind the walls and in the ceiling. The Steinway grand piano, for instance, is usually left in a corner that opens into trapping. There are two booths with sliding glass doors to one side of the studio with a window between the two in the communicating wall. One booth is for overdubs and vocals and is very dry and the other, larger, booth is used for drums and general isolation work. It is also possible to alter the acoustics. Two of the walls are faced with sliding glass panels with traps behind. It is also good for expanding thin-sounding electric guitars without making a dive for the first DDL that comes to hand.

The entrance to the studio is via the control room with the twin sliding glass doors forming an extension of the control room window. When space is really at a premium, the area between the two doors forms a vocal booth.

Studio B houses a Steinway grand and would be suitable for chamber music, string quartets, solo piano, etc.

On average Sierra is booked 700 to 750 hours per month and has even exceeded 1,000 hours on several occasions. In practical terms this means that both studios are working around the clock.

Sierra is slowly expanding its clientèle internationally with artists such as Nana Mouskouri, Demis Roussos, Vangelis, producer Vic Coppersmith and lyricist Gary Osborne.

"The biggest demand at the moment is that we install a video facility. We certainly have the room and we are thinking about it very seriously—it is the next logical step. However, video is a lot more expensive than audio and we would not want to put in anything that was less than professional. I think we will see things a lot more clearly as to future expansion towards the end of '86." **Terry Nelson Sierra Recordings, Sound Recording SA, 99 Messogion Street, GR-115 Athens, Greece. Tel: 6926019/6927097.**

Sirocco Studios, Kilmarnock

"Who's on the top line?" Clark Sorley asks. He is putting the vocal backing together for a Klari Katona master tape. That was at least the 10th time the three singers had tried it.

"Me," says Mandy, raising her hand. She is due for a laryngeal nodule operation in two hours time so no one can blame her if she gets it wrong.

"On 'Shine' you're singing E," Clark explains. "It should be F."

He shows her how. She tries again. They all sing together. It certainly works. The music has that extra sparkle.

Clark Sorley is half of Sirocco Studio's two man band. Musician, musical director and producer as well as engineer he is the presence and much of the inspiration which is giving the Kilmarnock recording unit, a growing reputation.

The link up with Hungarian pop star Klari Katona, a girl with a big international reputation but seeking an entry to the British market, has all the potential Sirocco needs. Unfortunately, Klari has disappeared back to Budapest in a cloud of influenza and Clark can already see the dream fading, the contract falling apart but he works on with the same meticulous precision.

Although Sirocco goes back only eight years, for 29-year-old Clark, it really all began when he took up piano playing when he was three. With 26 years of music behind him, "That's what gives me my ear," he claims.

In the early '70s, he transferred his musical allegiance and became another of the thousands of boys with a guitar. He took his music more seriously than most as far as practice and proficiency were concerned but lacked drive and direction. He threw over the idea of a university education and a career in law for his music (no accolades of parental approval here) but considered himself lucky to be playing one gig a month.

He was 'drifting'. Drifting in Kilmarnock is as scintillating as a conversion with a Trappist monk. It lasted six months.

Then he was drafted into the family building firm—"a soul destroying experience"—which ▷

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STUDIOFILE

taught him what work was all about and gave him an invaluable insight into business and its organisation.

By 1976 the music scene was showing signs of improvement. An amalgamation of Kilmarnock groups brought some of the best musicians together including Clark and his other half, as far as Sirocco is concerned, sax player and telcommunications engineer, Spike Bain.

Six musicians and two roadies, they travelled Scotland in a couple of builder's vans. Their band and their music were not the height of fashion—punk was in. By comparison, they considered themselves "to a degree more sophisticated" for "we played in tune".

It was a desire to have something permanent to show for their effort—transforming the ephemeral into the concrete—that brought them into recording. There were no suitable facilities in Glasgow so in 1978 they took over two first floor rooms in Glencairn Square, Kilmarnock.

Formerly part of a red sandstone, residential establishment, this was a building in decline. Their neighbours were a french polisher, a plumber and a knitting machine operator. The access alley still runs by the open kitchen door of the Chinese take-away which operates from the ground floor.

The previous occupants had already installed carpet and curtain insulation which was a "wee bit makeshift" but with the thick sandstone walls already proving effective, it's a makeshift pattern they have expanded rather than replaced over the years. Performers sometimes fail to appreciate the natural feedback but recording does not appear to suffer.

They installed their 'live concert' mixing unit and with two 2-track Sony tape recorders they could overdub voices. With a Bank of Scotland loan Sirocco Studios were in business.

"Credibility has always been a problem for someone like me," says Clark Sorley, getting people to "take it seriously."

"Why Kilmarnock?" he was and still is asked. "Why not Kilmarnock?" is and was his reply.

Sirocco, continued

If some did not take them seriously, the bands in and around Glagow certainly did. At £4.50 an hour, they were queuing for recording time. Many were punk groups placing more strain on the studio's equipment than on recording expertise. A number of their customers were destined for greater things, however, and are remembered with a mixture of fondness and pride—Simple Minds, Aztec Camera and Kissing the Pink.

It was all business, however, and by the end of the year they had moved on to 8-track recording and had redesigned the layout. It was a DIY operation. Experience in the building trade and in electronics was proving advantageous.

Two years later they were using 16 tracks and their own music making was bowing out to the pressure of the part-time work load at Sirocco. In the meantime, Clark Sorley had built his last wall, laid his last brick.

Pleading letters to recording and radio companies struck pay dirt. Radio Clyde were, by chance, looking to expand their technical team and Clark found a berth with that successful and innovative commercial station.

At the time, 1979, Andy Park was in charge. Programming was varied and expansive. In the next year and a half, Clark was covering everything from run of the mill station productions to outside broadcasts, from pop music to jazz and symphonies.

Then he went freelance, juggling his time between Sirocco and various outside commitments. Spike continued to work at the studio part-time. Both still found they were recording other people more and playing themselves less than they would have liked. It was a pattern which was destined to continue into 1985 and which nourished the continued expansion at Glencairn Square.

There is still a steady procession of hopefuls gracing Sirocco's portals. Hope, like all else, is subject to inflation but today's Sirocco price is still one of the cheapest around.

Still with the striving spirit in mind, there are four, rough and ready rehearsal rooms across the yard with three 2-track recorders (Revox, Bias and Teac) available. A second studio currently awaits completion.

The tradesmen have moved out and a lounge, office and kitchen have taken their place. A new pre-production unit has been introduced by agreement with a freelance audio technician seeking a base. He provides the electronics while Sirrocco provide the space.

In November, they purchased a new 24-track Amek *Angela* mixing desk and an MC1 *JH 114* multitrack recorder, secondhand from Mobile One. The recorder is not without teething problems. It has a propensity for chewing tape and the autolocate warning lights flash on and off in hysterical abandon, from time to time. Not a situation which will be allowed to continue. The Rebis effects rack with a Yamaha *REV 7* digital reverb, MXR and RDS digital delay lines, an MXR graphic equaliser plus Audio & Design compressor limiters and an Aphex *Aural Exciter* may not be in the same league as many of the larger studios but it competently meets customers' requirements.

"Total Cheatery," claims Clark Sorley of some of the effects at their disposal but concedes that generally, "as technology does advance, the musicians are improving." Everything links up to Tannoy *SRM 15S* monitors, Yamaha, *NS10*s and Auratones.

In studio one, a battery of microphones (Calrec, Shure, AKG, Beyer, Neumann, Sennheiser and Electro-Voice) overcome the problems of insulation and a variety of musical sounds—everything from accordian dance bands and fiddle music to folk guitar, pop and jazz.

Central piece to the casual visitor is the Scheidmayer grand piano, a legacy of days at Radio Clyde, but Clark and Spike are just as likely to be putting sounds together with the two synthesisers (*DX7* and guitar), electric guitar and bass, the Roland drum machine or the *QX7* digital sequencer.

It all attracts a ready market of musicians and record companies to Kilmarnock. Lismore Records which recently bought record production rights for the Channel 4 *Down Home* fiddle music series, used Sirocco equipment for editing. Folk artist Alistair MacDonald with his own Corban label is another customer as is Gus MacDonald's Klub Records. Klub produces about three pop LPs per year and Clark Sorley nurses an old dream that here might lie an outlet for his own music.

Both men still cling to their musical roots. Spike Bain has recently taken up the saxophone again, preferring the arpeggios á la John Coltrane to the electronc tailoring of other men's music. With a regular job behind him, he can afford to be cavalier, however. "Making money," he said, "is more like playing at Monopoly than life." It is Clark Sorley who has burned his bridges.

In many ways then, Sirocco is at another crossroads. The company must leave their Glencairn Square premises this year. Attempts to obtain a Kilmarnock local authority 'Business unit' have run into red tape supplied by bureaucrats who, as Sorley sees it, cling to an outmoded manufacturing past. A service industry is within their compass but a service industry based on music is an idea which they are taking time to accommodate.

Spike is all for moving out: "West of Scotland culture is a pint of beer," he explains. He sees no real future for himself there.

"Why not Kilmarnock?" Clark Sorley asks. Kilmarnock itself appears to be coming up with the answer.

The Scottish Development Agency is considering initiating a central Glasgow recording complex. Clark Sorley is in on the early consultancy discussions. If it goes ahead, perhaps Sirocco's future will need a move to the city. **Bill Melville**

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Fairview Studio, Hull

Hidden in the Yorkshire Wolds on the north western side of Hull lies Fairview Studio. A wooden sign pointing down a lane is the only indication that the end house of the terrace is in fact a studio, or rather part of a studio. This line of houses marks the end of suburban Hull and Fairview is an apt name as beyond the studio lies mile after mile of rolling countryside.

At first sight it seems a strange location for a studio but over the last 10 years Fairview has drawn customers from all over Britain and at the time of writing a rock band from Croydon was completing the end of a week's block booking.

The studio began like many rural studios—a hobby that outgrew itself as Keith Herd soon saw the potential of a small studio catering for local needs. Keith actually began to run Fairview professionally in 1973 although he had operated a studio of some description for the previous 10 years. In the beginning it consisted of a Farfisa with a 'lean-to' as the control room and access gained via the window!

Keith's new 8-track studio got a welcome shot in the arm in its first year when in 1973, David Bowie's group the Spiders From Mars booked in to try out new singers after Mr Bowie went his own way. The studio's success continued with less glamorous bread and butter work in the form of albums for local club bands; at one stage Fairview was producing two of these albums every week!

Things have progressed since then and Fairview is now a well established 24-track studio with a large cassette winding and duplicating operation. Cassette duplication takes place in the house whilst the studio occupies a converted barn at the bottom of the garden. The majority of people using the studio are rock bands although the place is rather expensive for most local bands needing demos. A recent visitor was Sister Of Mercy's Andy Eldritch doing work for his own label Merciful Release. The studio often handles work for the larger independent labels such as Red Rhino and Powerstation records as well as occasional work for larger labels who don't want to go to the expense of taking a new band to London.

Keith's technical ability is obvious; his consoles have always been custom made and he looks after the maintenance and repair of Fairview as well as a number of other local studios. The existing desk is a 24/24 with 7-band EQ on all input channels, 5 aux sends, 5 effects returns and full patchbay facilities. An eyecatcher the desk isn't—effective it is.

The studio has an air of professionalism without the trimmings found in central studios. The room available has been used practically rather than attempting to recreate a New York studio in Hull. No bar or pool table in Yorkshire for poor overworked musicians, although they are able to relax in an adequately equipped reception area with coffee machine, TV and video. This is no criticism; an exclusive studio would find very little work in this part of the country.

The converted barn which houses the studio is divided into four areas; the largest is the control room and the others studios which give a variety of sound qualities. All the areas are divided by large sliding glass doors which give excellent visual contact and of course provide good separation when they are closed.

The 16×12×12 ft control room is impressive. Keith designed and built it from a picture of one Eastlake's designs and it has been done well. The room is sensibly organised for work with modern rock bands, with a good view of the two main studios through the control room window. The desk, Soundcraft *SCM 762-24B* tape machine and auxiliary equipment are on a raised platform at the rear of the room leaving seating space for up to 10 people in front of the console. This area may also be used for DI-ing the studio's selection of synths. Inquisitve band members are free to congregate in the control room without getting in the engineer's way, although there is enough space left behind the desk for one or two 'helpers' to take part in the mixdown. Variable lighting and air-conditioning make the control room a comfortable place to work.

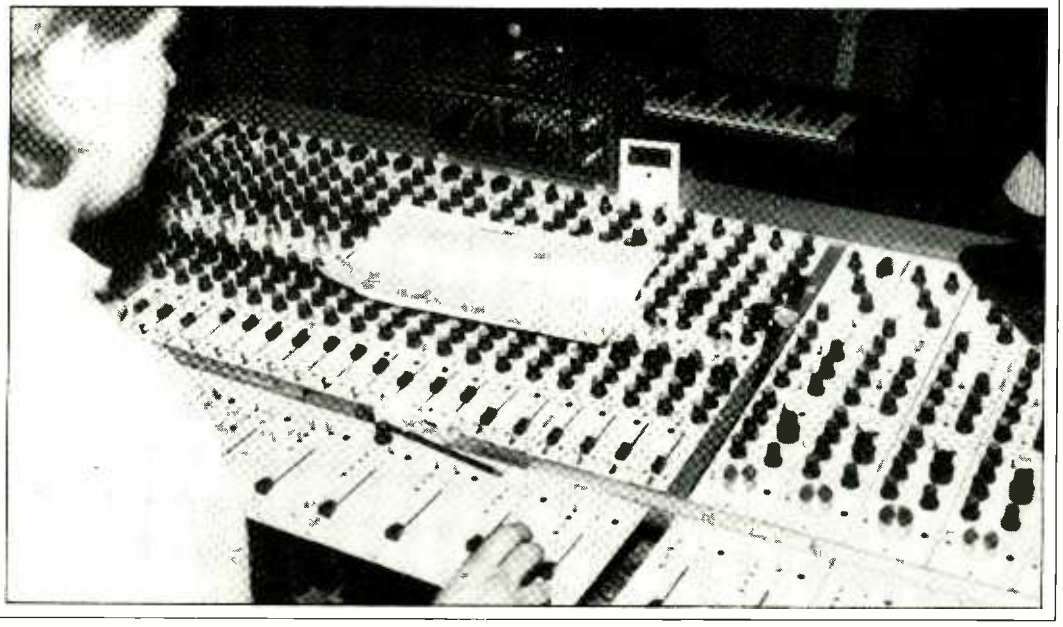
When the control room was rebuilt in its present position in 1982, the original Tannoy *Gold* monitors were replaced with JBL *4350*s which were mounted above the control room window and bi-amped with two Monogram 260 W power amps. In addition Yamaha *NS 10*s have been mounted at either end of the desk.

The studio's engineers, John and Roy, are both very pleased with the acoustics of the control room although John mentioned that the JBLs could be a little overpowering at mixdown. Relatively high volume monitoring of a rock band's material can often hide errors in the mix which miraculously appear when played back at home on the band's own stereo deck; to avoid this problem John often uses the *NS 10*s to get a more realistic balance on the mix, whilst using the JBLs for referencing.

The outboard gear is arranged on the right of the desk along the wall. In this position the engineer can trim the majority of the equipment from his chair giving him constant balance from the monitors.

Both engineers have found that the desk is very flexible as far as routing is concerned, with any track from the machine capable of being sent to any input channel; if equalisation isn't needed the monitor channels can also be used as returns. The fixed frequency EQ on every channel is perhaps a little limiting when compared to the cut or boost available on modern mass produced desks. Having said this, the results achieved compare very favourably with the quality produced by a sophisticated

Keith Herd at his custom made console



Cassette copying at Fairview

off the shelf model.

In the central recording area, which measures 13×8×13 ft, the relatively high ceiling of the original barn has been retained. This, along with 'Eastlake-type' stone walls, provide an extremely short reverberation time giving good separation and an uncoloured sound even with distant miking.

The second main recording area is larger than the first although the ceiling has been lowered by 2 ft and the cavity filled with hessian wool; carpet has been laid to make the room less reflective so that it can be used as the drum area. With the walls left hard and reflective a controlled live sound can be obtained from the kit.

To complete the studio a third area has been prepared as a live separation booth. Irregularly shaped to avoid parallel reflections and with a hardwood floor, reflective walls and hard ceiling, Keith has found it ideal for brass instruments or for any other sounds which are enhanced by ambience.

Fairview's mics are studio standards: Neumann, AKG, Beyer and Shure. The range of effects and signal processing equipment is comprehensive including, AMS *RMX 16*, AKG *BX20* and Yamaha *SPX90* reverbs, an Aphex *Aural Exciter* (Type B), Marshall *Time Modulator* and Drawmer *Multi-Tracker*. An AMS *DMX 15.80S* is available with a 6½ s loop edit facility plus keyboard interface for sampling. Stereo mastering is handled by an Otari *5050B* and Revox *A77*.

The studio is well booked, yet this is only half of Fairview's business; the cassette winding and duplicating is growing rapidly and the studio has international distribution of blank cassettes and copies. Some 25% of the copying is educational or instructive providing a lucrative second string to Fairview's bow. The studio is using Technics *M216* tape machines although they are in the process of re-equipping with Denon *DR-M22* stereo decks.

Fairview is a practical place. Its purpose is to produce a high quality, professional recording at a reasonable price; whether it's copying computer instruction tapes for Rank Xerox or creating an album for an independent label.

The studio continues to expand. Keith has recently added a studio manager to the staff, joining the two present freelance engineers who work in the studio and the cassette winder who prepares tapes to any required length for distribution.

Despite its position Fairview is a busy place. Keith is content to watch his business grow together with his reputation. **Tony Draper**

Fairview Studios, Great Gutter Lane, Willerby, Hull, North Humberside, UK. Tel: (0482) 653116.□

BUSINESS BUSINESS

Barry Fox investigates the facts behind the industry news

CD pressing capacity

PolyGram's CD factory in Hannover, West Germany, still has the largest capacity in the world—it should churn out 50 million this year. And it's still nowhere near enough.

Head of production at Hannover, Dieter Soine, says he is always looking for new ways of pressing more discs, faster. But you can forget about the continuous strip process, at least for the time being. Several companies are trying to press and punch from plastics strip but no one has yet seen a sample of saleable quality.

PolyGram is looking for other ways to speed production. The presses at Hannover work on the injection-plus-compression principle. So far this has limited cycle time. At first it was 35 s per disc. Now it is down to around 22 s. The Japanese use injection-only presses and are down to 18 s and less. PolyGram won't yet switch to injection because the mould parts, which hold the stampers, cost 10 times as much in an injection press; 10,000 DM instead 1,000 DM per set. PolyGram is now pushing compress-inject cycle time to 18 s, which looks like being the bottom limit. Stamper life is already down to 1,000 cycles.

The other bottlenecks are in metallisation and QC. The clear polycarbonate disc has to be coated with aluminium after pressing. So far this has been done by placing the disc in a vacuum chamber and sputtering it with metal. The chambers hold 700 discs at a time. It takes 15 minutes to pump the vacuum and another 10 minutes to create aluminium dust by bombarding a metal sheet with argon ions. Hannover is now installing machines which work on a conveyor system. The discs go in one end, pass through a series of pressure bulkheads to the vacuum chamber, where they hit a cloud of metal dust, and from there pass through another string of bulkheads out into atmosphere again.

Even after four years of mass production, PolyGram's plant still has a reject rate of around 15%; a fraction of a percent reject at every one of 60 production steps. The polycarbonate material can't be recycled, it has to be sold for scrap. So far QC has been all down to Mark One Eyeball, visual inspection by trained girls. Now a 2 s laser scan does the same job. Pressing prices are around 7.5 DM per disc, including jewel box and printed insert and the minimum initial run is 3,000 discs.

The cleverest move is to get the factory running seven days a week. In Germany it is against the law to work a factory over the weekend. PolyGram did a deal with the government. The company employs only unemployed people on Saturdays and Sundays.

Talking of unemployment and despite Philips denials, the Blackburn videodisc pressing plant is now pressing CDs on an experimental basis. There weren't enough orders for Laservision, so it was the obvious thing to do. Blackburn has now made CDs of saleable quality but it's not yet decided whether the factory will press CDs for sale.

Less hiss more coverage

Here we go again. From those wonderful people who gave us the EVR video system which wouldn't record, SQ quadraphonics with its magical effects in mono and stereo, and the CX compatible disc noise reduction system which was so incompatible engineers wouldn't use it—we now have FMX from CBS.

CBS claims FMX will quadruple the area of FM stereo coverage. It reduces hiss by compansion and yes, of course, it's compatible. Or so CBS says.

No doubt you will be hearing a lot more about FMX over the next few months before—like EVR, SQ and CX—it disappears. The whole thing looks like being a re-run of the CX debacle, and for that matter, the CBS anti-copying spoiler system. CBS UK knows nothing about FMX and cares even less. 'Try New York', they say. Telexes to NY are ignored.

Having now seen the publicity claims for FMX I can understand why they would prefer some journalists didn't see them. They look as if they've come from the same word processor which was previously programmed to puff SQ, CX and the spoiler.

Although hi-fi manufacturers are now excited about FMX, and some already promise to sell FMX receivers, I have to warn CBS that both the BBC and IBA have doubts about its compatibility. Neither has any plans yet even to stage broadcast tests.

The same system is used all round the world to transmit FM stereo on the VHF wavebands. The sum signal, a simple mix of left and right channels, is transmitted on the main RF carrier frequency. This gives mono reception on mono receivers. The stereo information for stereo receivers is carried piggy-back on the sum signal, as a high frequency AM sub-carrier. The sub carrier signal is the difference between left and right channels of stereo. A stereo receiver mixes the difference signal with the sum signal to give separate left and right channels.

The snag with this conventional system is that the high frequency sub-carrier is at low level and more difficult to receive than the main signal. Its usefulness falls off with distance much faster than the mono sum. For clear stereo the received signal must be around 14 times stronger than for mono. If it is not, the listener must either put up with hissy stereo or switch to mono.

With FMX, CBS compresses the difference signal before transmission. The compressor slope is oddly shaped, with 2:1 gradient, a shelf and dip. An FMX receiver expands the signal in mirror image. Doubtless this cures hiss but even CBS admits it would normally destroy all chance of good reception for people with conventional receivers. So FMX uses two sub-carriers in quadrature; one is of conventional type and the other of new compressed type.

In theory an ordinary receiver ignores the extra phase-shifted carrier while a new FMX receiver will latch on to it. CBS claims baldly that FMX "will not affect existing FM broadcasting methods and present consumer receivers".

Both the BBC and IBA have already told me that they have grave doubts on this claim. They worry about multipath. When broadcast signals are reflected off a building or hill, there is inevitably a phase shift which will confuse receivers into picking up the wrong sub-carrier. "It may work in East Anglia, where there are no hills," says the BBC, "but we would want to check it on the Wenvoe transmitter, where the signals are bounced around the Welsh valleys." Perhaps significantly, the CBS tests were run in Connecticut, where the terrain is pretty flat and there are no city skyscrapers.

As Dolby Labs found out when they tested Dolby FM 10 years ago (encoded signal and modified time constant) there are some pretty odd receivers in use out there. If even a couple of listeners complain on a small test, that will translate into vociferous hordes when the system is widely adopted in unfavourable conditions. Hasn't CBS learnt anything from SQ and CX?

Even if they wanted to, neither the BBC nor IBA can change their transmission standards without permission from the Department of Trade and Industry. The DTI will only authorise a change after extensive on-air tests have proved near-perfect compatibility.

Commercial radio stations, which would of course jump at the chance of extending their stereo coverage area, cannot go it alone because the IBA owns and controls their transmitters. There is also a good chance that if the local stations, like Capital in London, extended their range with FMX, the DTI would respond by demanding a cut in transmitter power to maintain the status quo!□

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A technical report by Hugh Ford

JVC DIGITAL AUDIO MASTERING SYSTEM

The core of the JVC editing system is the type *VP-900* digital audio processor which interfaces with a professional VHS or U-matic video recorder to provide up to two hours of digitally recorded audio. The unit unfortunately is restricted to the NTSC video standard requiring an NTSC-type recorder and an NTSC television monitor to monitor visually data from tape.

The stereo audio is coded into a 16-bit linear code with the sampling frequency switchable between 44.1 kHz and 44.056 kHz, the latter is essential when working with composite syncs where the audio is associated with video systems.

Whilst I do not have details of the coding system used, the data rate of 3.087 Mbit/s or 3.084 Mbit/s which depends on the sampling frequency in use, is quite low. Data is recorded in blocks and parity, in addition to some form of cyclic redundancy check, is used to protect the audio data as well as recording a JVC form of timecode. Further data is recorded, such as flags to identify the sampling frequency and the use of pre-emphasis and all data is corrected for errors.

Pre-emphasis may be set to 50 μs plus 15 μs giving a 3 dB boost at 3.183 kHz, standard for many broadcast systems but with the 15 μs time constant rolling off the boost at 10.61 kHz to lead to a maximum boost of about 8.6 dB at the upper frequency limit of the system around 20 kHz. Alternatively pre-emphasis may be switched out giving a flat frequency response at all signal levels.

The second part of the JVC editing system is the *AE-900V* editor which uses the JVC *TC-900V* timecode generator if it is needed to synchronise with video systems. The system as such does not use SMPTE timecode but a bi-parity (BP) timecode which ties up with the signal data format on tape.

The timecode generator has several functions for use with SMPTE timecode but not drop frame code which it does not handle. Firstly it can generate SMPTE and BP timecode for dubbing from external systems to the JVC system or recording on the JVC system in sync with external SMPTE codes.

Secondly it can accept an external SMPTE code and output both SMPTE and BP timecode for dubbing between JVC system tapes or for adding SMPTE code to existing JVC system recordings.

The editor itself is a two part system comprising the electronics and a separate keyboard which connects to the electronics by two multi-way cables fitted with locking connectors.

In addition to this a remote control unit is available for the digital audio processor. A further item not included in the review is a synchroniser which requires the use of a source of video sync pulses such as a camera or pulse generator. The unit converts the incoming EBU timecode into the BP timecode and locks the digital audio VCR to the incoming timecode, capable of handling both NTSC and PAL video systems.

Offsets may be entered into the unit and placed in memory with the ability to increment or decrement the offsets with displays showing the EBU timecode from the picture source, and the SMPTE timecode from the audio source. In addition the current difference in time is displayed in frames.

The *FC-900* is a bi-directional interface allowing the transfer of audio between the JVC system and the Sony format as used in the *1600/1610* units.

The *VP-900* digital audio processor, the *AE-900V* digital audio editor and the *TC-900V* timecode unit complete with the remote control unit for the processor; two VCRs—*BR-6800U* professional VHS recorder and a *CR-825OU* 'U' format machine plus an NTSC video monitor were provided for this review. The three sections of electronics are 17 in wide, such that they will fit into a standard 19 in rack with all the connections at the rear. Signal connections are via multi-way locking connectors and BNC sockets with power supplied via IEC connectors next to which are re-settable circuit breakers.

To the front of the audio processor and the editor removable panels reveal electronics on good quality horizontal circuit boards, these have clear component identifications. The power supplies are to the right behind the control panels and the editor's only control is the power on/off switch.

Digital audio processor

The electronics of the audio processor is contained on six large printed circuit boards all of which have user controls and/or LED indicators. The top board which is the playback board has four toggle switches, the first sets the detector level for the incoming signal from the video cassette recorder. This switch is set for minimum activity of the CRC (cyclic redundancy check) error indicator on the same board.

Next, the address switch allows the address display to be either held or set to zero when the VCR is stopped. One of the other switches selects the 44.1/44.056 kHz sampling frequency. The function of this switch, however, depends upon the setting of the sampling frequency auto/manual switch which has rather complicated functions that I will avoid going into. As a result of the switch's possible automatic overrides all except the detector level switch have associated LEDs.

Further LEDs are illuminated when the output is unmuted (ie normal playback data is present), when a ▷

VP-900 DIGITAL AUDIO PROCESSOR
Number of channels: 2.
Signal format: conforming to NTSC TV signal.
Transmission bit rate: 3.087 3.084 Mbits s.
Sampling frequency: 44.1/44.056 kHz (switchable).
Quantisation: 16-bit linear.
Dynamic range: more than 90 dB.
Harmonic distortion: less than 0.02% (at 1 kHz, +19 dBm output).
Wow & flutter: below measurable limits.
Frequency response: 10 Hz to 20 kHz, ±0.5 dB.
Emphasis time constant: 50 μs, 15 μs.
Dropout compensation: error detection and correction (22-bit CRC check, 2-party, triple error correction).
Tape address: 6-digit BCD system.
Analogue input: *XLR-3-31*, 10 kΩ balanced/unbalanced.
Reference level: +4 dBm, peak level: +19 dBm.
Analogue output: *XLR-3-32*, low impedance (suitable for 600 Ω load) balanced unbalanced (switchable), reference level: +4 dBm, peak level: +19 dBm.
Headphones: −10 dB, variable from approximately −10 dB to +10 dB in 1 dB steps.
Video signal input: BNC-R, 75 Ω, 1 Vp-p, ±2 dB, 1 line.
Video signal output: BNC-R, 75 Ω, 1 Vp-p, 2 lines.
VCR sync output: BNC-R, 75 Ω, 4 Vp-p, 3 lines.
External syncs: composite sync input: BNC-R, 75 Ω, 1 Vp-p, 1 line. Composite sync output: BNC-R, 75 Ω, 1 Vp-p to 4 Vp-p, 1 line. External sync input: BNC-R 44.1 kHz, 50 Ω unbalanced, TTL level/2.
Digital input/output: 50 Ω unbalanced, TTL level/2 (1) input/output for digital dubbing and editing (2) external, monitor signal input (3) A/D converted output.
Power consumption: 150 W.

MANUFACTURER'S SPECIFICATION

AE-900 DIGITAL AUDIO EDITOR
Number of channels: 2.
Digital input/output: 16 bits, 2's complement.
Video input/output: conforming to NTSC TV signal.
Timecode: frame unit address, recorded simultaneously with signal data.
Editing accuracy: approximately 180 μs.
Memory time: original 6 s, master 6 s.
Rehearsal time: 8 s (typical).
Cross fading duration: 0, 10, 20, 40 ms.
Fader: −12 dB to −infinity.
Editing point shifting function: 2 ms steps in either direction.
Power consumption: 150 W.
Manufacturer: Victor Company of Japan Limited, Tokyo, Japan.
UK: Bell and Howell Limited, Alperton House, Bridgewater Road, Wembley, Middlesex HA0 1EG.
USA: US JVC Corp, 41 Slater Drive, Elmwood Park, NJ 07407, USA.

TWO DEFINITIONS OF THE PERFECT ECLIPSE

A SOLAR ECLIPSE

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It's cause was for centuries beyond the comprehension of man, who's imagination and superstition associated it with the supernatural and religous ritual. Magicians and alchemists made the most of the awesome spectacle to assert control over their bewildered followers, until astronomers were able to disprove the mystical theories by offering a scientific explanation.

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REVIEW

syndrome error has been detected and when an un-correctable error has been found, in which case the previous data is held.

Following down, the record board has a single momentary pushbutton switch for initialising the section when composite external syncs are used. A LED next to the switch identified as Compo is normally illuminated in this mode with automatic initialisation but the switch will re-initialise the unit. Four further LEDs are illuminated for various error conditions including parity errors in data and address errors.

The control and metering board has switches to set the unit to one of five possible modes, the modes of interest being the normal recording mode, the editing mode and the digital dubbing mode. Further switches select pre-emphasis ON/OFF and select the source of syncs between external composite (black burst), internal or an external 44.1 kHz source.

The A/D (analogue/digital) board has two user controls in the form of multi-turn potentiometers for setting the offset in the A/D converters for the two channels. These controls are set whilst using a video monitor and are adjusted such that the least significant 3/4 bits are exercised.

So far the boards have very few internal switches or adjustments. Not so on the two remaining boards, each of which have about 10 adjustments for each audio channel, it is not known what these adjustments do. In addition each channel has a toggle switch on each board for setting the gain to a fixed level or allowing front panel potentiometers to set levels.

To the right of the front panel is the illuminated power on/off button; ¼ in stereo headphone jack and a detented monitoring level potentiometer—the remainder of the features are hidden behind a black translucent panel.

Twin vertical bar displays are used for the level indicators which work in 2 dB steps down to −30 dB with an extra step at −15 dB and then have −40 dB and −60 dB indications. At and below −15 dB the indications are green, the remainder yellow and a red Over at the top of the displays is used to indicate overload.

The −15 dB indication corresponds to the reference level of +4 dBm and a special reference level display may be switched in for accurate alignment of this level. This secondary display has a range of ±0.3 dB in 0.1 dB steps.

Three modes of operation of the main level display may be selected so that it may operate as a peak level meter, hold peak indications for 2 s or may hold peaks until the reset button is pressed. The latter modes also hold the Over indicators.

'Secret' displays illuminate showing the mode of operation set on the control and metering printed circuit board; they show if pre/de-emphasis is on and warn of internal error conditions.

To the bottom of the panel is a 4-digit time display showing min and s. In the replay mode this follows the timecode from tape but in the record mode it may be reset or held as needed.

Inputs and outputs

The two pairs of audio inputs and outputs at *XLR* connectors on the rear panel are balanced with a switch allowing the outputs to be internally unbalanced if desired.

The input impedance was 19.9 kΩ constant with frequency up to 20 kHz with the output impedance of 22.7 Ω also constant with frequency—both are sensible impedances. **Table 1** shows the input and output levels for 100% modulation at 1 kHz in the fixed gain and variable gain modes. It also shows that the balance between the two channels is very accurate—the overall gain at fixed gain is within better than 0.1 dB. Furthermore **Fig 1** shows that the common mode rejection of both channels is extremely good.

Turning to the stereo headphone jack, this had a source impedance of 47 Ω with the level control working in approximately 1 dB steps. As is shown in **Table 2**, however, the balance between the channels left something to be desired whilst the voltage levels were sensible for most types of headphone.

Whilst the multi-way remote and interface connections are probably of little user interest, the BNC video and sync connections are. Strangely the video out and the sync out connections had a source impedance of approximately 600 Ω as opposed to the normal (and specified) 75 Ω.

The composite video output had a black level of +0.7 V, sync tip at +0.11 V and peak white at +2.03 V at two separately buffered connections. The VCR sync output at three lines supplied negative going sync pulses from +0.6 V to −6.9 V, again at separately buffered outputs.

The VCR play input was accurately terminated with 75 Ω (the external sync input is a switchable 75 Ω termination).

Metering

The metering which follows pre-emphasis (when used) consists of two parts: the normal level display and the reference level display. The latter, intended for precise alignment of levels, has its 0 dB indication corresponding to −15 dB on the main display which in turn normally corresponds to +4 dBm. The latter was found to be within 0.01 dB for both channels with the 0.1 dB increments over the ±0.3 dB range of the display also within 0.01 dB. These figures applied up to 10 kHz above which minor errors appeared but these are of little significance for alignment purposes.

Checking the accuracy of the main metering steps showed it to be within 0.1 dB from 0 dB to −28 dB with an error of only 0.2 dB at the −30 dB indication. The final lower indications were less accurate with a reading of −40 dB being −40.75 dB and −60 dB being −63 dB—such errors are of no consequence.

Both metering systems were true peak responding devices with rise time of the main metering and the Over indication extremely fast, so that they fully responded to a single cycle at 10 kHz. The fall time of the main display was ▷

FIG.1
JVC VP-900
COMMON MODE REJECTION FOR BOTH INPUTS

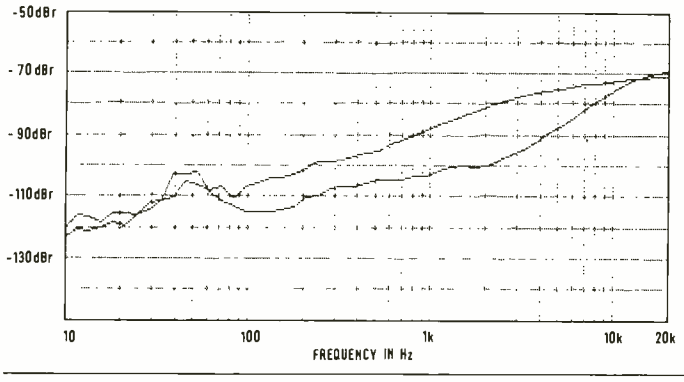


TABLE 1

	Left	Right
Maximum input at minimum input gain	+25.23 dBm	+25.22 dBm
Maximum input at maximum input gain	+11.82 dBm	+11.91 dBm
Maximum input at fixed gain	+19.04 dBm	+19.04 dBm
Maximum output	+25.50 dBm	+25.40 dBm
Maximum output at minimum output gain	+12.45 dBm	+12.48 dBm
Maximum output at fixed gain	+18.96 dBm	+19.00 dBm

TABLE 2

	Headphones output		
	Left	Right	Unbalance
Maximum output (100% Mod)	3.784 V	3.368 V	1.01 dB
Minimum output (100% Mod)	0.445 V	0.398 V	0.97 dB

REVIEW

385 ms—giving good readability, with the 2 s peak hold lasting for 1.56 s and the hold mode offering a permanent hold of true peaks.

Frequency response and noise

The overall frequency response from 10 Hz to 20 kHz without pre-emphasis is shown in **Fig 2** to be within +0.2/−0.4 dB reference 1 kHz. The four curves show the response to be the same at maximum modulation and at three steps at 1 dB increments below maximum modulation. When using the headphone monitor output the response was as shown in **Fig 3** where there is a possibly significant high frequency roll-off.

As the same anti-aliasing filters are used at both sampling frequencies the high frequency limits are the same giving a −1 dB point at 20.37/20.26 kHz for the two channels, falling to −3 dB at 20.56/20.54 kHz and −50 dB at 21.83/21.83 kHz.

Noise in the outputs was measured with and without de-emphasis in the unmuted condition with no signal input as shown in **Table 3**. The cause of the slight noise variations between channels is not known as the outputs were completely free from any power line artefacts or sampling frequency products. It may be that dither is incorporated making these small differences.

Often more interesting in digital systems is the noise in the presence of a signal caused by quantising errors. **Fig 4** shows the total harmonic distortion (THD) and noise in dB on the vertical axis versus frequency on the horizontal axis for 10 dB level steps referred to −5 dB below maximum modulation. As expected THD and noise decreases at high frequencies because the harmonics are outside the passband of the internal filters.

Reference to **Fig 5** again shows THD and noise on the vertical axis with signal level reference full modulation on the horizontal axis. THD and noise are plotted whilst the signal level at 1 kHz was reduced from full modulation to −100 dB in 0.1 dB steps. Whilst there is a slight peculiarity around −10 dB the THD and noise increases linearly with reduced signal level until the noise floor is reached around −90 dB.

Distortion

Whilst **Figs 4** and **5** show the overall pattern of harmonic distortion the performance was investigated in more detail. Individual second and third harmonics plus THD and noise over the band <10 Hz to 80 kHz were measured for both channels at 1 kHz at 10 dB increments below full modulation.

Table 4 shows a good consistency between channels with both channels offering good performance. Similar comments apply to intermodulation distortion to both the SMPTE method and the CCIF twin tone method. SMPTE-type intermodulation distortion was less than 0.03% at levels above 20 dB below full modulation; CCIF intermodulation distortion was better than 0.03% at levels above −30 dB. Square wave reproduction showed the usual ringing associated with sharp filters as shown in **Fig 6** for a 1 kHz square wave.

Other matters

Crosstalk between the two channels was at a very low level and almost constant with frequency as shown in **Fig 7** confirming the lack of power line frequencies in the outputs.

The phase difference between the channels was less than 1° over the range 20 Hz to 20 kHz with zero timing difference between the channels maintaining monophonic compatibility. Furthermore any timing jitter was

FIG. 2
JVC VP-900
FREQUENCY RESPONSE REF 100% MODULATION
IN 1dB LEVEL STEPS

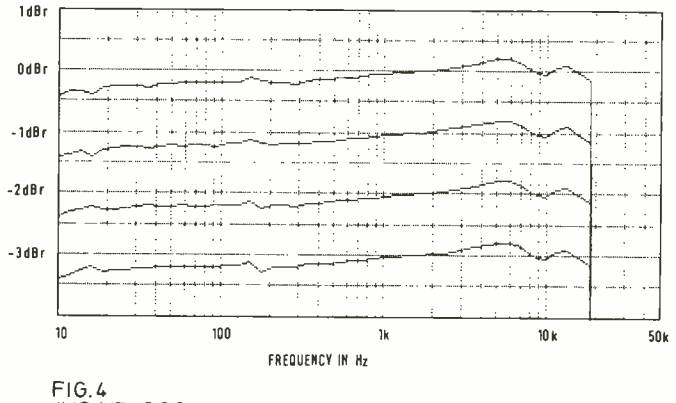


FIG. 3
JVC VP-900
HEADPHONE OUTPUTS-FREQUENCY RESPONSE
AND LEVEL ERRORS

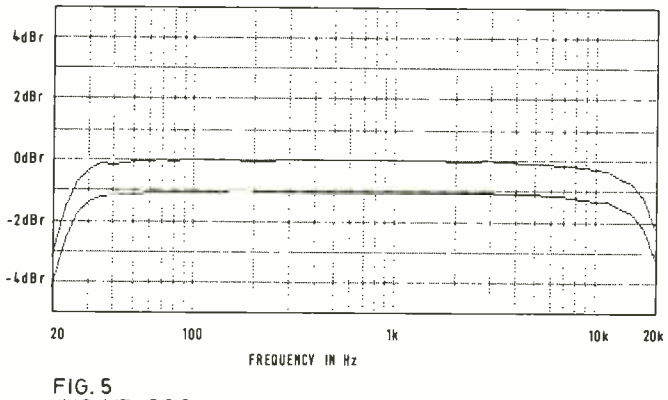


FIG. 4
JVC VP-900
THD AND NOISE WITH LEVEL AS A PARAMETER
IN 10dB STEPS REF -5dB BELOW 100% MODULATION

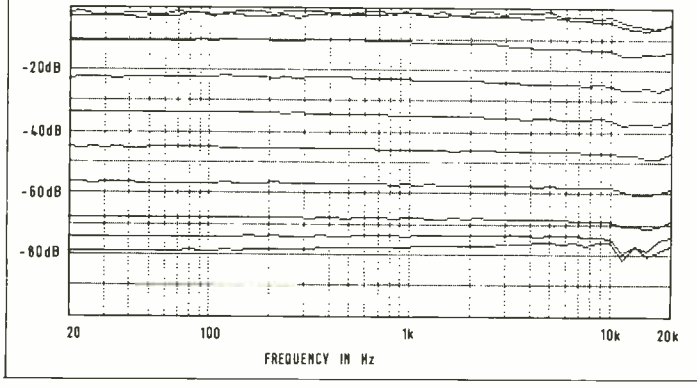


FIG. 5
JVC VP-900
THD AND NOISE AT 1kHz IN 0.1 dB STEPS
BELOW 100% MODULATION

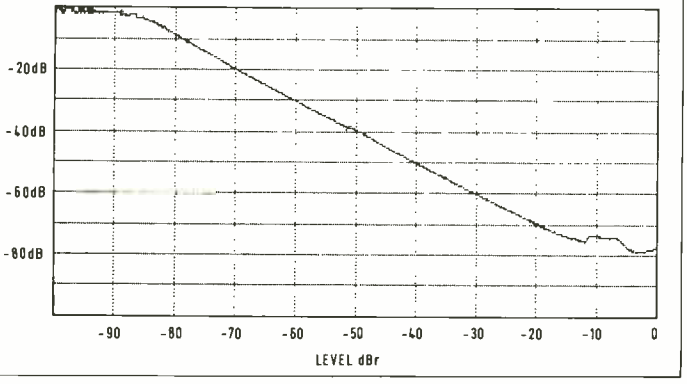


TABLE 3

Measurement method	Noise reference maximum modulation De-emphasis out	De-emphasis in
22 Hz to 22 kHz RMS	-92.5/-93.5 dB	-94.5 -96.1 dB
A-weighted RMS	-96.0/-97.0 dB	-98.8 -99.8 dB
CCIR-weighted RMS	-87.5/-88.5 dB	-92.0/-92.6 dB
CCIR-weighted quasi-peak	-83.5/-84.0 dB	88.1/-88.6 dB
CCIR/ARM ref 2 kHz	-94.5/-95.2 dB	-98.8/-99.4 dB

TABLE 4

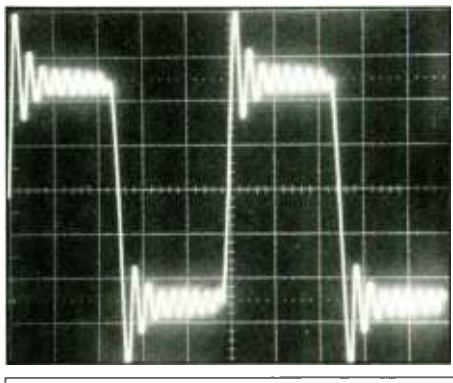
Level	Second harmonic	Third harmonic	Total
0 dB	0.015 <0.01%	0.014/0.013%	0.021 0.015%
-10 dB	0.015 0.011%	<0.01/<0.01%	0.021/0.017%
-20 dB	<0.01/<0.01%	<0.01/<0.01%	0.028/0.030%
-30 dB	0.013/<0.01%	0.013 <0.01%	0.087/0.091%
-40 dB	<0.01/<0.01%	0.07/0.04%	0.272/0.282%
-50 dB	0.22 0.20%	0.5/0.45%	0.977/1.000%
-60 dB	<0.10/0.40%	1.3/2.8%	2.880/2.880%
70 dB	<0.30/<0.30%	3.00 3.00%	9.770/9.770%
-80 dB	4.47/1.00%	12.6/8.9%	39.80/39.80%

minimal. As with many video-based systems, however, some jitter did occur at the frame rate of 60 Hz, leading to sidebands at ±60 Hz about a recorded tone but at only −80 dB relative to the tone.

During practical use no audible effects of tape dropout were noted with the CRC light blinking at intervals but the hold light (indicating uncorrectable errors) remaining extinguished. It was therefore decided to corrupt intentionally the replayed video by inserting bursts of noise to see how much data could be lost before trouble occurred. In the unlikely event that every video line was corrupted the processor was quite sensitive to data errors with the CRC coping with up to 140 ns of corruption before the hold mode was entered and the processor muting with errors in excess of 440 ns.

Such conditions are only likely to be met with a very poor VCR and corrupting once in every 10 video lines showed that up to four sequential lines could be lost before the unit muted. Decreasing the corruption rate to once in every 100 lines showed that extensive data corruption could occur even before the hold mode was entered.

FIG 6 JVC VP-900
1 kHz SQUARE WAVE



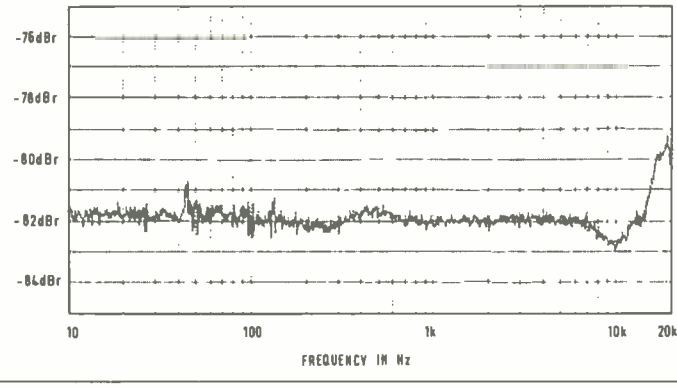
Remote control unit

This small free standing box duplicates the level indicator on the processor together with its peak hold functions but not the reference level facility. The address counter is also duplicated together with its reset and start/stop pushbuttons.

An added facility is a 4-digit display which may be preset to any address in minutes and seconds by using four pushbuttons below the display, each button incrementing one digit. This display is then used in conjunction with a search button as a simple autolocator.

The remaining buttons are tape movement buttons duplicating those on the VCR including the record function and a Load button which sets the ▷

FIG. 7
JVC VP-900
CROSSTALK BETWEEN CHANNELS



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current tape address into the autolocator display.

Editing system

The main frame of the editing system has a similar configuration to that of the digital audio processor with the electronics contained on six horizontal printed circuit boards which plug into a mother board. Several of the boards have LED indicators of unknown functions with only the user controls on the main processor board.

This contains a master reset button and an auto/manual toggle switch in addition to two 8-way DIL switches. One of these is used to set the baud rate of the RS-232 interface, details of which were not available. The second DIL switch, not all sections of which are used, performs three user functions: the editing mode may be set to assembly or insert editing, the timecode mode may be set to SMPTE or BP and the pre-roll time may be set to 10 s or to 30 s.

To the rear of the electronics unit are the video inputs from the two VCRs with a feed from the editor to the audio processor, all these at BNC sockets. The remaining connectors are locking multiway types feeding the processor, the remote control of the VCRs and the control section of the editor. The latter is a table top-mounted unit about 17 in wide by 12 in deep with a sloping front panel. Depending upon the setting of the DIL switch in the electronics unit the editor may be used for assembly editing or for insert editing. In either case the function of the control section is to identify the edit points, rehearse the editing without recording and once satisfied with the edit to record the edit. In the insert editing mode, however, the rehearsal functions are limited.

This involves two VCRs (the Original and the Master) so the very clear LED display at the top of the control section is divided into two almost identical sections to display data for the original and the master VCRs.

The top row of digits in each display shows the current tape time in min, sec and frames; the frame display relates to either TV frames when the BP timecode is used or SMPTE frames when the SMPTE timecode facility is used.

Below the current time display the sec display is normally used to identify edit points in min, s and frames plus three further digits which are identified as W×2 where the latter is related to the sampling data word. The final digital display is a single digit which indicates which one of four possible cross-fade times is selected. The range is from 0 to 40 ms in 10 ms steps selected by sequentially pressing a button on the control panel, a 45° splice at 15 in/s being equivalent to 16.66 ms.

Below the information display a transverse row of LEDs is used in the edit location mode. This display has seven LEDs at about 1.5 in intervals dimly illuminated in the edit location mode with intervening LEDs forming a horizontal bar display with one of the intervening LEDs illuminated.

The length of this display corresponds to a 6 digital audio store with 6 LEDs at 1 s intervals and the intervening LEDs showing the current position within the store when illuminated.

The display is used for edit point location for which purposes there are actually two 6 s digital stores for inserting two edit points, both stores reproducing very good quality audio. In order to locate an edit point the master or original are replayed using the master/original selection buttons together with the usual tape movement controls on the panel. The Set Up button is then pressed followed by the EDP (edit point) button at the approximate edit point. The editing store then grabs 6 s of audio which includes 2 s of audio before the EDP button was pressed and 4 s after it was pressed the tape stops.

From here the accurate location of the desired edit point involves replaying the stored audio in one of two modes using a large diameter knob which was rather stiff in operation. Selection of the Replay mode replays the stored audio continuously at a variable speed forward or backwards as set by the large knob. Alternatively selecting the Search mode allows the equivalent of moving the tape very slowly with one rotation of the large knob equivalent to about 0.4 s of tape time. In either mode the horizontal LED display shows the current position within the store and once the desired edit point has been found the EDP button is again pressed.

At this stage it is possible to audition the edit point in one of two modes. Pressing one button replays the stored audio and mutes at the edit point whilst pressing another button replays the stored audio and remains muted until the edit point. This system allows drop-in or drop-out point to be monitored.

If it is then desired to trim the edit point, this may be done by again pressing the Search or Replay button and using the rotary control with the edit timecode being shown in the display. Alternatively the edit point may be trimmed in 2 ms intervals (corresponding to 0.03 in of tape at 15 in/s by using the ← or the → buttons.

The same procedure is used for the original and master tapes in the assembly edit mode after which there are several ways of rehearsing the edit. Using the audio stores the edit may be replayed over a short period in mono, or alternatively pressing a Check button rehearses the edit using the original and master tapes as sources in stereo reproduction but without performing the edit. Once satisfied pressing the Edit button automatically performs the edit. ▷

REVIEW

Technical reports by Hugh Ford

A further feature is the inclusion of a digital fader which allows fading in or out of the original at any time. After a little practice the editor was very easy to use and the facilities for rehearsing edits were excellent. The insert editing mode is useful for replacing sections of a recording such as clicks or badly played notes. The first operation in this mode is to find the desired insert and exit points on the master tape and to note their timecodes—easily done in the assembly editing mode. Next the start of the required insert on the original tape is found in the insert editing mode and entered as in the assembly mode. After this simultaneously pressing the Stop and EDP buttons allows the timecode of the insert and exit points on the master tape to be entered, the latter with the reduced resolution of 1 frame (33.33 ms). From this point the edit may be auditioned using the Check button and subsequently performed using the Edit button. This form of editing relies on the tempo of the original being the same as that of the master, thus running the risk of timing errors if long inserts are made.

The remaining facilities include the insertion of edit points from a known timecode, searching for edit points or going to an edit point and entering play. These functions are initiated by holding down the stop button whilst pressing the EDP, Search or Play buttons.

Finally there is the facility to assign the fader to the left or right channels whilst maintaining unity gain in the other channel by pressing the Stop button together with the ← or → keys; this could be useful for correcting stereo balance or other effects.

Summary

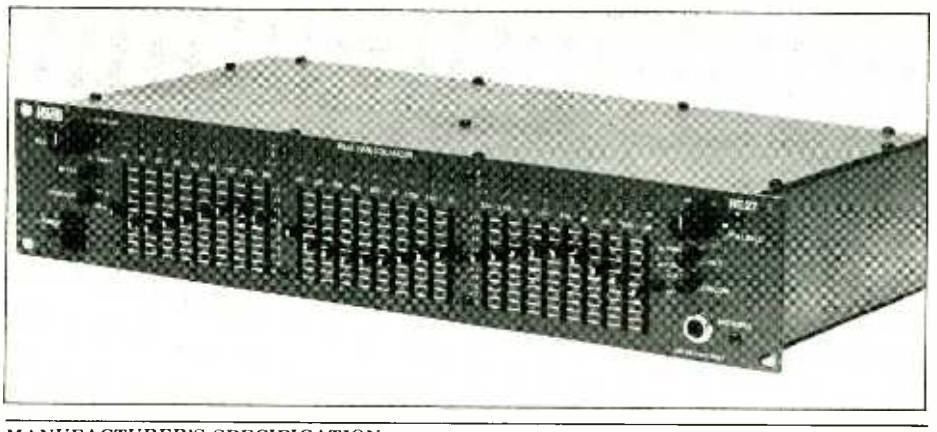
All the units were very well made and easy to use once set up. The initial setting up, however, is complicated by the large number of controls on the video cassette recorders none of which are needed during operation.

The *VP-900* digital audio processor is an excellent recording system in its own right which can work with the common NTSC-type video cassette recorders. As the unit uses a powerful error correction system, normal tape dropout is fully corrected without any interpolation.

During tests no uncorrected errors were heard or seen and intentionally corrupting the replayed video to produce hold errors had no significant audible effect before the machine muted at excessive error rates.

The *AE-900V* digital editing system was a delight to use, its rehearsal possibilities offering an untold advantage over the normal manual editing of tape. The accuracy of edit points was far better than is possible by conventional methods with the added advantage of being able to fade in/out whilst editing.□

RANE RE27 GRAPHIC EQUALISER



MANUFACTURER'S SPECIFICATION

Equaliser section
Configuration: (27) ⅓-octave state variable derived filters on ISO centres from 40 Hz to 16 kHz.
Centre frequency accuracy: ±3% maximum.
Filter type: constant Q, state variable derived (no inductors or gyrators).
Sliders: 45 mm full-throw, positive centre detent (grounded).
Range: boost 12 dB, +2/−1 dB, cut 15 dB, +2/−1 dB.
Signal/noise ratios: (ref +4 dBm, unweighted, 20 kHz bandwidths) sliders centred, unity gain −90 dB, sliders centred, maximum gain −85 dB, sliders maximum, unity gain −70 dB, sliders maximum, maximum gain −64 dB.
Frequency response: 31.5 Hz to 27 kHz, +0/−3 dB.
Total harmonic distortion + noise: less than 0.009%, 20 Hz to 20 kHz with +4 dBm output.
IM distortion: less than 0.02%, 60 Hz + 7 kHz, 4:1.
Maximum gain: +6dB (+3/−0 dB) with sliders centred.
Input impedance: 20 kΩ.
Output impedance: 50 Ω.
Maximum input level: +22 dBm (9.7 VRMS) level control below unity gain. +19 dBm (7.0 VRMS) level control at unity gain. +14 dBm (4.0 VRMS) level control maximum.
Maximum output level (600 Ω): +20 dBm (7.8 VRMS) level control maximum. +18 dBm (6.2 VRMS) level control at unity gain.
Subsonic filter: fixed at 31.5 Hz, 18 dB/octave.
Ultrasonic filter: fixed at 27 kHz, 18 dB/octave.
Overload indicator: red LED, lights at 4 dB below clipping.
Signal present indicator: green LED, lights above −20 dBm input RFI input filters.
Bypass switch: passive (hard-wire type), red LED indicated (bypass=on).
Output relay: turn on/off transient control.
Analyser section
Display range: ±1 dB or ±3 dB 'green window', selectable.
Measurement level range: 70 dB to 120 dB SPL calibrated.
Curve selection: normal flat from 40 Hz to 16 kHz ±0.5 dB, house −3 dB attenuation between 400 Hz and 1.6 kHz.
Display attack time: peak instantaneous.
Frequency accuracy: ±5% maximum.
Analyser filters: ANSI class II.
Pink noise: pseudo-random NMOS digitally-synthesised, 23-bit word length, 1 min repetition rate. Output level adjustable to +4 dBm. Response 16 Hz to 20 kHz, ±1 dB, crest factor 4.0.
Microphone: omnidirectional back-electret condenser type, powered by front panel jack (not phantom power); sensitivity −65 dB; frequency response 20 Hz to 16 kHz; maximum SPL: 140 dB.
Dimensions: (whd) 19×3.5×8.5 in.
Weight: 11 lb net.
Manufacturer: Rane Corporation, 6510 216th SW Mountlake Terrace, WA 98043, USA.
UK: Music Lab Sales, 72/74 Eversholt Street, London NW1 1BY.

Manufacturer's comment

Mr Ford is correct in his findings that the peak overload LED does not indicate first-stage overload, this is something that we were late in recognising but have now taken steps to correct in all existing and future products. We would like to point out that the *RE 27*'s unbalanced output stage is also floating, which makes it compatible with all balanced input stages.

REVIEW

REVIEW

The Rane *RE 27* and *RE 14* are constant Q graphic equalisers using state variable derived filters and mounted into 2U steel 19 in rack mounting cases. The *RE 27* is a 27-section single-channel ⅓-octave equaliser and the *RE 14* a 2-channel 14-section ⅔-octave equaliser. The specifications only vary slightly in the noise performance.

Most of the *RE 27*'s charcoal front panel is occupied by 27 vertical slider controls giving +12/−15 dB range to the 27 equalisers centred on ISO standard centre frequencies from 40 Hz to 16 kHz. Each equaliser has a rather weak detent at 0 dB gain with calibrations at 3 dB increments. Above each equaliser control are red, green and yellow LEDs identified as '+', '0' and '−'. These operate such that the equaliser may be used as an analyser.

To the left of the front panel is the power on/off rocker switch which operates on the secondary of the mains transformer, the primary being permanently connected to the line cord via a fuse located within the unit. At the top of the panel an uncalibrated potentiometer controls the overall gain of the unit following the electronically balanced input stage. Near this input level control a green LED is illuminated when signals in excess of −20 dBm are present. A second red LED is illuminated when signal level reaches −4 dB below clipping at the input to the equalisers or output from the equalisers—this does not protect the balanced input stage or the final output stage.

Below the level pot are two locking pushbuttons, one with a red warning LED bypassing the equaliser by hard wiring the input to the output and the second energising an internal source of pink noise.

To the right of the front panel are an unbalanced ¼ in microphone input jack socket and the real-time analyser (RTA) controls consisting of a potentiometer and two locking pushbutton switches. The analyser section is normally fed from the equaliser output but inserting the microphone jack feeds the analyser from the microphone input which is non-standard and designed for use only with the electret microphone supplied with the unit. If this microphone is used the calibrations around the RTA level control represent SPLs from 70 dB to 120 dB in 10 dB increments.

The analyser works in conjunction with the '+', '0' and '−' LEDs above the individual equaliser controls with one of the pushbutton switches selecting a ±1 dB or ±3 dB window. If the signal exceeds the window level the red '+' LED is illuminated, if it is below the yellow '−' LED is illuminated and if the signal level is within the window the green '0' LED is illuminated.

It follows that the equaliser may be used to define or measure spectra or frequency responses in conjunction with the internal pink noise generator using either the supplied microphone or any other type of input.

The final front panel control is the Normal/House curve switch which affects the frequency response of the analyser section which is flat in the normal position. In the House position the response between 400 Hz and 1.6 kHz is modified—the manufacturer claims 'This reduction in midrange results in a warmer more desirable sound at lower sound pressure levels.'

At the rear of the unit the audio input, audio output and pink noise output are at ¼ in jack sockets with the outputs being unbalanced except in the bypass mode when the output is directly connected to the input terminals which may be fed from a balanced or unbalanced source.

Within the unit printed circuit boards extend the width of the chassis at the top and bottom and across the front. The latter supports all the slider controls and the filters and level detectors are on the other two boards. The only pre-set controls are single potentiometers for each filter, setting the level.

Across the left side of the unit the ▷

REVIEW

power supply and input/output circuits are on a vertically mounted board with a similar board to the right having the random noise generator and microphone input circuits.

The only hand wiring is the connections to the power transformer; the printed circuit board interconnects with sockets and pin connectors making the unit very tidy. Whilst there are no component identifications the user's manual includes layout diagrams and circuits in addition to other user information.

The unit is well finished internally and externally with clear off-white panel markings and the chassis is painted inside and out.

Inputs and outputs

The electronically balanced audio input could accept a maximum of 9.58 VRMS (+21.8 dBm) into a load impedance constant with gain at 22 kΩ with the common mode rejection remaining at 80 dB within the audio pass band.

The gain to the unbalanced audio output with the equalisers set to their flat positions was a maximum of 6.7 dB with the output source impedance being 47 Ω. Measuring the maximum output capability showed it to vary widely with the gain set by the equaliser level control, this control affecting the input and output stages.

At maximum gain the output could deliver 9.51 VRMS (+21.8 dB.7V) falling to 7.26 VRMS (+19.4 dB.7V) at unity overall gain and thence to 1.05 VRMS (+2.6 dB.7V) at low overall gains.

The microphone input to the real-time analyser section is dedicated to the microphone supplied; the input has +2.19 VDC powering and the input impedance is 2.07 kΩ. The sensitivity for '0' indication with the window set to ±1 dB was −72 dBm at maximum gain increasing to −25 dBm at minimum gain with the calibrations of the RTA level control being rather rough and ready as shown in **Table 1.**

Pink noise at the unbalanced output could drive a maximum of +2 dBm over the bandwidth 22 Hz to 22 kHz from a very low source impedance. A constant bandwidth analysis of the pink noise as shown in **Fig 1** reveals that the frequency distribution of the pink noise is within ±0.5 dB from 20 Hz to 20 kHz.

TABLE 1

RTA level setting	70	80	90	100	110	120
Input level (dBm)	−72	−64	−515	−45	−37	−25

The signal present indicator illuminated at −21 dBm input with the overload indicator becoming illuminated 3.5 dB below clipping, the latter giving a visible indication with clipping conditions exceeding 300 μs.

Whilst the peak indicator shows overloading conditions at the feed to and from the equaliser sections, it does not operate with input overloads and will not necessarily indicate overload at the output stage.

Frequency response

The overall frequency response with the equalisers in their flat positions is shown in **Fig 2** to be within +0/−1 dB from 40 Hz to 12.6 kHz falling to −3 dB at 32 Hz and 22 kHz and then rolling off to provide a sensible restriction on the bandwidth.

The performance of all the 27 equalisers at their maximum cut and boost is shown in **Fig 3** where the centre frequencies are accurate but the alignment of the gain leaves something to be desired, particularly in the case of the 630 Hz stage. It was also noted that the three highest frequency sections had an available cut in excess of the specified −15 dB.

FIG.1
RANE RE 27
SPECTRUM ANALYSIS OF PINK NOISE

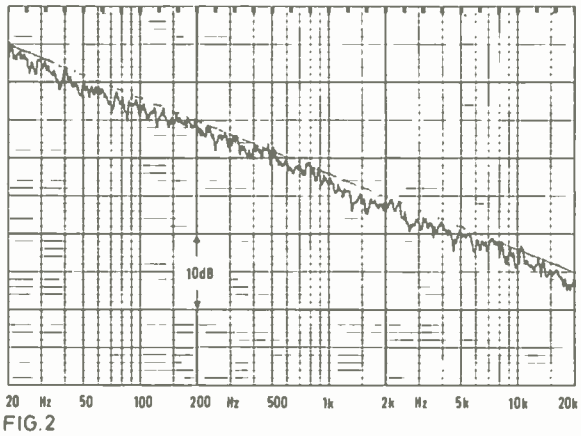


FIG.2
RANE RE27
FREQUENCY RESPONSE FLAT

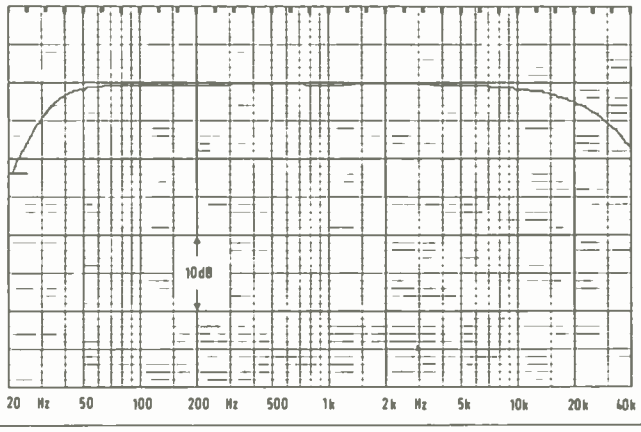


FIG.3
RANE RE27
EQUALISERS

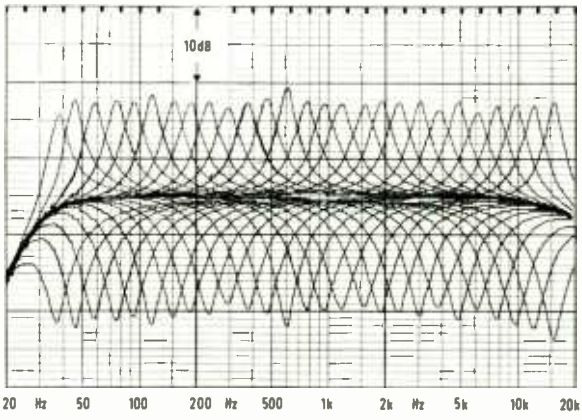
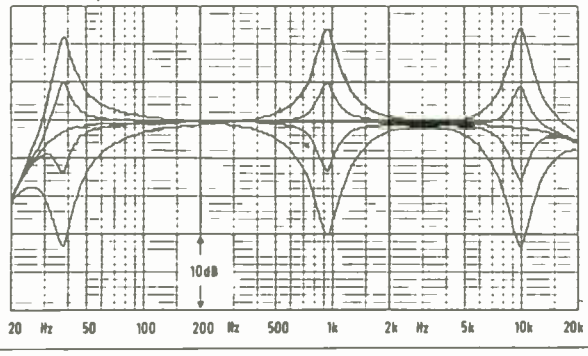


FIG.4
RANE RE27
40Hz, 1kHz AND 10kHz
EQUALISERS
AT MAX, ±6dB AND FLAT



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REVIEW

TABLE 2

Measurement method	Output noise Unity gain	Maximum gain
22 Hz to 22 kHz RMS	−78.8 dBm	−74.8 dBm
A-weighted RMS	−87.2 dBm	−83.5 dBm
CCIR-weighted RMS	−79.0 dBm	−75.0 dBm
CCIR-weighted quasi-peak	−74.0 dBm	−70.7 dBm
CCIR-weighted ARM ref 2 kHz	−86.0 dBm	−82.0 dBm

TABLE 3

Measurement method	Output noise Maximum cut	Maximum boost
22 Hz to 22 kHz RMS	−68.2 dBm	−59.6 dBm
A-weighted RMS	−78.0 dBm	−65.5 dBm
CCIR-weighted RMS	−70.4 dBm	−62.7 dBm
CCIR-weighted quasi-peak	−64.4 dBm	−55.0 dBm
CCIR-weighted ARM ref 2 kHz	−77.0 dBm	−70.6 dBm

Fig 4 shows the performance of the 40 Hz, 1 kHz and 10 kHz equalisers at their maximum settings and at the ±6 dB settings, the control law being good and the shape remaining constant with gain.

Within the analyser section the frequency response was flat within the readability of the display in the normal mode with the 'House' mode introducing a boost in sensitivity commencing at 100 Hz, rising to 3 dB between 400 Hz and 1.5 kHz and then falling to zero at 6 kHz.

A typical frequency response of the ⅓-octave filters is shown in **Fig 5** for the 1 kHz filter. This curve just falls within the outer limits for the ANSI standard class II response.

Noise and distortion

Noise in the output was completely free from power line hum or other constant tones with the output noise depending upon the setting of the gain control and the equalisers. With all equalisers set for unity gain the gain control influenced noise as shown in **Table 2.**

The use of the equalisers to cut or boost, increased the output noise but not to any alarming degree. **Table 3** shows the effect of fully cutting or boosting the nine mid-band equalisers from 315 Hz to 2 kHz with the nominal range being +12 dB to −15 dB.

Referring these noise levels to the maximum output capability shows that the noise performance is good under any likely conditions of operation. Operation of the pink noise source did not show any audible crosstalk into the equaliser section but operation of the analyser section produced very slight clicks as the level LEDs became illuminated.

The operation of the equaliser controls and the level control were completely silent and switching the unit on/off did not produce any unwarranted clicks.

Second and third harmonic distortion was measured under a variety of conditions of gain and equalisation, and was always to a high standard. The worst case shown in **Fig 6** was at +20 dBm output at maximum gain, the use of the equalisers having little effect upon the harmonic distortion which was related to output level rather than other conditions.

Intermodulation distortion to the CCIF twin tone method exhibited similar characteristics with the second order products (F2-F1) being always at a very low level—less than 0.01%. The worst case for the third order products was at high frequencies and high levels as shown in **Fig 7** for +20 dBm equivalent peak output.

Other matters

Testing the analyser in comparison with a Bruel & Kjaer type *4165* measuring microphone in conjunction with a Bruel & Kjaer *2606* measuring amplifier and a ⅓-octave filter set showed remarkably good results.

The Rane unit was first used to equalise the room using the ±1 dB sensitivity range with the input sensitivity set to 70 dB SPL. The Rane microphone was then replaced with the Bruel & Kjaer microphone and the room measured with the Bruel & Kjaer equipment. The resulting sound pressure level indicated at 70 dB with the Rane equipment measured 69 dB SPL with the B & K equipment, the two systems agreeing to within ±1 dB over the 27 ⅓-octave bands. The Rane microphone, however, was sensitive to hum pickup and unless the microphone stand was grounded, erroneous results could occur at low frequencies.

Summary

The Rane *RE 27* is an unusual combination of a ⅓-octave, constant Q, graphic equaliser and a real-time analyser with limited abilities. This combination, however, has all the facilities needed for obtaining a flat room response or equalising a room to the internal 'House' curve, using the internal pink noise source if required.

All sections of the unit offered a very good performance but the accuracy of alignment of the equalisers could be improved. However this has no effect upon the measurement capabilities which were remarkably accurate for a simple device.□

FIG. 5
RANE RE 27
TYPICAL FILTER RESPONSE

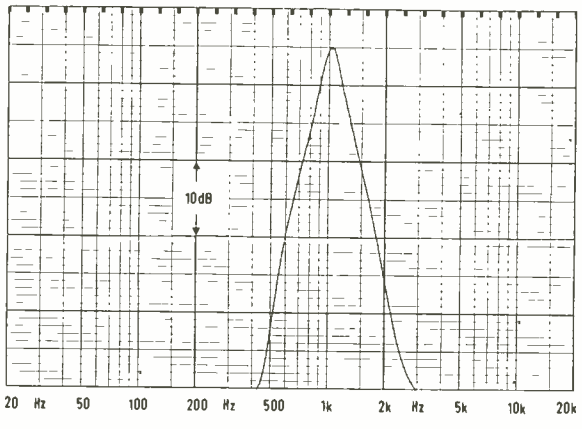


FIG. 6
RANE RE27 HARMONIC DISTORTION AT +20dBm

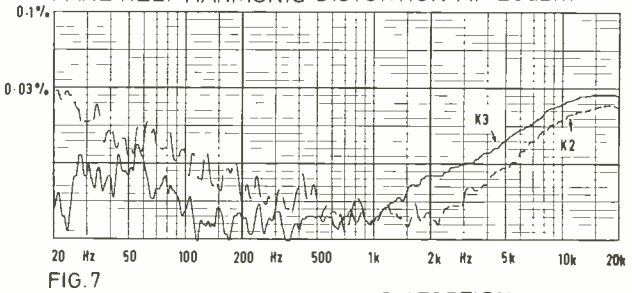
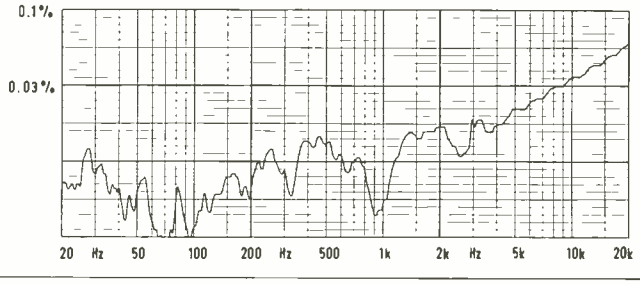


FIG. 7
RANE RE27 THIRD ORDER IM DISTORTION

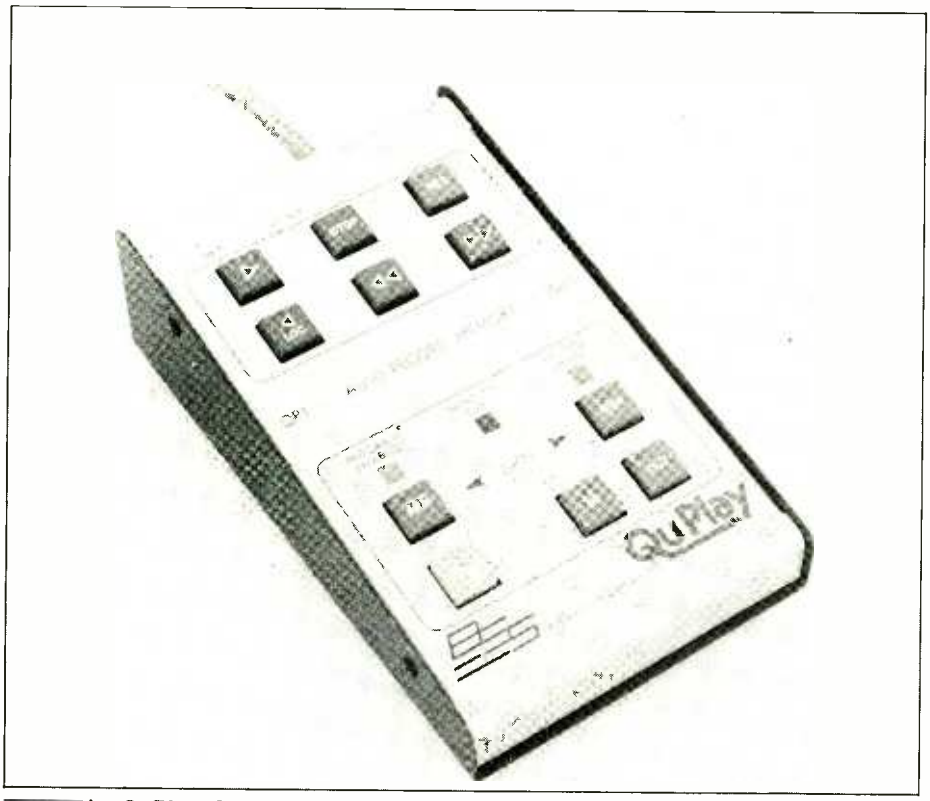


REVIEW

REVIEW

A user report by Patrick Stapley

QUPLAY QP1



The QuPlay *QP1* is a programmable drop-in and drop-out control unit that plugs directly into the tape machine using tach pulses as its reference. There are, at present, some 200 units in studios around the world with a quarter of these being in Britain. The system I examined was in use at producer Colin Thurston's studio in London where it is used in conjunction with an *Otari MTR90 mk II*.

The unit measures 17×11×15 cm and is small enough to sit neatly on most consoles with little problem. The controls are divided into two areas consisting of a remote section providing normal transport facilities, and the programming section with five pushbuttons and three status LEDs. The unit can be programmed with the tape machine running at normal speed, half speed or in edit mode depending upon the degree of accuracy required but whichever method is used the procedure is the same. Firstly the *QP1* must be primed to receive commands by pressing the Prog button which will light the green Program Enabled LED. With the transport running the In button is pressed at the drop-in point and the Out button at the drop-out point. The Program Enabled LED will extinguish and one now has a programmed drop-in or window. The accuracy of this window can be checked by the orange Window Cue LED which illuminates for the duration of the drop-in. Once satisfied with the positioning of the window the *QP1* should be 'record armed' and this is achieved by simultaneously pressing both Arm buttons lighting the red Record Armed LED. The tape machine is run back either normally or by using Loc, which will put the machine into rewind and apply the brakes at the In point parking the tape a few seconds before the drop-in. The track or tracks to record on are selected on the tape machine, Play is pressed and the drop-in is carried out automatically. When the *QP1* drops-out it also disarms itself, so to repeat the same drop-in the unit must be re-armed. However, there is a switch at the rear of the control box that allows 'continuous arming' and this can be useful if one is anticipating a number of passes over the same section or putting the tape machine into cycle mode but remember to switch back to Normal for a playback. The unit does not interfere with the operation of any existing remote or autolocator as it connects to an independent socket, so if preferred these can be used to perform transport functions, although the *QP1*'s remote will work in exactly the same way as the tape machine.

Once a program has been entered it will remain intact until another program is entered or changes are made to the existing program. A window may be shortened or lengthened by pressing Prog leaving the In point untouched and selecting an earlier or later Out point. If at any time one wanted to disarm *QP1* either before or during the window by pressing Arm the unit will immediately disarm and drop the machine out of record without effecting the program.

It is possible to create an Inverse Window by programming the unit in reverse. For example, if you enter an In point at two minutes and an Out point

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at one minute, then wind back to zero and Continuously Arm the unit, by pressing Play it will go into record from zero to 1 min, drop out until 2 min and then go back to record until stopped.

There is also the facility to program the unit by using a standard press-to-make footswitch which plugs into a standard ¼ in jack socket on the rear panel. In Program Enabled mode the first press of the switch creates the In point, the second the Out. This is particularly useful for anyone working single-handed and by arming the unit directly after enabling the program it is possible to do live drop-ins and program the memory whilst having the freedom to play a keyboard or guitar. The footswitch can also be patched through to the studio on a mic line allowing the artist to do his own drop-ins. The *QP1* is supplied with a 5 m cable joining it to the tape machine. If required longer cables can be provided so that the control box can be taken into the studio area or another room making it possible to have full control over the tape machine outside the control room.

When not in Program Enabled mode the footswitch has another function which is to shift the window to a different tape position. For example if there is a window of 30 s starting at 1 min into the track, by spooling the tape to 2 min and pressing the footswitch one now has a drop-in programmed to start at 2 min and end at 2 min 30 s. This opens up some interesting possibilities with strict tempo tracks where there are a number of identical sections.

The spot erase capability depends on the speed at which the tape machine will drop in and out. To test this I decided to select a double bass drum beat and lose the second. The *MTR 90* was put into edit and rocked over the second beat marking the In and Out points on the *QP1*. The window length was approximately 300 ms. Both *QP1* and the Otari had no problems in dealing with it but it is worth checking that the tape machine will respond to a quick window as the effect can be to drop-in correctly but ignore coming out!

Apart from the record functions, there is also a triggering facility. Next to the footswitch socket is the Trigger Output jack socket and above this is a switch that toggles between M (Momentary) and C (Continuous). Momentary causes a brief contact closure at both the start and end of the window, and Continuous gives an uninterrupted closure for the duration of the window. The trigger output can be used to activate all manner of drum machines, sequencers, effect units, etc, starting and stopping them at the beginning and end of the window. The beauty of this sytem is that one can trigger an effect and drop it in and out all by the press of one button, and by using the footswitch a number of fixed length sections can be dealt with quickly and easily.

The *QP1* does not interface successfully with all tape machines, so it is advisable to check that it is compatible with your machine before taking it any further. Generally speaking, it works well with modern Japanese machines like Otari, Tascam and Fostex. By the nature of the system working from tach pulses, it is essential that tape machines are well maintained and free from any clock or tape slippage. At present, *QP1* is customised to fit the client's machine but a series *II* model should be available soon which will incorporate internal dip switches and plug in leads making it simple to swap tape machines.

If you own a machine which will interface with the *QP1* and don't already have any programmable drop-in device, then this unit could be of interest to you. It is not expensive.

Colin Thurston is impressed with this unit and uses it exclusively to do all his drop-ins. I asked him if using it slowed the session down: "I prefer accuracy to speed and *QuPlay* rules out any human error, so at the end of the session there's no time wasted by mistakes. I've never seen anything like it before and I will use it all the time."□

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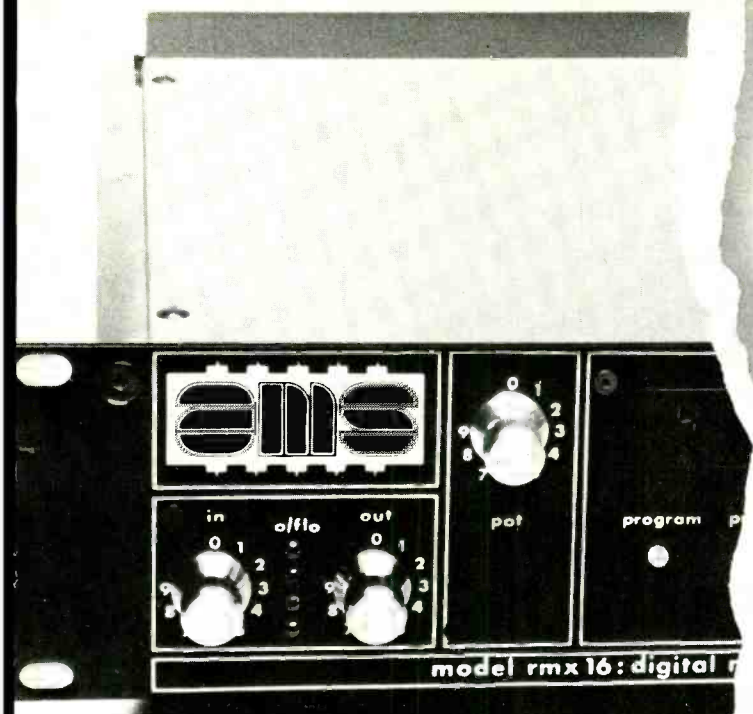

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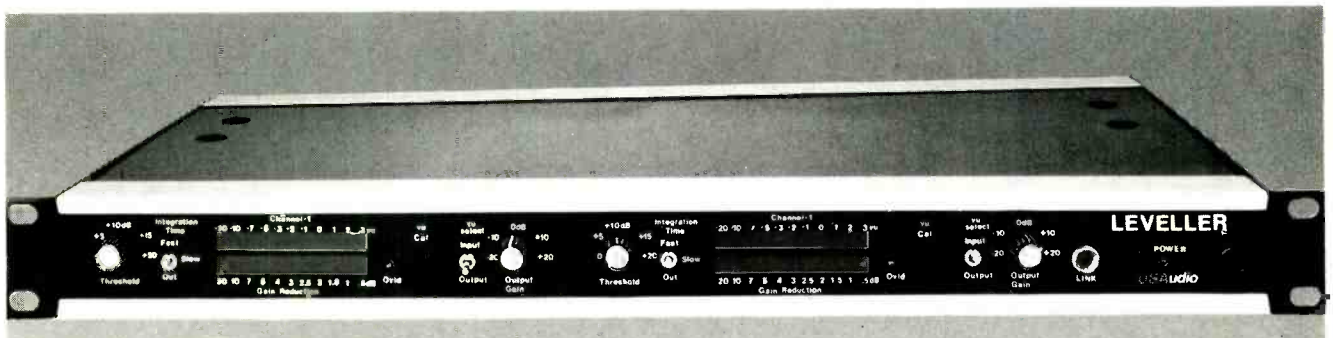

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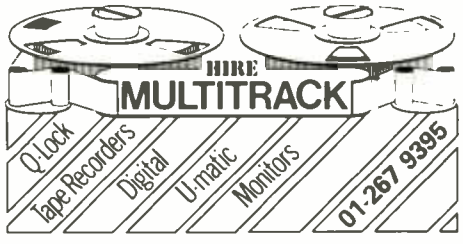

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a few quiet words from Hilton Sound..

Some people are fighting a rearguard action to save analog recording systems. They talk about cost and convenience. About the sonic characteristics of analog. Its trouble free use. They even say that it's a good idea to record on analog and mix down on digital. They'll say anything, in fact, to avoid the inevitable conclusion that digital is the way the industry is going. The ostrich and his reaction to danger is far sighted by comparison.

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NEUMANN technology assisted in the completion of the stereo master tape: Proven NEUMANN microphones finely balanced and equalised on a sophisticated NEUMANN mixing console.

The NEUMANN tape-to-disc transfer system has 4 components:
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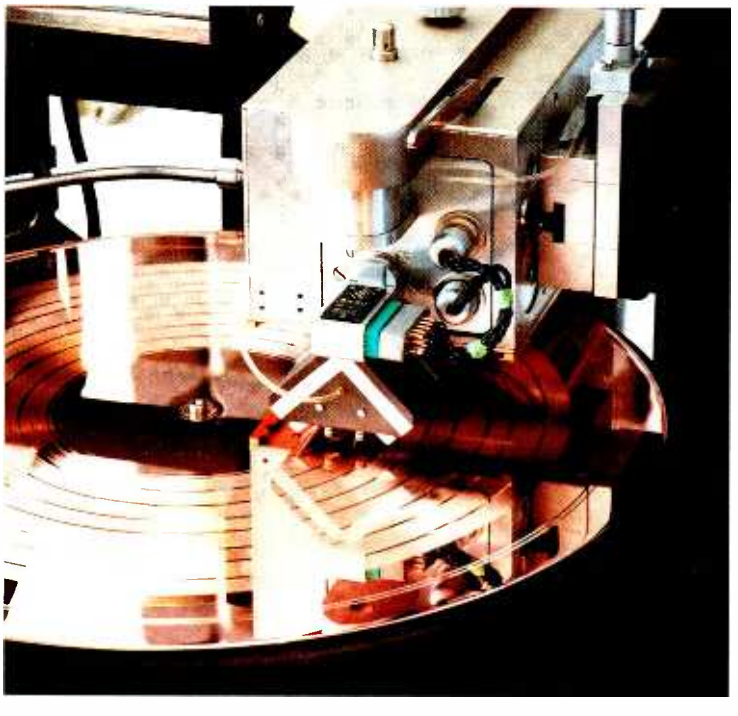

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