October 1987 US$4.00 £1.50

STUDIO SOUND

AND BROADCAST ENGINEERING

AES PREVIEW NEW YORK
THE DECISIONS GAME

Performance the Swiss would be proud of. At a price even the Japanese will envy.

If you thought the only way for your studio to achieve the highest professional standards was to stretch to a multitrack you can't really afford, or settle for a budget machine with limited performance, think again.

Because with the Soundcraft Saturn there's no such compromise – ask any of our growing list of owners.

Its performance and features are equalled only by the Studer A820 (take a look at the comparison chart below).

COMPARISON CHART	SATURN	A820	MX80	JH24
PROCESSOR CONTROL OF AUDIO	YES	YES	NO	NO
AUTOMATIC ALIGNMENT	YES	YES	NO	NO
ALIGNMENT AND METERING FROM STANDARD REMOTE	YES	NO	NO	NO
SPEEDS/EQS	3/3	3/2	2/2	2/2
PROCESSOR CONTROL OF TRANSPORT	YES	YES	YES	NO
OPEN LOOP TENSION CONTROL	YES	NO	NO	NO
REWIND TIME (2400 FT)	56 S	(56 S)*	80 S	85 S
FULL FUNCTION LOCATOR WITH PROGRAMMABLE FUNCTION KEYS	YES	NO	NO	NO
14" REEL CAPACITY	YES	YES	NO	YES
W & F (30 ips)	<0.03%	0.03%	0.04%	0.03%
S/N (500 nWb/m, 20Hz-20kHz, 30 ips REC/REP)	66dB	–	61dB	64dB
VARISPEED RANGE (30 ips)	+100, −50%	–	150%	120%

* MEASURED AT EXHIBITION. NOT PUBLISHED

Yet its price is little more than an Otari MX-80, a machine it outperforms in virtually every respect.

With such a significant saving, a Dolby SR system becomes a realistic proposition – you can actually buy a Saturn with SR for less than an A-820 without.

Saturn's technical superiority is underlined in features like the COLT (Calculated Open Loop Tension) transport with its unrivalled tape handling, the fully digital Total Remote control and auto-alignment.

And its excellent reliability record confirms our confidence in providing 2 years' Warranty Support, backed by our 364-day Rapid Response Service.

Call us to arrange a personal demonstration. We'll show you how British engineering has put Saturn ahead of the world.

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STUDIO SOUND
AND BROADCAST ENGINEERING

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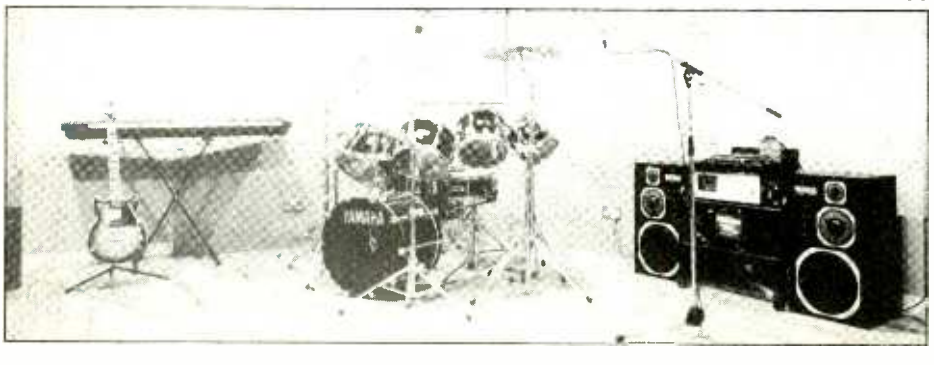
The R&D studio at Yamaha (see page 58)



Stepp inventor Stephen Randall (see page 108)

TRUTH... OR CONSEQUENCES.

If you haven't heard JBL's new generation of Studio Monitors, you haven't heard the "truth" about your sound.

TRUTH: A lot of monitors "color" their sound. They don't deliver truly flat response. Their technology is full of compromises. Their components are from a variety of sources, and not designed to precisely integrate with each other.
CONSEQUENCES: Bad mixes. Re-mixes. Having to "trash" an entire session. Or worst of all, no mixes because clients simply don't come back.

TRUTH: JBL eliminates these consequences by achieving a new "truth" in sound: JBL's remarkable new 4400 Series. The design, size, and materials have been specifically tailored to each monitor's function. For example, the 2-way 4406 6" Monitor is ideally designed for console or close-in listening. While the 2-way 8" 4408 is ideal for broadcast applications. The 3-way 10" 4410 Monitor captures maximum spatial detail at greater listening distances. And the 3-way 12" 4412 Monitor is mounted with a tight-cluster arrangement for close-in monitoring.
CONSEQUENCES: "Universal" monitors, those not specifically designed for a precise application or environment, invariably compromise technology, with inferior sound the result.

TRUTH: JBL's 4400 Series Studio Monitors achieve a new "truth" in sound with an extended high frequency response that remains effortlessly smooth through the critical 3,000 to 20,000 Hz range. And even extends beyond audibility to 27 kHz, reducing phase shift within the audible band for a more open and natural sound. The 4400 Series' incomparable high end clarity is the result of JBL's use of pure titanium for its unique ribbed-dome tweeter and diamond surround, capable of withstanding forces surpassing a phenomenal 1000 G's.
CONSEQUENCES: When pushed hard, most tweeters simply fail. Transient detail blurs, and the material itself deforms and breaks down. Other materials can't take the stress, and crack under pressure.

TRUTH: The Frequency Dividing Network in each 4400 Series monitor allows optimum transitions between drivers in both amplitude and phase. The precisely calibrated reference controls let you adjust for personal preferences, room variations, and specific equalization.
CONSEQUENCES: When the interaction between drivers is not carefully orchestrated, the results can be edgy, indistinctive, or simply "false" sound.

TRUTH: All 4400 Studio Monitors feature JBL's exclusive Symmetrical Field Geometry magnetic structure, which dramatically reduces second harmonic distortion, and is key in producing the 4400's deep, powerful, clean bass.
CONSEQUENCES: Conventional magnetic structures utilize non-symmetrical magnetic fields, which add significantly to distortion due to a nonlinear pull on the voice coil.

TRUTH: 4400 Series monitors also feature special low diffraction grill frame designs, which reduce time delay distortion. Extra-large voice coils and ultra-rigid cast frames result in both mechanical and thermal stability under heavy professional use.
CONSEQUENCES: For reasons of economics, monitors will often use stamped rather than cast frames, resulting in both mechanical distortion and power compression.

TRUTH: The JBL 4400 Studio Monitor Series captures the full dynamic range, extended high frequency, and precise character of your sound as no other monitors in the business. Experience the 4400 Series Studio Monitors at your JBL dealer's today.
CONSEQUENCES: You'll never know the "truth" until you do.

JBL

JBL Professional
8500 Balboa Boulevard
Northridge, CA 91329

STUDIO SOUND
AND BROADCAST ENGINEERING

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EDITORIAL

As I write this we are just about to enter the second phase of this year's exhibition season after what is becoming an ever-decreasing short summer period without pro-audio related shows. The next major show for us is the New York AES Convention to which this issue is dedicated. It promises to be a particularly interesting event with a far increased number of exhibitors, but not just for reasons of scale.

We seem to have reached a rather special time in pro-audio development—in a rather odd way we are actually experiencing a slight lull, which is perhaps not a bad thing. I don't mean that there is any shortage of new products or developments but that the way we were viewing frantic new technology introductions two years ago has not been present for the last year. We have, if you like, become familiar with digital audio, disk-based recording and digitally-controlled mixing consoles—I say 'familiar with' rather than 'have mastered'.

We have been introduced to the major developments. Viewed from this point in time I would like to suggest that we will grow into these equipment areas as they develop, which is far easier to cope with on the commercial side. So my earlier reference to a lull is perhaps more truly an element of stability in the development race. Then again I could be wrong—time will tell.

We do, however, need a break from new technologies, so that the commercial aspects of the market place can be sorted. Studio rates are still far too low and studio owners must find a point when they can no longer afford to be quite so philanthropic. The problem has become amplified by the fact that new technologies seem to bring two diverging pricing policies—those things you need to have get more expensive (tape machines and consoles) while those optional items (signal processing) get cheaper. This means that the major purchase decisions about consoles are far more critical and perhaps a wrong choice may also cost the business.

This is the analogy we are drawing with this month's cover. Running a studio has become a game of strategy although there may be more than two sides playing at any one time. What we all badly need is a period of time to earn some money so we may be better prepared to buy what will appear in next year's shows.

On a more practical note, I feel I must now be fully qualified for the title of Fully Seasoned Exhibition Attendee. One of the few rights that we FSEAs have earned is to have our ideas listened to, even if outwardly they seem crazy. Please let me present one to you.

The situation is standard. You walk on to the booth/stand of XYZ Audio to see what they are offering new. The representative of XYZ Audio is very pleased to demo their XYZ-666 MkII SupaDigiFecta and launches himself/herself into the demo routine which at the same point involves a jab in the direction of the CD player and invitation to play with the unit yourself. The problem at this point is what are you listening to? With the increasing use of CD for demonstration we are at the mercy of the taste of XYZ Audio. This will fall into one of three categories—the current AOR faves, super obscure import CDs of equally obscure music, or maybe even classical music of some description. At best you may be familiar with the AOR CDs but they can at their best only be a very rough guide with no absolute value at all. Also it does rather limit us to judging against commercial CD and CD player quality, which one hopes that most pieces of pro gear will attempt to better. In the days when tape, or even cassette, was used as a source, it was possible to present a suitable type of test material but it would be interesting to check how many exhibitors are still using any form of tailored demo material.

My suggestion is that the possibility of a standard test CD for demo use should be considered. Firstly, this does not preclude other material being used as well should it be necessary. Secondly, because you would be familiar with the contents there would be an element of absolute value to your testing. Thirdly it could form a far easier way of describing sounds in words as we would all be working from the same reference. Yes, there are, of course, sound differences between CD players and headphones brands but, in a way rather similar to the manner an experienced engineer trains his ear very quickly to adapt to different monitor speakers, with a standardised test CD you would become so familiar with the choice of material that differences in reproduction would become obvious. Such a disc could also become part of the engineer's kit to reference when visiting new studios. The possibilities are endless. With up to 75 minutes playing time there would be ample space for a wide range of material. My immediate suggestions would be for some basic reference tones, frequency sweeps, reference levels, percussive sounds for reverb testing, extensive selection of music instruments dryly recorded, short selections of different types of music and some of the more difficult recorded sounds such as audience applause. With 75 minutes there would be plenty of space as only enough time would be needed of each sound for the CD player to loop a short section.

There are test discs available right now but very few I am aware of meet these requirements. Our sister publication *Hi-Fi News* have their own test CD, and very good it is too, but it is not really sufficient for my intended purposes. The Sheffield Lab *Track and Drum Record* is also useful but again, not as broadly-based in material as I would envisage being necessary.

Daydreaming over, may I wish that any exhibition you may be attending during the rest of this year be a worthwhile experience.□

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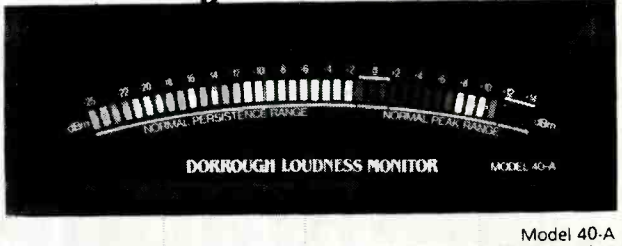

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For details of the entire Sennheiser range of microphones, write to: Hayden Laboratories, FREEPOST, (no stamp required), Hayden House, Chiltern Hill, Chalfont St. Peter, Bucks. SL9 9BS.
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Go downtown and look around. The fancy pants dance where the music is cool. And the smoothest, easiest way to perfect a club's sound is Rane's innovative MP 24.

We've loaded this new Stereo Program Mixing Console to the gills with features. You're looking at more flexibility and performance in this one unit than in any other mixer/preamp made. Furthermore, its got the highest level of signal quality: noise and distortion are virtually eliminated.

Here's a partial rundown of why the MP 24 just made the competition obsolete. Nine stereo inputs (three phono and six line) are accessed through four stereo mixing buses, each with its own 4-position selector switch and Alps studio grade 60mm slider. Crossfade is completely assignable via another 60mm slider and two selector switches. Then there's separate mic and program EQ, mic and program loops, master balanced outputs, zone and booth outputs, light trigger output, cue system... whew! And that's not the half of it.

RIGHT AS RANE

Those in the know are already saying our MP 24 will be the industry standard. But why be modest? We think it'll be the king.

Rane Corporation, 6510 216th Southwest, Mountlake Terrace, WA 98043. 206/774-7309.

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UK Distributor:
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What does it take to pro-audio centre

It takes more than a warehouse full of the best audio equipment.

We've got that of course.

Names like Amcron – we have every model. Yamaha – we're the biggest pro-audio stockist in the UK. Sony – we launched low-cost digital in this country.

It also takes experience: at HHB you won't find slick salesmen, just a team that knows its business inside out.

You'll also find everyone at HHB has a one-track mind. (Or 24 track if you want to see our range of Amek TAC consoles and Sony recorders!)

Our directors started out building sound systems for rising stars, and the staff all have very similar backgrounds.

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departments are hard at it to preserve our reputation for the best back-up in the business.

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And of course to make your visit more palatable we're always happy to offer you suitable refreshments.

We feel that, with our unmatched technical expertise, approachability and reputation – and our new premises – we've earned the right to call ourselves the first pro-audio – centre in the country.

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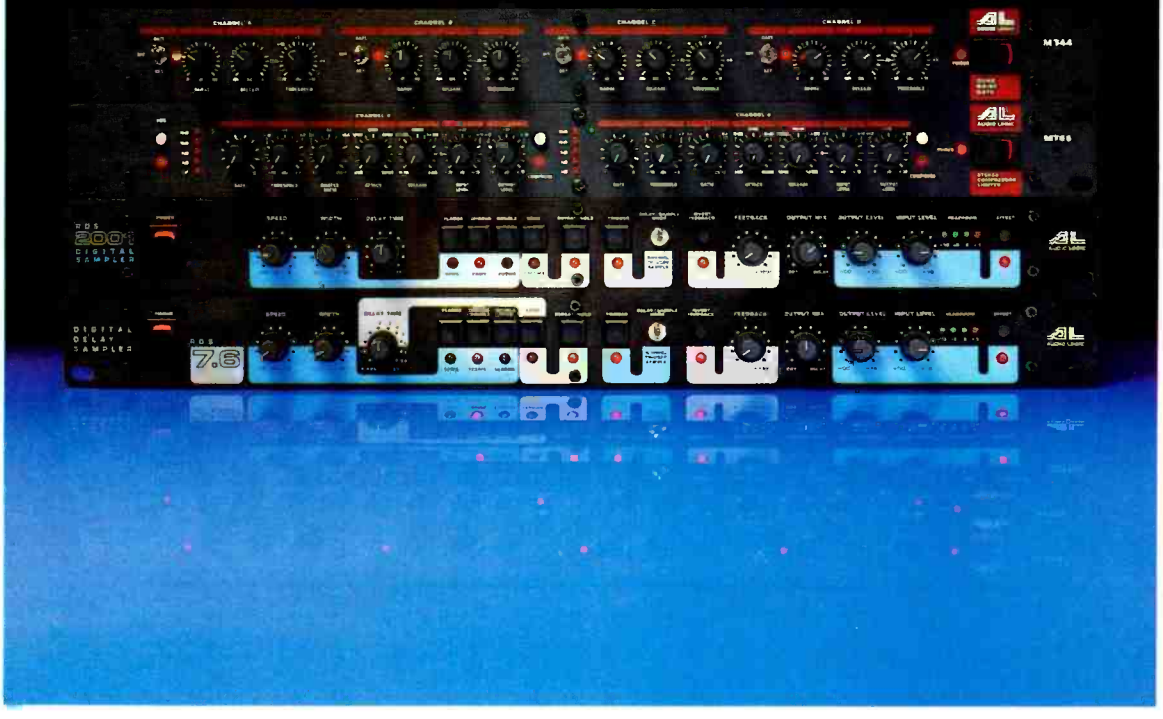

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NEWS

Studio Sound US developments

By the time you read this issue *Studio Sound* will have taken several important steps in developing our coverage, circulation and overall presence in the United States. This issue has seen a doubling in size of our US circulation on top of our existing worldwide distribution. Incidentally, to accommodate this increase in circulation we have also switched our printing to Web Offset, a technique that allows easier printing of larger numbers of copies.

The most important development for the future will be the opening of a US office in New York. This office will handle both editorial and advertising business under the direction of our head offices in Croydon, England. At the time of writing (mid August) we cannot confirm the names of appointed staff but these will be made known before the New York AES Convention. Through these offices we look forward to more convenient communications with the US Recording Industry at all levels.

Note on VCR-based digital recording survey

In last month's survey on video-based digital recording formats, although we mentioned in the entry for the Sony *PCM-F1* that the unit was not widely available except through a couple of specialist suppliers, this does perhaps need a little more clarification. Distribution of the *F1* was never handled through Sony Broadcast for the UK but came through Sony UK. Sony stopped manufacturing the *F1* nearly two years ago but under pressure from specialist dealers, such as London's HHB who were still experiencing a very strong demand for the product, Sony agreed to restart manufacture on a small scale. Because of this the number of outlets able to supply the *PCM-F1* is very small. To the best of our knowledge the only European source is HHB Hire & Sales, 73-75 Scrubs Lane, London NW10 6QU, UK. Tel: 01-960 2144. Telex: 923393.

Evenlode Soundworks

Evenlode Soundworks is a newly formed UK-based distributor of MIDI and electronic music products. Based in part of the original Solid State Logic premises in Oxfordshire Evenlode will be distributing products from Steinberg Research (software), JL Cooper Electronics (MIDI control equipment), Australian company Passac (MIDI guitar controllers) and Swedish Clavia Digital Instruments (drum computers).

Evenlode Soundworks, The Studio, Church Street, Stonesfield, Oxford OX7 2PS, UK. Tel: 099 389 228. Telex: 837883.

In brief

- Audio Services of North Hollywood have announced that their rental and sales departments are now providing communication equipment such as hard-wired intercoms, wireless systems, ear-cuing systems, audio and video monitoring etc.
- Darren Frearson, ex-Audio Kinetics salesman, has set up Synchrotech Sales, a London-based pro-audio dealer, specialising in timecode product, such as *Q.Lock* and *MasterMix*. Agreements have been made with Akai, Tannoy and Neumann, and they've added Soundcraft consoles. Synchrotech Sales Ltd, 66 Rochester Place, London NW1 9JX, UK. Tel: 01-267 4202.
- Celebrating their 10th anniversary, Kajem Recording have changed their name to Victory, added to their original Gladwyne Studio (now Victory West) with another in Society Hill (now Victory East), and appointed advertising production man Wally Hayman as the studio's fifth partner.
- New England Digital have announced the opening of a new regional sales, service and training centre in Chicago at 741 North Dearborn Parkway. Tel: (312) 266-0266.
- Auvis-Asona of West Germany have changed their name to Asona Audio Technik GmbH & Co KG.
- The General Booking Company have announced the expansion of their services with the incorporation of a continually updated database, thereby providing clients with both the quickest possible information, and excellent deals from co-operating members.

The General Booking Company, Oliver House, 8-9 Ivor Place, London NW1 6BY, UK. Tel: 01-724 2471.

- Soundtracs have announced that the Yamaha music store in Shibuya, Tokyo, has a *PC24* MIDI console on permanent display. The Yamaha chain is usually only an outlet for Yamaha products. This arrangement was made by Soundtracs' Japanese distributor MTC.
- The 1987 joint winners of the UK Performing Right Society's John Lennon Award were Timara Galassi and Gerald Murphy. The aim of the award is to encourage an outstanding student to undertake a course of specialised study in a field suggested by John Lennon's musical achievements such as composition, record production or advanced recording techniques.
- A new pro-audio company has been launched in Australia known as Rebel Audio Pty Ltd. Based in Sydney but with representative agents in all states, it will cater for the audio installation/contracting market while supplying products for broadcast, sound reinforcement and studio markets. Founded by Ian Woodhouse and Andrew Horman, ex-Electro-Voice and Klarion Enterprises respectively, they will be distributing products from Bel, White, Tantek, Community, Nemesis, Pro-Co, Greystone, Sescom, MicroAudio and Audio Digital. Rebel Audio, 104-106 Hampden Road, Five Dock, Sydney, Australia. Tel: (02) 713-6872.
- Kelsey Acoustics, UK Carver distributor, has announced that Windmill-Munro Associates are now recommending Carver *PM-1.5* power amplifiers for use with their new *M-4* 4-way studio monitors.

Agencies

- Milab International AB have named EXP of Studio City in California as exclusive distributor for their full line of condenser microphones in the US.
- Chromatix of London have been appointed main agents for Kurzweil Music Systems, and in particular for their *Midiboard* master keyboard.
- Fane Acoustics of West Yorkshire have decided to open their own US subsidiary, Fane Acoustics Inc, located in Chicago. Fane will create a warehousing facility and establish a nationwide sales and service network to ensure delivery to all customers within 24 hours.
- TDS of Milan have made an agreement with Audioscope of Rome for Italian distribution of the entire Audioscope range of products for level display and spectrum analysis.
- UK-based State of the Art Distribution have announced their distribution of the Nady line of radio mics.
- Michael Stevens & Partners have been appointed sole UK distributors of d&b audiotechnik concert PA and theatre sound systems. Michael Stevens are also now offering KEF Professional Products, currently comprising two monitoring systems with dedicated power amps.
- Gotham Audio have added to its line of products with the addition of Audio Developments range of mixers and sound processing equipment.
- Kelsey Acoustics Ltd have announced that they have the exclusive worldwide distribution rights to the *Signex* range of patchbays manufactured by Osotrack. Agents appointed so far include SCV, France; MORE Productions, Israel; Lyd Rommet, Norway; and Audio Concrol Lease, Belgium.

NEWS

Change of address

• Otari Corporation of California expect an August groundbreaking for their new US headquarters, with hopes of moving in by January 1988. The two-storey, 34,000 ft² combined office/warehouse facility, will be located at: 378 Vintage Park Drive, Vintage Park Development, Foster City, California.
• UK distributor for the Uher range of portable tape machines, Telecommunications Information Systems Ltd, has moved. They are now located at Tisl House, St John's Road, Isleworth, Middlesex TW7 6NL, UK. Tel: 01-847 3033. Telex: 933327.
• Karl Brown's Studio Innovations have moved to: 33 Roof of the World, Boxhill Road, Tadworth, Surrey KT20 7JP, UK. Tel: 073 784 2993.
• Presence Audio has moved and is now at The Old Posthouse, Plummers Plain, Horsham, West Sussex RH13 6NU, UK. Tel: 0403 76777.
• US loudspeaker manufacturers Dahlquist have replaced their telex machine with a fax: (517) 234-5781.

Nexo at Avignon

Considered one of the major events in the live theatre world, the Avignon Festival in the South of France was celebrating successfully its 40th anniversary this year. About 120,000 spectators attended the performances played in the 10 official sites as well as the various improvised theatres of the underground festival, 'Avignon Off'. Through the years Avignon has become a real trade show where theatre tour organisers choose their programmes for the coming season. Deeply involved in the theatre industry, the French loudspeaker manufacturer Nexo was named in the list of sponsors by providing equipment and technical support for the main site La Cour d'Honneur du Palais des Papes where Paul Claudel's play *Le Soulier de Satin* (all nine hours) was performed. Nexo was also widely represented at Avignon through the sound hire companies that provide the equipment for seven of the 10 main official sites (Espace Sud, Texen, Sud Regie, BAS, Asstecs, Techniscene) with a total of six MSIC, two Integrated Systems and 44 PCs with appropriate processors.

Gisele Clark

Pro-Britro formed

A new company has been formed from the combination of UK distributors Britannia Row Equipment Ltd and Professional Audio Ltd. The new distributor will be known as Pro-Britro Ltd and will be representing products from Trident Audio, Westlake Audio, Lyrec, Sonosax, Renkus-Heinz, Summit Audio, Aquarius Electronics, BGW Systems, SJ Court & Associates, Unisound and Bel. Richard Kelley will be managing director, Tom Belshaw marketing director, Ian Wilson sales director, Vava Tsioupra chief engineer and Emily Morris office manageress. In the short term they will be based at 53 Corsica Street, London N5 1JT, UK. Tel: 01-226 1226.

Digital Information Exchange 87 programme

The programme for this year's Digital Information Exchange sponsored by HHB Hire & Sales and Sony Broadcast in Association with *Studio Sound* and *Pro Sound News* has been provisionally announced. This year the event will be held over four days, November 23rd to 26th, at London Zoo. Day one will cover Broadcast and Video, days two and three Recording Industry and day 4 Scientific and Industrial. Confirmed speakers are as follows:
Barry Fox, New Scientist; Allan Mornington-West, The IBA; Gert-Jan Vogelaar, Philips DuPont; Geoff Irons, Trilion; Guy McNally, Digital Audio Research; Mike Bradley, HHB Hire & Sales; David Smith, Editel, New York; Tony Griffiths, Decca International; Bruce Jackson, Apogee Corporation; Mike Hedges, Producer; Andy Hilton, Hilton Sound; Kim Ryrie/Roger Bolton, Fairlight Industries; Roger Lagadec, Sony Corporation; Bill Aitken, Solid State Logic; Cary Fisher, Sony Corporation, America; Paul Leader, Otari Electric (UK) Ltd; Nick Hopewell-Smith, Consultant; Richard Salter, Sony Broadcast; Andy Proudfoot & Roger Cameron, Neve Electronics; Stuart Nevison, AMS Industries; Bob Ludwig, Masterdisk, New York; Martin Russ, British Telecom Research; Dr Klaus Genuit, Head Acoustics; John Watkinson, Ampex UK; Ramsey Ismail, Sony Broadcast.

The cost of attending (including VAT) is £85 per day or £280 for the full four days. To book a ticket contact Peter Woodcock, tel: 0992 583557. For further information contact Nick Hopewell-Smith, tel: 01-381 4624.

New French association

In June 1987, the Association des Professionnels de l'Audio (APA) was created by a representative group of audio professionals. Their first objective was the organisation of trade show, Audio Pro 87, to be held at the Parisian Palais des Congres from December 15th to 17th, replacing the CTEAP. After the initial elections, Patrick Aufour of Saje will be president with Richard Garrido of SCV Audio and Jean-Noel Kendirgi of High Fidelity Services/Trident/AMS acting as co-vice-presidents.
APA, PO Box 177, 95023 Cergy Cedex France. Tel: 30 38 91 26.

Literature received

• Feedback Instruments of East Sussex have published a 12-page colour catalogue highlighting the products supplied by the company's recently formed Test & Measurement Division. Instruments covered include oscilloscopes, logic analysers, analogue and digital multimeters, counters and timers, signal sources, phase meters, component analysers, recorders, power supplies, fibre optic testers, temperature monitors, impedance testers and static meters. Further information is available from: Feedback Instruments, Test & Measurement Division, Park Road Crowborough, East Sussex TN16 2QR, UK. Tel: 08926 3322.
• The APRS have completely updated and revised their Guide to Recording in the UK for 1987. The core of the guide is a detailed directory of over 100 recording studios throughout the UK, with one page dedicated to each. Due for September publication, the guide will cost £3.00 (plus 70p postage and packaging) in the UK and Europe, and $6.00 inclusive for American buyers. For more information and order forms, contact: APRS, 163A High Street, Rickmansworth, Herts WD3 1AY, UK.
• The new Future Films catalogue is now available free from PO Box 3DG, 114 Wardour Street, London W1A 3DG, UK. Tel: 01-434 3344.
• The British Standards Institute has announced the publication of standard BS 6865 specification for time and control codes for video tape recorders. This standard is identical with standard IEC 461:1986 and will help overcome the absence of a standard digital code format and modulation method for timing and control purposes of VTRs and/or associated separate audio recorders. Available price £25.60 from BSI Sales, Linford Wood, Milton Keynes MK14 6LE, UK.

How to turn a regular Mac into a bigger Mac

Or how Terry MacDonald substantially increased his client base, business + profit with the AMS AudioFile.

Who, you may ask, is Terry MacDonald?
Well, he's the owner of a small studio in Seattle, Washington.
He's not a Disney or an Editel, but (like Disney and Editel) he does have an AMS AudioFile.
(The hard disc based multitrack recording, editing and playback system).
Which is why MacDonald Recording is now earning more hard cash.
And taking more business from his competitors.
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Whatever your size of company, AMS has the recipe for turning regular Macs into bigger Macs.
Find out about the AMS AudioFile and find out where your business is going.

"I am a true believer! When we installed the AMS AudioFile in my little 8-track studio, it represented the major cost of my studio build. And it has been everything I dreamt it would be . . . we have been using AudioFile for radio commercials, pre-production TV audio, video sweetening, industrial film sync work, in short, for everything in sound. And if a small studio like mine can see this system pay off, it has real potential for any studio in the world. AudioFile is paying off and knocking producers off their chairs."

Terry R MacDonald

MacDonald Recording Co.
Seattle, Washington.

Demonstration systems can be booked from:

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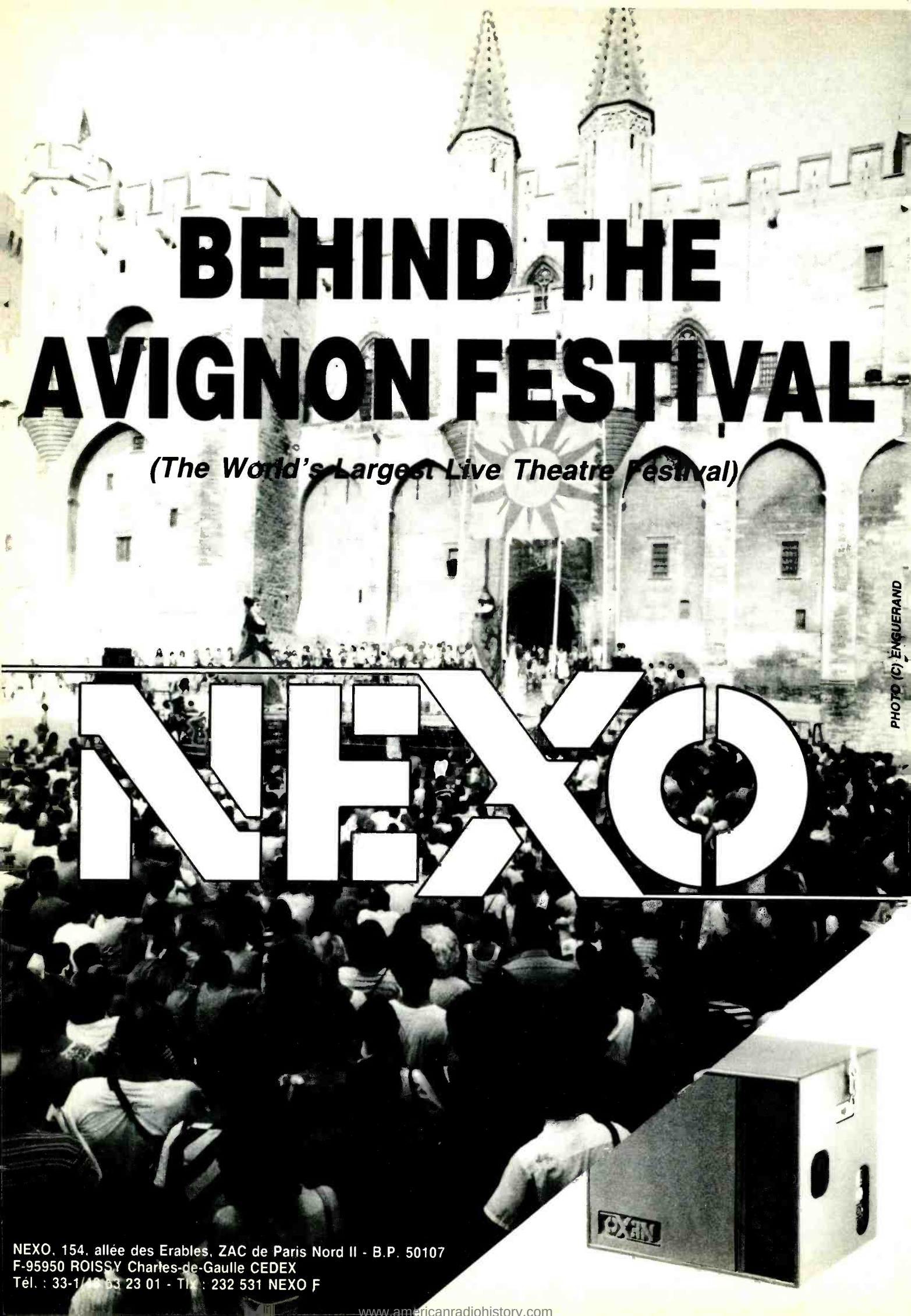
NEW YORK
Studio Consultarts Inc. (212) 586 7376
CHICAGO
Doug Ordon & Co Inc. (312) 440 0500
SEATTLE
Calrec by AMS (706) 633 1956
TORONTO
Manta Electronics Group (416) 868 0513
REST OF THE WORLD
AMS Industries Plc, England. Tel: (0282) 57011 Telex 63108 AMS-G.Fax: (0282) 39542



NEWS

People

● Ted Uzzle, director, market development of Altec Lansing, has accepted an invitation from the AES's Board of Governors to chair the May 1988 AES Conference on Sound Reinforcement and Electronic Communications.

● The APRS have appointed two new executive committee members: Myrtle Batchelor of Tam Studios and Philip Love of Eden Studios. Chairman Ken Townsend announced simultaneously the creation of a new, individual class of membership—the Associate category for non-corporate members.

● Asona Audio-Technik of West Germany have appointed Erich Vogl to a senior management role.

● James A (Andy) Moorer has joined Sonic Solutions of San Francisco as vice-president of audio research. Moorer has been involved in the field of digital audio for almost 20 years.

● The Joiner-Rose Group of Dallas have promoted Jack Wrightson to principal, and appointed Erich Friend and Chris Williams as associates.

● Autograph Sales of London have appointed Roma Skinner as a director as of August 1st, after 16 years with Expotus where she was responsible for setting up and maintaining a European distribution network for several prominent UK pro-audio manufacturers.

● Michael Stevens & Partners have announced the appointment of a new sales team comprising Bruno Plank and Bernard Van Leer, plus Steve Hoile as systems sales manager.

● HSS Hire Group Ltd have appointed Guy Chatburn as divisional manager of Sightsound, the Group's audio-visual sector.

● Ed Michel of RCA has undertaken the task of remastering the records of their great artists from earlier earas. He's been working on this for 15 months, dealing with performers such as Duke Ellington, Charlie Barnett, Benny Goodman, Bud Powell, Earl Hines, Charlie Mingus and Louis Armstrong.

● AKG have announced a number of top management changes in their Vienna headquarters. Helmut Gunst joins as member of the managing board, previously heading the consumer products division of Philips Austria. And Peter Hillebrand, current vice-president of AKG GmbH and AKG Holding AG, has decided to leave the company at the end of the year.

● Ferrograph have appointed Jeremy Bancroft to head their new digital products division, coming from AMS where he became closely involved with the development and marketing of the *AudioFile*.

● D&R Electronica bv of Holland have appointed Paul Westbrook to head their new US subsidiary, D&R USA. Westbrook comes from MCI Intertec where he was sales manager responsible for Soundtracs.

● Haydn Abbott has been appointed to the board of Sony (UK) Ltd with divisional responsibility for the non-customer products group. He was previously managing director of Racal Survey International Ltd.

● Ampex have announced the appointment of Lindsay Allen to the position of product manager for industrial audio products at the Ampex Corporation's magnetic tape division. He was previously staff engineer on the development of mix processes and the Ampex tape manufacturing centre in Opelika, Alabama.

● Neotek Corporation have appointed Greg Thompson to the position of director of visual design. He will be responsible for providing visual and mechanical designs for Neotek products. Prior to joining Neotek he completed a wide variety of design work including projects for studios such as Cherokee, Schnee and Michael Boddicker's personal studios.

NEWS

Contracts

● Mitsubishi Pro Audio Group have announced an order for a 52-channel *Westar* console from London studio The Music Works. The order includes *Compumix IV* automation and customisation to the studio's requirements. The console is destined for Studio One, a large recording area undergoing a full refit.

● Kelsey Acoustics Ltd have announced the supply of connectors and cabling to studio installations including Orinoco, Paul Miller, Sam Therapy, Howard Jones, Swan Yard and SSL's in-house facility.

● A Harrison series *10* console has been delivered to Saunders and Gordon of London, a leading advertising commercial production house, for their third new studio.

● Secret Sound LA have announced they are the first North American studio to receive the Studer *A820* 24-track digitally-controlled analogue tape machine. They also took delivery of an *A727* CD player and an *A721* cassette recorder.

● Bruel & Kjaer have sold 14 *4006* omnidirectional microphones to the BBC.

● Total Audio Concepts have received an order for four *Matchless* consoles by New York audio dealer Sam Ash. Another has gone to songwriter Gary Wright's home studio, while Australian Greg Ham has had installed a 26/24 version for his private studio.

● London-based Molinare have installed Dolby *SR* in all the multitrack machines in their video dubbing facilities.

● Different Fur recording studios of San Francisco have taken delivery of an SSL *SL 4048 E* series console, the first in North California. Other SSL sales include a US$2.2 million deal with Todd/AO, Glen Glenn for eight *SL 5000 M* film sound production consoles, a 52-channel *SL 5400* to Nippon Hoso in Japan, a 32-channel *SL 5300* to RTE in Dublin, a 48-channel *SL 6048 E* to Howard Schwartz Studio in New York, a 54-channel *SL 4072 E* to Skip Saylor Studios in Los Angeles, a 40-channel *SL 4056 E* to Wessex Studios in London, a 68-channel *SL 4072 E* to The Enterprise in California, a second 32-channel *SL 4040 E* to Chiyoda Institute of Technology in Japan, a 36-channel *SL 6056 E* to Spectrum in Oregon, a 56-channel *SL 4056 E* to Rimini Studio Records in Italy, a 48-channel *SL 4040 E* to Danmarks Radio Studio in Denmark (their 16th SSL), a 40-channel *SL 6056 E* to Eddie Murphy's private New York Studio, a 56-input *SL 4000 E* to the University of Southern California, two *SL 6000 Es* to Elumba Recording Studios in Hollywood, a second *SL 4000 E* to Skyline Studios in New York, and a 32-channel *SL 6048 E* to NBC's Edit Suite 7 in New York.

● Otari UK have announced their first UK sale of a pair of *DTR-900* digital 32-tracks to Hilton Sound in London.

● Hilton Sound have announced their biggest ever single contract, to supply digital recording and processing equipment for the three audio systems used in the filming of Billy Joel's main concerts of his two-week tour of the Soviet Union. The main job was additional equipment for the Fleetwood Mobile which was recording the concert soundtracks.

● Calrec by AMS have won the largest ever UK contract for mixing consoles from the BBC, an order worth about £900,000 for two 96-channel assignable mixing consoles for studios One and Three at Television Centre in Shepherd's Bush.

● Soundtracs' Austrian dealer, Audiosales of Mödling, have sold an *FMX* to Sound Art Service of Vienna for this year's biggest jazz festival in the Vienna Stadhalle. Other sales include an *M* series for Erste Allegmeine Verunsicherung, and an *M* and *FMX* for Konferenssentrum Hofburg.

● Soundcraft Canada have sold a second *TS-12/Saturn* package to Digital Music Systems of Montreal. The Université du Québec à Montréal have recently installed a 24-input *TS-12* in their music department (adding to their growing list of Soundcraft consoles). Rush guitarist Alex Liefson took delivery of a 24-input *TS-12* for his private studio, while sound reinforcement rental and supply company, Handsome Dan, recently ordered a large-frame *8000* house console along with a *500* monitor console.

GUESS WHAT FORAT HAS IN STORAGE FOR YOU?

The MSM 2000 Modular System Memory from Forat offers you the ability to store over 2000 custom sounds, including the 512 free sounds we give you, for your Yamaha DX-7, RX-11 or Roland keyboards. All at the push of a button.

Like your tape machine, the MSM 2000 has three buttons: Fast Forward, Rewind and Record. The first two allow you to step or scroll through 64 banks of 32 sounds each. Pressing Fast Forward or Rewind will move you through the banks of sounds, one bank at a time. You then access individual sounds through your keyboard or drum machine. In a hurry? Hold either button down and quickly scan through the banks. A single MSM 2000, by simply swaping RAM cartridge interfaces, will operate with your Yamaha DX-7, RX-11 or Roland keyboard. Your favorite sounds are on line all the time.

To save a sound, just push the Record button. Once activated, the Record light comes on telling you that "Memory Protect" is off. Now you may save to or format the bank currently shown in the display window. Once formating or saving is complete, the light will automatically go off and "Memory Protect" is enabled. You may cancel the record function by simply pushing Fast Forward or Rewind.

To insure that all your precious work won't get lost, the MSM 2000 comes standard with automatic memory self protection. This is provided through maintenance free rechargeable batteries. Every time you plug in the MSM 2000, the batteries are automatically recharged.

Only the MSM 2000 can give you the freedom, speed and flexibility you need, on the road or in the studio. To experience the remarkable MSM 2000, contact your favorite professional music dealer or call Forat for the authorized dealer near you.

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Dealer/Distributor Inquiries Invited.

NEWS

Doug Dickey

It is with great sorrow that we have to announce the death of Douglas Finch Dickey, a key figure in the professional audio industry and senior executive at Solid State Logic.

For over ten years Doug played a major role in SSL's development and success; first as head of SSL's professional audio team in the US and subsequently became increasingly involved in product specification and design. He was part of the team responsible for the SSL Stereo Video System, which has become a major influence in the production of audio for stereo television. More recently he helped guide SSL's move into the motion picture industry, and was involved in panel design and software interfaces for SSL's first digital system.

He became vice president for Design Communications in 1983 and moved from Washington DC to SSL's headquarters at Oxford, England in May 1986.

We at *Studio Sound* will remember Doug as being a complete professional with a level of dedication that, even within the audio industy, was quite unique. Many in the UK industry will recall the Digital Information Exchange last year where despite having literally just stepped off a flight from LA, he held an audience in rapt attention presenting views on digital equipment architecture with such humour and authority that we became almost as enthusiastic as he himself. This is how we will remember him.

He died on August 8th 1987, aged 35 after a long illness. We would like to give our sympathies to his family and colleagues.

Staff changes at Studio Sound

This month sees the departure of two long serving members of the *Studio Sound* team who may not be quite so well known to readers but we can assure you, are as every bit as vital as the more visible names.

Debbie Denbigh handles *Studio Sound*'s advertising accounts administration and we have got used to that part of the organisation working almost automatically which is a tribute to her. Debbie is leaving to start a family.

Also leaving is Jacky Pearce (formerly Thompson) who is copy control manager. She has handled with great care and efficiency the advertising copy for *BSE, One To One*, our directory publications and of course *Studio Sound*. Her ability to co-ordinate copy (on time) from all corners of the world has been invaluable. She is also leaving to start a family. We wish them both all the best for the future.

ANT sets up in UK

ANT Telecommunications, manufacturers of *telcom* noise reduction, have set up a UK subsidiary located at 17 Liverpool Road, Slough, Berkshire. While *telcom* will still be manufactured in West Germany, and Audio+Design will still distribute the product, it is expected that the new subsidiary will greatly help in the ordering, backup and servicing aspects.

In brief

- Audio Engineering Associates of Pasadena have announced the opening of MIDI Works, specialising in the sale of MIDI-based audio system products. It's the first LA-based pro-audio company to offer MIDI products in conjunction with a full line of pro-audio gear.
- Ampex have announced their new packaging system for the *400* series analogue and digital tape line. The company claims it will aid rapid product identification.
- Sound Absorption Ltd have received investment from Lancashire Enterprises Ltd to manufacture and market *Coustone*, a new cladding material for sound absorption and noise control.
- Ampex have announced that their pack-out programme with Studer-Revox now extends to the *A807* analogue machine, and will be shipped to buyers with a reel of *Grandmaster 456*.

Studer have also agreed to include *467* digital mastering tape in each ¼ in *820D*.

- New England Digital plan to build a new 60,000 ft² national headquarters centre in Hartford, Vermont. It's expected to house all the company's manufacturing, sales, marketing and administration services, and employ some 300 people.
- UK hire company Hilton Sound have recently taken delivery of two Otari *DTR-900* digital 32-track machines and an AMS *AudioFile*. These are the first Otari digital sales in the UK. Hilton are able to supply the machines, as with other PD format machines, with interface units to make direct transfers from DASH format recorders. Hilton have also opened a fully functioning office in Paris, France, to service the French market. Headed by Serge Lobbe on the sales side and Paul Jarvis on the technical maintenance. Hilton Sound, 6 Rue Ruhmkorff, 75017 Paris, France. Tel: (1) 42 04 68 69.
- Paul Farrah Sound have set up a subsidiary company, Metro Audio Ltd, to distribute and market a range of pro-audio products to be designed and built under the direct control of Paul Farrah Sound.
- John Leeson of Ampex (UK) has been awarded a Fellowship of the Royal Television Society for his outstanding contribution to the industry.

Correction

In last month's issue we carried a short item on the installation of an Amek *APC* at Green Street Studios, New York. As is often the way with the most straightforward of news, it somehow got messed up. Please note that it was not intended to infer that the console or the studio construction were at fault but that the console was now installed in the studio—just as simple as that.

Forthcoming events

October 14th to 17th Broadcast '87, Frankfurt, West Germany.
October 16th to 19th AES 83rd Convention, New York, USA.
October 27th to October 30th AUDIOVIDEX, Rimini Trade Fair, Rimini, Italy.
November 5th to 8th The Institute of Acoustics' Reproduced Sound 3 (in collaboration with the AES, ACSE, EMAS and APRS), Windermere Hydro Hotel, Windermere, UK.
November 16th to 18th Entertainment and the Arts '87, International Conference and Exhibition Centre, Harrogate, UK.
November 16th to November 20th 28th Salon International des Composants Electroniques, Paris, France.
November 23rd to 26th Digital Information Exchange '87, Private Member's Suite, London Zoo, UK.

1988

March 1st to 4th AES 84th Convention. Palais des Congrés, Paris, France.
March 9th to 13th Frankfurt Musik Messe '88, Frankfurt, West Germany.
March 21st to 24th 7th International Conference on Video, Audio and Data Recording, University of York, UK.
April 5th to April 8th Acoustics '88, University of Cambridge, UK.
April 8th to 12th NAB, Las Vegas, USA.
April 25th to 28th Audio Visual '88, Wembley Exhibition Centre, UK.
September 23rd to 27th International Broadcasting Convention '88, Metropole Conference and Exhibition Centre, Brighton, UK.
September 30th to October 9th BBC Radio Show, Earls Court, London, UK.

1989

April 28th to May 2nd NAB, Las Vegas, USA.
June 17 to June 23rd ITS, Montreux, Switzerland.

1990

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

NEWS

Report from AES Japan

In mid-June, the Audio Engineering Society of Japan held the Second AES Regional Convention, with three days of technical seminars and workshops and an exhibition of the latest in Japanese professional audio technology.

Over 1,500 people attended, with a number of participants flying in from overseas. For an international flavour, the Convention committee invited Dr Thomas Stockham, from the University of Utah, and Doug Sax, president of Sheffield Lab Inc, to address the Convention.

The focus was on developments in the field of digital audio technology over the last 10 years, and a large number of seminar topics and technology on display was concerned with the various aspects of digital reproduction.

The two invited guests spoke on the developments of digital audio technology. One full afternoon session was devoted solely to DAT, ranging from tape transportation mechanisms for S-DAT devices to evaluative methods of R-DAT signals, and a practical workshop session considered the question of whether the development of digital technology had resulted in a change in recording techniques.

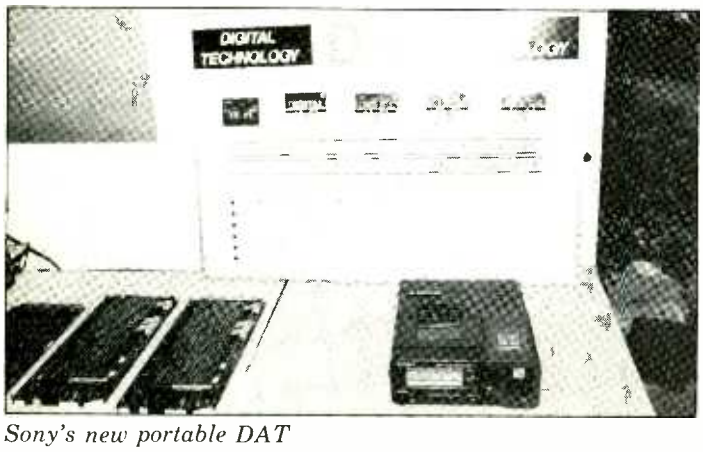
Other seminar topics included:

A session in programme production, hosted predominantly by technical members from NHK (the Japan Broadcasting Corporation) dealing with satellite applications for the production of worldwide news programmes and the transmission of digital stereo programmes.

A signal processing session with representatives from a number of major Japanese audio firms presenting papers on this topic, concerning using signal processing techniques to upgrade loudspeaker phase characteristics and using digital processors to improve automobile sound reproduction systems.

A session concerned with acoustics and sound reinforcement, concentrating on techniques used to evaluate acoustic characteristics, such as those which make use of computer technology or advanced acoustical design systems.

A session on transducers dealing mainly with loudspeaker developments, particularly in the area of loudspeaker design, ranging from a paper on an audio flat panel system to monitoring methods for loudspeakers.



Sony's new portable DAT

Over 30 major companies displayed at the exhibition, professional audio equipment predominating. Many of the company participants saw the show as a means of informing professional audio personnel of the developments made in recent years, particularly in the area of digital technology.

The exhibit range was comprehensive, including such devices as testing and measuring equipment, acoustic analysers, sibilance processors, speaker components, recording mixers, amplifiers, audio monitors, consumer DATs, musical synthesisers, and tape and CD recording media.

Many of the Japanese companies exhibiting have had problems in the last few years with export markets hit hard by the increasing strength of the yen. Companies have been forced to find ways of cutting costs in order to remain competitive. One such company is Fostex, a firm with 15 years experience in the Japanese audio industry.

A company spokesman says that the endaka (yen appreciation) has resulted in efforts by the company to reduce the prices for its products exported to the US and Europe. In addition, the company is hoping to expand its domestic market share in order to counter the slump in exports. The company's presence at the show was one means of indicating its support for the domestic Japanese audio industry.

Fostex's display concentrated on their new range of water-repellant microphones and speakers, designed for use in outside broadcasts and recording. The microphone is impregnated with a special resin to prevent water from seeping in, while still allowing high quality pick-up.

Other Japanese companies have countered the endaka by concentrating on ties with foreign firms, importing material to the Japanese market. The Japanese firm Electori showed products from 19 different companies representing six different countries. The company has been importing products from many of these companies for the last eight to 10 years, and is considering stepping up their imports to compete with the relatively expensive domestic products.

Electori sell a wide variety of audio and video products such as condenser microphones from the West German company Neumann, video projectors from the Belgian firm Barco, and DAD recorders from Internet of Japan. At present, says a company spokesman, Electori is concentrating on products produced by Lexicon (US), Westar (Mitsubishi, US) and Mitsubishi (Japan).

One company that deals with Electori also had an independent booth at the exhibition: dbx first entered the Japanese market in 1971 with noise reduction systems; the company's major line in Japan is now compressors/expanders.

Their display focused on the newly developed RT analyser, which is expected to be officially released in Japan some time in the coming autumn. Company representative Masaya Ishikawa said, "We first announced the analyser at the November AES show (in the US), and this is the first audio show where we have displayed it. The response has been good from show visitors, particularly from loudspeaker manufacturers and sound studios."

The English-based company AMS (Advanced Music Systems) had a large display devoted to its *AudioFile* computer audio storage system. Demonstrations of its editing and recording possibilities appeared popular and company representatives were happy with audience response to their product.

JVC (the Victor Company of Japan Ltd) displayed its *DAS-900* digital audio mastering system, consisting of independent digital audio editors, mixers, and processors, as well as peripheral equipment such as timecode units, interfaces, A/V synchronisers and remote control units. The 2-channel PCM system is aimed at professional recording, editing and mastering, using a variety of media including VHS tapes and CD-ROMs.

The company also had representatives from its Acoustic Design Office, a company division that specialises in acoustical analysis and design of sound facilities worldwide. Recent projects completed by the office include the acoustical design for Moscow's Palace Hall of the Republic of Russia and construction, in collaboration with the UK firm Eastlake Audio, of the London Town House Studio 4 complex. Tatsuo Miyaji of JVC presented a paper in the acoustics session, regarding a computer-based design and analysis program for room acoustics.

JVC was one of a number of Japanese companies that were exhibiting their DAT products for the consumer market. In March, JVC released its *XD-Z1100*, a digital audio tape deck for non-professional use. The DAT recorder is unusual in that it can operate at half-speed allowing up to 240 minutes of use from a 120-minute tape.

Sony's portable DAT attracted a lot of attention from show attendees. The prototype on display weighed only 4 kg and measured just 205×78×263 mm (whd), making it the smallest announced to date. A company spokesman says that, once released, the yet-to-be-named device is expected to lead to a surge in market demand for DAT tapes and smaller DAT devices. **Vicki Hyde**

D&R Dayner Series Console

Totally modular in-line, split in/out, monitor modules or patchpanels allow unlimited expandability with unparalleled compactness. Individual led metering, 4 band eq. with sweepable mids, and 8 aux busses are all standard. The DAYNER has a welded steel chassis and a superb styling.

8 fully floating subgroups: allow routing any input (or group) to any multitrack channel(s) without repatching. In addition, since any I/O module can become a subgroup master, subgroups can be equalized, fed to auxiliaries, muted or grouped.

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Precision engineered and manufactured by D&R Electronica: recognized the world over as a leader in professional audio. Priced to make value an understatement.

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Call or write to D&R USA, 1720 Chip N Dale Drive, Arlington, TX 76012, Tel. (817) 548-1677, tlx 758666, or contact one of our distributors.

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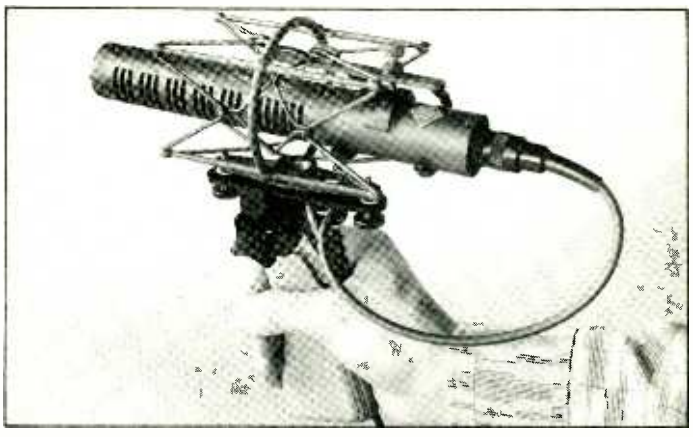
NEWS

Studiomaster IDP1

The Studiomaster *IDP1* Intelligent Dynamics Processor is a major departure for the company and is the first product from their new digital design department. The *IDP1* is a 1U 19 in rackmount unit with two identical independent channels of dynamics processing that may be stereo linked. Available processing includes compressor, expander, limiter, noise gate, MIDI-triggered gating and ducking, manual and MIDI-triggered auto-fade, MIDI pitch bend fading and MIDI-controlled amplitude. Each channel also has an extra expander function that may be used in conjunction with the main processing to reduce unwanted signal noise. Control of the parameters is based around a one parameter/one key design that the manufacturers feel to be easier to use than multilayered control software.

In the compressor mode the *IDP1* has a Delay parameter that Studiomaster say can be used to drastically reduce LF distortion when compressing.

Studiomaster, Studiomaster House, Chaul End Lane, Luton, Beds LU4 8EZ, UK. Tel: 0582 570370.
USA: Studiomaster Inc, 1340-G Dynamics Street, Anaheim, CA 92806. Tel: (714) 524-2227.



Neumann stereo microphone

Neumann have recently introduced a completely new microphone in the form of the *RSM 190i*, a stereo condenser shotgun mic with remote controllable directional characteristic. Neumann say that this is the first mic of its type available. It contains two separate capsule systems that deliver a mid and side signal, which are then available at the outputs of the system matrix amplifier as mid/side or left/right information. The mic comes with foam windshield, matrix amplifier, connecting cables and an aluminium case to contain the complete system.

Neumann see applications for the mic where it is required to make stereo recordings in the open air especially in the cases where there may be a high level of ambient noise.

Georg Neumann GmbH, Charlottenstrasse 3, D-1000 Berlin 61, Postfach 610469, (West Germany). Tel: (030) 2 59 93-0.
UK: FWO Bauch Ltd, 49 Theobald Street, Borehamwood, Herts WD6 4RZ. Tel: 01-953 0091.
USA: Gotham Audio Corporation, 1790 Broadway, New York, NY 10019-1412. Tel: (212) 765-3410.

Symetrix noise reduction

Symetrix have introduced a new version of the 511 single-ended noise reduction unit to be known as the *511A*. Symetrix claim up to 30 dB of noise reduction being attainable with any source using high frequency dynamic filtering and downward expansion. The unit also includes an 18 dB/octave rumble filter. Fully independent 2-channel unit with adjustable front panel control of threshold, release and ratio for expander section and adjustable threshold for dynamic filter. Sections individually switchable in/out and stereo link capability.

Symetrix Inc, 4211 24th Avenue West, Seattle WA 98199, USA. Tel: (206) 282-2555.
UK: Sound Technology plc, 6 Letchworth Business Centre, Avenue One, Letchworth, Herts SG6 2HR. Tel: 0462 675675.

SSM VCA in production

Solid State Micro Technology for Music Inc has announced availability of the *SSM 2014* operational voltage controlled element. The device can be configured as a standard VCA using standard current input/current output or as differential input/differential output, permitting a wide range of applications that SSM claim to have been previously unavailable from single VCAs.

The *SSM 2014* can be operated as full class A or class A/B depending on user preference. In demanding applications a simple level detector may be used to switch the device from class A/B to A above a predetermined level. Claimed specification for the device features 116 dB dynamic range in class A/B, 0.01% distortion and low control feedthrough.

Solid State Micro Technology For Music Inc, 2076 B Walsh Avenue, Santa Clara, CA 95050, USA. Tel: (408) 727-0917. Telex: 171189.

Soundtracs MX series

The *MX* series is a new range of consoles designed principally for touring rental companies. Available in three mainframe sizes of 40, 32 and 24 inputs the *MX* series is available with optional input metering and stereo inputs. Construction is extruded aluminium and steel for the chassis which the manufacturers describe as being light but rugged.

The input module has four band EQ with two sweepable mid ranges and six dedicated aux sends without using concentric knobs. Groups have an 8×4 matrix and eight dedicated effects returns. There is provision on end cheeks for use of *Littlites* for lighting.

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

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

In brief

- Ampex has introduced an 80 min play length to its line of *467* U-matic digital audio cassettes. The 467 series now includes 30, 60, 75 and 80 min lengths.
- Barcus-Berry Electronics have added a single-channel version of their BBE system for vocal and acoustic instrument use. The *BBE 401* is equipped with both mic and line level inputs and adjustable controls for gain, lo-contour and definition with hi-contour LED indication of processing. Barcus-Berry Electronics Inc, 5500 Bolsa Avenue, Suite 245, Huntingdon Beach, CA 92649, USA. Tel: (714) 897 6766. UK: Shuttlesound Ltd, Unit 15, Osiers Estate, Osiers Road, London SW18 1EJ. Tel: 01-871 0966.
- Stepp have announced a software update for the *DG1*. The update includes new strum software for plastic plectra; three new modes enabling trigger and pull-off options to be understood via MIDI; and new dynamics tables to allow compatibility with all MIDI synths. Most important result of these is perhaps the fact that metal picks are no longer necessary.
- The Clarity *XLV* effects automation interface that was originally designed for operation with the Lexicon *224XL* and *480L* has been updated to enable automation of the AMS *RMX-16*, Quantec *Room Simulator* and the Yamaha *REV-1*.
- Applied Research & Technology (ART) have announced an update to the *ProVerb* digital reverb and effects unit in the form of battery memory back-up. A five year lifespan lithium battery means that the *ProVerb* can now be programmed with, and memorise up to, 100 MIDI-assignable presets without constant resetting. Battery back-up can be retrofitted to existing units and will be installed in future units as an optional extra.

NEWS

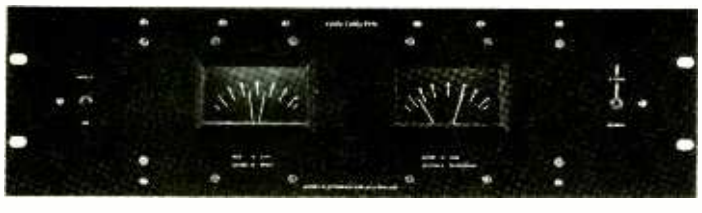
Surrey Twin Twin

Surrey Electronics have recently made available a dual movement 2-channel PPM system that they manufacture under licence from the BBC. This is a rack mount design that comprises the two meters and two *PPM9* boards to give simultaneous monitoring of A/B on red and green pointers and M/S on white and yellow pointers. The manufacturers claim that the *Twin Twin* PPM will provide more complete information on a stereo signal than a phase meter does. Audio inputs are *XLR*-type for each channel.

The *PPM9* board is a 2-channel PPM driver that may be switched remotely between left/right and sum/difference operation with a further S+20 dB mode for precision centering of mono sources. The board is small enough to fit within the profile of twin movements and features transformerless electronic line balance with DC isolation, RF filtering and input protection. The logarithmic law is defined by software on a single chip and also offers programs to aid testing and alignment. This is also claimed to make the unit totally stable and drift-free. A further single meter unit is available in a box form and is known as the Illuminated Stereo Twin Meter Box.

Surrey Electronics Ltd, The Forge, Lucks Green, Cranleigh, Surrey GU6 7BG, UK. Tel: 0483 275997.

(European distribution through appointed distributors. US distribution direct from manufacturer.)



Adams-Smith 2600 events controller

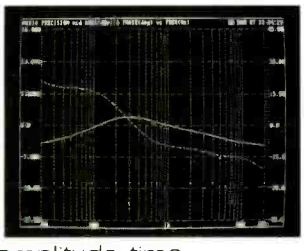
The Adams-Smith *2600 CC* Compact Controller and the *2600 A/V* computerised editor can now control the model *2600 EE* Event Executive module. This can provide the *2600* series with on/off triggering of devices such as digital delays, cart machines and cueing devices. The number, duration and timing are user-adjustable. The *EE* module provides 12 momentary outputs, six additional momentary overlap outputs and six continuous outputs, all adjustable to $^{1}/_{1000}$th frame accuracy. It may also store up to 120 event addresses in memory.

Adams-Smith have also released details of a new software package to be sold as an option for the model *2600 SI* Serial Interface module allowing it to be paired with a model *2600 TS* Tape Synchroniser. This will allow all audio transport functions to be controlled from a *CMX*-type video editor including synchronisation, cueing frame accurate punch in/out. Adding further *SY-SI* pairs will allow control of up to five separate transports.

Adams-Smith, 34 Rower 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 410104.

THE ULTIMATE AUDIO DESIGN LAB TOOL



COMPREHENSIVE AND CAPABLE:

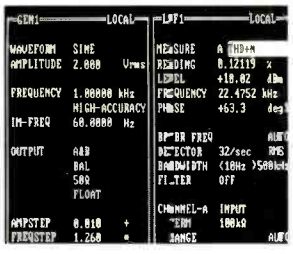
System One measures:

- harmonic, intermodulation (including dynamic), quantization distortion;
- wideband or selective amplitude and noise;
- phase;
- frequency;
- wow and flutter;
- dc Volts and resistance.

Industry-leading specs such as:

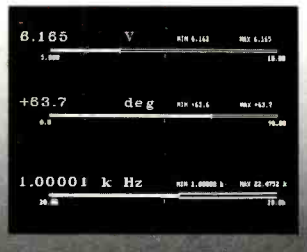
- 0.001% distortion;
- 1.5 microvolts noise;
- 0.05 dB flatness;
- generator output levels from 26 Volts to 10 microvolts.

One keystroke runs and graphs a test in seconds, measuring one or two variables versus frequency, amplitude, time.



Use mouse or arrow keys with on-screen panels to **make impromptu changes** in impedances, detectors, filters, levels, frequencies - or name and **save a complete setup to disk,** recall it with mouse or a few keystrokes.

One keystroke displays analog bargraphs for tweaks; as many as three parameters measured and, displayed simultaneously.



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NEWS

Soundtracs ERIC production console

Soundtracs have recently introduced the *ERIC* console for which preliminary details are available. It is a 24-bus design in a split configuration with mainframe sizes of 32, 40 and 48 units. The design priority is a high analogue specification. Claimed specs include crosstalk between channels or monitors better than −74 dB at 20 kHz and mix noise with 56 inputs routed better than −80 dB (+4 dBm). The console has balanced buses.

Each of the 24 groups also has line inputs enabling these to be used as additional inputs during mixdown. The monitor sections each have two line inputs for two 24-track tape machines. These may be used to select up to 24 individual tracks from the 48 available.

Routing is microprocessor-controlled with up to 100 patches memory capacity, although further patches may be stored and recalled from disk. Muting on inputs, subgroups, monitors, aux sends and masters is also under digital control. There is a record ready feature that alters the status of the monitors in conjunction with the console tape machine controls allowing automated 'drop-ins'.

The channel EQ is 4-band parametric with variable high pass filter, which is also used on the groups and monitors. The eight aux sends on the inputs may be used with, or separate to, the eight aux sends on the groups. There are 16 aux masters. The console includes a modular plug-in patchbay.

Three pre-production *ERIC* consoles are undergoing field trials currently with a view to full production in November.

Soundtracs plc, 91 Ewell Road, Surbiton, Surrey KT6 6AH, UK. Tel: 01-399 3392. Telex: 8951073.
USA: AKG Acoustics Inc, 77 Selleck Street, Stamford, CT 06902. Tel: (203) 348-2121.

Shiva computer-assisted mixing

The *Shiva* computer-assisted mixing system is a mix automation system that allows level control of up to 32 channels. The system consists of a rack mountable audio processor, which is connected to an existing console normally through the insert points. This is then linked to a screen and keyboard that may be up to 300 m away. Mixes are set up in realtime using a mouse or a digital fader and these levels are stored. The memories may be recalled in sequence or at random with the ability to set the speed of level transition between the memories from 00.01 to 99.99 s. Memories may also be triggered by timecode with the addition of the timecode module.

Shiva also has facilities for control of routing in consoles able to accept external commands and with an optional software module the system can receive and transmit MIDI information including the possibility to cue mix memories against positions in songs from MIDI data. A software mode in the system known as Patch Board allows a memory to trigger any one of up to 32 output events. There is also provision for the controlling of Shiva from General Purpose Inputs that will allow the user to set up the system to meet his needs.

The basic system is configured with 16 channels, eight input event and eight output events with expansion possibilities up to 32 channels and events with options of hard disk, MIDI, balancing and timecode reading.

PSR Software Ltd, 36 Ashby Road, Kegworth, Derby DE7 2DH, UK. Tel: 05097 4545.
UK and worldwide: G2 Systems, 5 Mead Lane, Farnham, Surrey GU9 7DY. Tel: 0252 712525.

MUSIC NEWS

This year's British Music Fair featured only a handful of new products not seen at the Frankfurt, APRS or NAMM shows, but those that were introduced were generally highly impressive. The Fair was opened by Trevor Horn and it used the entire National Hall as well as the Olympia 2 building, representing a virtual doubling in size compared to last year.

Akai

Akai's *EVI* (Electronic Valve Instrument) and *EWI* (Electronic Wind Instrument) are based on Nyle Steiner's controllers for the trumpet and saxophone player. Each connects via a proprietary system to a rack mounted monophonic digital synthesiser with a MIDI output for connection to other synths or samplers, if even more realistic imitation is desired.

Expression can be produced with the tongue, lips or fingers and octave switching is available.

The *ADR15* is a sampling drum machine/sequencer designed by Roger Linn that offers powerful drum and MIDI compositional facilities. Akai's *S900* Sampler now has additional software on disk for Crossfade Looping, which improves disk capacity, plus a hard disk option. Akai's audio effects line now includes a small programmable mixer, equaliser and digital reverb plus large audio/video programmable patchbays.

Casio

Casio's *FZ-1* sampling synthesiser is now available and the sample library is increasing. Surpisingly, Casio did not launch a rack mount version at the BMF, preferring to premier their new range of MIDI guitars. The inexpensive *DG20* has a plastic body and strings plus built-in synth, speakers and drum machine, however, its MIDI output allows it to play or program music with basic guitar phrasing.

The *MG500* and *MG510* are professional guitar controllers with program change, guitar synth mix and LED display facilities.

Cheetah

Previously dedicated to home computer music accessories, Cheetah now market three MIDI mother keyboards including a 7-octave, velocity and pressure sensitive model for under £500. They also have a 6-voice multitimbral DCO synthesiser module, a sampled drum machine and a drum pad set at similarly unrealistic prices.

UK: Cheetah Marketing, Norbury House, Norbury Road, Fairwater, Cardiff CF5 3AS. Tel: 0222 555525.

Elka

Elka's range of digital FM synthesisers and modules are now joined by an 18-note dynamic MIDI pedalboard, two drum machines, a powerful 88-note MIDI mother keyboard with sequencer, and several mixers and mixer amplifiers.

Farfisa

Farfisa are now UK importers for the French Digigram *MC5*, a polyphonic MIDI composer with an Epson-compatible printer port to score out music. Capacity is 11,000 notes with 12 tracks, chaining and resolution down to ¼₆th triplets.

Korg

The *DSS-1* sampler/synthesiser now has a 1 Mbyte memory expansion available, while Korg US have developed a hard disk interface for instant access to 99 sets of four 'Systems' of synthesised and sampled sounds. A 16-voice, 16-output, 4-channel rack version, the *DSM-1*, is forthcoming.

Korg's latest digital piano is the improved *SG-1D* sampled grand, while the *DRM-1* is a new percussion sound module with sequencer, trigger-to-MIDI conversion from tape signals and pads, 16 'kit' memories, remote control and compatibility with existing *DDD-1* and *DDD-5* sound memory cards in one 19 in rack unit.

Roland

Roland's successful *D50* synth is now available in a *D550* module version. The *MT-32*, using the same LA Synthesis system, is a budget 8-note multitimbral expander with 28 PCM sampled drum sounds and built-in digital reverb. The *S-550* is the new rack version of the *S50* sampler, while the *Maestro S* is a software package giving the *S50* powerful sequencing facilities.

The *S-220* is a budget rack sampler based on the *S10*, the *TR-626* is a new mid-price digital drum machine with 30 sounds and multiple outputs, and the *VP-70* voice processor is a 4-voice pitch shifter or pitch-to-MIDI converter for voice or wind instruments.

The Micro Studio series adds the *RPD-10* panning delay, and also introduced is the *RV-2* digital reverb foot pedal. For the guitarist, the *GP-70* is a programmable multi-effects unit with manual, foot switch or MIDI patch change.

Yamaha

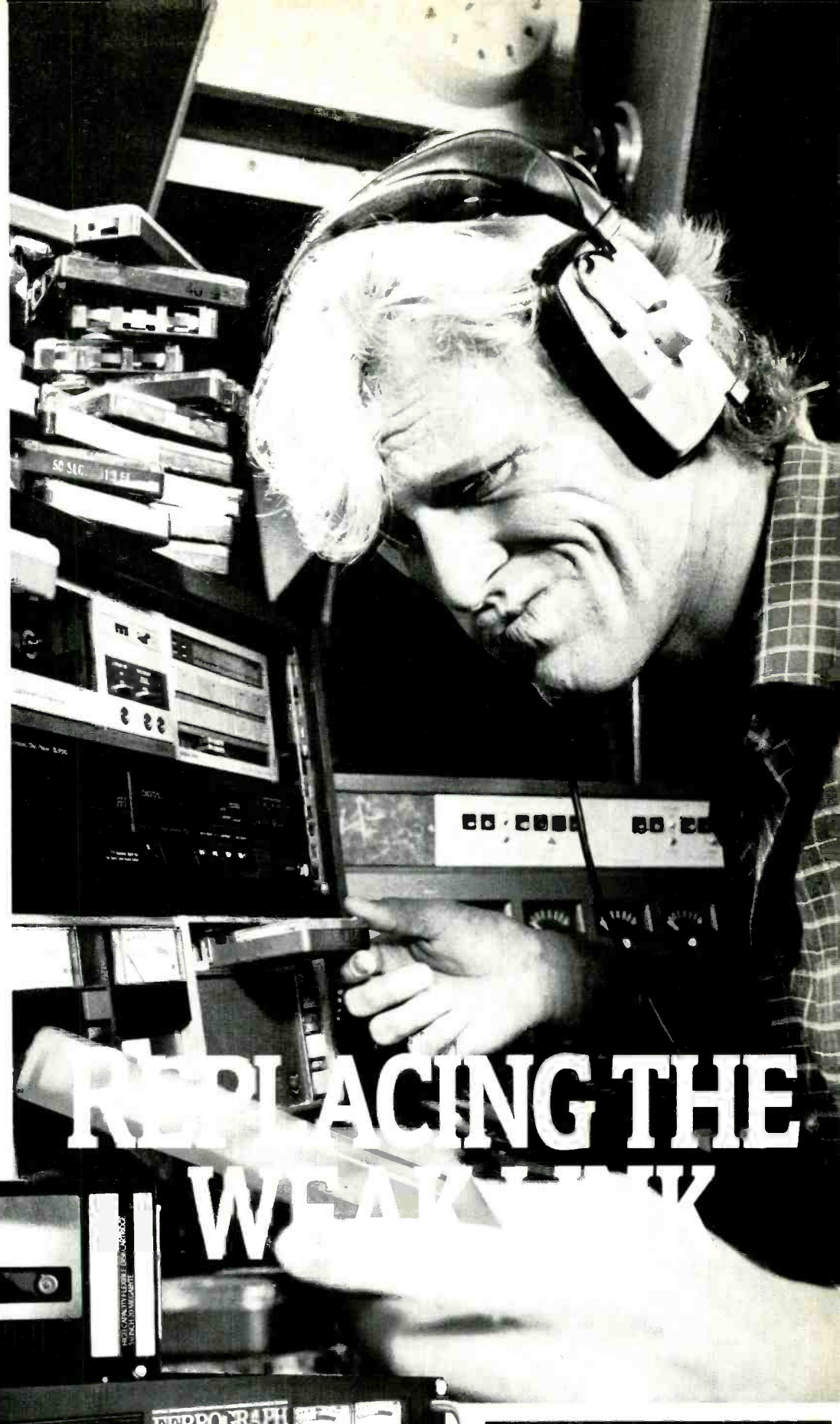
Yamaha's *REX50* is a budget digital reverb with distortion programs, while the new *MSS-1* synchroniser was shown in conjunction with the latest *QX3* sequencer.

On the synth front there were the current *DX7MkIID* and *DX7MkIIFD* models, a new *DX7MkIIS*, which lacks their split and layer capabilities, and the *TX802*, a rackmounting *IID* with slightly different performance parameters due to its multitimbral capability.

The *WX7* wind controller was shown linked to a *TX81Z* synth module but its battery pack with MIDI output can control any MIDI unit. In the piano hall at the BMF, Yamaha showed a floppy disk-driven upright player piano with built-in sequencer and infra-red remote control.

Yamaha TX802 tone generator

Casio MG500 digital guitar



Ask busy, professional broadcasters what they regard as the weak link in the audio chain and the answer will be NAB cartridges.

In all its years of use this workhorse of broadcasting has changed little. However, at last, there is a viable alternative - digital audio cartridges.

The Ferrograph Series 9 Magnetic digital cartridge recorder records high quality digital audio onto removable disk cartridges. The 5¼ inch flexible, magnetic disk, enclosed in a robust rigid housing, has a storage capacity of 8 minutes of stereo. Any part of the disk can be instantly accessed and cued, allowing multiple cuts to be recorded on one disk.

Playback is similar to conventional cartridge systems - i.e. START, STOP and CUE. But, in addition, there are editing features to allow 'topping and tailing' of recorded cues and the creation of loops during the preparation of new cartridges.

Cues are selected by the CUE button and the cue name is shown on the LCD display, together with a countdown.

Multiple cues on one disk mean less players are required in the studio. The cartridges are much smaller than NAB cartridges and can be used many more times. Audio quality and reliability of the digital system are far superior to analogue systems.

There's no need for broadcasters to worry about the weak link anymore now they know they can lay their hands on a more reliable, high quality and cost effective system.

And, as we're broadcasting the fact that a replacement is here, this is an ideal time to contact us and ask for a demonstration of the Ferrograph Series 9.

FERROGRAPH
Series 9
Sounds simply perfect

Ferrograph, Unit 21, Royal Industrial Estate, Jarrow, Tyne & Wear NE32 3HR. Tel: (091) 489 3092. Telex: 537227 NEFERO.

LETTERS

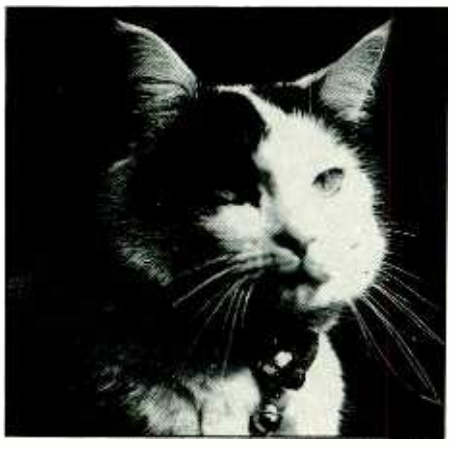
I read with interest the Barry Fox article regarding the legal battle in California between Dolby Labs Inc and Thomas Dolby. I thought that you may be interested to hear about our 10-year-old cat called Dolby. She is very quiet and much admired.

Perhaps in view of the legal situation in California and the manner in which Dolby Labs Inc seem to try and protect their name (even on non-electronic items!) you could put our minds at rest on our cat's legal position.

Peter Thompson, Studio AVP, 82 Clifton Hill, Abbey Road, London NW8 0JT, UK.

PS. Dolby's insurance certificate enclosed just in case!

Barry Fox's considered advice is 'Ssshh'.



In his letter to *Studio Sound* (June) Martin Goldman is quite right to ask if he is "missing something" in his theory about the tape levy concept. He is, in fact, missing the point.

Home taping is theft, and what Mr Goldman fails to take into account is that 90% of all blank tapes sold are used for illegally recording music. Surely Mr Goldman doesn't condone the theft of other people's property? He does not seem to realise that the reason blank tapes are as cheap as they are, both for the type of use he puts them to and for the use of others, is simply because a volume market has been developed on the back of copyright infringement—people illegally taping music at home.

Mr Goldman suggests increasing the price of records and compact discs as an alternative to a tape levy. But even a small increase in price will only deter people further from buying records and CDs, creating another incentive for the illegal home taping game. Already, six times more music is recorded than bought, inflicting a heavy loss on the record manufacturers and retailers. Payment for use of copyright is vital for the continued health of an industry that creates intellectual property. Home taping deprives authors, composers and producers of the opportunity to receive payment for their work. The removal of this commercial incentive seriously impairs the flow of creative energy for which this country is noted. The introduction of a royalty on blank tape and audio hardware will provide a fair and practical solution to the problem.

Sarah Davis, Press & PR manager, BPI, Roxburghe House, 273/287 Regent Street, London W1R 7PB, UK.

Sarah Davis of the BPI states, as fact, that I am missing the point; that home taping is theft. I am aware that legally this *is* the case. Yet a record buyer who tapes a recording that they have bought, so a cassette version can be enjoyed in a car, or in a hotel room, is not morally committing theft. Arguably they should buy a pre-recorded cassette but those produced by record companies are often of poor quality compared to those made domestically. Are cases such as these included in the "90% of all blank tapes" used illegally and in the "6 times more music" recorded than bought?

Presumably the figures quoted are from a BPI sponsored survey. To my knowledge this has not been made available for public consideration. It would be interesting to know how it was conducted and what questions were asked. For instance, if they were posed outside a record shop the overall result may be different to that conducted near a petrol station or supermarket.

Audio cassettes have improved in quality over the years, in parallel with vinyl. Both have remained relatively cheap. To state that cassettes have done so solely "on the back of copyright infringement" ignores any advance in technical processes, or the mass use for applications other than pirating.

In the event of a tape levy being introduced what equitable solution does the BPI propose for the legitimate mass user—cassette duplicators—who will be forced to pay the levy on incoming stock? In a world of intense competition capital will be tied up, in the same way as with VAT now, until the rebate is received. Notably, from October 1987 the structure of VAT liability is to change and will be paid only on bills that have been settled. The Government has acknowledged the unfairness in VAT. Legally a tape levy will not be theft. And morally? Do the BPI propose to compensate bulk cassette users for the additional funding demanded and for the administrative costs?

Sarah Davis states that a small increase in the price of discs and CDs will reduce sales. No account is made of the enhanced value such a recording will have for the buyer, that of the licence to copy for one's own private use. It is also worthy of consideration in the R-DAT debate. The BPI consider this another great threat to the copyright owners, yet the initial cost of R-DAT hardware coupled with the need to maintain consistent high quality of the software, and so its cost, appear to make this an uneconomic equation. Yet there is a proposal to introduce a notch filter on CDs, devaluing the superlative reproduction available. Without experiencing a notch-filtered CD I am dependent upon other writers' views and hearing, but this seems more likely to deter buyers than a few pence on the price of a CD.

I have no wish to deny just recompense for intellectual rights in recorded works. I am deeply appreciative of aspects of the recording industry, both professionally and as personal entertainment. Friends and associates are writers and performers of music, and variously employed within the industry.

It will be of interest to hear from your readers' experience in those European countries already operating a tape levy.

Martin Goldman, Ad Air, 16 Red Hill Lane, Great Shelford, Cambridge CB2 5JR, UK.

In the July edition of *Studio Sound*, Barry Fox referred to Ray Dolby's lecture to the BBC's Institute of Broadcast Sound.

I should like to make it clear that the Institute draws its membership from more than 60 different broadcasting organisations and support houses, both in the UK and abroad.

Whilst we enjoy the co-operation and support of the BBC and the IBA, along with many manufacturers of broadcast audio equipment, we remain firmly independent of them all.

We were delighted and honoured that Dr Dolby had agreed to be the guest speaker at our 10th anniversary meeting. At the end of the evening he was made a Fellow of the Institute for his outstanding services to the world of audio.

Pete Wisbey, Chairman, IBS, 27 Old Gloucester Street, London WC1N 3XX, UK.

It is difficult to allow the contribution of Mike Skeet (MS Technique) in the June issue of *Studio Sound* to go without comment.

It is clearly wrong to consider M/S only in terms of obsolete technology, as evidenced during the presentation of Blumlein's provisional specification, dated December 14th, 1931 and the complete specification 394 325 filed November 10th, 1933. The advent of the cardioid characteristic, whose polar diagram is the summing of a figure-of-eight and omnidirectional microphone of equal sensitivity.

In 1987 without special matrixing arrangements, a leftward facing AKG *460 B*, fitted with an ultra-linear capsule *ULS/61*, a similar rightward facing AKG *460 B* will provide the S (side signals), left channel and right channel respectively. With an M (mid) signal being provided by an AKG *460 B* fitted with a similar capsule *ULS/61*, cardioid, or a *ULS/62* omnidirectional to choice. This signal panpotted centrally, with the ability to choose the relative phase and amount of contribution will result in truly outstanding performance with great versatility. Thus bringing modern technology to bear on Blumlein's extraordinary originality, without the use of special equipment. The array should be arranged carefully to reduce diffraction and interference effects.

Ted Nurse, Whornes Cottage, Bondend, Upton-St-Leonards, Gloucester GL4 8EG, UK.

How to deliver precisely the mixes you want, exactly where you want them.

To the audience, it's one hall. To you, it's a collection of many separate locations. Each with its own unique requirements for level, EQ and output mix.

Usable outputs

Lots of them: that's what the job demands. DDA's carefully thought out design includes 21 usable outputs in the S Series PA. In addition to the normal Master outputs, there's a 4 Group x 4 Way Matrix and 8 Auxiliary sends with individual 3 band EQ. And a separate Mono output with its own level control. Returns are equally plentiful: in addition to inserts on every input channel and group and on the four Aux sends, there are four Aux Returns with 3 stage EQ. With that kind of flexibility, you can create a precisely tailored mix for everyone from the lighting crew to the orchestra to the backstage area.

Impeccable audio performance

At DDA, cost-effective designs don't force you to pay a price in sound quality. Meticulous attention to every detail of S Series circuitry maintains the high standards set by our world-class D Series consoles. Input channel crosstalk is typically better than −80dBv, line level noise is −84dBv, and other specs are equally outstanding. From the main house to the balcony to the stage, the sound is clear, clean and accurate.

4 Group x 4 Matix Output Section

3 Band EQ with sweepable mid-range on all Aux and Foldback Sends

Flexible Aux and Foldback routing on each input channel

Flexibility and reliability

Because everyone has a different way of working, because each venue has different requirements, S Series consoles come in a range of sizes. Choose 16, 24, or 32 input frames and load the right number of channels for your job. The S Series PA is designed to go from a simple spoken word production one night to a full ensemble or rock band the next.

DDA's stringent quality control includes a complete "burn-in" of each console. We won't ship an S Series console until we're satisfied that it's ready to perform any time. And every time.

Discover a better alternative

For the name of the DDA S Series dealer nearest you, contact:

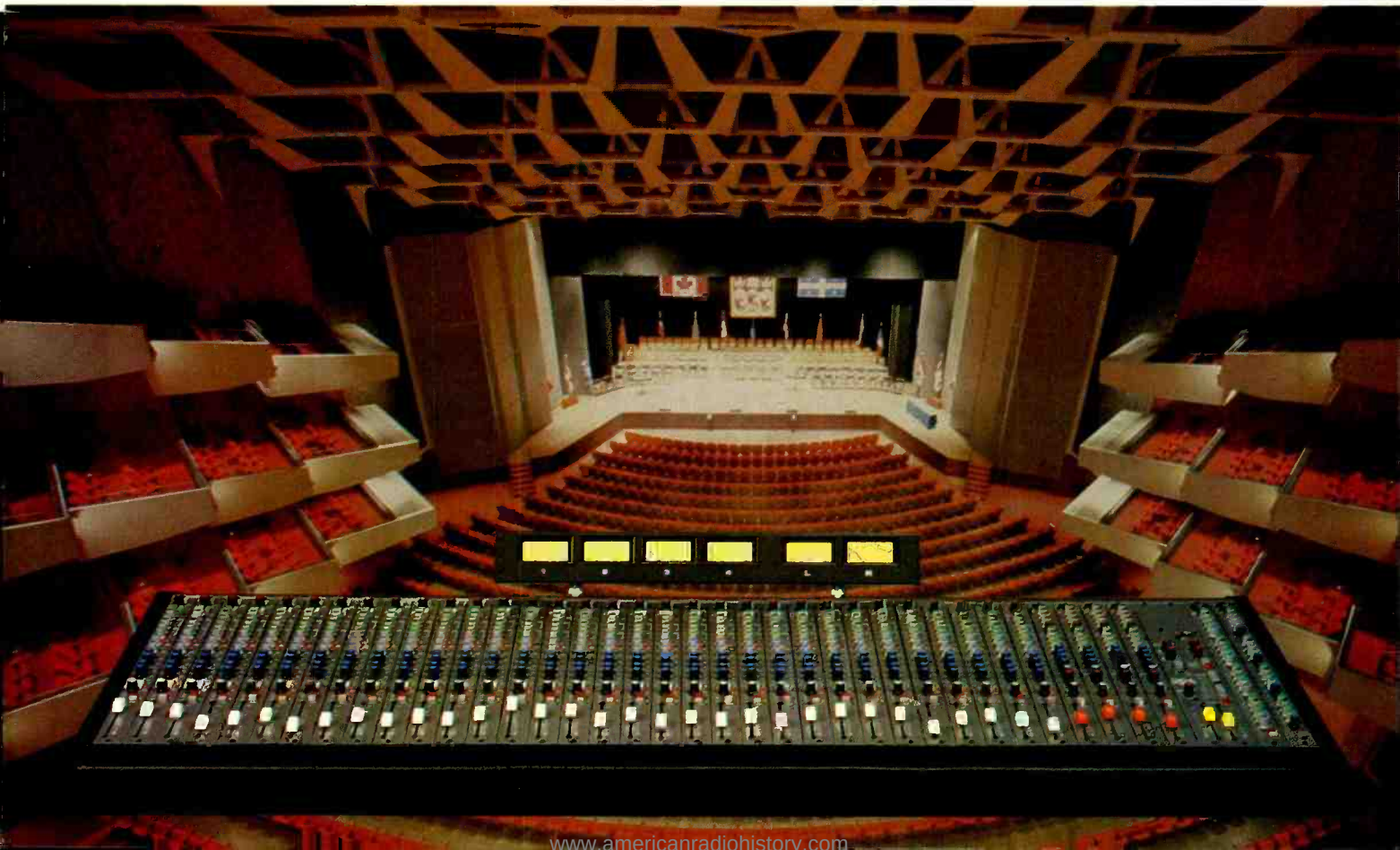
DDA Limited,
Unit #1, Inwood Business Park,
Whitton Road, Hounslow,
Middlesex TW3 2EB.
Tel: 01 570 7161
Telex: 932905 Fax: 01 577 3677

Discover the difference DDA sound quality, precise control and ergonomic design can make.

DDA S SERIES PA

A Klark-Teknik Company

In the USA write to:
Klark-Teknik Electronics Inc., 30B Banfi Plaza North, Farmingdale, NY 11735 Tel: (516) 249 3660 Fax: (516) 420 1863.



LETTERS

Readers of my articles in *Studio Sound* will be aware of the extraordinary difficulties I have encountered in finding studios suitable for recording the spoken word. Here is another extraordinary instalment in this continuing saga.

Last month, in pursuit of locations in the north of England, I addressed letters to 20 studios advertising themselves in the *Yellow Pages* under 'Recording Services–Sound'. Purposely, I spread the net quite widely, taking in Tyne & Wear, Durham, Cleveland and West Yorkshire. My demands were quite straightforward: adequate soundproofing, decent equipment, a competent engineer and, as a final plea prompted by ugly recollections, an absence of squalor and dirt.

Not much to ask for, you may think but of the 20 letters sent out, one was returned marked 'gone away', and only two others brought a reply. The first of those two offerings proved to be totally unsatisfactory, and I have yet to investigate the second. But what really perplexes me is why there was no response at all from the other 17. Could it be that they just did not bother to reply? Or were they, perhaps, worried lest they should find themselves the subject matter of another article in *Studio Sound*? I remain mystified.

Peter Orr, 46 Wooburn Manor Park, Wooburn Green, High Wycombe, Bucks HP10 0ES, UK.

Your editorial (January, *Studio Sound*) offers some telling points about the importance of maintenance capability. It suggests that studios which offer well-maintained, properly calibrated equipment can–or should–find this a significant competitive advantage in the bid for more and better business.

In the APRS we have always felt that it is essential for any serious commercially-based recording studio to have adequate maintenance capability available from its own engineering staff, and this is closely investigated when we consider applications from studios who wish to becoming members of the association. Studios who have satisfied our criteria can feel justifiably proud of their professional rating; we encourage them to use the APRS logo in their promotion, and we hope that this will continue to offer them competitive advantage.

Although we are actively seeking further ways in which to help members improve their marketing performance, we shall continue to regard maintenance capability as the fundamental element in professionalism, and to encourage the customers to insist on this capability when they place their business.

Yours faithfully, Ken Townsend, Chairman, APRS, 163a High Street, Rickmansworth, Herts WD3 1AY, UK.

May I, as a professional in the audio sphere, offer a point of information to your readers who collectively are responsible for the flow of large amounts of money to Japan in exchange for that country's audio exports?

I have read in the June 11th edition of *New Scientist* that Japan intends to harvest 825 minke whales and 50 sperm whales each year until the year 2000. Japan exempts itself from the International Whaling Commission's moratorium by claiming that the killing is justified for scientific research. This 'research whaling' is a fraud, say conservationists. Nakasone, the Japanese Prime Minister says of the quota: "My honest feeling is that this number is too large." Iceland's and South Korea's whaling activities would cease were it not for the Japanese market for whale products.

Very little is known about the populations of the whales affected save that a dramatic decline in numbers of minke whales has been observed. Incidentally, Norway too plans to introduce 'scientific whaling' next year.

I trust that some of us who feel for the plight of whales may be able to exert some small but valuable influence when the opportunity presents itself in our working lives.

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AES CONVENTION PREVIEW

The 83rd Convention of the Audio Engineering Society will be held in New York October 16, 17 18 and 19, 1987. The venues will be the New York Hilton Hotel and the New York Sheraton Centre. As is normal there will be a full programme of technical papers and workshop sessions in addition to the largest ever associated exhibition. We have compiled an exhibition preview based upon information that was available to us at the time of writing.

Amber's 5500 audio measurement system and Audiocheck software package

Studio Sound will be present at the Hilton Hotel where not only will we have current issues of the magazine, but also our sister publications, *Broadcast Systems Engineering* and *One to One*. There will also be information available on our developments in the US.

A

• **AB International:** range of amplifiers and sound reinforcement equipment. • **ACO Pacific:** will introduce a new line of omni-directional mics with frequency response of 20 to 20 kHz and 17 dB noise floor. Also on show will be the *ACM 48UP* cardoid. • **Adams-Smith:** will be highlighting the *C:Sound* audio-graphic editing system, now a standard feature for the *2600 A/V* editor. Up to one hour of sound on three separate audio channels can be digitally sampled, and any two can be displayed together on the monitor. Using techniques similar to video slow motion/still frame the operator can locate sync and edit record points with sub-frame accuracy. *C:Sound* appears on main screen of editor and is controlled by special function keys from the keyboard. Also on show will be a full MIDI software package with the *Zeta-Three* timecode and MIDI synchroniser. • **Advanced Music Systems/Calrec:** *AudioFile* will be on display along with the latest software updates, incorporating full version of the new cut and splice editing page, reel-rocking on edit points, storage extension of seven hours, eight simultaneous outputs, sync recording, punch-in/out and direct machine control. Also on show will be the complete range of digital audio processors, the range of Calrec microphones and the *Minimixer* portable broadcast mixer. • **Agfa-Gevaert:** complete range of magnetic products, including the *PEM 291D* audio digital tape, available in ¼, ½ and 1 in sizes, plus *PEM* mastering tapes, *PEM 526* bin loop tape, *PE 649/949* cassettes and *PER 528/368* broadcast tapes. • **Aircraft Digital Music Library:** large library of stock music, representing a wide variety of styles and tastes. • **AKG Acoustics:** will have on show their full range of microphones, preamps and sound processors including the *C414B-ULS* mic with 25 mm diaphragm, *C460EB* preamp with *ULS* Ultra Linear and *CX* Remote Series capsules, the *ADR 68K* 16-bit computer-controlled sound processor, *C562 BL* boundary layer mic, *TDU 8000* time delay unit and the *K240DF* studio monitor headphones. See also Soundtracs entry. • **Alesis:** will be showing their drum machine, sequencer, Microgate, Micro enhancer and Micro limiter and reverb products. • **Allen & Heath Brenell:** *CMPTE* software/hardware package for controlling *CMC* line of mixers; operational *CMC* doing a mixdown under microprocessor control from 8-track tape machine and MIDI song pointer; first showing of *Sigma* with new *M470* I/O modules allowing two inputs to be mixed simultaneously and having 5-band EQ; first US showing of *Sigma* LED metering options (on small frame version) and 24-channel mechanical metering on large frame *Sigma*. • **Alpha Audio:** will be showing complete range of acoustic materials including *Sonex, Soundtex* and *Acoustilead* products, as well as a fully operational *BOSS* automated editing system. • **Amber Electro Design:** *Total Solution* package for automated audio test and measurement, based on *5500* programmable audio measurement system under control of new

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AES CONVENTION PREVIEW

AudioCheck software for configuration of high performance test sequences. Run from IBM *PC-XT-AT* the full system will be on demonstration. Other new products include enhancement products for the *5500* system, a high speed plotting system, new *PC* applications software, and a *PC* instrument controller. Also existing products range. • **Amek:** included in their range of audio consoles will be the *G2520* 40- and 56-input console with 24- or 48-track monitoring options, eight aux sends, parametric EQ, balanced busing, digital sub-grouping of VCA faders; can be interfaced to Audio Kinetics' *Mastermix* or built with GML moving faders. A 16-track version of the *APC1000* 80-input console will be on show with full GML moving faders, reset, recall and synchronous reset, as well as the restyled *Angela* and the *BCII* and *Classic* broadcast consoles. • **American Modular Power:** no information available. • **American Multimedia/Concept Design:** range of duplicating equipment including dual pancake adaptor to *790*-type loaders and quality analysis system for cassette tape manufacturers and duplicators. • **Ampex:** complete range of magnetic tape products for professional digital and analogue applications. • **Analog Digital Synergy:** no information available. • **Anchor Audio/ROH:** featured will be the *302* intercom station combining features of the *300* master stations with industry standard 2-channel party line intercoms, all in a 1U package; optional speaker/mic or headset operation, and switchable 2-wire/4-wire master channel. Also on show will be complete line of broadcast intercom and IFB systems, audio switchers with built-in monitoring and general purpose modular audio systems including *211B* and *212B* audio distribution amps. Rack mountable *AN-1000* and *AN-1400* powered monitor speakers, and the *PortaCom* battery-powered party line intercom system will also be shown. • **ANT Telecommunications:** the full range of *telcom c4* noise reduction units and cards including the new multichannel *E413* unit with *c4 E* cards. • **Apex:** manufacturers of multicolour tape label printers will display their full range of products. • **Aphex:** will be demonstrating their *Compellor, Dominator, Aural Exciter,* as well as their *Studio II* and types *C* and *D*. • **API Audio Products:** will display their range of products and will feature the new *3124* mic preamplifier and the new *5502* equaliser. • **Apogee Electronics:** are exhibiting their anti-aliasing filter for digital multitracks, as well as filters for the *PCM-1630* and *F1*, and a patchbay for the *PCM-701*. • **Apogee Sound:** Loudspeaker systems utilising front-end dedicated signal processors. • **Applied Research & Technology:** new from ART will be an addition to the *IEQ* line of programmable equalisers, the *IEQ-1/3* controller and satellite, as well as an ART video monitor. The *IEQ-1/3*, which incorporates Smartcurve, offers 128 presets, complete MIDI, programmable low cut filter, multiple slider editing and comes in a 1U case; the 9 in CRT monitor displays video outputs from the

Amek APC1000 console

Audio Developments AD062-M portable mixer

controller, while accepting monochrome video from other sources. • **Audico:** audio and video (U-matic, VHS) cassette loaders, rewinders, counters, plus video reloader, audio impulser, and tape winders for carts and reels. New will be the video systems' abilities to be equipped for 8 mm, M-II, Betacam and 19 mm cassettes. • **Audio Accessories:** range of jack plugs, sockets and cords, plus range of pre-wired audio patch panels, either standard or custom-built. • **Audiocast:** no information available. • **Audio Design Associates:** no information available. • **Audio Developments:** US AES debut for *AD145-E* edit mixer with VCA control and 2/3 machine monitoring, as well as *AD062-M* with studio-style meter bridge; other new products include *AD150* dual mic preamp and *AD071* 4-input into 8-output battery/mains distribution amp; also on show is the *AD066 Port-a-Flex* range plus a full complement of standard ENG, film, post production OB, OB van and studio mixers. • **Audio/Digital:** introduced will be the *ADD-3US* digital processor, maximum delay time of 481 ms and programmable in any combination of μs/ms steps storing all settings in non-volatile memory. Also *ADD-3PG* digital processor that can store four 'pages' of information for remote recall; page mode allows storage of three channels of delay times and digital attenuation on each page. Existing products include the *ADX-2000* processor, the *ADD-2* and *ADD-3* industrial processors, the *TC-5* processor, the *TC-4* broadcast processor, the *TC-3* pre-reverb digital processor and the *TC-2* delay processor. • **Audio Media Research:** range of pro-audio products, including *System One* multitrack cassette recording system with simultaneous 4-track recording, Dolby *B* and *C*; *PRM* series studio phase reference monitors, with 18 dB/octave crossovers; *ERO 10* and *ERC 12* condenser mics plus *DM* series hypercardioid dynamics; and *PMA 200* 100 W/channel power amplifier. • **Audio Precision:** are demonstrating their *System One* automatic audio test system with tests for routing switchers and for wow and flutter intermodulation distortion. • **Audio-Technica:** new will be a line of condenser mics (the *40* series), comprising the *AT-4071* and *AT-4073* highly polarised shotguns with 'new innovations', plus the *AT-4031* condenser. Also new will be the *AT-8506* 4-channel AC phantom power supply. Also on show will be full product range. • **Audiotechniques:** will be showing the Tubetech line of tube/valve products, including the *PE1B* equaliser and the *CL1A* compressor/limiter, plus the new *MP1A* 2-channel mic premaplifier. Also shown will be a new digital PPM designed specifically for Sony's *PCM-1610/30s*, RTW meters, the Soundcraft *Saturn*, Sony pro-audio products and products from AMR and DDA. • **Audio Video Consultants:** are showing the Tapematic range of duplicating equipment including equipment for tape loading, packaging and testing.

B

• **BASF:** range of magnetic tape products including *Studio Master 910, 920* loopbin mastering tape and *930* digital mastering tape for DASH format machines. • **Benchmark Associates** with **Downtown Design:** will be discussing past, present and future projects, with staff on hand to answer any queries. • **Berklee College of Music:** the largest independent music college in the US, with B. Music and Diploma courses. • **Beyer Dynamic:** will introduce several new products, including *M700* supercardioid

AES CONVENTION PREVIEW

MCE10 hypercardioid mic from Beyer

dynamic vocal mic, *MCE80* supercardioid condenser for instruments and *MCE81* supercardioid condenser for vocals; the *MCE10* mini hypercardioid condenser for sound reinforcement and *MCE6* mini condenser for brass; the *M58* internally shockmounted dynamic mic for ENG/EFP use; the *MPC40* boundary layer mic for musical instruments; the *DT770* closed ear studio monitoring headphones and the *DT990* semi-open ear studio headphones. • **BGW Systems:** wide range of power amplifiers. • **Bruel & Kjaer Instruments:** will show their complete line of pro-audio microphones and analysers. Featured microphone will be the new cardioid *4011* mic. Also will introduce their new *4128* head and torso simulator, incorporating a mic in each ear and a speaker in the mouth, intended for *in situ* acoustical research. Also new is the *2231* modular precision sound level meter, with programmable modules for measuring all aspects of acoustics. • **BrystonVermont:** new will be the *10B* electronic 2-way stereo (3-way mono) crossover, featuring independently selectable crossover points for high- and low-pass, plus selectable crossover slope, from 6, 12, or 18 dB/octave. Also on show will be their range of amps and preamps, including the *BP-1* broadcast preamp, the *70* series professional amps comprising the *270*, *370* and *470* at 50, 100 and 200 W respectively, and the *Pro* series of amps, whose top of the line *4B Pro* will handle 800 W bridged into 8 ohms.

Clarity XLV effects automation interface

Omnicraft 4-channel noise gate from C-T Audio

C

• **Cal Switch:** electronic component products. • **Calzone Case Company:** their complete range of standard and customised transport cases, comprising the *Escort* and *Pro-Line* series, as well as the new *Ultima* series. • **Canare Cable:** wide range of cable, including *Star Quad* mic cable, *MR202-AT* mic/line audio cable in 2- to 24-channel versions. • **Carver:** range of pro-audio power amplifiers and CD players. • **Celestion:** will be demonstrating their new *SR* system, comprising two *SR-1* speakers linked to an *SR-C1* controller, plus a C-audio amplifier and two new sub woofers. • **Cetec Gauss:** high-speed tape duplicating equipment along with loudspeaker systems for studio applications. • **Cetec Ivie:** modular sound reinforcement products and spectrum analysers. • **Cetec Vega:** will display their range of wireless microphone and intercom systems. • **Cipher Digital:** four new products on show include the *CDI-4810* phantom VTR emulator for controlling audio transport, the *CDI-4825 Shadowpad-Mini* offset entry controller, the *CDI-4835 Shadowpad-Maxi* full function controller, and the *CDI-4890 Softtouch-PC*, a complete audio editing controller for use with IBM *PC*s and compatibles. • **Clarity:** will show the *XLV* effects automation interface; MIDI automation protocol allows control of all parameters of the Lexicon *224XL* and *480L*, AMS *RMX-16*, Quantec Room Simulator and Yamaha *REV1*; 8 MIDI channels control voltage conversion and allows automation of digital delay lines, VCA-based processors, analogue synths and other devices. • **CMX Corporation:** featuring the *CASS 1* computer-assisted audio sweetening system with audio synchronisation, editing and audio console automation all linked to SMPTE. • **Community Light & Sound:** two-, three- and four-way loudspeaker systems for schools, churches, nightclubs and portable live applications. Also pattern control horns, midrange compression loudspeakers and components for engineered sound systems. New will be the *CS52* three-way loudspeaker for nightclubs and touring acts, with high sound pressure levels, smooth frequency response and very low distortion at all levels. • **Connectronics:** are showing a specialised range of audio wire and cable, as well as the latest mixing consoles available from Seck. • **Countryman:** will show their range of miniature microphones for studio, broadcast, sound reinforcement, podium, TV and film applications. • **Court Acoustic Sales:** will exhibit their range of graphic equalisers, the 3-way crossover, and the *SA30* ⅓-octave spectrum analyser. • **Crest Audio:** are exhibiting the new *8001* power amp, 3U high, 1200 W/channel into 4 ohms, 1500 W/channel into 2 ohms, completely modular and already in use with major touring companies. Also on show is the *FA800* amplifier, 2U high, 400 W/channel into 4 ohms. • **Crown International:** full range of TEF products, power amplifiers and microphone products. • **CST Manufacturing:** no information available. • **C-T Audio:** new *C-Ducer* MIDI-based drum mic and trigger system enabling MIDI equipment to be driven from acoustic drum kit, giving drummers access to electronic sounds. Also on

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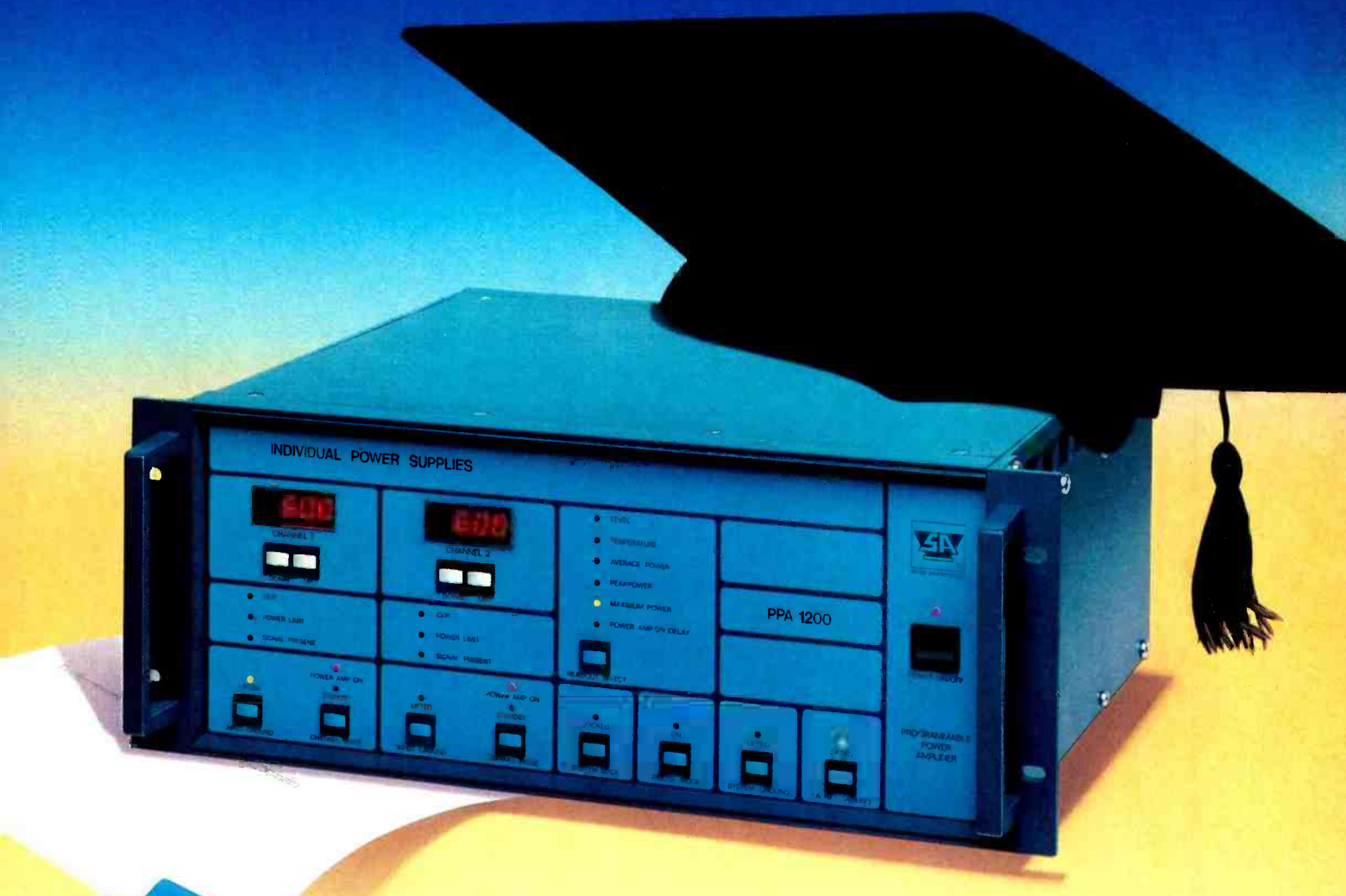

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AES CONVENTION PREVIEW

DigiTech DSP-128 digital signal processor

show is the Omnicraft range of optically coupled noise gates, including plug-in modules and a cell-powered 4-channel unit.

D

• **David Hafler Co:** are exhibiting their range of top-end hi-fi and pro-audio equipment, including amplifiers, power amps and tuners. • **Design Direct Sound:** *80* series mixer and acoustic horn, plus DDS line of horns, speaker systems, mixing boards and custom design service. • **Dialight:** will have on display their range of plugs, connectors, jacks, goosenecks, wall plates, handles, binding posts and so on. • **Digital Audio Research:** *Soundstation II* digital audio production centre comprising control console, central processor and disk-storage unit; works from digital and analogue sources, instant access to programme segments for edit rehearsal, variable speed playback; features include cross-fading, 'reel-rocking', splice adjustment and time-slipping. • **Digital Creations:** will feature their PC-based *Diskmix* automation with either VCAs or moving faders, designed for almost any console, with 10-bit conversion and P&G motorised faders. Mixes are stored in disk at the end of each pass and there is full off-line editing capability. • **Digital Signal Processing & Control:** no information available. • **DOD Electronics:** will show the new DigiTech *DSP-128* MIDI controllable digital signal processor with a variety of reverb and delay effects and 128 presets; effects development software will be shown allowing new effects to be written; *SC-31* ⅓-octave band graphic EQ will be shown in Audio Logic range along with *R2D3* 3-tap digital room correction delay and a new parametric EQ for professional use. • **Dolby:** full range of cinema Surround Sound and audio noise reduction products including Dolby *SR*. • **Dorrough Electronics:** among their exhibits will be the *40-A* LED loudness meter, which displays the peak as a dot and the average as bargraph; peak and average are defined in terms of equal power.

E

• **Eastern Acoustic Works:** live sound speaker systems. • **Editron:** range of timecode synchronisation equipment. • **Electro Sound:** a range of high speed tape duplication systems and QC systems. • **E-Mu Systems:** will be showing the *Emulator III* featuring stereo sampling, 16 voices, 16-bit linear data sampling (30 and 44.1 kHz) and oversampling on output channels. Also *EMAX-HD* digital sampling system with 20 Mbyte hard disk drive, and *SP-1200* 12-bit sampling percussion system. • **Eventide:** are 'announcing a major new product'. • **Evertz Microsystems:** professional line of LTC and VITC timecode equipment, including generators, readers, translators and character inserters, plus A/V synchronisers and audio tape transport interfaces for video editors.

F

• **Fairlight Instruments:** will have on show their range of pro audio and video equipment, including the Fairlight Series *III, CVI* and *Voicetracker*. The latest software will be demonstrated on the Series *III*. • **Fane Acoustics:** new products include the addition of 10 in and 18 in models to the hand-built range of Fane's *Studio* series co-axial speakers, four new bass drivers—*15S, 15LR, 18S* and *18 LR*—plus the *B* series glass fibre horns and *HT100* and *HT150* constant directivity horn tweeters. • **FM Acoustics:** range of power amplifiers, crossovers and high power cables. Includes the *FM236/4* linear phase crossover, the *FM214* precision balanced line driver and the *FM216* precision line driver. • **FM Tubecraft:** will be showing entire range of products including keyboard stands, racking consoles, portable tables, workstations and acoustical wall dividers. • **For Music Services:** no information available. • **Fostex:** new products on show include the *4011* video character inserter and VITC generator/reader, as well as the *LS-5* studio monitor with no crossover point in the mid-range from 250 Hz to 5 kHz. Also full range of tape machines. • **Full Compass Systems/Richmond Sound:** will display their range of pro-audio equipment from large range of companies; microphones, mixers, tape machines, tape, signal processing, speakers, intercoms, test equipment, headphones, parts, video equipment and more. • **Full Sail Center for the Recording Arts:** the Orlando, Florida-based recording college accredited by the National Association of Trade and Technical Schools and licensed by the State of Florida.

G

• **Gold Line:** will exhibit their entire range of products including 10-band ⅓-octave realtime analysers, crossovers, gates, limiters, oscillator/frequency counter/dB meter, and audio test sets. • **Gotham Audio:** along with their own brand of cable, will show Neumann microphones (new *RSM 190* stereo shotgun, plus *TLM 170* and *U89* studio condensers) and accessories, EMT signal processing and reverberation (new *246* with digital I/O and the established 252), loudspeakers from Klein & Hummel, NTP meters, Harmonia Mundi Acustica digital equipment (*BW 102* interface system with 6-band digital EQ), Teldec DMM CD technology, plus the range of Audio Developments' portable mixers.

H

• **Heino Ilsemann:** labelling, sorting and packaging machines for cassettes, video cassettes and compact discs. • **Howe Technologies:** range of audio broadcast consoles, plus details on studio design and installation.

I

• **Innovative Electronic Design:** will feature their new *6000* series power amplifier system consisting of a wide range of signal processing equipment. The *6270* power amp card consists of a single channel 200 W switchmode power amp capable of delivering full power to 70.7 V line without output transformer. • **International Music Company:** are showing a new Akai digital matrix patchbay and will introduce the *MPC-60*, a MIDI production centre made in collaboration between Akai and Linn. Also on show will be electronic wind and valve instruments *EWI* and *EVI*. • **IPS:** range of C-Os in sonic, 5-screw and other designs, bulk loaded and VHS cassettes. • **IQS:** IBM *PC*-based multi channel signal processing software, calibrated reference microphone systems and mic stands.

J

• **JBL:** *Bi-Radial* and *4400* series studio monitors, *Concert* series loudspeaker systems including *Control 5*, and individual speaker components; also JBL/UREI power amplifiers, ⅓-octave equalisers, mixers, electronic crossovers

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AES CONVENTION PREVIEW

and digital audio delay units. • **JL Cooper Electronics:** console automation, RAM-based SMPTE automation manager, 8-channel expandable muters, mixer gain interface and audio routing network interface. • **JRF Magnetic Sciences:** new on show is the *PLX* series of direct replacement magnetic heads for ¼ in mastering, recording and broadcast equipment, including Sony/MCI *JH110*, Scully *280*, Ampex *440*, Otari *MX5050B* and *MTR 10/12/20* machines. Also new is a line of direct replacement heads for 16 and 35 mm mag film equipment. • **JVC:** Series *900* digital audio mastering system along with other professional audio products, including the *PQ* editor and the *MU-6200E* microphone.

K

• **Kenwood:** range of compact disc test equipment including coders, decoders and jitter analysers. • **Keyboard Technologies Inc/Solid Support Industries:** no information available. • **King Instrument:** new from King will be the *2797* dual pancake audio loader. Other products on show include the well-established *2500* video loader. • **Klark-Teknik:** new will be the *400* range of parametric equalisers; the *DN 405* has five bands full parametric EQ with separate variable high- and low-pass filters, 100% frequency overlap between all filters, individual EQ in/out switch; the dual *DN 410* features two channels of five-band EQ, switchable stereo/mono operation and automatic bypass of unwanted controls in single 10-channel mode. Also on show is the *300* range of equalisers, the *DN60* real-time spectrum analyser, *DN773* broadcast digital delay unit, *DN716* multiple output digital audio delay, and *DN780* digital reverb system with latest software and new MIDI/computer interface. BSS Audio will be introducing the new *DPR-502* noise gate to the US as well as the *MSR-604* microphone signal splitter. BSS will also have their full range of other products. • **Klotz:** wide range of cable and accessories. • **Korg:** will exhibit their *DSM* rack unit as well as their digital rhythm modules (*DRMs*) with a variety of ROM cards. Also on show will be the versatile low-cost *DRV3000* multi-effects processor. • **Kurzweil:** will introduce a Separate Output option for the *250* digital synthesiser, which adds 12 direct monophonic outputs and allows each voice to be assigned to one or more channels, where effects can be added in each individual channel. New is the *1000* series rackmountable 2U expander modules: *PX* (pro), *SX* (strings), *HX* (horns) and *GX* (guitar); 24 channels for pro model, 20 for others; 128 presets and up to 64 user-defined programs per module, full MIDI implementation and effects editing. *K1000* is keyboard version of *PX*, used as performance instrument or master MIDI controller. Plus other products from their musical instrument range,

including the *Midiboard* and *150* Fourier synthesiser with its new *Sound Modeling System*.

L

● **Lenco:** range of power amplifiers, including the *MPA* series monitor amps. ● **Leonardo:** range of software for IBM *AT*s and compatibles intended for sound people in film production, including *Sound Supervisor, Professional Librarian, CuePrinter* and *Professional Assistant*. ● **Lexicon:** will be showing the *Opus* in a fully operational editing suite, and introducing a sampling memory expansion board for the *480L*. Also on show will be the *PCM 70, PCM 60*, plus the *PCM 41* and *42* delay lines, and the *2400* time compressor/expander featuring timecode follow.

M

● **Magnefax International:** audio tape duplicating equipment for cassette and ¼ in reel-to-reel plus bulk tape degaussers. ● **Marshall Electronic:** range of rackmountable effects units, including synthesiser/processors and room simulation/ambience generators. ● **Martin Audio Video:** as well as the line of Sanken microphones, Martin will be showing Timeline synchronisers plus a full range of MIDI equipment for audio and video applications. ● **Meyer Sound Laboratories:** will show the *P-1A* control electronics unit for the *UPM-1* loudspeaker, with 6-section EQ, low-frequency sliding filter suppressing frequencies below 100 Hz at high SPL; *UPM-1* now has additional octave at low end for extended frequency range. The *500 R* compact loudspeaker system for portable sound reinforcement; 2-way with 15 in LF cone driver and 2.8 in hard dome HF driver with 40×90° horn and passive crossover. Also on show is *500 RW* 2-channel full-range stage monitor system. ● **Micro-Point:** will show their disk-recording styli and master recording blank, plus software for managing test equipment. ● **Milab International:** new at the show will be the *LC-28* tranformerless condenser mic; switchable (six positions) high-pass filter and pad, with 10 and 20 dB attenuation. ● **Minim Electronics:** will show their presenter's clock, intended for on-air studio enabling presenter to read time easily and insert prompts at particular times—based on Minim's digital timeswitches, also on show. Also appearing will be ambisonic decoding equipment for monitoring and listening applications. ● **Mitsubishi:** will introduce their two machine *XE-2* digital editor. Also on show will be their *X-850, X-400, X-86* and *X-80* digital recorders, plus their line of *Westar, Superstar* and *Moviestar* consoles as well as their film sound equipment. ● **Monster Cable:** professional cable products for microphones, interconnections, loudspeakers and connectors. ● **Mosses & Mitchell:** a wide range of audio and video jacks and jackfields including the 440 range of miniature jack sockets. ● **Music Maker Publications:** range of musician and instrument-oriented magazines.

N

● **Nakamichi:** range of professional cassette decks and stereo monitoring headphones. ● **Neotek:** range of consoles for recording, production, theatre, broadcast and television, including the *Elite, Elan* and *Esprit*. ● **New England Digital:** NED are celebrating their 10th anniversary at the show, and will debut the stand-alone *Direct-to-Disk* Multitrack Recorder. Available in 4-, 8- and 16-track configurations, with 100 kHz 16-bit stereo sampling and digital recording, max record time of three hours, mouse-operated software, and lockable to SMPTE timecode. Also on show will be the *Synclavier* digital audio system with SMPTE and MIDI interface capability, dubbed *The Tapeless Studio*, which is a workstation for composition, synthesis, performance, multitrack recording and editing music and effects. New *Synclavier* options include an optical disk storage and retrieval drive with 2 Gbytes memory per disk; up to 20,000 sounds are immediately accessible and the system can store over 5½ hours of digital audio on each disk; the optical disk drive will have its own screen.

O

● **Optical Disc Corporation:** will demonstrate their compact disc mastering system and may show their video disc recording system. ● **Orban:** four new products are on show. The *787A* is a programmable mic multi-function processor with adjustable compressor, 3-band parametric EQ, noise gate, de-esser and effects return level; 32 memory registers with instant set-up and recall, MIDI-controllable. *642B* parametric equaliser is dual-channel, 4 band per channel, tunable 12 dB/octave low pass filter and 18 dB/octave high pass filter plus vernier control. *222A* stereo spatial enhancer is dedicated, on-air broadcast processor that widens and deepens stereo image. Plus fully programmable dual-channel parametric equaliser with 4 bands/channel, tunable high- and low-pass filters, input gain and MIDI-controllable. ● **Otari:** exhibiting their full line of professional tape machines for recording and post production,

AES CONVENTION PREVIEW

as well as their line of tape duplicating systems, synchronisers and SMPTE timecode readers. Featured will be the MTR90 MkIII with restyled transport and electronics. • **Oxmoor:** will be showing the *DCA-2* digital control attenuator and the *RC-16* which translates knob movements into digital pulses to control audio levels. Also *DEQ-29* ⅓-octave programmable EQ with no physical control panel.

P

• **Panasonic:** featuring the Ramsa line of pro-audio products, including the recently introduced *WS-A240* subwoofer and *WS-SP2* subwoofer crossover/processor; also, their range of power amplifiers and microphones, plus the Panasonic range of compact disc machines. • **Pearl Microphone Laboratory:** *TLA-A* stereo mic, dual diaphragm, independent outputs; *MS* series stereo mics, with rectangular capsule, available in omni or cardioid configurations; plus 2-channel stereo mixer for Pearl's stereo mics. • **Peavey:** will show their range of sound reinforcement equipment, loudspeakers, power amplifiers, microphones, signal processing and mixing consoles. • **Penn Fabrication:** a range of hardware for cases, cabinets, plugs, jacks, sockets, castor wheels, brackets and connectors. • **Penny + Giles:** will show their comprehensive range of studio faders and other audio/video controls, featuring the motorised studio fader. Also shown will be the Mosses & Mitchell range of audio jack sockets and jackfields. • **Philip Drake Electronics:** will be showing items from their wide range of intercom and audio products including a software-controlled matrix intercom. • **Philips Subsystems and Peripherals:** will be showing compact disc and video disc mastering equipment. • **Power Solutions:** no information available. • **Pro Co Sound:** will introduce a number of new products. The *TT-448* patchbay system for 8-, 16- and 24-track recording with full channel, group and master patching, 36 I/O pairs; a wide range of interface boxes, including the *MS-2* and *MS-3* mic splitters, and *MC-2* mic combiner, the *AV-1* audio-visual interface, the *DB-1* direct box and *DB-4* quad direct box. Also *HJ* series stereo headphone junction box, the *IT-4* and *IT-8* rackmountable line-level output isolation transformer unit, the *MS-42* and *43* rackmountable mic splitters and the *RMS-2* rackmountable recording monitor switcher handling 2 stereo power amps and 6 sets of speakers. Additionally, Pro Co will have on display a wide variety of cables. • **Professional Audio Services & Supply:** featuring products from Otari, Crest Audio, Tannoy and Neumann.

Q

• **QSC:** complete line of professional 2-channel power amplifiers, plug-in accessories including isolation transformers, precision attenuators, active limiters and crossovers. • **Quested:** the established *Q012* and *Q209* monitors as well as the more recent *H405* nearfield monitor and the *HM415*, claimed to be the largest 4-way studio monitor available; also the passive *H210* with two 10 in bass drivers, a 3 in midrange and 1 in tweeter. On the stand will be amplifiers by Hill Audio, HH Electronics, Times One and Yamaha.

R

• **Recording Engineer/Producer:** sound recording magazine. • **Renkus-Heinz:** processor-controlled PA systems, signal processors with driver protection, high-frequency compression drivers and horns, plus a large range of speaker systems. • **Research Technology International:** ¾ in U-matic evaluator/cleaner, plus dropout analyser/timecode generators for preparing tape for CD pre-mastering. • **Roland:** digital *D-50* synthesisers with linear arithmetic synthesis, 16-bit PCM waveforms, digital EQ, 32 types of reverb. Also the *GP-8* guitar processor, the *VP-70* voice processor and the range of *Boss* effects. • **RPG Diffusor Systems:** will introduce their new acoustic treatment systems consisting of the *QRDG* broad band diffuser, the *Abfussor* broad band absorber and the *Triffusor* variable acoustics module. • **Rupert Neve Inc:** complete range of analogue and digital mixing consoles the main exhibits being a fully-working 60-channel *V series* audio console in simulated TV post production set up with *Necam 96* automation, and the *DTC-1* digital transfer console.

S

• **Saki Magnetics:** long-life ferrite heads for reel-to-reels made by Ampex, MCI, Mincom, Otari, Revox and Studer; cassette duplicator heads for Infonics, Recordex, Pentagon, Telex and Wollensak; and 24T 2 in metal heads for Ampex *1200*, ATR *124*, MCI, Mincom and Studer *A800*. New products include 24T 2 in metal heads for Otari *MTR-90* and Studer *A80*. • **Samson Technologies:** three lines of wireless VHF mics, featuring the first AES showing of their frequency selectable STD (synthesised true diversity) *Broadcast* series with dbx noise reduction. Both receive and transmit are selectable over 10 channels. Also on show is the *Concert* TD series, single-channel systems also with dbx. Finally, the *Stage* series, featuring miniature 12 V receiver, aimed at the video market. • **Sanken:** the full range of Sanken mics will be shown. • **Schoeps/Posthorn Recordings:** will introduce their new *Mk21* subcardioid capsule, claimed to be uniquely suited to pickup where spaced omnis can't reach; it has low frequency performance comparable to omnis and similar presence to ambience, but with superior off-axis response. It joins the *Colette* range of 15 interchangeable capsules that all mate with the *CMC* amplifiers. Also on show is the entire line of Schoeps mics and accessories, plus the *Sonotrim* mini electret lavalier for film and video, plus *The Box* realtime soundstage editor. • **Selco/Sifam:** range of VU and PPM meters, plus knobs, switches and buttons for a wide variety of applications. • **Sennheiser:** will introduce the *MKH-30* figure-of-eight for digital recording, the *MKE-42PU* gooseneck for consoles and podiums, and the *HD-25* studio headset. Factory personnel from Germany will be on hand to discuss these and existing products. • **Shape:** will show the *MK10*

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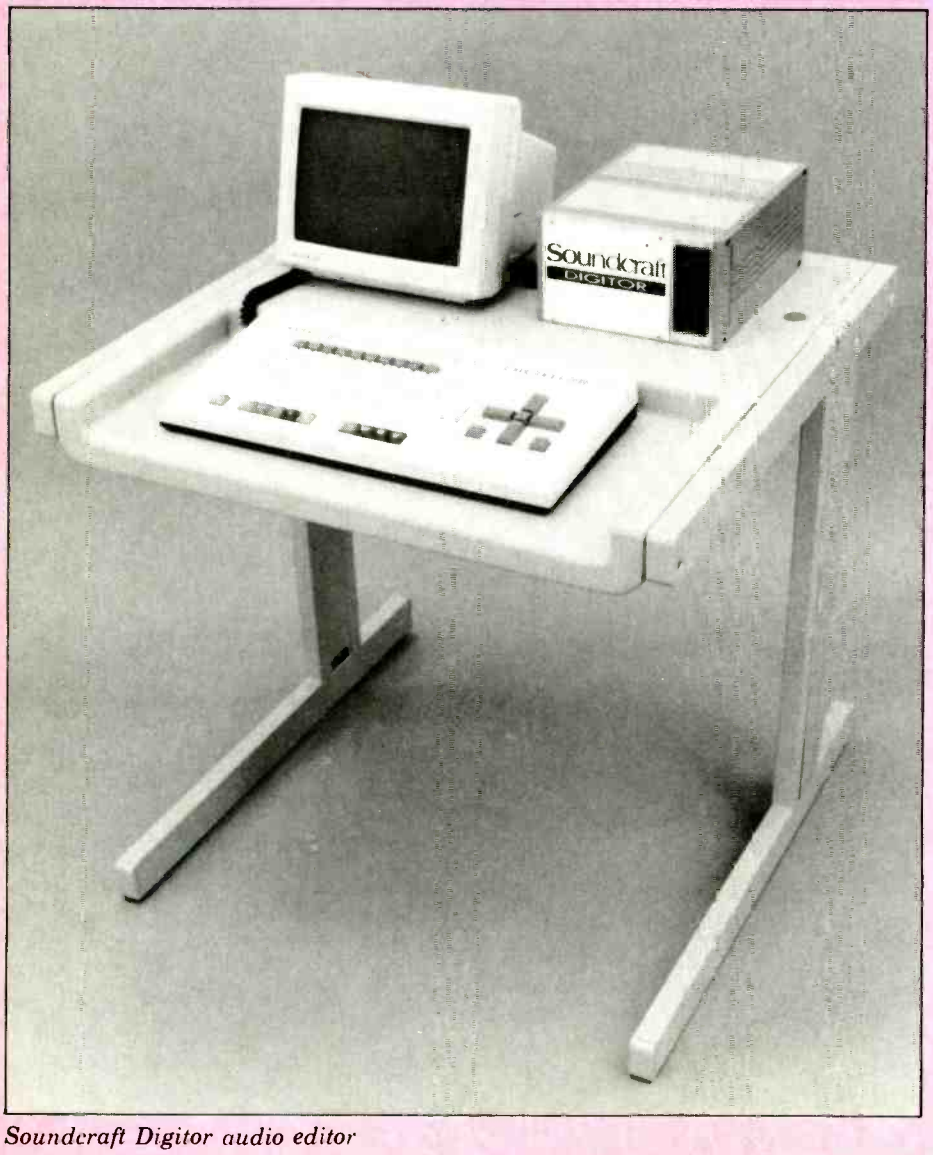
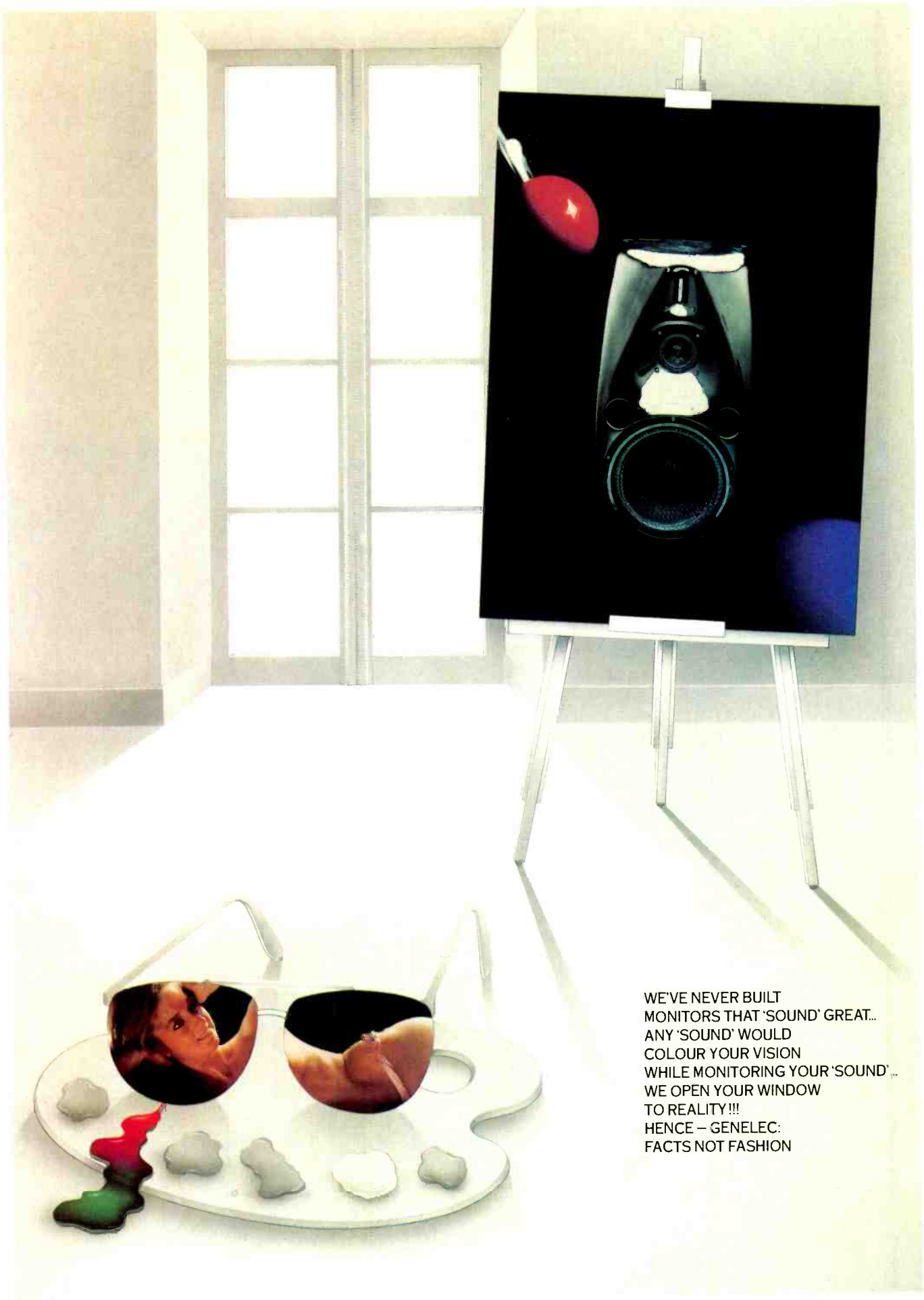


Soundcraft Digitor audio editor

audio cassette line, along with three new CD packaging systems: *Lift-lock, Flip-file* and *Retailer*; will also show their automated VHS and cassette loading systems. • **Shep Associates:** will display the range of Bel audio sound samplers/delays, featuring the new *BDE2400S* stereo sampler with 13 sec sample (26 in mono) at 18 kHz bandwidth; sounds are stored in 99 memories and can be edited and pitch shifted, and samples can be stored on disk and then played with a MIDI keyboard; also on show is a range of modified Neve equalisers and they will be discussing their specialty of customising and refurbishing Neve consoles; their own design equalisers will be on show, and they will be talking about complete package deals, including studio design and installation. • **Shure Brothers:** will introduce several new products, including the *FP51* gated compressor/mixer for broadcast field production, the *SM84* lavalier microphone and the *BC* series of professional broadcast phono cartridges. • **Simmons:** will be exhibiting the 16-bit, screen-based *SDX* drum sampling system. • **Solid State Logic:** existing products on show will be the *SL 4000 E* master studio system, the *SL 5000 M* stereo broadcast console, and the *SL 5000 M* film console. New to the AES will be the *G* series computer with large on-board memory, high-capacity disk cartridges and optional remote keyboard; plus new EQ and input cards for retrofit on *SL 4000 E* consoles. • **Sonic Research Associates:** no information available. • **Sonosax:** will show their new *SX-PR* modular compact stereo mixer available with two, four or six inputs ideal for ENG/EFP applications; also new is the *SX-V* intended for TV and video applications, taking up to 10 inputs and having optional VCAs. Other products on show include the *SX-S* portable mixer and the *SX-T*, available in 12, 16, 24 and 32 input versions with 8 VCA groups and 8, 24 or 32 outputs. • **Sony:** the *MXP 2000* and *3000* consoles, the *DAL 1000* digital limiter, a computer-controlled CD changer, plus the range of DASH format digital tape machines. New will be a large frame *MXT-2036*, the *APR-5002-W* with extended response heads, *PCM-2000* and *2550* pro DAT machines. • **Soundcraft:** featured items will be the *6/24* 'Producer' with new input modules giving full routing to 24 buses and all six auxs; the *TS12* recording console with *FAME* automation; the *Digitor* tapeless audio editor, storing data on RAM and edited with tape machine-like controls; the *200BVE* video editing audio console, a direct interface to the Sony *BVE900* with integral VCA package; and the *8000* series console with new meter options and VCA subgrouping package. • **Sound Ideas:** sound effects library with some 3000 sounds on 28 compact discs. • **Soundmaster International:** will introduce Smart Sync (Soundmaster Auto Restored Timebase Synchronisation), a feature on the Version 4 integrated editing system enabling a transport to be synchronised while running off its standard speed. The *Synchro* controller will also be shown. • **Sound Technology:** full range of test equipment and systems, including the *3000A* programmable audio test system, *MSAT* multichannel switching system, *1510A* tape recorder/audio test system, *1710A* distortion measurement system, *170* audio filter set, *TR-150* technical test record, plus a range of test tapes. • **Soundtracs:** will be showing the *ERIC* console, a 24-bus digitally routed mixer with integrated 68000-based computer providing control over routing, muting, mic/line switching, insert points and 32 external events. Also on show *MRX* series desk as 24 or 32 input mainframe with other recent products including the *CMS3* timecode



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generator and MIDI converter package for the *CP6800* and *CM4400* desks; new input module for the *CP6800* and the *MX* series of sound reinforcement consoles. • **Sound Workshop Professional Audio Products:** new products include the *VD-3* three-man video dubbing stage console with on-board graphic equalisers, integrated software, definable machine control/monitor switching and *Diskmix* automation. Also new is a console for production work on ADR/Foley stages; modular with six mic inputs and 24-track monitoring with custom hardware/software package designed by Larson Technology of California. System allows complete automation of ADR/Foley process. Sound Workshop also announced that their series *34C* record/mix console is now available with *Diskmix*. • **SPARS:** the Society of Professional Audio Recording Studios will provide information and literature on their activities. • **Stanton Magnetics:** will introduce new pro-quality headphones, including the *ST-Pro* closed-ear with high-velocity samarium cobalt driver, adjustable headband and full soft vinyl isolation cushions. Also new is the SRS range—models include the *SRS-215, SRS-225, SRS-245* and *SRS-265*. • **Star Case:** will be showing their range of flight and carry cases. • **Stramp USA:** featured will be the *CP-1* automated mixdown unit and effects processors from Peter Struven GmbH. • **Strand Magnetic Tapes:** UK tape manufacturer featuring E10 to E240 video lengths, E180 consumer video tape, plus the Strand brand of video, hi-fi and compact disc products. • **Studer Revox:** will feature the *A820* 1 in 8-track (available with internal *telcom* or Dolby *SR* noise reduction) plus the *VUK* trolley console version of the *A807*, the *A727* CD player along with the full line of analogue and digital audio recorders and mixing consoles. • **Studio Master Systems:** will highlight their colour version of *Studio Master Plus* with *CCL* (console control logging), able to scan and log all knobs and fader positions in each console module; settings are quickly restored from disk. Integrated in the software are: *Studio Master*, with automatic billing, invoicing, track sheets and labels, word processor and bill editor; *Track Master*, with track sheets, tape logs, customised logos and word processor; and *Outboard Master* for easily created control panels and settings of any piece of outboard equipment. All are intended for the Apple *Macintosh*, with *Studio Master Plus* made for the *Macintosh II*. • **Sunkyong:** range of SKC tape for duplicating applications including audio pancake tape, blank cassette tape, open reel tape and C-Os. • **Symetrix:** new will be the *511-A* noise reduction system, as well as their *200* series, comprising ½ rack headphone out, microphone preamplifier and parametric equaliser.

T

• **Tannoy:** will exhibit their *Super Gold Monitor* series, comprising the desk-top *NFM-8* 8 in, the 10 in *SGM10B*, the 12 in *Little Gold Monitor* and *SGM 12X*, the 15 in *SGM 1000* and *SGM 3000*, along with the *FSM*, a 15 in dual concentric unit plus a 15 in bass unit. • **Tape Automation:** tape duplicating equipment including *XL-Minor* cassette loader, master transport systems, slaves and the Xenon high-speed video cassette loader. • **Tascam:** will be showing their entire range of pro-audio products, including the *ATR-80* 24-track tape machine, professional cassette players and pro compact disc machine. • **TC Electronic:** range of signal processing equipment including equalisers, compressors and delays. • **Technics:** range of compact disc players and changer systems, turntables, nearfield monitors, power amplifiers and preamps. • **Technos Inc:** no information available. • **Telex:** their complete range of wireless microphones including diversity types, intercom systems, broadcast series headsets and wireless mics for video cameras. • **3M:** range of magnetic tape products for analogue and digital applications in audio, broadcast and video industries. Also information on optical disc facilities. • **Timeline:** will feature their *Lynx* timecode synchroniser modules with all the latest software updates. • **Toolex Alpha:** record and compact disc manufacturers, pressing and consultants. • **Total Audio Concepts:** the latest TAC console is the *SR9000* with 52 module positions, with standard format featuring 42 inputs, 16 aux sends, 16 subgroups, 8 VCA groups, 8 mute groups and 16×8 output matrix. Also displayed will be the *Scorpion* multi-purpose mixing system and the fully modular, 24-bus *Matchless*, available in 26-8-2 *M32* version and 36-8-2 *M42*. • **Trident:** fully operational versions

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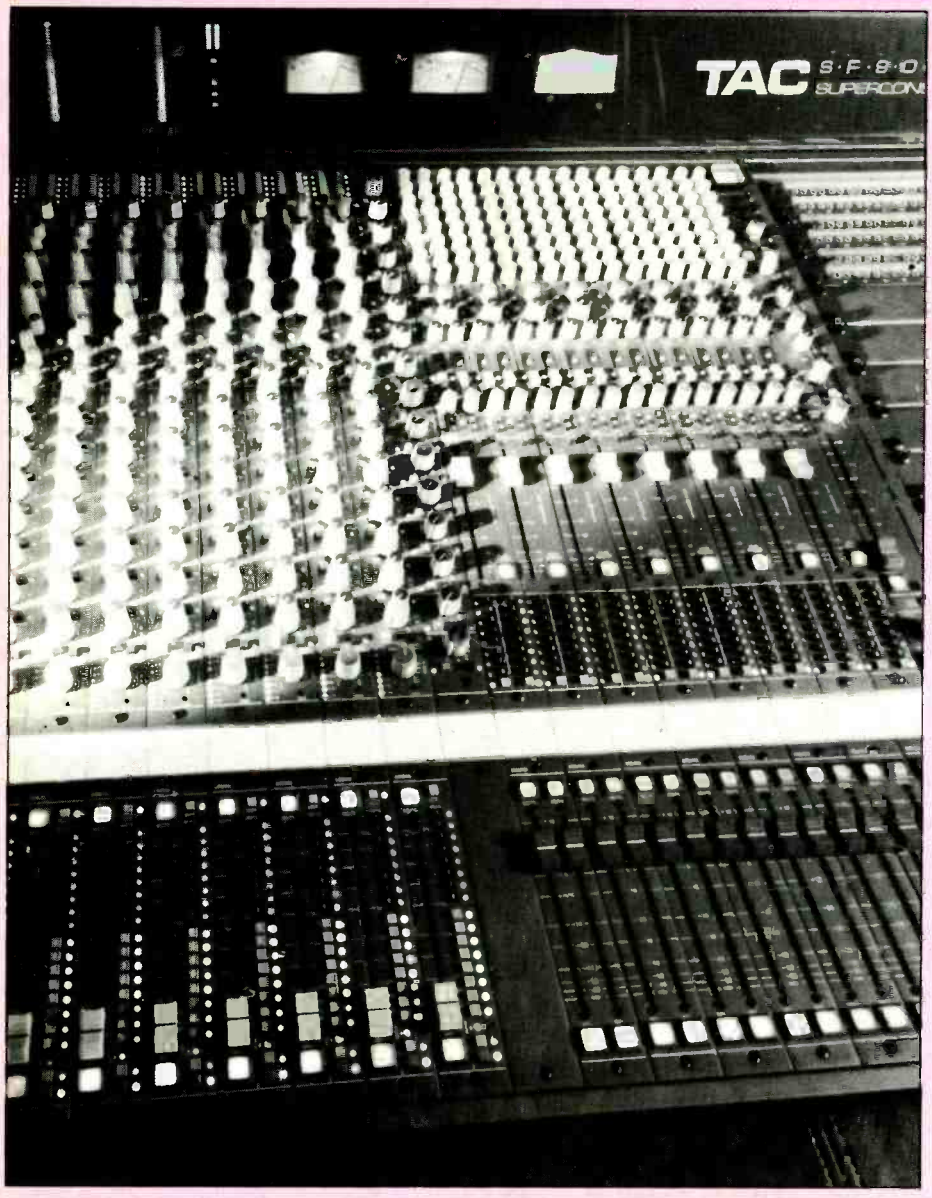

TAC SR9000 console

of the *Di-An*, Trident *24* and their newest *80* series, the model *C*. • **Troisi edc:** distribution amps, dual and single parametric equalisers, dynamic equalisers, compressor/expanders, expander/gates and power processing racks. • **Turbosound:** will introduce a variety of new enclosures for the *TSE* installation series of separate mid/high and bass enclosures, featuring the *TSE-260* high frequency enclosure, *TSE-211* mid/high, and *TSE-115* and *TSE-215* bass enclosures. Also on show will be the *TFM-2* TurboConcentric floor monitor and the *LS-2403* 24 in sub-bass loudspeaker. • **27th Dimension:** holophonically recorded sound effects library; 1001 effects in library of 10 CDs with cross reference index of 2500. Also lower cost production music library with 343 digitally mastered tracks.

U

• **UREI:** are showing their range of *Time-Align* studio monitors, plus equalisers, filters, crossovers and other signal processing equipment.

V

• **Voyetra Technologies:** music software for IBM *PC*s and compatibles. New will be *Sideman DTX*, a voice editor for the Yamaha *DX/TX-7/II* with library support, 2000 patches and allows the user to randomise selected parameters on patch to create new sounds; *Patch Master Plus* universal librarian program supporting over 60 popular MIDI synths with MIDI data analyser allowing viewing on *PC* monitor, and *Conversion Plus* sequencer/personal composer/songfile converter. Also on show will be two new MIDI interfaces, the *OP-4000* and *OP-4001*, plus the range of sequencers.

W

• **WaveFrame:** no information available. • **Westlake Audio:** will have on show their complete range of studio monitors. • **Whirlwind:** audio and video cables for studio, remote and special applications with wide range of accessories. • **Wireworks:** multi-cable components for mics, multipin audio interconnect products including splitters, stage boxes and racks, coaxials and colour-coded cables.

X

• **Xedit:** large range of tape editing blocks for 2 in, 1 in, ¾ in, ½ in, ¼ in and ⅛ in tape, plus a large selection of pre-cut splicing tabs.

Y

• **Yamaha:** among their new products will be the *Club* series of low-price loudspeakers, the *EM* series of three power mixers, three consoles in the new *MC* stereo range, plus the *REV5, REX50, DMP7* and the latest *NS-10* monitors. Also new will be the *P2500* power amplifier, and the latest additions to the *MZ* series of microphones. All existing products will also be on show, and Yamaha 'expect to show three or four surprises'.

Z

• **Zimbelman:** no information available.□

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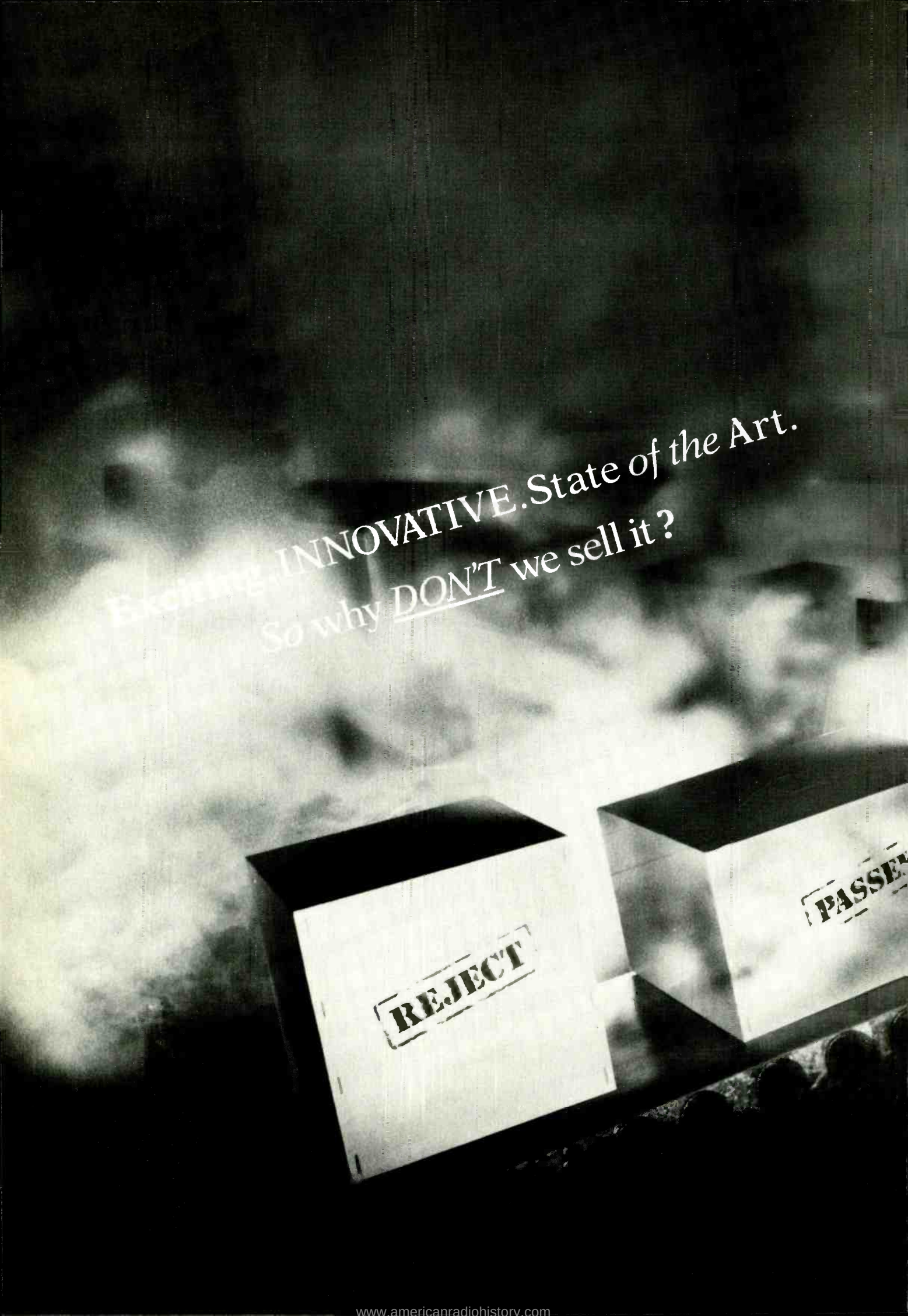

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YAMAHA R&D

Yamaha have recently set up a research and development studio in London where producers, engineers and musicians will be invited to use, comment and talk. Report by Janet Angus

The Japanese Yamaha company's continuing inroads into professional audio have recently been reinforced with the opening of a European research and development facility in central London. Comprising a full-blown working recording studio and featuring the full range of Yamaha instruments and equipment, they are seeking to establish a working relationship with the UK's top musicians, producers and recording engineers. The feedback from these will find its way to Japan and eventually on to the production line.

In typical Japanese style, the building is furnished with a Yamaha (three crossed tuning forks) logo carpet throughout with a spectacular replica of this logo suspended from the ceiling in reception. Their identity well and truly established, the Eastlake-designed recording studio in the basement is packed with Yamaha products.

The central research area is in the control room where there is a 40/24 Yamaha mixing console. Custom built for the centre, there are no plans to produce it since the market for these large expensive products has been pretty well sewn up by other manufacturers. Yamaha is only interested in mass earners: new products, new ideas.

The control room

The tape machines are therefore by Otari *(MTR90* and *MTR12)* with Dolby *A PS2* noise reduction and a Sony *PCM-701*. Studio engineer Guy Gampbell explained that any non-Yamaha equipment must necessarily be very familiar to industry standards in order to ensure that visitors can immediately get to grips with the system and concentrate on the project in hand.

Main studio monitors are Quested *Q412*s, with the new Yamaha NS10M *Studio* nearfield monitors mounted on the console. Video facilities are Sony Betamax and U-matic and JVC VHS machines with Adams-Smith *2600* synchroniser.

The main area of the control room is taken up with two mobile MIDI workstations filled with Yamaha products. Workstation One is equipped with *DX7 MkIIFD, CX5 MkII, RX5, QX5*, two *TX81Z*, two *FB01*, two *MEP4, MDF1*, three *MV802* mixers, *DMP7* digital mixing processor, two *SPX90* digital processors and a *REV7* reverb, a *MIDIMAX* patchbay and Yamaha *K515* speakers. Two has *DX7 MkII, TX816, TX812, TX802, QX5/QX1, RX5*, two *MEP4*, *SPX90* reverb, *DMP7* digital mixing processor, *MV802* mixers, *MIDIMAX* patchbay and *K510* speakers.

Arranged in several racks built into the control room wall are various items of outboard equipment including, by Yamaha, *REV1, REV7* reverbs, *SPX90* digital processor, *YDD 2600* delay and *GC2020B* compressor/limiter. These are joined by AMS *DMX15-80S*, Drawmer *DL221* and *DS201* and UREI *1176 LN* limiters, dbx *160X*, and Aphex *Aural Exciter.*

Gampell explained the way the facility works: "This is the workhorse end around which the studio functions and through which we carry out our research. The aim of the design was complex. Firstly, we wanted to be able to use it for making recordings in the traditional multitrack environment.

"The two MIDI workstations enable the composition of electronic music with FM synthesis and sampled drums, etc. Both stations have multitrack sequencers and on-board mixing and can therefore function independently of the studio or integrated with the rest of the control room as required. All audio appears on the patchbay of the main mixing console and so you could control it from there if desired.

"We see this facility being used for three purposes:
–for composition, either solely MIDI with the synths being run from the sequencer, or maybe synced with video using the SMPTE video converter;
–locked to tape in the traditional multitrack way;
–making use of the Adams-Smith synchroniser, working with tape and/or MIDI and/or video.

"The idea is to research into applications of all the equipment in the studio, either all operating globally together, or individually as required."

The control room also has four small speakers located in each corner of the room, comprising what is designated the *DSP-1* 'surround sound' system. Its practical applications in the control room are limited more or less to reproducing Dolby Surround effects for video post-production. Essentially intended for the domestic market in Japan, the *DSP-1* uses similar technology to the *SPX90*; a 4-channel system, it has 24 settings including hall, reverb and effects programmes; it is fully editable and has 12 user-memories. Thus various ambiences and environments may be

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YAMAHA R&D

simulated within the room.

Adjoining the control room is a smallish studio with folding dividing doors which may be arranged diagonally across the room for separation. The main feature of the studio, however, is the Assisted Acoustics System with which Yamaha is experimenting. It is intended to optimise a room from a performer's point of view to enable the best possible performance from that musician or ensemble. Applications are expected to be wider reaching than mere recording facilities, with concert halls, rehearsal rooms, churches, and all sorts of buildings already considered where the acoustics need improving, altering or the ability to be varied.

Based on the simple principle of listening to the sound in a room, treating it and feeding it back in, an infinite number of acoustic environments may be simulated. Because of the small nature of the R&D studio, the system installed here is an 8-channel one, although it is expandable up to 16. In each corner of the room there are two Yamaha *NS1000* speakers mounted in the wall—one horizontally, facing into the room and above this the other facing up to a reflector that beams the sound back out into the room.

Four Schoeps *CMC5* ambience microphones are suspended from the ceiling, each generating two channels of information and individually editable through a small PC.

Gampell: "The system is totally software controlled; there is no limit to the acoustics it can recreate—reverb programmes, early reflection programmes, any combination you want. There are 10 acoustics per file, five of which are at any time loaded into the remote control which the performer may then adjust to create exactly the environment he wants. There are approximately 90 parameters per setting.

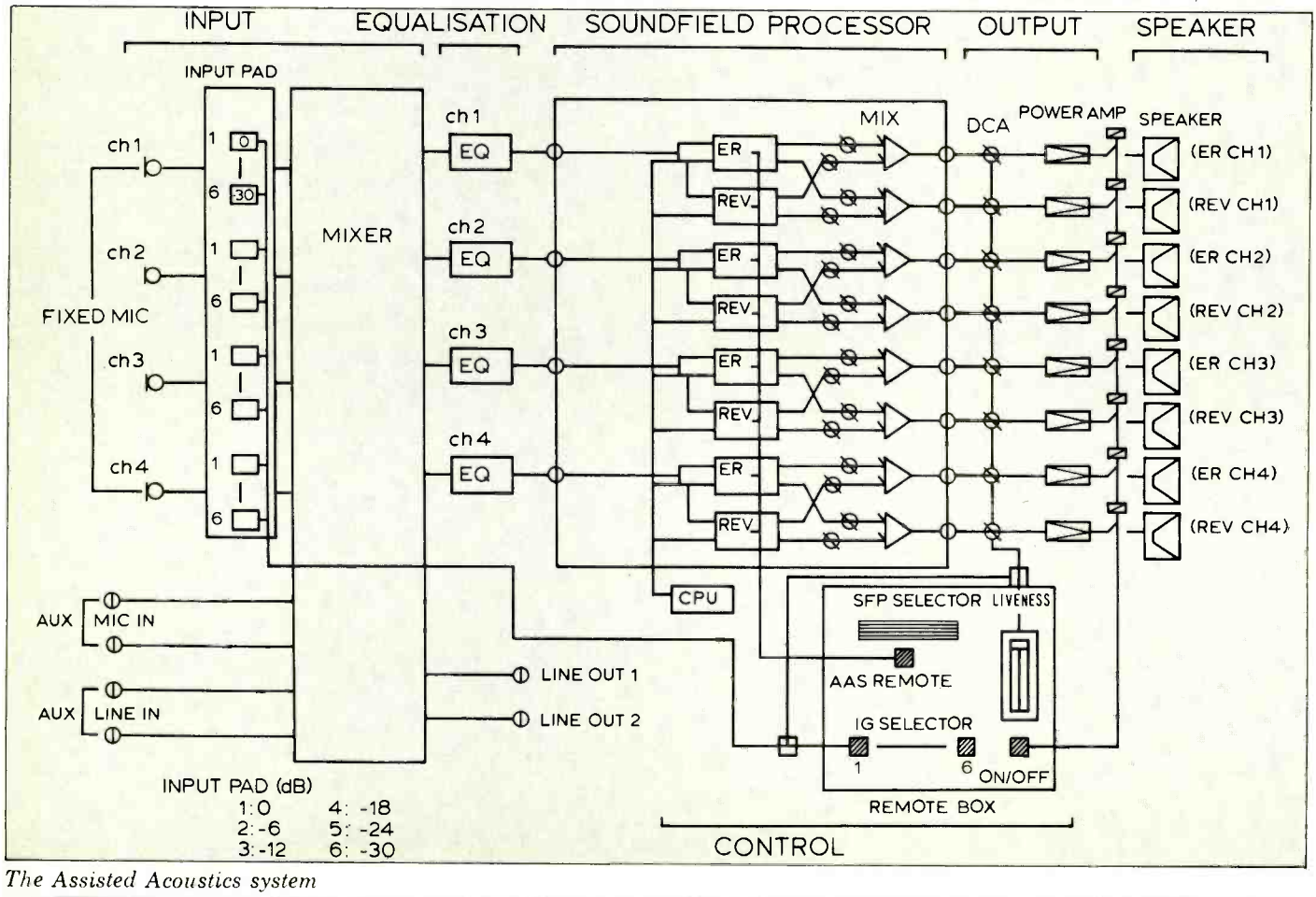
"The microphones, being omnis, can theoretically be placed anywhere in the room. Mr Shimizo, the designer, told us that the placing of the group is not that critical but the actual spacing between the four microphones is."

Internally the system is mostly hand-built and rackmounted in the isolation area between control room and studio. These include a Yamaha mixer, which controls only level and EQ and routes to the bank of eight digital processors, interface systems and amplifiers.

"Because the PC is talking in MIDI we may develop MIDI control software but with the room digitally controlled it is possible to alter the sensitivity of the microphones (the digital balancing system comes into play). Being rackmounted, theoretically it would be possible to produce this as a portable system for theatres and concert venues.

"There are currently three working models in operation: one at Yamaha R&D in Tokyo, one in a Japanese Chapel where they wanted to change the acoustics to suit the organ, and this one here in London. The reason we have installed it here is to gauge reaction. It would be very easy to develop it from this current format."

In order to accommodate the AAS, Eastlake's



The Assisted Acoustics system

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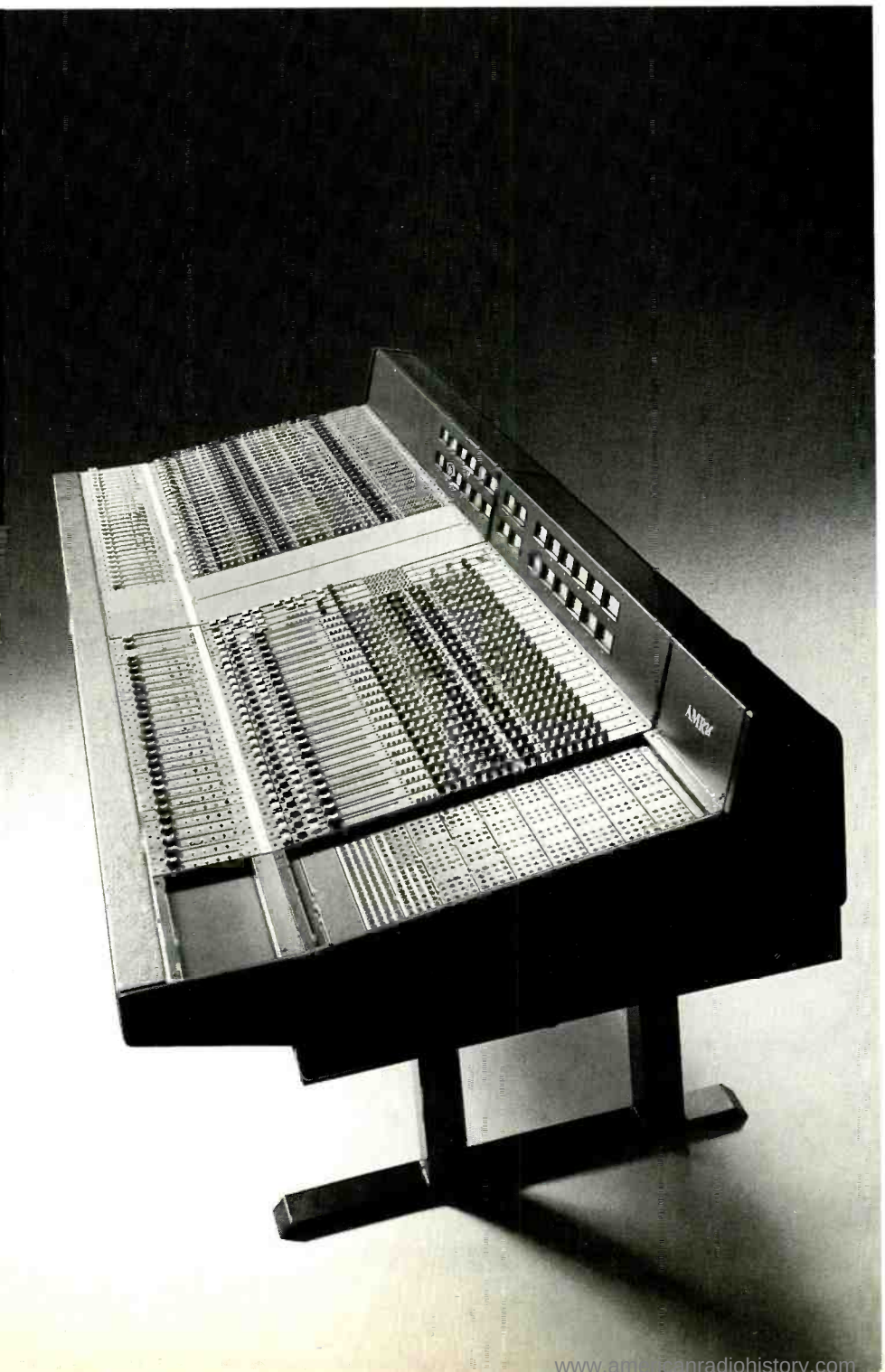

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YAMAHA R&D

David Hawkins was required to produce a room with an RT of 0.2 s.

"With a high density of early reflections but short reverb time, very little of what you hear is the room. For installation in existing recording studios, Yamaha engineers would probably need to deaden the room first. Mr Shimizo told us that it is much easier to put the system into a large room, so this one provided them with a lot of fun! In a large room, using all 16 channels, you could create different acoustics in different parts of the room.

"The main point of it, though, is the psychoacoustic effect on the musicians, enabling them to sing or play better. I recorded a bassoon quartet recently and allowed them to choose their own setting for the acoustic. Unbeknown to them, I switched the system off and although they didn't actually notice I had done it, their ensemble went to pieces and their tuning and everything was just not nearly as good as it had been with the system on."

Another innovation in the recording area is a Yamaha MIDI grand piano. Based on the model *C3* (5 ft) grand, this piano is equipped with MIDI although there is no mechanical interference with its action. Electronic sensors feed information from the hammers into the two MIDI processors and the piano's performance continues unadulterated in any way. It is, however, able to utilise any MIDI processing it chooses; the two built-in processors each having two separate outputs. Any combination of voices may be selected with different transposition on each. Other features include pitch bend and modulation wheels and 64 on-board memories. One advantage of this system is that you can record the piano part, with particular attention to the performance and choose the MIDI voice for it at a later date; thus the player doesn't get tired and fed up and lose the sparkle in his performance whilst the electronics are sorted out. This piano will eventually find its way on to the general market, for sale at some time in the very near future.

Other equipment in the R&D studio includes a wide range of AKG, Neumann, Sennheiser and Yamaha microphones plus, of course, the full range of Yamaha instruments and equipment. Since the object of the exercise is to research into professional users' needs, any equipment which a producer/performer/engineer may require during his project not already here, would be hired in.

Hitoshi (Eric) Atsumi, the centre's manager, explained Yamaha's presence here in London: "We see this city as being the leading place in the world in terms of pop music and new ideas."

At the end of the year a similar centre will open in New York, making a total of three world centres (including Yamaha in Tokyo). Apart from these there is a small Yamaha studio at IRCAM in the Pompidou Centre in Paris.

In London the staff includes Gampell as studio engineer, Mike Collins, MIDI/FM specialist, technician Dusty Miller, and Eddie Kudo whose job it is to liaise with Japan ("He is hot from our Tokyo design department").

Users are varied: producers, engineers, performers, composers (including contemporary classical composers involved in electronic music) and video. They come either by invitation or at their own request if Yamaha feels they have ideas to exchange and work on together.

Atsumi: "We are trying to keep at the front edge of music technology. We want to invite professional musicians, engineers, producers and academics with advanced ideas to try out, to come here and give us feedback so that we can proceed on the right lines. Sometimes it may be improvements on existing equipment, sometimes completely new ideas, sometimes prototypes and we can have meetings to gauge reaction.

"We need the software knowhow, which is here in London and which we cannot get in Japan. That is the most important thing; how professional people use a particular technology; how to make the most of that technology and produce those products for the end user to make the most.

"We are looking for new markets. We want to be in a position to use our muscle, our advantage. Performers are getting more and more involved in electronics—look at pianos, keyboards and electronic drums. The direction of music technology is very performance orientated."

The arrival of this centre marks a major commitment on the part of this Japanese manufacturer to the European market.□

Eastlake Audio found the project to build a studio in the Yamaha R&D centre an interesting challenge as previous projects have largely been in the music and broadcasting fields.

Biggest challenge of all was probably the location itself (described by David Hawkins as 'hostile') with its close proximity to not one but three underground railway lines. David has become quite an authority on the subject.

"Recordings in many London West End studios are influenced by the running of the underground trains," he explains. "Whilst the degree of penetration is most directly linked to the distance from the tunnels, the condition of the rails and the weights of the trains which pass are also important factors."

Critical times include heavily laden ballast trains during the early morning and packed commuter trains during the rush hour—particularly when a studio microphone is being followed by a high level of gain.

When Eastlake became involved, the overall plan for the building was already complete with the basement allocated for the studio area. Immediately above this was to be the ground floor musical instrument sales and demo area creating additional isolation problems for the studio below.

"A survey revealed the Jubilee line tunnel stratum at 14 m vertically below the basement floor level. As it did not pass directly underneath, the diagonal distance was 45 m. Luckily the Jubilee line is a recent construction and the joints are welded rather than rivetted. This made the design of suitable isolation systems less daunting."

A site survey of the noise and vibration penetration identified the minimum degree of additional isolation required: improvement ranging from 5 dB at 63 Hz to max 16 dB at 160 Hz (the vibration centre).

The floor designed to meet these requirements was based around glass fibre cubes loaded with concrete weighing 240 kg/m^2. The design aimed to provide the dead load of the concrete in the form of standard 600 m^2 pre-cast concrete slabs.

"Although it took more time to construct the floor in this way than it would have taken to pump concrete from a truck down the stairs to the basement, it has major advantages should any change be required to the floating floor geometry during the life of the studio."

It also meant that when the building lease expires it will be a relatively simple task to restore the original floor levels etc.

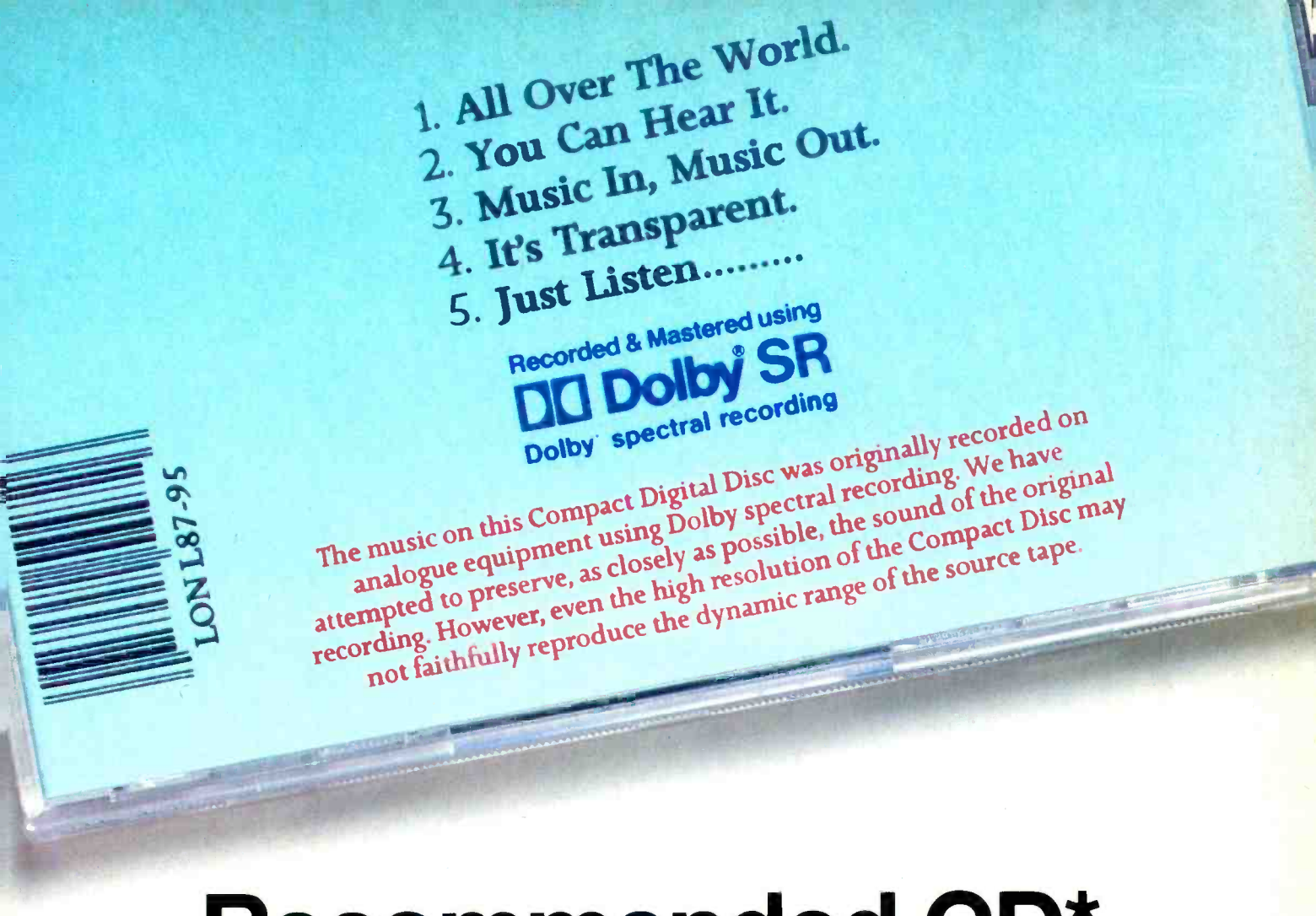
Apart from isolation constraints, Eastlake's brief demanded specific RTs optimised for the Assisted Acoustic System, which was then under development. Conventional timber stud/gypsum-board walls and ceilings were employed with membranes of sheet lead suspended around each wall and over the isolation ceiling to bring the LF performance of the walls to the required values.

In the studio area solid hardwood flooring was installed as well as in the vicinity of the mixing console in the control room. Wall surfaces are a mixture of acoustically transparent fabric and stained hardwood (Japanese Ash) panelling.

"The isolation values which exist between the control room and studio are unusually high—better than 45 dB at 63 Hz rising to more than 65 dB at 1 kHz. There are two reasons for this: firstly because of the presence of four structural pillars we were forced to form a wider than normal lock between the two areas. Secondly the floating floor was designed so that whilst the control room and studio are each totally separated structures, so too is the lock a totally separate and integral structure. For this reason we were able to incorporate within it a very effective guitar amplifier/speaker isolation booth which provides a high degree of acoustical isolation from the studio."

The proof of the pudding is in the eating and standing in the storage area next door to the control room you can clearly hear the tube trains going about their business. Once inside the control room and studio areas the noise is inaudible.

David Hawkins found the Yamaha project, although relatively small, a very challenging and interesting one with its variety of design demands. Is it going to herald the dawn of a new breed of facility for R&D? The cost involved would tend to suggest not.□



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PANDORA'S DAD

Tim Leigh Smith visits a small company designing digital audio disk systems. The first was for Quantel's Harry to provide stereo audio and things have developed from there

Pandora's Other Box ("It must be a video company with a name like that," someone said) is a small company with a number of useful devices to its credit. Most of these are video equipment but the latest development is a multichannel Digital Audio Disk (DAD).

To begin at the beginning: Pandora was a generous Greek lady, her name means 'All-giving', and according to legend the first woman, created to punish man for having acquired the secret of fire. She had about her person a box that contained exactly the sort of terrible things that insurance companies go into small print about. Opinions differ over how the box came to be opened but it is generally agreed that everything was all right up 'til then. Now we have muzak in lifts, the tinny clank of personal stereos everywhere and the Copycode concept.

Pandora's Other Box is, of course, quite different. The company was started by Steve Brett whose early interests included music and electronics. Several years ago he got involved with hardware for the *Digi-Grade* telecine control system, which is the equivalent of a mixdown computer for telecine. It stores parameter changes—colour balance, contrast, sound level, transport control, etc—and reproduces them as required.

When *Digi-Grade* needed a software expert Steve thought of Martin Greenwood. They had both worked for an electronics component firm before Martin, who has a flair for software, went to Middlesbrough to study computing. Together they developed the hardware and software for *Digi-Grade III*. This eventually led to the establishment of a manufacturing wing for the things Built By Pandora.

Rushes, one of the many video post-production facilities in London's Soho, had the first *Digi-Grade III*, and contacts there led to several other projects for Pandora's Other Box. As Steve says, the facilities companies are very competitive: "If they can get a box which enables them to do something quicker than the guy down the road they will pay for it."

One of the boxes Rushes bought was named *Harry*. This is a realtime random access digital video disk recorder with a natty control system, made by Quantel—of digital video effects fame—ideal for TV commercials makers who wish to combine quality with complexity of clever effects packed into a few seconds.

The random access bit means that a couple of thousand frames of video stored on *Harry*'s four 470 Mbyte disks can be replayed in any sequence. The basic running time would be over 80 s but frames can be repeated for freeze frame and slow motion. Rushes went for greater flexibility with eight disks to store about 170 s.

The control system is based on the pad and pressure-sensitive pen used in the Quantel *Paintbox* video graphics device. Operations are selected using the pen to move a cursor around a menu on the screen then applying pressure on the pad. In edit mode, three 'strips' of miniaturised images are displayed vertically down the screen, creating an effect like a film editing bench that has been nicknamed the 'Videola'.

Images are inched along by positioning the cursor on a strip and moving it up or down. Placing the cursor on a scale alongside a strip and pressing causes that strip to run at a selected speed, continuously variable from fast forward to fast reverse. Frames or groups of images can be repeated, deleted or moved from one strip to another to create a final image using cuts, dissolves or chromakey, not to mention all the additional manipulation possible with an associated *Encore* effects system or *Paintbox*.

As an afterthought Quantel provided *Harry* with a basic mono audio guide track. Rushes wanted something better: digital stereo audio to go with the digital colour video when editing commercials and pop promos. *Harry*'s ability to leap about from frame to frame in any order tended to confuse devices designed to reproduce sequential information related to timecode. What was required was a totally random access digital audio disk.

There are two main considerations in this sort of game: how you handle the data and how the user interface works. It has been suggested that anyone can get data on and off a hard disk with the SCSI chips around now, the clever bit is doing it right. Steve Brett and Martin Greenwood in Pandora's Other Box were faced with a range of options as Rushes discovered what *Harry* could do.

Steve Brett: "We didn't really know exactly where it was going to end, so the approach was to make the hardware very, very powerful so that we could do everything later in software. Once the hardware is designed, it's fixed. There's no

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PANDORA'S DAD

point in using a computer that only just does the job. We're not really concerned at this point with how much it costs, although that does come into it later, it's only a few pounds difference. We're not in a consumer market producing something for a price, we're in a professional market producing something that does the job. So we put a 32 bit microprocessor in where we could probably have done it with a 16 or 8 bit one, but obviously there's a lot of potential there to do more in software as the machine runs faster."

Rushes settled for 4½ minutes of 16 bit digital stereo on a 50 Mbyte disk that could either follow or trigger *Harry* and stay in sync. An essential requirement was the ability to rock and roll together to find cue points in sound and/or vision. The DAD, inevitably known at Rushes as 'Harry's Dad', handles audio in frame-sized chunks, providing one frame's worth of sound for each frame of picture.

"We could theoretically just link samples together but it would be meaningless. We can cue to an accuracy of one sample, rather than one frame, which is all you can do with video. That's probably not worth a light in video terms but it's nice to be absolute. You can't get it any better so it's got to be good enough."

The DAD control panel includes an electroluminescent visual display with five 'softkeys' for occasional functions, numeric keypad for entering timecodes, etc, and a set of keys to select regular functions such as play, record, stop, cue, sync, jog, varispeed, shuttle and remote.

A rotary control drives a shaft encoder to jog the DAD frame by frame in either direction, to search the disk in varispeed up to double speed, or to skim the disk picking up spots of audio in shuttle mode. A single frame of audio lasting 1/25th of a second at normal speed is audible but it is hardly identifiable, so in the job mode each frame is repeated to produce a recognisable burst of sound.

Once Harry's Dad was settled in, they turned their attention to other DADs. A lot of people expressed an interest in a multichannel digital device. Such a device should be available from Pandora's Other Box by Christmas. Storage capacity is no problem. The SCSI drive interface accepts up to seven disks each of around 300 Mbyte which it treats as a single drive.

"For multichannel use the problem becomes the bandwidth of the bus transferring data on to the drive. Obviously there's a limit to the amount of data you can put up and down that, something like 4 Mbyte/s, so we use more than one drive. The original DAD was on three PCBs so we put that on one board—sounds easy—and we added a sort of local area network. If you plug two cards in they talk to each other but essentially it's two separate machines in one box with separate drives."

Each board handles two channels, so 24-track means 12 boards and 12 drives, but there are no tracks wasted on timecode. The maximum number of channels is limited by depth of pocket rather than the system. Any of the tracks can be recalled and resynchronised individually. Steve Brett points out that for dubbing purposes a DAD could have one stereo pair with an hour or more storage and several effects tracks with smaller drives providing only a few minutes storage.

"We have true random access to anything anywhere, within the limitations of the few milliseconds it takes to turn the drive on. It can get any data in about 20 ms, which is instananeous enough—you wouldn't notice it when you push the button. For use in video editing applications we give it a pre-roll of one frame which takes care of finding any data."

Rushes have already ordered a second DAD to work with their Abekas *A64* digital video disk. Steve Brett thinks the price of the multichannel version will be competitive so that Pandora's DAD can find its place in purely audio applications as digital tape has. There is the obvious attraction of being able to take a tape off and keep it. This is not practicable with hard disks but the DAD can be software configured for digital audio input or output to any standard including R-DAT.□

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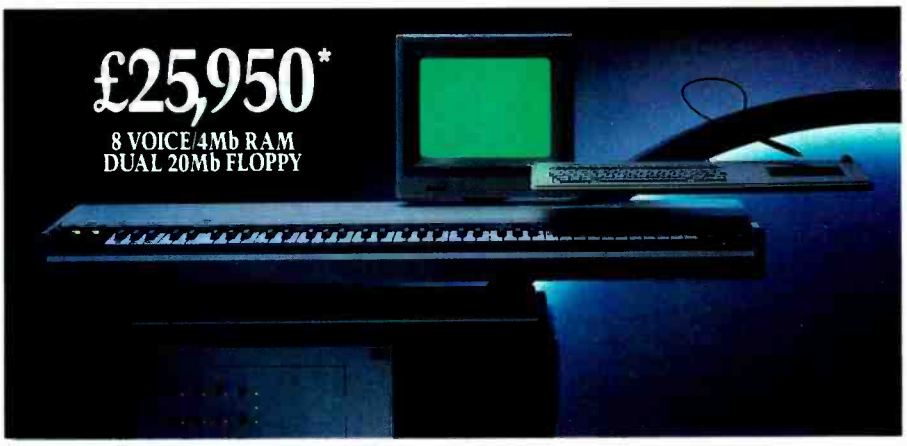

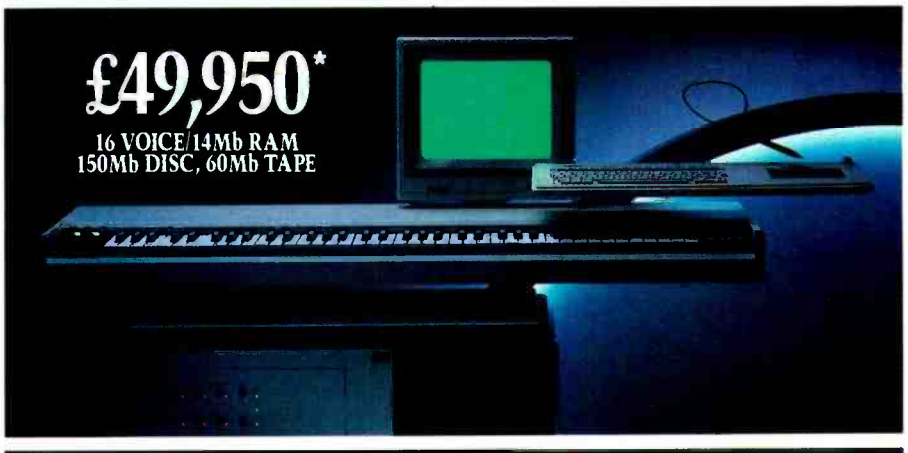

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*Prices effective as at July 1, 1987 subject to change without notice. Systems above 16 voice require external rack-mount units (not shown), delivery late 1987. £25,950 system does not include music keyboard.

TREBLE WATSON + MORE FAIRLIGHT

ALL UNDER CONTROL

A call for more considered labelling of controls and functions from music technology consultant Martin Russ

You probably don't give it much thought but most of the front panel controls you use every day, are really only representations of their function, rather than explicit indications of their action. As an example, take the old fashioned lever switches you see in old horror films—the action is completely obvious: when you open the circuit, or close it, the action is quite literally the function.

On today's studio outboard equipment, switches and knobs have less immediate effects and are not as obvious—take the standard symbols for on and off on most European electrical goods, **Fig 1**. The vertical line for On, and the dot or circle for Off, are not obvious symbols for an on and off and it is really only through familiarity that we know their meaning. Conventions like these are more common than you think—what about volume controls? If you think about it, both sliders and rotary versions only show you visually a representation of the current volume level relative to its maximum and minimum values. In fact, the mechanical arrangement here plays a very important part in the picture you have of how it works, **Fig 2**.

The picture you have of how something works, like a rotary pot, does not always help you: take a multiturn potentiometer—did you know that it uses either a reduction gearing arrangement or a spiral track-based system? In this case the implementation does not affect the visualisation, since functionally the two types have the same end effect—you perceive only a control that can be turned through several complete rotations instead of just through 240°. Or how about meters?—the angle of deflection of a needle or the height of a bar-LED display are again just symbols to represent real values.

But it's obvious

It is interesting to see just how ingrained some of these conventions are. As an example, many manufacturers of modern mixing desks have display systems that can show how the desk is configured on a TV monitor. The display is usually little more than a representation of the sliders and control knobs much as you would find them on the desk itself. Because the conventions are well-known and in most cases 'obvious', they are usually the natural choice for using on this type of display, and because they exploit ingrained knowledge, such displays become easy to interpret after only a short time.

Of course, in many cases it is much more convenient to represent the internal action in a simple way rather than by an explicit diagram. It is probably a very good thing that the control marked 'colour' on a colour TV doesn't try to show you the effect it has on the three colour gun drives. In a similar way most synthesists know almost instinctively what the control marked 'frequency' on a VCF does to the sound, but usually have only a very sketchy idea of why it is called the 'frequency' control or what it does to the waveform itself. What would they make of the symbol shown in **Fig 3**?

This symbol attempts to show a low pass filter with a variable cut-off frequency, as in most analogue synthesisers. Technical symbols like these often expect a high level of user knowledge and are therefore limited in their application. In this case the term 'cut-off' frequency' and its effect is well-known and a symbol is not usually needed.

When there is no established model for the operation of a piece of equipment, the problem of effective representation is obviously much more difficult. A well-known example is Yamaha's *DX7*, where very few people have a clear idea of what happens inside, and so all the editors and displays of the inner workings of FM use the same names for identifying parameters as the manufacturer gave them in the first place. How would you use a picture to show a Modulating Operator's Output Level? Could you think of a shorter word to convey the same meaning when associated with a simple symbol? This is not to say that it is impossible to represent FM by pictures but perhaps that no obvious pictorial treatment is established for this subject, **Fig 4**.

Similar problems are encountered with most hi-tech equipment—how do you convey the use of a control knob in a couple of words when the operator's manual devotes a whole chapter to it? On well-established ground like Volume or Balance there is no problem but what would you do to label a button which inverts the phase of a control voltage at a rate set by a Low Frequency Oscillator when active, and does nothing when inactive?

Chips with everything

With the trend to fit microprocessors into almost every piece of equipment it is very easy to give some feedback to the user of what he is doing. In fact, with the advent of the single master rotary controls on some pieces of equipment, where the display is used to indicate which parameter is being changed by rotating the control knob, the LED display, LCD or TV picture is an essential

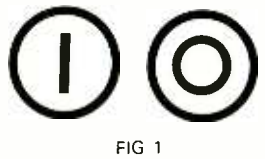


FIG 1

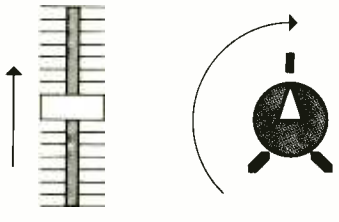


FIG 2

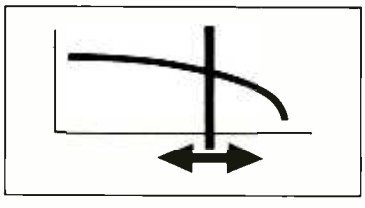


FIG 3

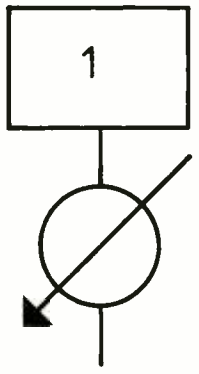


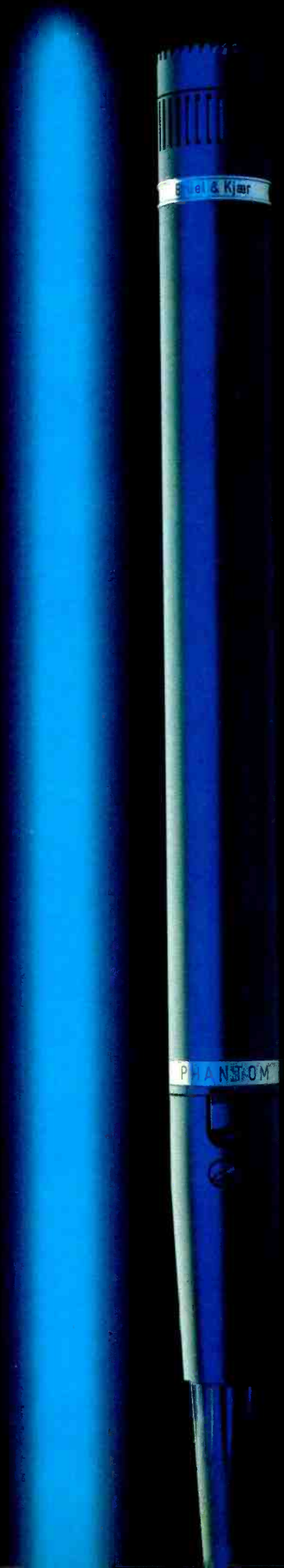
FIG 4

The Brüel & Kjær Cardioid Microphone

A Work of Art

The type 4011 Cardioid Professional Microphone joins the Series 4000 range of Professional Microphones — the product of ten years of research and development by a team of dedicated specialists. The 4011 is a prepolarized condenser-microphone, with a first-order cardioid directional characteristic which combines a flat on-axis frequency response with a uniformly smooth off-axis phase and frequency response. The type 4011 can handle 158dB SPL before clipping. Coupled with extremely low distortion, this gives the type 4011 a sonic performance unequalled by any other cardioid. These design features open up a wide range of application possibilities.

The work Brüel & Kjaer's engineers have put into the design of this microphone ensures that it will not become readily obsolete due to rapid advances in technology. The craftsmanship and materials involved in its construction are what make the difference between a good microphone and a superb microphone, and allow the 4011 to be called, justifiably, a work of art. Its technical specifications paint ar impressive picture, but there's more to it than that. Put the 4011 to use and you'll find that, for once, what you read translates into what you hear.



Brüel & Kjær

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87-285

ALL UNDER CONTROL

part of the editing process, **Fig 5**.

So with digital control of a wide range of equipment it has become possible to provide displays internally or on TV monitors, of the state of the internal workings of a piece of equipment. Now although it is easy to provide an indication of the current state of operation, it is not as easy to display it imaginatively or effectively. Most current hi-tech equipment seems to show the required information in a very technical and dry form, probably because of time constraints in the design stage and unfamiliarity with what is possible. It is comparatively easy to write software that displays the first parameter and lets you alter it followed by the next parameter, etc. This sort of system does not utilise an 8-bit microcontroller/microprocessor's power to any marked degree but has the advantages of being simple to implement and requiring very little development time. When 16-bit processors are used inside equipment, the scope for improving the display expands enormously, although this can cost more in development time. As an example of the sort of thing which is possible, let us look at the user interface of a few personal computers.

User interfaces

The user interface is the environment you use to get the computer to do things. The keyboard and screen are the major elements traditionally associated with this function on most computers. To give the computer commands you type in mnemonic or plain English-based words and press the return key. The computer then interprets your command and carries out the required action. For use with games the keyboard is usually not very quick or efficient and is usually replaced by a joystick or tracker ball, where movements of the user's hands are converted into commands to move objects around the screen, etc. The direct relationship between the movement of your hands and the movement of the controlled object is immediately apparent and is quickly grasped.

The presence of the joystick as an intermediary between your hands and the computer soon fades into the background, leaving your mind to concentrate on zapping the aliens. The process of converting musical symbols on a score into the finger movements needed to produce the required sounds is another case where the instrument used as the interface can move out of your immediate attention, leaving you free to concentrate on the music.

Notice that the user interfaces mentioned above—the joystick and a musical instrument—both use simple conventions to enable you to use them. A joystick translates your movements from side to side and backwards and forwards into screen action, while the musical instrument translates your movements into sound. The interfaces on most modern pieces of equipment do not seem to achieve the same sort of effect—rather than disappear into the background, they demand to be in the centre of your concentration. This is often defended by stating that the available options for control are too large to be easily represented and controlled. However, it is possible to make even very complicated tasks simple to manage with a very 'natural' feeling control system.

'Mousey' computers

As an example, the Apple *Macintosh* computer: unlike most computers, on a *Mac* it is possible to do most of the tasks you would normally use a keyboard for, by using a single device—a mouse.

The mouse is a variation on a joystick or tracker ball and is a small object containing a ball, which you move around by hand on any flat surface—it then converts your hand movements into movements of objects on the *Mac*'s screen. The connection between moving your hand and watching an object move on a screen is a very natural activity, despite any preconceptions you may have to the contrary. Instead of LOADing and RUNning 'A:\dir1\work2\FILE*.*' into your computer, you just move the mouse so that the pointer on the screen lies on top of a picture representing the file you wish to load and press the button on top of the mouse twice quickly. To copy the file you merely drag it around the screen by moving on top of the picture representing the file (called an 'icon') and hold down the button whilst moving it to where you want to copy it to.

The use of pictures and mice is not restricted to the *Mac*—many computers (Atari *ST*s, IBM *PC*s and even BBC computers) can now be equipped with similar systems. The major point to remember is that the use of mice and icons enables people to use a computer without needing to know what the commands are. It is not necessary to know anything other than how the mouse works and what you want it to do, assuming you have the right software!

With the combination of using pictures to represent Object, Files and Actions, as well as the mouse to move them around, this approach is a powerful demonstration of what you can do to make it easier to use an immensely complicated piece of equipment. Adding this sort of user interface is not as difficult as it may appear, since instead of having to develop all the code for the computer, the manufacturer can use a proprietary operating system, leaving only the task of writing the high level code in a convenient, easily supportable form. Having introduced the mouse and icon philosophy, let's try and apply it to a few pieces of equipment, showing the sort of interface that you may be finding on your future purchases.

A simple interface for a mixer

Instead of the conventional sliders and rotary control knobs, it is possible to use a display-based system to represent sound as discrete shapes on a screen. You could use the left and right hand sides of the screen to indicate the position of the sound in the stereo image, with the actual dimensions of the shape used to represent the sound having useful meanings. The height of the shape could represent the volume, while the individual EQ for that sound could use one of the sides, **Fig 6**.

Each sound could be labelled with a picture to instantly suggest its nature, thus a bass line would have an associated picture of a bass guitar, or a mouth to represent vocals—more complicated representations depend on the imagination of the user. The pattern or colour of the shapes could be used to indicate effects, grouping of sounds into sets, or any other desired parameter, **Fig 7**.

By using a 3D display (holograms, etc, are usually *de rigeur* for this type of display), it would be possible to represent and control complicated soundfields by moving shapes in space, giving a direct and immediately obvious connection

FIG 5

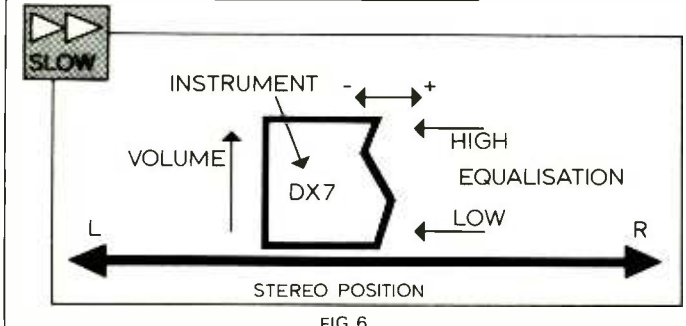

FIG 6

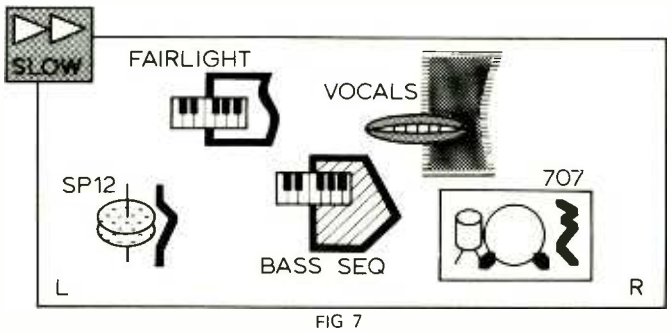

FIG 7

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- Virtually instant random access to recorded segments
- 16 bit CD quality with flat frequency response to 15 kHz
- Playback quality that never varies
- Up to 8 channels available
- Very high signal linearity with low distortion — Less than 0.15 % THD +8 dB
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ALL UNDER CONTROL

between the sound and the pictorial representation of it. Although this may sound unlikely, weird or like science fiction, it is only a simple exploration of the possibilities.

Effects

For a more complex example, let us look at a possible future product by the YamKorRola Corporation– a MIDI-based multichannel digital effects unit. The 'YKR 1250' has 128 assignable channels of time domain effects, things like delays, chorus, phasing, flanging, stereo reverb *et al*, as well as frequency domain effects such as equalisation, filtering, pitch shifting, frequency inversion, narrow band vocoders *et al*, and each channel can be concatenated with others to form sets of 16 composite effects at any one time. Each channel of the composites can be separately MIDI-controlled for all of its parameters, as well as which MIDI Channel, MIDI Velocity, MIDI Key Splits and MIDI Patch Number it responds to. (Just to add a bit of spice to the specifications let's say that it uses 20-bit sampling at 352.8 kHz (8 × the CD rate) and uses least squares maximal sample interpolation when reconstructing the output to give a superbly transparent sound.)

You may be imagining the number of controlled parameters this gives and thinking that it is beyond anyone to control it–but by using a few simple pictorial representations it should be possible to see how to use such a fearsome device without any problems.

Each channel would be displayed, if required, as a channel box showing the MIDI parameters, or the effects parameters. To see the two tagged displays you would just move the mouse to the appropriate handle and press the mouse's button, **Fig 8**.

When not displaying either set of tag parameters the channel box would close down to a small channel box displaying just some sort of indication as to what it does, **Fig 9**.

To chain or parallel boxes you would just move them and join them up in the required arrangement, storing the whole composite set in a composite set box, **Fig 10**.

A closed down version of the composite set box would be used to show you what the 16 available sets were doing at any one time. The current setup would be stored as an icon representing the 'YKR-1250s' front panel, which could be stored as one of a number of possible setups, including several standard settings for initial learning or reference, **Fig 11**.

So to use the '1250', you just power it up, and move the mouse to the setup you wish to use. Once selected you can choose a composite set of channels to display and edit if you wish, or just listen. If you wish to edit a single channel within a composite group you just select it and choose the MIDI or delay parameter display. That is one power-up, one move and click for the setup, one move and click for the composite set and one move and click for the editing–at this point you perhaps begin to see the power of the system. With only a few moves and presses of the button we can move from the top level of overall control, down into the lowest level of parameter editing, without any recourse to the operator's manual or aimless button pressing.

FIG 8

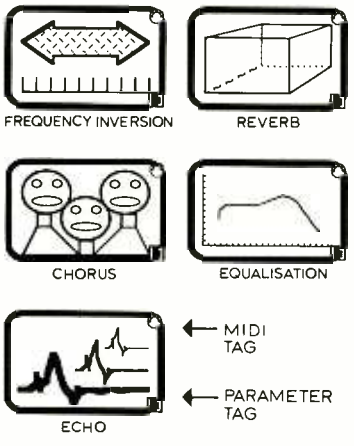


FIG 9

The problems

At the time of writing I only know of a single piece of test equipment that uses a mouse as its major user control–it is a spectrum analyser designed and built in the UK. AMS's *AudioFile* has gone some way to providing a better user interface, although it is still very biased towards the use of text rather than being graphics based. The reason for this limited exploitation is probably two-fold. Firstly, the image and saleability of a plain box with 'YKR 1250' on the front panel, connected to a mouse and TV monitor is currently poor–look at hi-fi for numerous examples of fashionable front panel clutter. Secondly, the extra complexity and unfamiliar development process involved with producing 16-bit processor-based equipment may deter would-be innovators. Hopefully the benefits of a better control method will soon produce some revolutionary products and cause reverberations throughout the industry. We currently seem to be at an intermediate stage where MIDI has begun to be used as a method of controlling sophisticated outboard equipment, by using an external personal computer as a user-friendly front end.

Predictions

The prevailing trend to sell pieces of equipment with very simple user controls, leaving the development of more advanced computer-based systems to third parties, is OK until you reach the stage where the third parties start to make large amounts of money–at some point a manufacturer will realise that another market opportunity is ripe for the taking. So look out for firstly retrofit updates to software, like the recent upgrade of the Korg *Poly 800* (is the digital delay just software?) or the rumoured replacement operating system for the *DX7 I* and *II*, which replaces all the parameter editing with a much more usable system. Or how about a video output so that small, unreadable displays (16×2 row LCDs for example) can be replaced with a more comprehensive and informative version on a TV or RGB monitor. (. . .seems like Roland have beaten me to this one!) Swiftly on the heels of developments like these will come mouse-equipped 16-bit computer-based general purpose widgets, much as I have discussed above, which will be disarmingly easy to use.

Conclusion

This article is not as far fetched as you may be thinking. As a parting example try asking a few school-kids if they can read a non-digital (hands and dial) type watch and thereby tell you the time. Conventions like digital watches seem to have crept in without anyone noticing–so perhaps you had better expect a mouse with your next piece of outboard gear!□

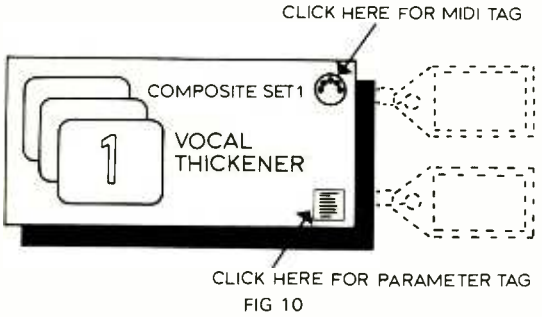


FIG 10

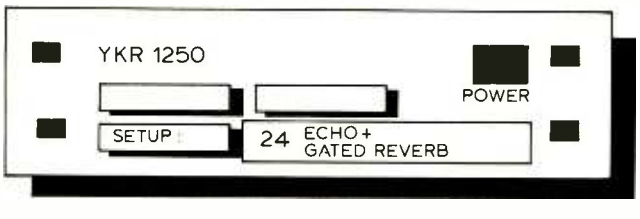


FIG 11

Sidetraker

The NEW Eq. system featured on the CONCEPT 2200 - 3200 - 4400 - 6400 and 8400 range of consoles

'Sidetraker' 6 fixed frequency active filters with centres at: 12.5kHz, 4.5kHz, 1.5kHz, 500Hz, 150Hz and 60Hz. ± 12dB
AND
1 high-Q filter sweepable from 50Hz to 5kHz and adjustable from -24dB to + 6dB

Although varying in performance and complexity, most Eq. designs have followed either of two classic principles:

parametric: or more usually 'semi-parametric equalisers are almost universally used on console input channels. Normally comprising four filters, two (or sometimes four) of the filters can be 'swept' up or down the audio band to centre on the exact frequency needing attention.
Proven to work very well, semi-parametric eq's have two major disadvantages:
1. A tendency for audible phase shift 'ringing'
2. A limited ability to control the entire audio band at one time
For example: having used the 'high mid' to suppress the 'edge' on a singer's voice, there is no facility left to boost the critical 'presence' frequencies that lie either side of the unwanted frequencies that have just been cut.

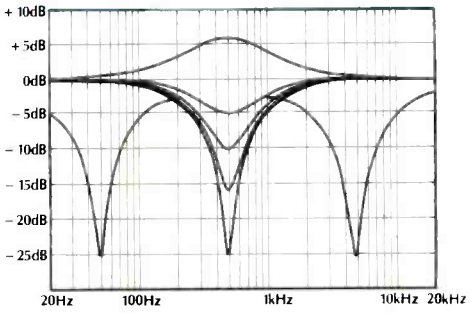
graphic: normally used for system and room equalisation, graphic equalisers use multiple, fixed frequency, fixed bandwidth filters, to generate gentle, essentially phase-free control over the entire audio band.
The graphic principle has one major disadvantage:
1. A limited ability to control narrow band problems.
For example: although frequencies in the 'presence' band can be easily and cleanly boosted, that annoying 'edge' to the singer's voice gets boosted as well.

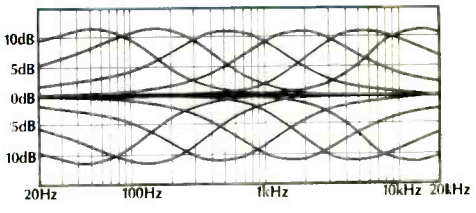
Up until now Hill Audio has uniquely offered the graphic solution on their consoles, believing the ability to keep good control over the entire audio band is preferable to having greater control over just part of it.

Now Hill Audio has the best of both worlds! 'Sidetraker'

The 'Sidetraker' Eq. system provides continuous control over the entire audio band via multiple, phase-coherant, fixed frequency active filters, PLUS a sidetracking, high-Q filter that can be swept over 7 octaves, enabling narrow band 'spot' frequency correction without any effect or compromise of the main Eq.

Now you can cut the 'edge' AND boost the 'presence' at the same time!





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Hill Audio

MARTIN POLON'S PERSPECTIVE

The scene: London some years from now (it might just as well be New York)
The place: A large recording studio
The Time: Late morning
In the main office of Digizap Recording, the owner George is seated at a large wooden desk with his head in his hands. He is turned towards two individuals—a man and a woman. The two are dressed in so much polyester that George worries his lit cigarette could start a conflagration. Then George decides that no, being civil servants and all, their cheap clothes would be treated with fireproofing. The two begin talking to George.
Man: "You have forgotten again to file your 'Professional Digital Tape Recorder—Monthly Exemption From Copycode' report."
George: "But I don't have the time. I'm trying to run my business. The bloody form is 12 pages long."
Woman: "That's no excuse. All this now requires you to file a report on the 'Explanation Of Failure To File Digital Copycode Exemption'."
George: "I have had that form on order for over three months. The Central Store is out of stock."
Man: "That does not exempt you from the legal requirement to file. You have your obligations."
Woman: "And what about your 'Monthly Log Of Alien Performers Subject To Withholding of Wages'?"
Man: "And what about your monthly report on 'Value Added To Creative Endeavour By The Recording Process For The Purposes Of Taxation'?"
Woman: "And where is you current year's copy with monthly updates of your 'Microprocessor-Based Equipment Purchases And Usage Log' to prove you are not smuggling higher technology to the Trans-Eastern Bloc?"
Man: "We need to see the urine test results for this month's drug testing of your staff."
Woman: "You have forgotten to renew your Resellers Permit for buying blank tape without tax."
Man: "Oh yes. That reminds me. I must view your 'Professional Exemption From Consumer Royalty On Blank Tape Used' to see if it is current."
Woman: "We need to see proof of your establishing pension plans for your employees and of your having liability insurance for your employees and of offering child care on premises."
Man: "About your Workman's Compensation. I can't find any record of your having an ES-1 'Electrical Safety Inspection'..."
George: "STOP! I can't take anymore of this!" (Takes off clothes and runs screaming into the night.)
FADE TO BLACK

Well, gentle readers, what do you think of our little playlet. Another bit of science fiction from the pen of *Studio Sound*'s resident crank? A bit of Orwell (*1984*) mixed into Burgess/Kubrick (*A Clockwork Orange*) with some help from Monty Python? Didn't you see reruns of this routine on Channel 4 midnight Sunday last? Think again. The setting may be science fiction but the reality of government in studio life is science fact! All the above regulations and requirements are currently in existence or pending for passage or narrowly defeated in the legislative branch—of either the United States or Great Britain or maybe both.

Legislators take a tongue-in-cheek view of the recording industry. One fellow volunteered, "My Congressional colleagues view record studios as temples of revenue where artists come to worship the gold disc. They do not separate the fact that the studio is only the physical location where the recording is made. The studio is not the record company. But also, Congress tends to view any business using technology as follows:
If it moves—regulate it.
If it grows—tax it.
If it makes a profit—investigate it.
This may be a bit of an oversimplification, but sometimes I wonder."

Recording studios today are being saddled with the myriad of rules, regulations, forms and bureaucratic control by big and little government that is threatening to destroy small business activity in the Western World today. More than 80% of all small business ventures started in the US and the UK fail during their first year and the legislated snarl is strong reason for calamity.

Herein is a sampling of the areas of studio operation newly impinged upon by government agencies during the last decade.

Legislative remedies for loss of creative profits by third parties:

In the case of DAT (digital audio tape), legislators in the US Congress and in the EEC Parliament have been asked to look at legislative remedies for problems of the artists and the record companies; problems involving illicit copying in the home. The legislators on both sides of the Atlantic have been interested in this view of taxing or limiting technology. It appear that clearer heads may reject the concept of using legislation to control new technology but the fact that the concept received more than a casual hearing is a little frightening. In the US, the proposed legislation does not exempt professional or studio digital recorders from the proposed ban. It allows for the Secretary of Commerce to exempt studios but the intention is to keep a close watch on studio activities and equipment.

Blank tape royalties are another way to supposedly 'equalise' some real or imagined injustice in the marketplace. Now, the point here is not to deny the rights of record companies or artists to proper compensation or protection but just to move such rights out of the pathways of studio operations. Legislation to add royalties to blank tape will add significant costs, and what may be worse, record keeping responsibilities to studio duplicating operations. Again, the legitimate studio could end up paying a penalty for the thousands of bootleg operators making clandestine tapes.

Legislative remedies requiring studios to enforce laws enacted:

Alien Withholding is another example of increased record keeping requirements being placed upon the record industry by government fiat. This one sounds like the government intends to deny ET his ration of candies with a hard candy shell and peanut butter and chocolate inside. In fact, in the United States, it requires all employers to check indentification to verify that employees are legal; either as citizens or as 'legal' aliens. This US posture is part of the new laws dealing with immigration. The financial penalties for being caught with an illegal alien on the premises are substantial. On the surface, in the States, it seems that recording studios would be unlikely to have illegal employees. But there are many categories of employee who could be or are illegal aliens. Illegal means Asian, Irish, Italian and others as well as Hispanic if the individual entered the country illegally or legally without the right to seek and hold employment. A studio could have janitors, secretaries, guards, cooks (if there is a catering capability) and even technical staff fall into the category of illegal aliens. How many US studios have hired British freelancers over the last 10 years without checking their papers? In the UK similar requirements for holding employment have been in effect for some time although enforcement is a good deal less stringent.

Resale licensing of expendables (blank tape, etc) is already a reality in the United Kingdom with Value Added Tax (VAT) and in many US counties and states with sales tax. The principal burden of all of this is the complex bookkeeping such schemes require and the Damoclian threat of closure by the appropriate government agency if these taxes are not turned over in a timely manner. These taxes are routinely applied to 'auxiliary' services and supplies. Tapes that are delivered to a client from duplication, the renting to a client of extra tape recorders and processing equipment during a session, a charge for moving musical instruments to a session are all categories in which such taxation is levied.

Legislative remedies for real or perceived safety problems:

The business of requiring strict electrical inspections of audio equipment to conform to electrical code is a recent trend in the United Kingdom and the United States. Previously, conformity with code for circuits above 55 V was all that was required (that being the theoretical threshold for electrocution). Now, there is a trend amongst regulators to control all wiring and connections that carry voltage or that are in circuits that could conceivably come into contact with higher voltages.

It is virtually useless to try to explain how such accidental contact would destroy hundreds of thousands of dollars worth of equipment as well as threaten human life and that everything in

'The STRONGROOM complex consists of a 24-track mastering studio and a a pre-production programming room, known as The BRIDGE.
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Richard Boote and Dave Formula, The Strongroom

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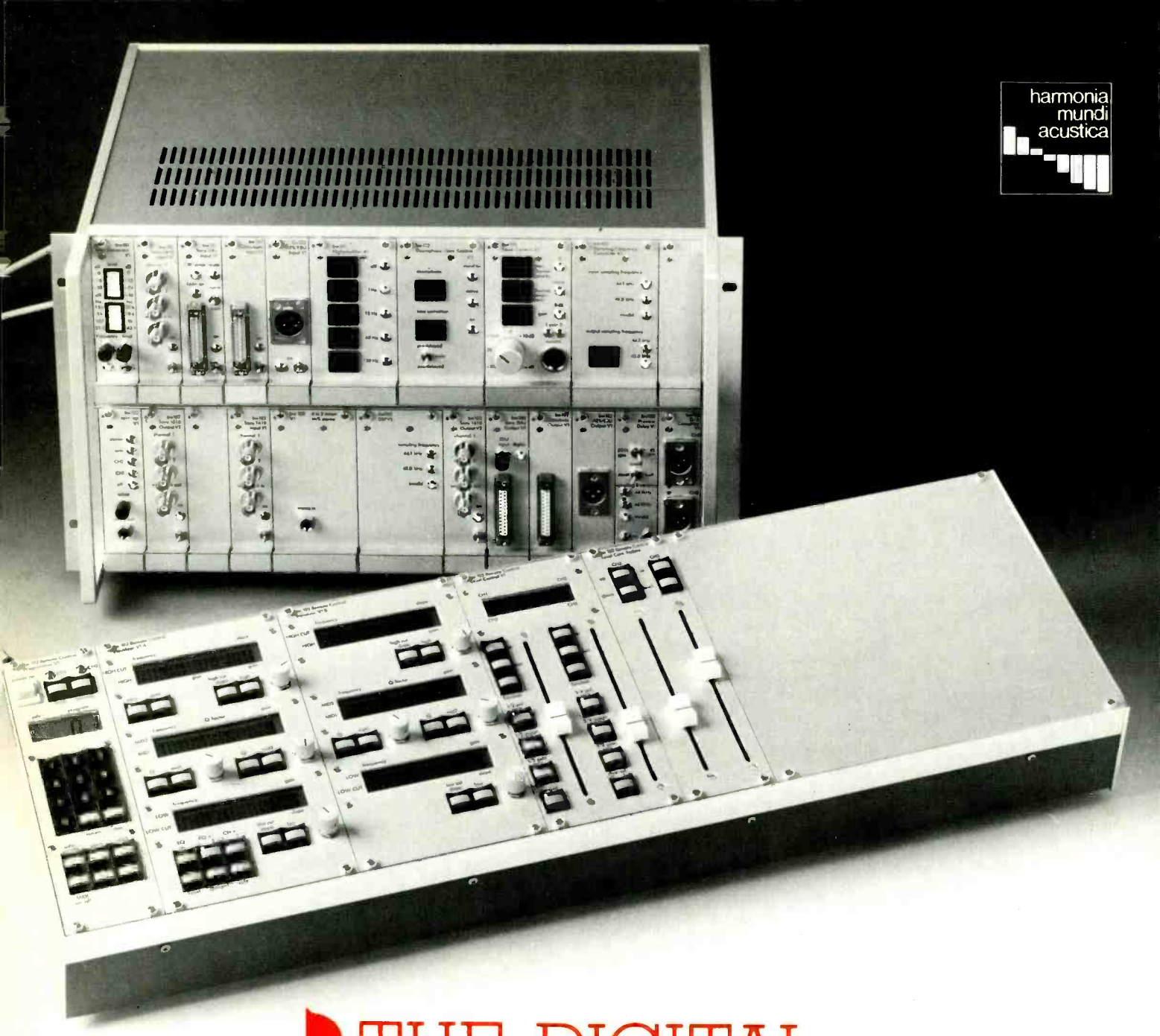

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MARTIN POLON'S PERSPECTIVE

studio practice is done to prevent that from happening. Unfortunately, there have been several serious accidents in both the US and the UK involving home studios and this has been feeding fuel to the regulatory fire.

High sound pressure levels are another area that was formerly avoided but is now beginning to draw regulatory attention on both sides of the Atlantic. In the US, questions have been asked about continuous employee exposure to levels in the range of 110-120 dB SPL-A found in recording monitoring environments. Previous practice was to assume that exposure was infrequent and ample opportunity for recovery existed. A much harder line towards high level sound has been working its way into the regulatory structure due to the potentials for disturbance of non-involved populations during rock concerts. Neighbour complaints have pushed high level sound into the public's eye as well. In the US, a change of administration in 1988 is expected to thrust occupational health issues back into the limelight.

Legislative remedies for increasing government revenue from studio operations:

Perception of studios as the 'pot of gold at the end of the electronic rainbow' remains a very real problem, especially at State level in the US and City level in the UK. Unions have this 'vision' as well in trying to achieve lucrative contracts. The current trend is towards taxation of value added to creative properties and retroactively if possible. In a word—revenue. The plan that has appeared in California and other states is to place a sales tax on the increase in value of a reel of blank tape due to the recording that is placed on it. If a record worth $500,000 is produced, then 5% would go to the State. A similar scheme has been mentioned in the EEC to place Value Added Tax (VAT) on session time in the same way. Fortunately, these measures have been battered down but the inclination of government and others to see the recording studios as having full and deep pockets stays with us. In the UK, some studio owners feel that the practice of their paying the rates (property taxes in the US) whether they lease or own allows the various municipal taxing authorities to levy significantly higher amounts than if "we were running a ladies hairdressing school in the same space".

The imposition of sales taxes on personal services provided during a recording session is another wrinkle being bandied about. I know personal services sounds like the credit card slip one gets from a madam after some form or another of naughty behaviour has been purchased. In fact, it refers to the attempt to have the studios collect tax on the billings of independent contractors working on a session. Such a practice would wreak havoc with freelance engineers, for example, not to mention the increase in studio bookkeeping needs.

In Great Britain, the scheme was devised to make studios the agent for partial withholding of payment to artists. This partial withholding of say 20% ran contrary to the double taxation treaty between the UK and the US. This whole plan was pointed at artists who came to Great Britain to record an album or score/re-record a film. It did not seem to register on the astute minds of the civil servants that such a deed would drive away much of the business of the English studios. Fortunately, the scheme was blocked by industry pressure.

Legislative remedies for perceived social or political problems:

Requirements for pensions, liability, health, child care, luncheon vouchers, food stamps and other social concerns have been increasingly foisted on the recording studio business environment as well as it has on other small businesses. Unfortunately, recording studios do not have the resources to handle these requirements easily. It is not economically viable to build up personnel just to cope with the bookkeeping requirements imposed by government.

Bottom line:

It is a great curiosity that the various plans for taxation that begin, say in a state such as California (where everything weird and wonderful either begins or ends), end up in the United Kingdom. Well folks, surprise! There is no coincidence at work here at all. Tax planners, legislators, drafters of legislation have conventions and professional meetings just as we do. They have their equivalent of AES, APRS, SPARS, ASA, NAB, etc, except they plan at their meetings how to squeeze more taxes out of you and me. And why shouldn't New Jersey planners meet in England with their British colleagues and the British in turn get to study Los Angeles county methods in February (the presence of all that sun is just an unfortunate coincidence). After all, it is tax deductible for them to do so.

Seriously, it is time for our industry to justify that title. We are all going to have to work together to ward off the ever-increasing bite of the vampire of government. The kinds of institutional behaviour that have marked various trade activities in other industries are going to have to exist in audio if we are to retain a modicum of profitability. The AES may not be the appropriate agency nor may be SPARS or ASA. It may be time for a new entity that can lobby and that can fight. We are targeted as the scion of wealthy parents: the record business and the motion picture/television business. We are always going to be viewed as fat cats worthy of increased taxation and/or regulation. We must stand prepared to preserve our recording community.□

BARRY FOX'S BUSINESS

Watch out for fun, games and confusion when CD Video hits the market—supposedly before Christmas but more likely around February.

CD Video is Philips' thinly disguised relaunch of the technically superb, but commercially unsuccessful, *Laservision* optical video disc. CDV was unveiled to the American trade at the Chicago Electronics Show in June. The Americans yawned and said it was re-invention of the wheel. In Europe, however, things could be different.

Because CDV is an analogue format, albeit with digital sound, there will be PAL and NTSC versions, for Europe and the US/Japan. The PAL CDV format will go on sale in Germany first, Britain next. So far *all* the demonstrations of CDV—even in Europe—have been on NTSC format.

In early August it was still touch and go whether there would be PAL equipment ready in time for the Berlin Radio Show launch at the end of that month. All the 5 in CDV discs so far demonstrated have been pressed by the Philips and DuPont joint venture factory at Blackburn, originally built by Philips to press *Laservision* videodiscs. Quality of the discs has, however, been very poor and software companies have complained about 12-week waits. Even though a 5 in CDV disc only holds five minutes of video, it is still a very tight squeeze. Any blemish on the disc surface shows up as a white or coloured dropout, like a radar blip.

Philips tied up with Matsushita (Panasonic/Technics) and Yamaha on CD Video. Matsushita sees CDV as a neat way out of the embarrassing commitment to the VHD videodisc system, developed by subsidiary JVC. Thorn-EMI recently shut down the VHD presses at Swindon that had been producing a few discs for video jukeboxes. And no sooner had the deal to sell off the Ferguson TV and video wing to Thomson of France been signed, than Thorn signed with Philips to distribute the BBC's Domesday laser video discs. Yamaha are already committed to optical video disc and sells dual compact disc/laser video players in Japan, so CDV commitment is logical.

In Japan earlier this year Yamaha complained about the quality of discs being provided by PDO. Matsushita was also pressing test discs but they too were not up to standard. The first Japanese CDV discs (probably from Pioneer) are much, much better. I recently saw an NTSC 5 in disc of Janet Jackson's *Nasty*, which was visually almost perfect. By comparison a Blackburn-pressed Moody Blues music clip disc looked very poor.

Both were, of course, NTSC discs and curiously the pictures on screen also suffered from the same problem that have marred previous CDV demonstrations—a curved Moiré pattern effect on the screen. Engineers say this is not the fault of the CDV system, and blame the Philips NTSC monitors. The same pictures on a Sony monitor look far better but for political reasons Philips will not be seen to use Sony equipment.

Education—by Philips—of the trade, press and public is the key to success for CDV. But Philips has a poor track record on this. Whereas Sony helped Philips spread the message for CD Audio, Sony has so far shown no interest in CD Video and is concentrating on the 3 in CD Audio disc as a 'single' instead.

First problem for Philips on CDV comes with the name. CDV is intended to cover the whole range of disc sizes—5 in, 8 in and 12 in—but the press and trade take it to mean 5 in 'clip' video discs. And not surprisingly there has been no enthusiasm for the idea of a £400 CD player that coughs up 5 minutes of pop music promo.

The real market potential for CDV lays in a £500 Combi player that can cope with ordinary 5 in CD audio discs, 8 in and 12 in *Laservision* video discs, and—if you must have them—5 in CDV clip discs.

Philips has had to change the system name. And it isn't just because *Laservision* carries the smell of failure. It's mainly because there is only partial compatiblity between old *Laservision* and the new CDV in the European PAL format.

Although no formal announcements have been made, Philips and Pioneer both know they will have to compensate owners of existing *Laservision* players (up to 15,000 across Europe) for hardware that the new format makes useless. This is why Philips and Pioneer have soft-pedalled on *Laservision* in Britain for the last couple of years. They knew that every sale would later cost them money.

In the beginning, 10 years ago, all laser video discs had an analogue stereo soundtrack. But in America and Japan, some discs have for several years had 16 bit digital stereo sound of CD audio quality. This is what created the thriving market there for dual video/audio disc players. It was possible because there is room in the NTSC video signal for two parallel versions of the same sound track, one in old analogue and the other in new digital. So in Japan and America old discs play on new players and new discs play on old players.

The launch of CDV there will simply extend this happy situation, so 5 in discs can also contain a 5 minute clip of video.

In Europe things are very different. The new CDV discs, of all sizes, will have digital stereo soundtracks. But there is not room for two soundtracks in the PAL video signal. So the new CDV discs will not have an analogue soundtrack. Old discs will play on the new CDV Combi players, because they will have both analogue and digital sound circuits. But new CDV discs (of all sizes) will not play back with sound on old *Laservision* players because they never had digital decoders.

Even before CDV is launched the scene is set for the next CD format—CD Interactive. CDI mixes audio, graphics, text and computer programs, for exotic games and education. The new CDV players should have sockets for the connection of outboard circuitry to make them CDI compatible. Let's hope they have.

CDI offers the chance to record many hours of sound on a 5 in disc, instead of the usual 60 or 70 minutes. The quality reduces to that of FM radio. Denon has already produced Muzak-style discs and players. This development may lie behind Sony's decision to spurn CDV and instead push a 3 in CD as the new audio single format. The 3 in CD will hold 20 minutes of full fidelity stereo but use of CDI mid-fi coding would stretch playing time from a tiny player and disc to an hour. At last this makes CD a viable alternative to tape for portable stereo. But it leaves the public even more confused by technology overkill and split standards.

Success for CDV will slow the welcome trend to cheaper CDs. Around 50 CD plants round the world can now produce more discs than the record companies want. Simple supply and demand economics have cut pressing price from an unofficially fixed rate of £2 per disc to under £1.50, and almost £1 with bulk deals and arm-twisting. This is why there are now CDs in the shops for £6, £7 and £8. It is also why Nimbus recently had to sack 108 out of 620 workers at the Welsh CD pressing plant—the crumbling price structure has forced more automation. If demand for 5 in CDV disc booms, the CD factories can get greedy again.

Although there are now 10,000 cinemas in 40 countries equipped with Dolby gear, only three in Europe have installed *THX*. (That's the heavy duty stack of JBL speakers that ensure audiences can be blasted from their seats by deafening sound that is clean rather than distorted.) One is in Paris and two are in the UK: one at London's Warner West End and the most recent system in the High Wycombe cinema complex. Although Warner has had *THX* for a year now, the cinema has done little or nothing to publicise the fact. The only press screening was put on by JBL, obviously frustrated at the lost opportunity.

In the US there are now two dozen cinemas equipped to show films with *SR* tracks. A few copies of three films, *Inner Space*, *Robocop* and *Startrek IV* (in 70 mm) were released in *SR*. The cinema just temporarily swaps *SR* cards for standard film cards, and gets stereo with around 80 dB S/N. The snag is that whereas conventional Dolby stereo tracks are reasonably compatible with old non-Dolby projectors (which can use a little high end lift anyway) *SR* prints are definitely *not* compatible with anything else. So there has to be dual inventory releasing, which is always clumsy. So far there are no *SR* cinemas in Europe.

An interesting picture emerges of what is going on behind closed doors in Brussels about DAT. In a nutshell, there is now a split on thinking about Copycode and copyright protection.

The people in Brussels who run the Common Market are divided into groups, called Directorate-Generals, each with a number. DG3 deals with 'internal markets', and copyright. It is DG3 that is preparing the Green Paper aimed at rationalising all copyright law throughout the

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BARRY FOX'S BUSINESS

Common Market into the next century. The DG3 lawyers have so far accepted statistics on the record industry provided by the IFPI and BPI. They believe the tales of doom and gloom presented to them. Like the BPI's latest Year Book, which argues for Copycode and glibly states as fact: 'DAT will clone compact discs when recordings are made digitally...once the public has the facility to make perfect copies...the incentive to purchase CDs will be greatly reduced'.

No matter that domestic DAT and CD already have deliberately mismatched sampling frequencies to prevent digital dubbing DG3 have swallowed the anti-DAT argument completely.

Their line is legislate for Copycode as soon as possible. They hesitated when told of the Philips 'one copy' system, which allows a DAT recorder to make one copy of any analogue line input signal but not then clone it digitally. But being lawyers, not engineers, DG3 has now swallowed Philips' daft talk about needing time to perfect the system. There is nothing to perfect. 'One copy' is little more than implementation of the anti-copy flag option already provided by the compact disc standard. Philips started talking about 'time to perfect' when Polygram objected to the 'one copy' proposal because it pulled the rug from under Copycode. DG3 was obligingly confused and has now swung back to backing Copycode.

Fortunately the other group involved, DG13, is concerned with telecommunications and understands more about audio technology like DAT. DG13 worries about Copycode and does not regard the IFPI/BPI figures and arguments as a tablet of stone.

Flies on the wall tell me that DG13 is trying to stop DG3 becoming as much of a laughing stock over Copycode as other DGs are over wine lakes, butter mountains and rotting fruit. All eyes are now on the USA.

In May the American Government Congress tried to settle the Copycode controversy by telling the National Bureau of Standards to test the CBS system. But Congress neglected to tell the NBS who would pay them. The NBS had no idea how to go about subjective testing (it has always been involved in pure measurement) and estimated the cost of consultancy advice and testing at $0.2 million. Not surprisingly the NBS refused to start testing Copycode until the money was guaranteed.

Reluctantly the Recording Industry Association of America (RIAA), which has been pushing for Copycode, has agreed to pay half the cost; even more reluctantly the Home Recording Rights Coalition (HRRC), which has been fighting Copycode, has been stuck with the other half. By the end of July the NBS had still not begun testing because of another squabble.

The HRRC says that if it must pay $0.1 million for Copycode to be tested, then CBS must release the technical standards for Copycode. So far the HRRC, and the audio industry, have had to defend themselves against a moving target. It's a re-run of the SQ quadrophonics saga. When Copycode is criticised—CBS argues that the critics are working from the wrong specifications. And CBS won't release the Copycode specs. The RIAA, which wants to protect the credibility of Copycode, does not want the NBS to release the technical specification either. Hence, impasse.

At this rate the NBS tests won't be completed before the end of the year. So DG3 and DG13 won't get the information they want. Even if the tests give Copycode a clean bill of health—which is highly unlikely—Copycode enforcement laws then have to be passed. Only then will the Japanese start re-masking their chips to incorporate Copycode scanners in DAT recorders. We are into 1989 for DAT with Copycode.

Frankly I cannot imagine why the NBS, or anyone else, needs to spend $0.2 million on testing Copycode. What you do is this. You go into a recording studio with a CBS encoder and record all the notes on a piano twice, once encoded and once clean. You play back the tapes to a cross section of 'average' listeners and ask them to say if they can hear any difference between the paired notes, side by side. Then you do the same with a flute, acoustic guitar and human voice. If CBS had any confidence in Copycode the company would surely have run this simple test at least a year ago, instead of trying to railroad the system past cloth-eared lawyers, politicians and record industry executives behind closed doors.□

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TALKING TO RUPERT NEVE

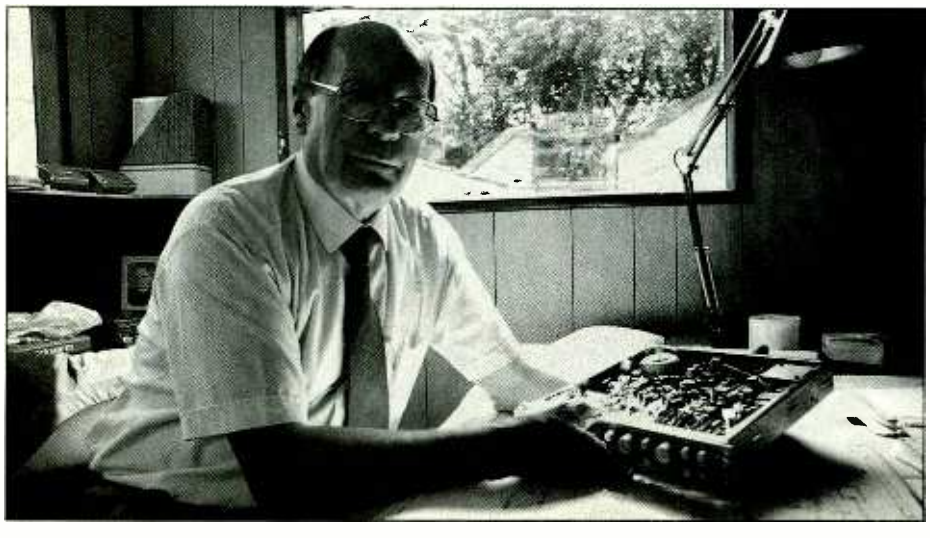
David Mellor finds out what the founder member of one of Britain's major console manufacturers is doing now

Rupert Neve. Is he not a founder-member of the Great British School of Mixing Console Design and Manufacture?—yet the company that bears his name has long since followed a path through the higher echelons of the discipline without his guidance. So where is Neve, the man, now? What do you do when you have made it to the top of the audio tree and then stood aside? In this case, the answer is to find another tree to climb. The object is in the doing.

Rupert Neve is now head of a new company—Focusrite—which, from its small base in the heart of Suffolk, sets out to strive for excellence in its chosen field.

The Focusrite product list at the moment consists primarily of high quality (and price!) equaliser modules, though there are also microphone preamps available and other types of module to come. Around 1985 when the company was set up there was a trend towards refurbishing older Neve consoles. Marketing-wise, Rupert Neve spotted that there must be something missing.

"Why did people want to do that instead of buying new consoles? People were paying ridiculous prices for old spares. I was getting people phoning up asking if I could possibly build them new modules. There were people who specialised in doing that using genuine Neve parts—it never struck me as being interesting business but it triggered the interest. Then someone in the States asked me to make more modules, so I said: 'There are several people making replicas of Neve modules and there are several other good equalisers about,' but he replied that he could sell any number of modules 'made by you!' This sent me back to the old notebooks and resulted in the decision not to remake old designs but to build better ones."



So, although there was some talk awhile ago, Focusrite are definitely not in the business of making new modules for old Neve consoles.

"If you have a console which was made in '73 or '74, commercially, it's long past its amortisation. It's probably a second- or even third-hand console. The modules we make here are expensive. The components cost a lot of money, we put a lot of care into them. If somebody is going to replace existing modules he has really got to think about what he has done to his console. What is the book value of a console which is umpteen years old and he has already used for three or four years himself? Now he is going to put £50,000 or £70,000 worth of this into it. It's a nonsense commercially. I can't justify it to people. It ought to be a piece of outboard equipment."

It should go without saying that these modules are intended to be products of the highest performance, but does electronic theory fit in with good sound quality? Do you need to get conventional performance parameters such as noise and distortion correct before turning to finer details?

"Oh yes, you've got to do that. That's your ploughed field. If you don't prepare your ground properly, if you don't plant the right seed and give it the right fertiliser, you haven't got a starting point. You get wild oats coming up."

One could speculate whether there are any new parameters being invented that are worthy of measurement. Perhaps we could do without some things that can be quantified, yet maybe there are things that we have not learnt to measure because we do not understand the way our minds work.

"It's not just our ears, our ears are microphones. A lot is known about the ear, but the interrelation between what you hear and what you perceive is an enormous gulf.

"In the early days of the Neve company, we did have one or two people say they didn't like the sound of our consoles. They thought it was too clinical. They were expecting the console to add something—that something was the transistor sound, caused by poor design. There is always an element who listen to it and they want it. They find it interesting. It set me thinking, did we want the console to do something of itself or did we want it to faithfully reproduce what was fed into it? From an engineering point of view the answer must be obvious.

"There was one occasion when an engineer, who I respect, thought he could hear a difference in sound put through a particular console. He thought it sounded brighter. Once he had pointed it out to me, I began to detect a difference myself. Having convinced myself that he was right we set about looking for the problem and doing some measurements. We found a 3 dB rise at 54 kHz in two or three channels. The damping resistor had been left off the transformer. He had spotted it without knowing how. You tell me if you can hear 54 kHz. Academic guys know you can't hear 54 kHz. I prefer to say OK I know it can't be heard. There's something though because that guy can hear it. I don't think that guy's an idiot because he is number one in the industry.

"Can you measure these things, can you justify them? I can only say that one can perceive things, for example, the difference between a 12 kHz sine wave and a 12 kHz square wave. I don't know why, or how it works, but I do think that because you can demonstrate quite clearly what the limits of human hearing appear to be, we assume that that's as far as it goes. We are getting down to finer and finer differences. The kind of things that are at the bottom of the barrel. I question

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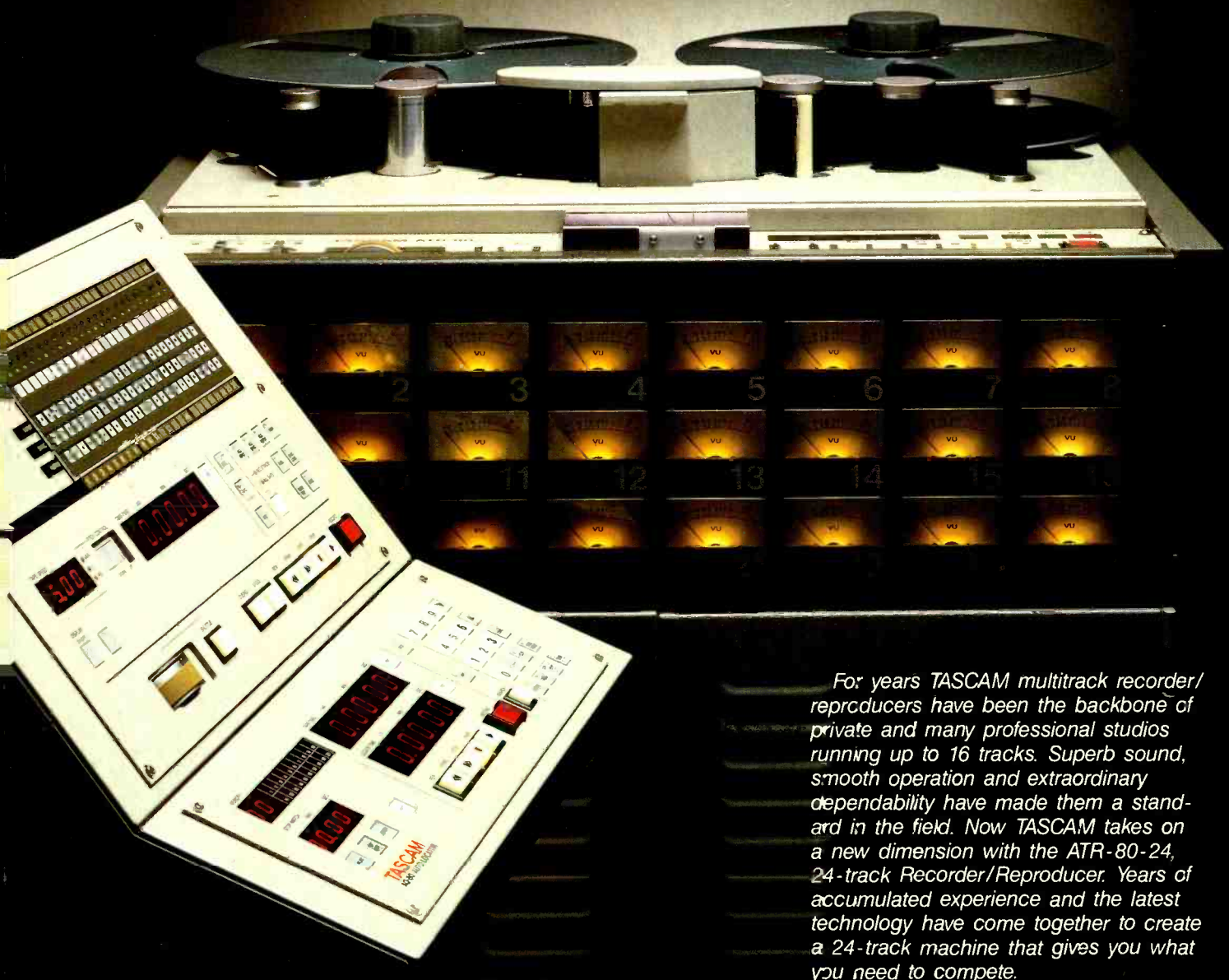

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TALKING TO RUPERT NEVE

how much is relevant to the home music situation, although it is more relevant now than it ever was before."

CD has put a limit on what you can achieve. It defines frequency response, it defines resolution, so presumably if you are building better and better console circuitry, there is going to be a point where it's not going to come through.

"People are already questioning CD standards and it must only be a question of time before they have to go up. The standards used today were agreed some time ago when it was thought that 20 kHz was plenty. For 90% of applications it *is* plenty. We are saying that you need to be able to handle a signal with full integrity up to 100 kHz or beyond. All our designs are based on that. No amplifier must go into slew rate distortion or any other limitation of performance until it gets above 100 kHz. There must be no measurable resonance. Above 100 kHz it must fall away slowly. At the low frequency end, 20 Hz has to be passed with full integrity, and you must also know what is going on below 20 Hz. It is no good if it's cracking up at 10 Hz for instance. It has got to be an impeccable amplifier all the way through.

"Yes, you do need a much wider bandwidth than the domestic media offer currently. Whether domestic media will ever want to go that far I don't know. Compact disc gives you low noise and low distortion but it doesn't give you the bandwidth. Anybody who tries to get into digital signal processing today without the resources of a very big company, I think is on a very sticky wicket."

Obviously, a major selling point of an equaliser of any description is the selection of the EQ curves. The original Neve curves were developed through a long process of listening and discussion.

One interesting feature of the Focusrite unit is the Q ('sharpness of resonance') of the mid-frequency filters, which is claimed to be constant whether the gain is turned up all the way, or just a fraction. This is not a common feature of equaliser design so why should it be featured here?

"The original consoles used inductors and capacitors, so it was difficult to implement variable Q filters. I spoke to a recording engineer who wanted some equalisers and he told me—in subjective terms—what he wanted to do, which was to lift particular musical instruments out and enhance them. That calls for a fairly high Q, and a Q which does not vary with gain. If you have that, you can pull instruments out. It comes back to energy. A lot of what we hear isn't just enhancing frequencies, it's having musical energy in that band or perhaps a little less in another. If you don't have control of the bandwidth of frequencies you are lifting, it is not as flexible. That's the main difference we have introduced."

There are other differences. The Focusrite

equalisers are said, for instance, to pay more careful attention to the shape of the curve.

"It is the steepness of the curve which determines what you are doing to the harmonic content. If you go too steep you make it into a totally different musical instrument. If it's not steep enough then you are not making enough change. You can make the whole sound brighter or mellower but you are not doing anything to the individual instrument. The shelf curve for instance—the slope is the important thing. Using the traditional circuitry you can't do what this module can. The traditional curve is much shallower."

Two major talking points these days are the supposed undesirability of electrolytic capacitors and, conversely, the desirability of using oxygen-free copper cable for internal wiring. What was Rupert Neve's viewpoint?

"I am cynical. There are situations where one would not use an electrolytic, but usually the reason why they got a bad name is because they are misused. If you have an electrolytic which has a voltage rating of 3 V with no polarisation on it and you are applying a signal of a volt or two, then at low frequencies particularly, something happens. In one direction you are polarising it and in the other direction you are doing the opposite. The effect is that its capacitance value changes over the audio cycle. If you are feeding that into a lowish resistance—or conversely if the value of the capacitor is not high enough for the passband involved—you will get distortion, it's asymetrical. If you make your electrolytic of sufficiently high value or the following impedance sufficiently high you do not get the problem. If you polarise it you don't get the problem. We do not do that because it's not necessary. We use quality electrolytics of a value which is much, much higher than you will need for the audio passband, so there is no question of the value changing even over the lowest frequency."

Are there any problems at high frequencies?

"No, if the impedance was rising due to the electrolytic then you have to bypass it with a smaller capacitor. Usually that is not the case. I only use electrolytics for decoupling the supply and for interstage coupling where their high frequency characteristics are not a problem."

And the oxygen-free copper cable?

"A lot of the folklore that has grown up about it stems from the fact that when people change a cable they don't only change one thing. A chap I was talking to a few months ago was totally sold on this oxygen-free copper wire. He told me that he rewired some piece of equipment he had and also the microphone cables to his studio. He said 'I can hear the difference'. The first question I asked him was how did he A-B it?

"He couldn't A-B it because he had torn the equipment apart. Any scientific person would say that you have to A-B it if you are going to make a statement of that sort. Ideally you have two identical pieces of equipment and you modify one and A-B them. He hadn't done that, so his judgment was in question. If you had spent goodness knows how much on all that, would you actually tell anyone that it was a dead failure and there was no difference? Like they guy who buys a new car—until he's had it for six months it's the best car that ever was.

"There are other things. If you're running new screened cables, is the capacitance—conductor to screen, conductor to conductor—the same? Are there other things that you haven't thought about? I'm convinced that has a lot to do with it. Having said that, there are things you can perceive which don't seem to be entirely rational. If somebody has used oxygen-free copper and likes it, good luck to him."

Many less expensive pieces of equipment use electronically balanced inputs and outputs, whereas Neve designs, old and new, use transformers. There must be advantages which outweigh the transformer's bulk and cost. The Neve philosophy says that the transformer gives you a total freedom of interface. You can use the transformer balanced or unbalanced. Its interface with the outside world is floating. The well designed transformer is balanced, in that its common mode rejection is very good indeed and so on. If you take a so-called electronic balance, an input circuit is much easier than an output circuit. Even so, although an electronic input circuit can have a very high common mode rejection, it can never be entirely earth-free.

"The question you have to ask is what happens if you have to ground one side. Some of the so-called input balance transformerless circuits are not properly balanced anyway. The output end is the difficult one. The output end is generally two separate amplifiers which are referenced to ground. Again ask yourself the question: what happens if I ground one side? It depends how you derive the balance but if you ground one side you have probably shorted out one amplifier. It's going to produce some horrific results and may even backfire into the amplifier alongside it. It's a compromise, and it doesn't free you from ground. No piece of equipment entirely stands alone, unless you buy a *Portastudio*. If we sell a module, we don't know what it's going to be used with. You can take any of these Focusrite modules and plug them into any situation you will ever find in the studio and they will always work. That is not true with a lot of cheap modules that are produced which are not isolated. And to tack on a

TALKING TO RUPERT NEVE

transformer is not the answer because a transformer has to be an integral part of the design."

There were some CMOS integrated circuits in the Focusrite module, so had electronic FET switching found acceptance here?

"There is no FET switching. I haven't yet found a successful way of switching as quietly or as efficiently as with a relay. Relays, even in the last five or seven years, have improved radically. Going back a bit, relays were diabolical things to put into low level circuits. That's no longer the case."

If you have seen a Focusrite module, you may think that it sports a rather aggressive colour scheme—blue, yellow and grey. If you can believe it, when the original Neve consoles came out, they were considered to be rather bold in colour.

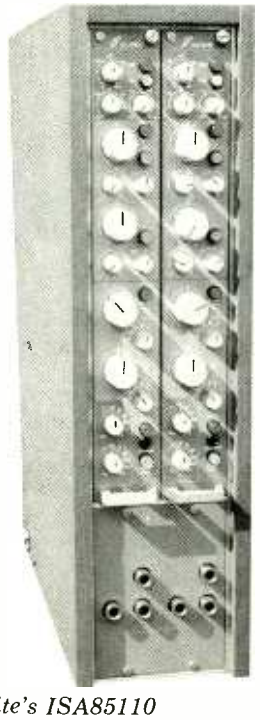
"Going back to the mid '60s, people were making dull coloured instruments of all sorts. The Germans were making battleship grey panels, EMI were olive green. All the American stuff was black. I really racked my brains about it—do you want it to be restful, do you want it to be exciting? At the end of the day it was more or less what we could get rather than the ideal. The blue-grey that we used was considered to be quite innovative and a departure from tradition in those days. We were accused of being too garish. Nobody would think that today.

"When I came to the Focusrite module, I didn't want just another grey panel or another blue panel or whatever. Reg Bentinck, who designed the original console with me from the aesthetic point of view 25 years ago, was called in and he came up with something which I rebelled against. I said 'Reg that's too much, you can't get away with that.' He said 'No, it's got to be exciting and innovative and scintillating.' I took it down to one or two of the people in the studios. George Martin looked at the brochure and said that the colours were too strong. We toned them down a bit and agreed that if he didn't like them we would paint them all grey—but we've never had a complaint."

With all this activity on the equaliser front it would seem unlikely that Focusrite would restrain themselves from building a console for long. There are about eight consoles out on offer at the moment. Ranging from one or two quite modest ones to an 80-input 32-track, all-singing all-dancing model.

"I really wasn't enthused until we went to Los Angeles in November last year. One studio boss said he would buy a few modules but he really wanted us to build a console. I wasn't keen but he insisted. His comments were, 'It's going to be special because it is going to be unique. It'll be expensive because it's going to take that to make you build it. If you build six a year you're not building 60 a year and the six who have bought one are going to be head and shoulders above the rest.' I said it's a nice thought but what about automation, what about recall and all those other things people feel they need these days. I hadn't begun to design that stuff yet. But he had made his mind up, and would probably use Massenburg.

"I went to see him after the exhibition. I had done a bit of arithmetic. I said 'Just multiplying out the modules and adding a bit for the real estate you're looking at half a million dollars.' One of the engineers said, 'You mean we can get one of these consoles for half a million dollars?' I wondered whether I hadn't underestimated. I told them that when you added up faders and other things it was going to put it up another hundred thousand or so. But it was still OK with them. The monster console built this way is always going to be very expensive.



Focusrite's ISA85110

"We are working on the formulation of bus bars at the moment. If we are touching on things like very low distortion, low noise and the rest of it, it makes no sense if you have breakthrough from an adjacent circuit; if noise is at −90 dB and breakthrough is at −70 dB, for instance. A lot of consoles do no better than do that."

A comment as to whether there would be ribbon cable buses produced a vigorous shake of the Neve head.

"One of the reasons the old Neve consoles succeeded is because of the immense amount of care we took. We used to be able to fire a signal into one module and assign it to every output group but one, then look at the unselected output. Up to 15 kHz, if the unselected output was worse than −80 dB it was a reject. At most frequencies you couldn't find the crosstalk at all. If I can avoid polluting a wanted signal with one that isn't wanted, I do it. I think it makes a better console. Even today you won't find many console manufacturers that take that amount of care because it's very difficult to do.

"If you make consoles to a high enough standard, you can sell them at a premium price. I do not want to crank the handle and churn out large quantities of consoles competitively with other people.

"One of the things that has come through over the years is that there's always room at the top. A lot of engineers, including myself, tend to be perfectionists, they want to build one thing, and build it absolutely right, but not many have the opportunity.

"If the people we are serving are musicians, we have got to try and hear it through their ears. I think this is where a lot of engineers fall down. They have been educated to think that certain parameters are desirable so they aim for the very lowest distortion, a frequency response which goes from this to that. If it meets that it must be OK.

"If it does meet all the parameters it very nearly is OK but not quite and the not quite is the difference beteween the $50,000 and the $250,000 console. It costs a lot of money to get everything just right."

Building consoles and modules is but one part of Rupert Neve's life—there is much more including work on projects in the third world.

"Being a Christian is a matter of total commitment—not just a nodding acquaintance with the Almighty on Sunday—if convenient. It's a new horizon, a new dimension to life. The old worn out earth rules are not the important ones. Success, fulfilment and all these things for which we strive, are measured in a different way. Whilst I'm sure that God is more concerned with the individual—me—than in what I do—or try to do for Him and His Kingdom, nevertheless He does expect me always to strive for the best.

"One of the most important things we can do is to find ways of using the media to help people develop—especially the have nots—hopefully a practical expression of Christian love."

It is evident that Neve's motivation comes not only from his Christian faith, but a drive to pursue excellence—for its own sake, and for the benefit of the audio industry. Long may he continue.□

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We present a controversial view of noise, which the author describes as 'A psycho-acoustic investigation into observed noise-related phenomena in diverse recorded music reproduction media, postulating a unified system embracing hitherto unrelated phenomena'. By Paul Randle BA Essex (failed)

In the beginning Dog created the wax cylinder, and His Master's Voice was reproduced with such fidelity that some listeners claimed it was indistinguishable from the Source. Since those halcyon days our spiritual leaders have constantly recognised imperfections in the recording hardware and software, and in seeking to eliminate them have achieved ever-closer approximations to the original sound, and sacrificed ever-more expensive artifacts to the religion of music recording. The unholy of unholies has long been identified as noise and distortion, and as I have a foot (or more accurately a toe) in both the recording and electronic branches of the faith, I have devoutly followed the official doctrine and favoured each advance of the faithful against the heathen.

Occasionally, however, my faith has been challenged, not by the Barbarian hordes, but by distinguished members of the congregation: dedicated musicians and serious listeners to recorded music. This has led to much soul searching, not to mention wailing and gnashing of teeth. The first crisis of faith involved that wondrous invention Dolby noise reduction, which introduced the possibility that cassettes might be capable of something better than dictation and telephone quality. I played a Dolby encoded tape of his own performance to a musician friend, and was deeply shocked, insulted even, when he preferred it replayed undecoded! When I recovered sufficiently to engage in an approximation to rational thought I eventually concluded that this was simply an individual aberration and dismissed it. Unfortunately for my mental and spiritual well-being, I was soon to have several similar experiences culminating in one involving a discerning classical musician and a Dolby *A* master. I could no longer ignore this phenomenon and sought to understand it.

Another such experience relates to my early exposure to compact disc and the reactions of critics to the new medium. While acknowledging the obvious and much reported and investigated faults with some early CDs, my overall impression was one of revelation. Having become accustomed to the vast degradation that occurs between master tape and hi-fi reproduction, particularly the problems of audible surface imperfections on even virgin vinyl discs, to hear music reproduced cleanly on a domestic medium was a dream come true. Even heard over the radio, the improvement in sound quality was readily apparent.

Valve amps presented another problem. Fair enough, guitarists had always preferred these antiquated monsters. As a member of the class that was more likely to carry them than play through them, I was never that keen although I did acknowledge that for those who can only play with everything set to 11, valve amps were definitely preferable to the comparable cries of pain from a transistor amp receiving the same treatment. When hi-fi enthusiasts started to dig old valve amps out of the second hand shops and take them seriously, I could only wonder whose sanity had failed, mine or theirs. After all, the noted 'nice tone' associated with the valve equipment familiar to those of my parents' generation was primarily due to rolling-off the top starting at about 200 Hz. But that noise, and the even order distortion! Transformers in the output stages—urgh!

At this point I must make a confession: I occasionally buy hi-fi magazines. One such occasion was to learn more about CD. And lo! And behold! But did the critics rant and rave and tear their hair over the compact disc saying how you couldn't even recognise your favourite tunes. Once more my faith was shaken unto its foundations, and I took to wearing sack-cloth and ashes and long periods of solitary meditation.

One of the keys to unravelling this mystery lies in an anecdote related to me by a hi-fi dealer. A well-known Dutch company was staging a CD versus vinyl demo for its dealers in an attempt to stem the commercial results of the critical storm against CD. A record was played and the auditorium was filled with the familiar sound of frying vinyl and RIAA'ed rumble. The audience swooned. The same recording was replayed from CD, music filled the air and the audience froze. There followed a heated discussion, though I am assured that the only serious casualty was the truth. The CD was played again accompanied by a tape of blank groove ambience, and the assembled dealers agreed that this disc was much more musical than that nasty CD.

Thus my theory, which is my own:

In the early days of his evolution, man was for practical purposes a mere animal; he was both hunter and hunted. In this situation, acute hearing had high survival value on both sides and was required to answer two questions, but fast: what-is-it? and where is it? The latter subdivides into direction and distance. Since the fittest and most able survive and reproduce, while the rest get eaten, these functions have become highly developed in the human race, literally second nature, although the most important survival skills have changed. Thus, just as an uncritical listener may not perceive gross distortion in music reproduction, yet notices relatively subtle imperfections in the reproduction of a familiar voice, so would he detect the nature, distance and direction of a perceived sound.

The corollary of this is that the hearing mechanism is programmed to automatically determine 'what' and 'where' for all sounds perceived, and since it incorporates a supposedly

. . . for those who can only play with everything set to 11 valve amps were preferable to the comparable cries of a transistor amp

intelligent device, the human mind, will attempt to synthesise the needed data when incomplete data is perceived by the ear. Most of the time this occurs below the level of consciousness, thus a person concentrating on reading a book will automatically turn round and look at the source of an unexpected loud sound, far faster than he could think about and work out where the sound is coming from. However, should the perceived data not adequately define the source, he would automatically look round and use his eyes to supplement the data from his ears.

So, what is this data that tells us the source of the sounds we hear? As any synthesist will tell you, the what-is-it? comes from the Attack, Decay, Sustain and Release of the envelope of the sound, and from its frequency spectrum. The attack, or initial transient, is particularly critical as can be demonstrated by a simple and amusing experiment. Record the same note as played by two quite dissimilar instruments, and edit them so each has the attack originated by the other. In most cases the resulting note will seem to come from the instrument producing the transient, though it may sound wrong due to conflicting data from other features of the sound. This phenomenon is used, for example, by guitarists to simulate the sound of a violin by fading-in a note after it has been played, thereby losing the distinctive fast attack of the guitar and imitating the slow build up of the violin note.

Direction is determined in a number of ways, and the relative importance of each varies with frequency. In the horizontal plane (assuming the head is vertical) the sound at the two ears is compared and analysed for relative loudness and arrival time. Vertical plane information is derived from the complex phase cancellation effects caused by the shape of the ear lobes. This has some bizarre side effects, and some readers may recall a vintage of speakers that gave an apparent

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image above the plane of the speaker, a phenomenon that has more recently been discovered to originate from a resonance at around 6 kHz. Distance from the source is determined in two ways. Firstly by reference to an acoustic memory, performing a 'how loud is a sabre-toothed tiger anyway?' mechanism, and secondly the relative loudness of the direct sound is compared with that of the ambient field. The direct sound obeys the classic inverse square law (loudness is inversely proportional to the square of the distance) while the ambient field varies from near constant, in a small cave, to near zero, in an open desert, but is accurately known for the current environment since it has been constantly monitored at the subconscious level while in that environment.

To relate each of these factors to the recording process, the what-is-it? is pretty well preserved by contemporary recording techniques unless you're doing something silly with compression/limiting/expansion, or trying to record a piano while monitoring level on VU meters (which should be confined to their design purpose of monitoring constant tones on phone lines). Direction often leads to problems due to the common practice of simulating stereo from mono with a panpot, which mimics the relative amplitude mechanism and works fairly well for someone sitting in the middle of the 'stereo seat'. However if you're too near the 'wrong' speaker you get conflicting arrival time data and the stereo image shifts every time you move your head a hair's breadth, or collapses into the nearer speaker. This can be overcome by coincident mic stereo recording, which maintains a relatively accurate stereo image over a remarkably wide range of listening positions but suffers from requiring sensible recording techniques and producers who can make decisions before they get into the third week of remixing. (This recording technique was first described by the great prophet A D Blumlein, a true disciple of The Master.)

So far no major problems but how far away is it? This is where reality flies out the window. If you place a mic in intimate contact with an instrument in a manner no-one would ever place an ear, even if it were physically possible, you will get a sonic picture no mind can adequately interpret. By way of analogy, if you listened to a band with one ear inside the kick drum, four other ears around the kit, one pointing to the floor in front of the guitar amp and with a bass guitar pick-up hard wired to your brain, you would probably be a little confused. In fact you wouldn't be reading this, you'd be cycling sideways across the Atlantic or some such pastime. Even in the classical field this kind of situation is not unknown: I have heard a piano concerto recording where a 20 ft piano straddled a miniature orchestra. In pop music the result is usually too confused to present any coherent picture.

Possibly by now the more attentive readers are wondering what this has to do with Dolby and CD. Contrary to the evidence I'm about to start coming to the point. Returning to my musician friend, anyone who tries communicating via a microphone when there is a less than ideal foldback system will observe that it is very difficult to know whether you are getting across since the sound of your voice as heard through the head by bone conduction drowns out anything heard through the PA. This is for the simple reason that if you can hear yourself louder than you are singing/talking, so can the mic, a highly undesirable condition resulting in positive feedback or howlround. The only thing you can hear is that which is added to the original sound, ie noise, distortion and reverberation, if these are reproduced at sufficient level. Thus reverb acts as negative feedback (the kind that allows a performance to be monitored and corrected) and is highly desirable to a performer. Indeed, it's so desirable that it is responsible for the 'bathroom effect', whereby even the least musical person is likely to burst into song in a highly reverberant room, such as a bathroom. Replaying the Dolby tape undecoded increases all the low level sounds, noise, distortion and reverberation, resulting in an overall sound that is closer to what the performing musician hears, or wants to hear on stage.

It would appear from the foregoing that reverberation/ambient information is rather more important for the subjective enjoyment of music than is allowed for in the mainstream of contemporary recording. So what is this reverberation that has suddenly gained a new importance to us? Its nature is complex since it consists of multiple delayed reflections of the original sound, comb filtered by the resonances of the room, high and low pass filtered by natural and artificial absorbers, and so forth.

When you look at it from the ear's viewpoint, it becomes quite simple as the ear deals with samples or packets of sound. An individual sample consists of the direct sound, which accounts for most of the volume and lots of tiny bits of delayed elements of earlier sound. While these bits are all strictly related to earlier direct sound, in relation to the current sample of direct sound, they are effectively random. Does this relationship remind you of anything? Low level

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The combination of dynamic delay and pan modulation allow quite a variety of effects within a single processing device. T.C. was very smart about this. The 2290 does a lot more, and is more affordable than any other unit we've used."

Engineer Don Rodenbach

A demonstration model of the new TC 2290 was sent to Power Station by Martin Audio. The first engineer to use the 2290 was Don Rodenbach, who was so pleased with the sound, and features of the 2290, as well as "the clarity of the :32 samples," that he bought one for his own rack. His unit then started making the rounds of various sessions at Power Station. Today there are six TC 2290 units at Power Station and no waiting. Each unit has 32 second capability for sampling (and delay), can be locked in perfect synch with a second 2290 for stereo sampling *(The new stereo link update)*, and has Sampling 2 software, along with "Fast Trigger," update.

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random sound—why it's the old devil himself, manifested as noise and distortion. Hence the conclusion of my theory: the hearing mechanism is programmed over a great many generations to demand ambient information with any sound it hears. In the absence of such information, as routinely occurs with modern recording techniques, it will grab at any available substitute to try to make sense of what it perceives. Noise and some forms of low level distortion have the right characteristics to be interpreted as pseudo-ambience and thus may be subjectively more desirable than their absence, contrary to the generally accepted view in hi-fi and recording circles. (Absence of desired ambient information is probably also an important factor in listening fatigue but that's another story.)

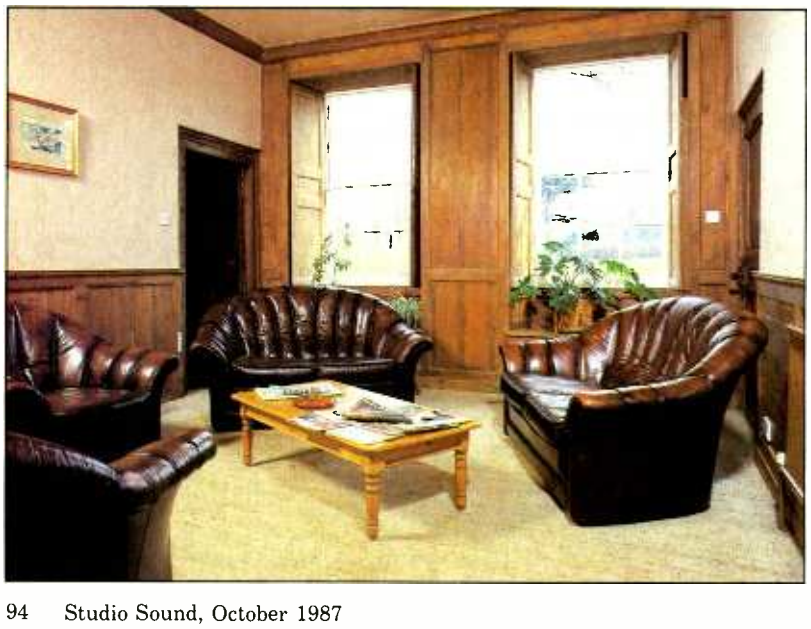
It now becomes apparent that there may be more to good recording technique than previously considered. This is particularly relevant in the light of CD (and perhaps R-DAT), which give the domestic consumer a clearer image of our endeavours than previously possible. Now that digital sound is beginning to penetrate the mass market substantially there are many consumers who are able to do direct comparisons of vinyl and CD. It is also unavoidably the case that these people make unintended comparisons simply by listening to new CDs of old familiar favourites. That these are not scientific, double blind, etc, does not alter the fact that if a significant number prefer nasty old black plastic it could produce an anti-technology backlash with repercussions almost too awful to contemplate for anyone (other than the confirmed flatearthers who are still using valve mixers) professionally involved in the recording business.

Tradition behoves me at this point to come up with a simple universal cure to eradicate these problems from the annals of recorded sound. I am sorely tempted to promote crossed-figure-of-eights, one-tape-live-in-the-studio direct-to-stereo recording as a universal panacea, but I am realist enough to realise that this approach would not suit everyone. Such methods do, however, have their place, particularly for music that is primarily acoustic in nature. Drums are an excellent example of this—you do remember drums don't you? A drum kit in a large room recorded by a coincident pair from a position that would more conventionally be regarded as ambient miking, and going on to a mere two tracks of the multitrack, can produce drums with a presence and solidity that does wonders for livening up a track; though this does have the disadvantage that it needs more planning to make it work than is currently normal as you can't go back and replace the snare with this brilliant sample you've nicked off the latest Beatles CD. A recommendation that has more general application relates more to the philosophical rather than pragmatic aspect of recording.

George Martin describes record production as painting pictures in sound. If this analogy is extended to three dimensions by considering depth as part of the picture one would be well on the way to making better and more coherent-sounding recordings. An essential ingredient of this kind of approach is giving some thought to the desired end product before putting anything on tape. The better idea you have of the end product before you start, the quicker you will get there, and you will also get closer to the intended target. Remember live studio recording, fully rehearsed in advance has been the norm for far longer than multitrack and many of the classic recordings that people spend hundreds of hours trying to emulate were made in this way. Experiment with more distant mic positioning to put some real space round tracks, rather than relying on expensive synthetic spaces that come out of black boxes: I generally use the principle of not putting a mic anywhere I would not put my ears. This can of course lead to separation problems but, again, planning is the answer: record a large rhythm section playing together with the aural perspective that you want on the master, and spill becomes irrelevant, you save hours of mixing time, and you end up with a track that sounds like real music. Where this approach is not feasible, applying artificial time domain effects to a mix rather than to individual tracks in isolation, will produce a more coherent sound picture.□

GREAT LINFORD MANOR

Janet Angus visits a new luxury residential UK studio built into a former Lord Mayor's manor



In a climate of penny pinching and cost cutting among UK studios, the opening earlier this year of a brand new luxurious country residential facility raised a few eyebrows. Great Linford Manor, subscribing to the current minority philosophy that the only way to beat the Joneses is to thoroughly upstage them, has opted for a fully SSL/Mitsubishi digital multitrack recording facility, set in a historic listed country manor house and furnished lavishly (often in period style) throughout.

Owned by local man Harry Malone, the studio building (built in 1679) became available in 1986 when the local arts council decided to move out. The studio project was warmly received as continuing an arts theme and in the long term Malone plans to include an arts and recreational facility at the manor. In the grounds there are two pavilions erected by the Lord Mayor of London, for whom the manor was built, to obscure the stable block from view. There are also several alms houses and barns and all these buildings have been allocated to various arts-related activities. The Milton Keynes artist-in-residence, for example, lives in one of the pavilions alongside sculptors, designers, silversmiths, and so on.

The artistic atmosphere is no less enhanced by the idyllic setting. The grand circular driveway to the front is complemented by a sweeping lawn surrounded by ornamental gardens including a walled garden—site of future development plans. Malone's favourite garden feature is an ancient Cedar of Lebanon tree that he and his gardener are desperately trying to save. It certainly makes the view from the studio and control room windows pretty spectacular.

Milton Keynes is such a mixture of hi-tech and back-to-nature philosophies. The Japanese community is expanding at a rate of knots as Japanese firms move into the area and yet there are beautiful historic buildings and natural surroundings carefully preserved all round the town. Milton Keynes is a new town surrounded by old villages. It was built in the patch of land in the middle and the design policy has been to religiously preserve as much of the history and nature as possible.

Throughout his many years in management and publishing, Malone had seen associations with the likes of McGuinness Flint, Manfred Mann's Earth Band, Eddie and the Hot Rods, Uriah Heep and The Blues Band. A general feeling of unhappiness with the service he was receiving from various recording studios at a cost of around £150,000 a year, persuaded Malone to build his ideal facility.

"Most of my acts haven't been based in London. So I had to fly them in, accommodate them in the West End in hotels with 24-hour room service and then there was driving them to and from the studio, etc, and it's a hassle.

"I knew the studio had to be within one hour of London—there seems to be a psychological barrier of one hour—any more and you can't claim to be near London."

The SSL/Mitsubishi formula, Malone feels, was almost inevitable: "If we had been setting up in the centre of London with an SSL facility it would have been difficult to be different. Being in the country we felt that we had to be a little conservative and although we looked at other consoles we decided in the end that we didn't want to be guinea pigs. Every producer and engineer is familiar with SSL so it is a safe bet.

"For the multitracks, we originally intended to get Otari *MTR90*s but when the Studer *A820* came out with built-in Dolby we decided to go for that. We're really pleased that we changed horses. The *820* has created a lot of interest. We decided that we really needed digital multitrack in order to be different. Mitsubishi was chosen as a result of talking to lots of people.

"Once you've got Quested monitoring, an SSL console and various other bits and pieces you're still pretty much the same as any other studio. You need to provide more: great ambience and first class facilities, we have tried to achieve that. For example there are white carpets in the bedrooms; expensive leather furniture in the television room; all the bedrooms have bathrooms en suite each with a different theme: Victorian with power shower from America, very modern with a jacuzzi bath and water activities, a '20s theme with mahogany surround and a '20s bath tub."

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GREAT LINFORD MANOR

Malone was advised that his expensive decor and furnishing would merely get abused but he believed, and has found, that if a band is given comfortable surroundings they appreciate them and treat them with respect.

The studio room itself is in what was originally the Lord's sitting room, for some reason designated the Ballroom. As it is the Lord Mayor's country cottage, the manor is panelled in pitch pine (rather than more up-market oak) throughout, creating a warm and light ambience. The ballroom did not receive much acoustic treatment apart from secondary glazing for sound insulation. The character of the room and the view from the windows on to the rear garden were essential ingredients in the design. Although there were originally various ideas for acoustically treating the room, it has turned out to be a fairly controlled live room as it stands, with its 24 ft ceiling, so nothing was actually implemented.

"We felt it was very important to keep the big windows with their view and the light and airy atmosphere they provide."

There is direct loading access to the front of the house from the studio, and double doors lead through to the control room, or ante room to the ballroom. This is where the trouble started. Great Linford Manor is a Grade II listed building, so nothing whatsoever may be altered—rather limiting for the studio designer! English Heritage who implement this control, along with various other bodies, insisted that no element of the building be altered or harmed in any way. The room itself is rather unusual in shape and Munro Associates, when approached, were slightly dubious as to its practicality.

Andy Munro: "The whole programme was ambitious from the start. Had it not been for the fact that Harry Malone himself had some architectural background and in turn had an architect under his wing, and that we had our own in-house architect in Roger D'Arcy, I don't think the programme would really have got past the English Heritage Trust.

"As it was there were massive compromises required in terms of not touching the existing building and the general approach.

"The acoustic design is relatively standardised Munro Associates practice in the use of high mass-membrane absorbers and the full specialist absorption units designed to cope with standing wave limitations of the relatively small control room. It's slightly amusing because many manufacturers and people in the industry were fairly sceptical about the project but the thing was made to work, which just goes to show you don't have to have the absolute perfect space to design a control room."

Innovative features include a completely floating floor slab with air conditioning installed underneath: all plant and ductwork is in the cellar below floor level to minimise damage to the building. The mixing console faces two large sash windows with wooden panelling surrounds. It was eventually allowed that some of the wooden panelling could be removed from the walls on the understanding that each panel was numbered and stored in the attic for re-installation should the studio decide to leave.

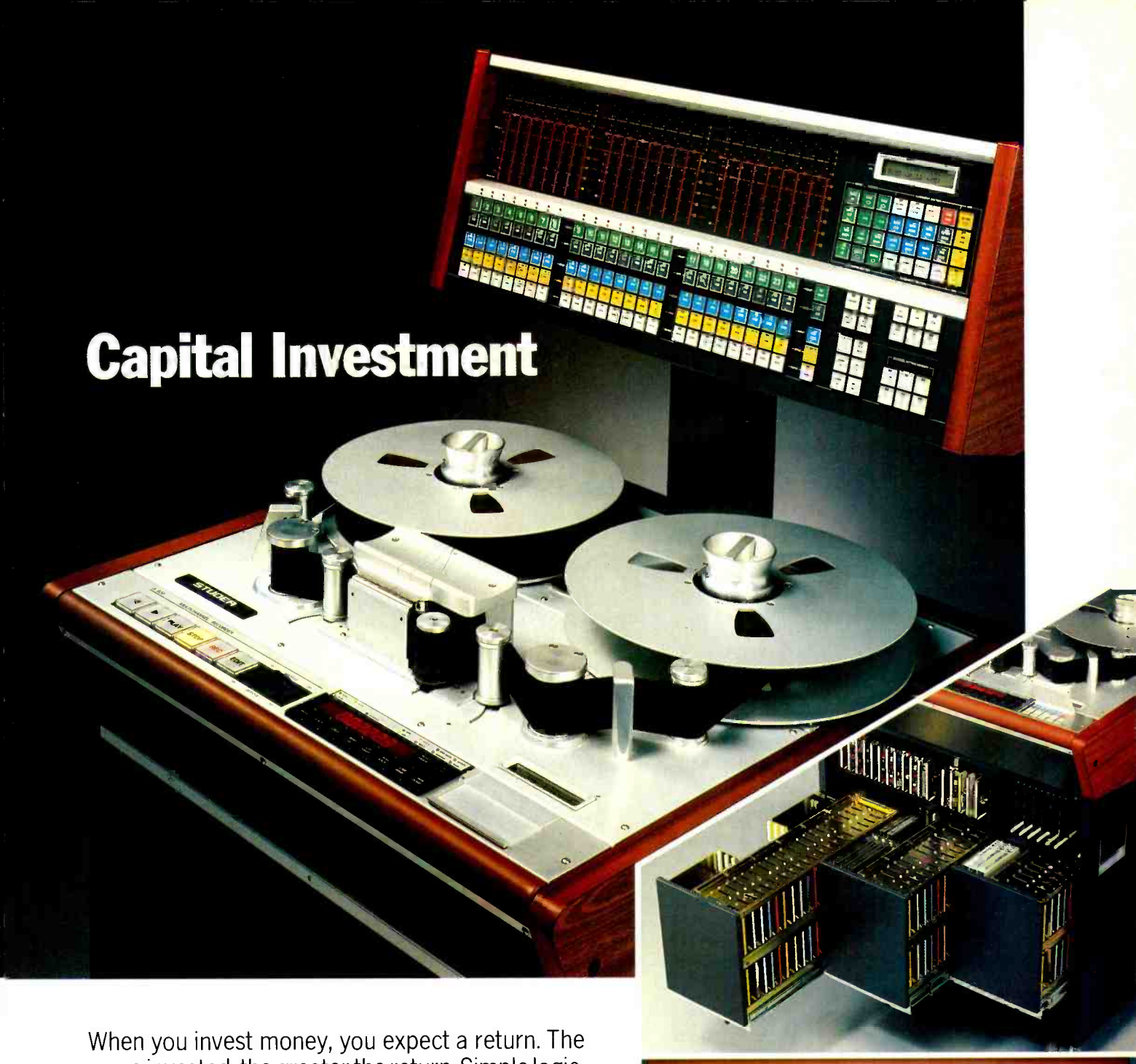
The effects rack is at one end of the desk and diametrically opposite the control room window. Both these features have angled wooden wings to reduce any flutter echoes and maximise diffusion in the early soundfield, thus reducing hot spots at the console.

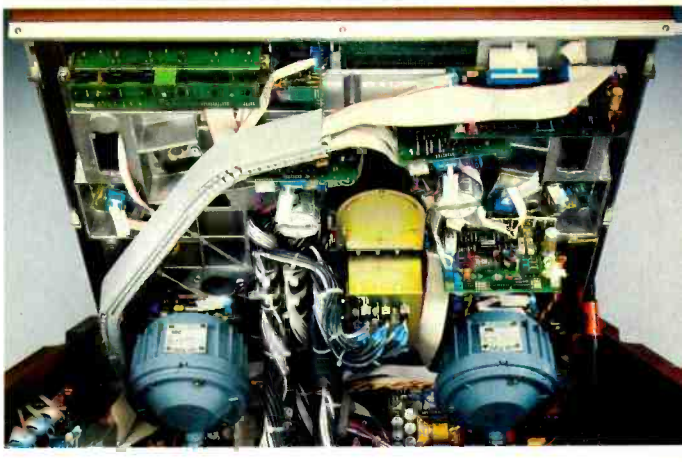
"If you have a very straight vertical rack that is beaming sound directly from the monitor on to your ears, then the slightest movement creates a phase cancellation effect."

Preserving the general Georgian feel of the room was decided on at a very early stage but several compromises had to be made in the interests of the preservation of the building. A chimney breast at the back of the room had to stay, so it was incorporated into the design: "We made use of the hole, creating an acoustic absorber; it's not ideal but it's there and we overcame the problem. In the perfect world you don't put chimneys in control rooms, everybody knows that! But it had to stay.

"There were a lot of things that had to be compromised but it shows you can put a control room into very difficult spaces. Any limitations created by the space have been more than compensated for by the aesthetic appeal of the place and the fact that when you are in there you genuinely feel that you are in a recording studio in a major listed building country house."

Capital Investment





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GREAT LINFORD MANOR

House technical engineer Paul Ward (ex-The Manor) said that they were knocked out with the room: "Andy was very reticent because of the shape but we have got very good results from the monitoring. A very smooth response for this difficult-shaped room. The isolation from the rest of the building was very difficult as they weren't allowed to touch the rest of the building. It is a particularly fine piece of isolation design."

Control room monitors are Questeds, loaded with JBL *215*s. This was Harry Malone's choice: "Just to give the 'oompf'. The more usual *412*s don't hit you in the chest the way these do. The first day we switched the whole thing on—Christmas last year—was just wonderful."

Prior to Paul Ward's arrival on the scene Malone consulted with engineer/producers Mick Glossop and Hein Hoven ("particularly Glossop") as to equipping the facility. The machine room houses Studer *A820* 24-track and ½ in 2-track; Mitsubishi *X850* 32-track and *X86* 2-track digital recorders and a *Lynx* synchroniser. At the time of our visit they were working on interfacing the *820* with the *Lynx*.

Great Linford feel that once clients have used digital multitrack they don't want to look back to analogue.

Malone: "The only thing that is stopping it really taking off is the record companies. In the end the public will demand digital quality sound, it's inevitable and so digital has been built into our cash projections. We want to encourage people to use it; it's much cheaper to have it as part of the facility than for the client to hire in."

The console is a 48-channel *SL4056* with *Total Recall* for which the new Series *G* computer has been ordered.

In addition to the Questeds there are *AR18*s, Yamaha *NS10*s and Auratone monitors, although the studio has found that clients tend to monitor on the Questeds at low levels in preference to the smaller alternatives.

Effects include AMS *RMX-16*, Lexicon *PCM70*, EMT *140* stereo plate and Yamaha *REV7* reverbs; Yamaha *SPX90*, AMS *DMX15-80S*, Akai *S900*, two Drawmer *DS201* noise gates, Drawmer *1960* tube compressor, Electrospace *Spanner*, Bel *BF20* stereo flanger, Orban *622B* parametric, Yamaha *Q22031* graphic, dbx *160* and *163* limiters and UREI *1178* and *LA4* limiters. There is a Yamaha grand piano in the studio.

Next to the machine room is an overdub booth for keyboards, bass, guitar, etc. The rest of the ground floor is taken up with the admin office, a very comfortable living room and a huge kitchen with an old fashioned range in a stone surround and featuring a French ash table circa 1800 and a Welsh dairy table, both piled high with food and standing on the red tiled floor. This centre of the household is ruled by a rota of housekeepers who keep a constant supply of fresh food in preparation.

The seven bedrooms are upstairs along with the band's recreation room (formerly an art gallery and featuring much pitch pine panelling and wooden shutters) and the studio workshop. Sited over the control room, the workshop is eventually destined to become a preprogramming facility tie-lined to downstairs. That isn't all.

The original plan was to allow one year for the studio to become established. But having opened with its first clients—Swing Out Sister with Paul Stavely O'Duffy—on February 5th, 1987, and having been fully booked well in advance ever since, Plan B is going to come on line much sooner than envisaged.

In 18 months time a second theatre/recording facility should be complete, situated in the walled garden, closely followed by a restaurant and function rooms intended both for public and band use.

"We eventually intend to go into video and satellite."

Why not go the whole hog? 60% of initial business at Great Linford has originated in the UK. All of it has come by word of mouth. Immediate marketing plans are to attract more business from America and to this end they are offering a door-to-door all-inclusive 1-invoice package to American clients whereby they collect you in America and deliver you to the door, all on one bill.

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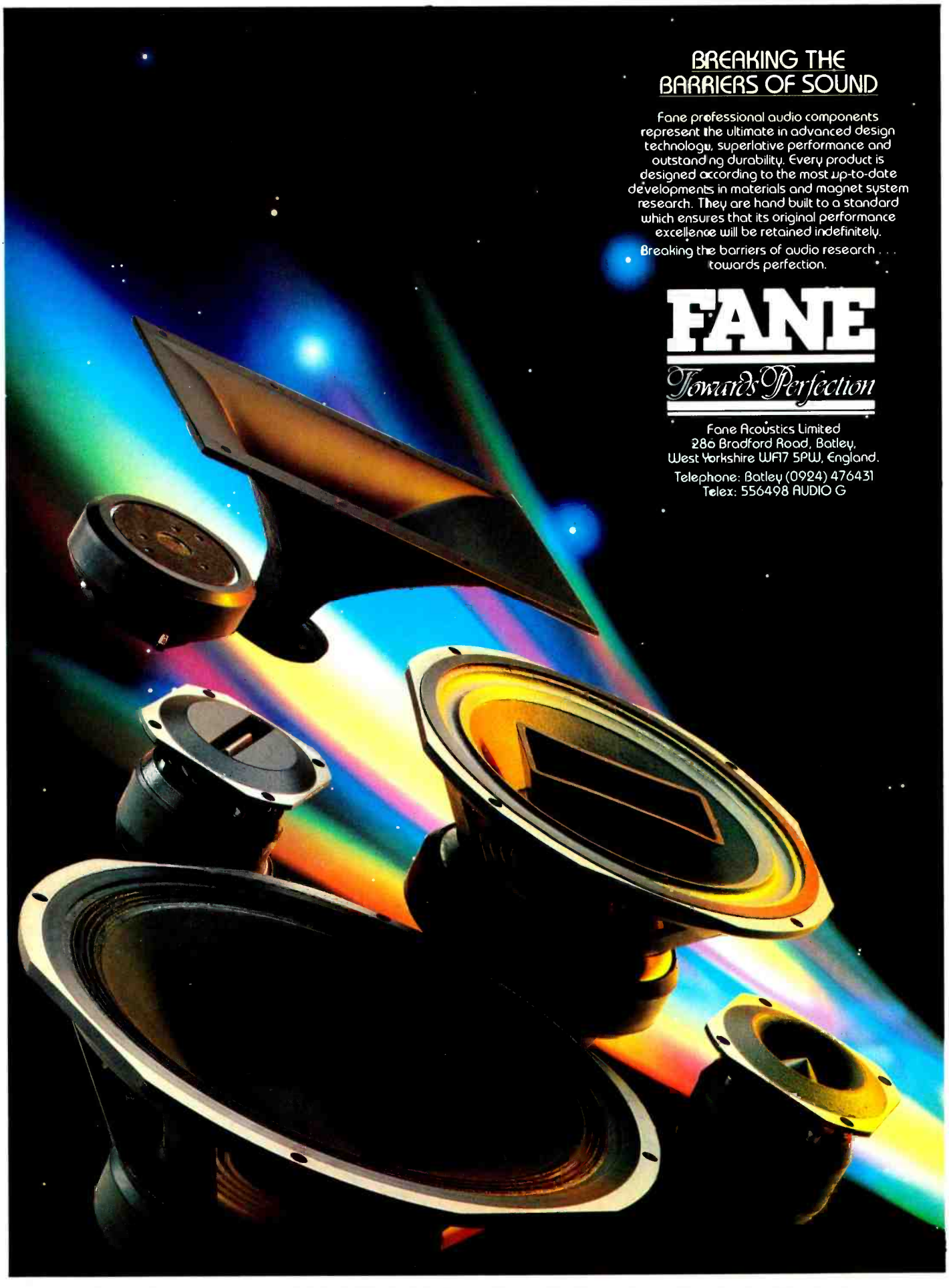

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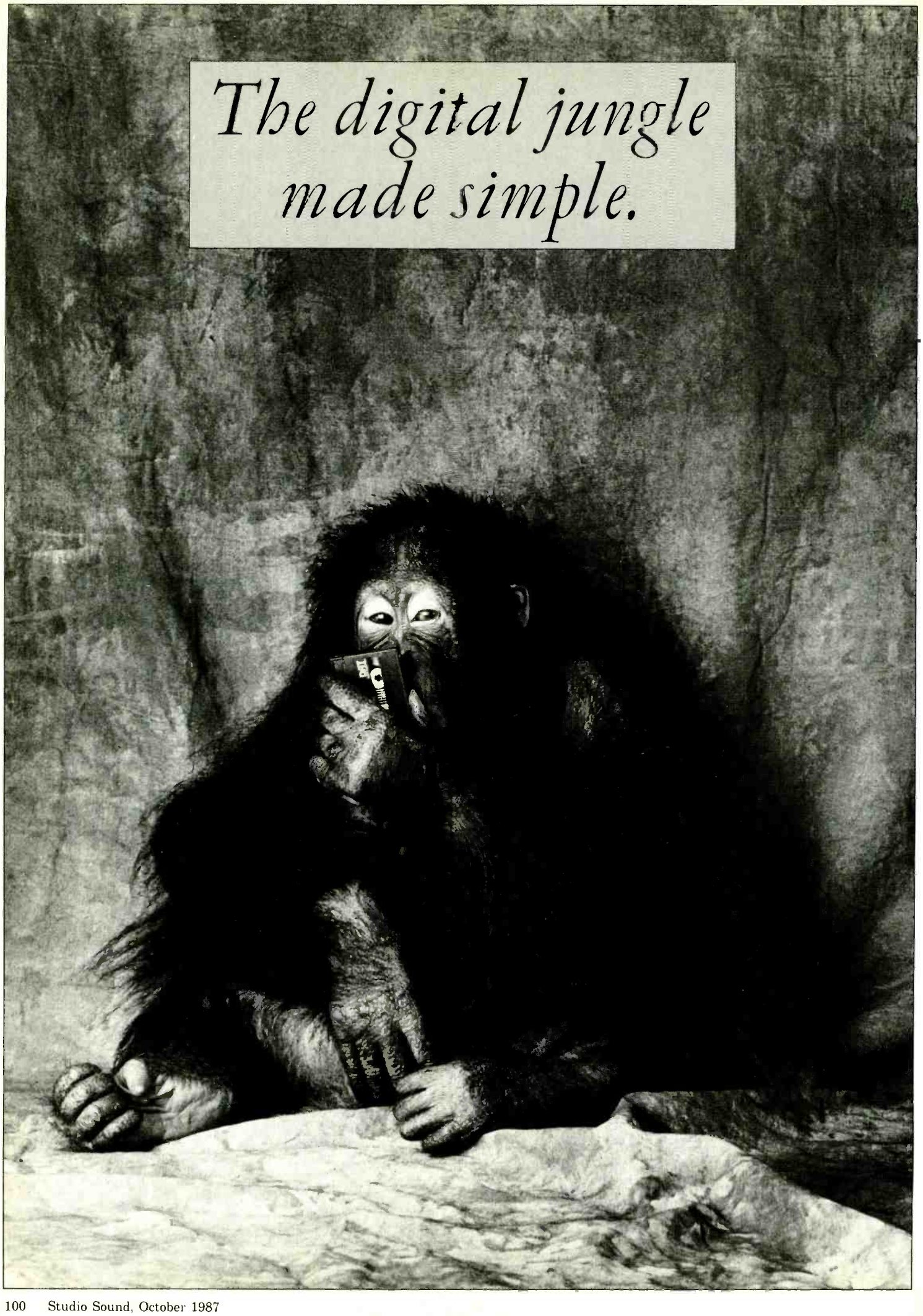

From broadcast station to recording studio and from editing suite to industrial laboratory, the role to be played by digital audio technology is more dynamic than ever before.

It may still not be that simple, but the technology is certainly becoming more accessible. Yet new formats and fresh technology demand new skills and fresh understanding from audio professionals everywhere.

This November, the Digital Information Exchange seminar series returns to London Zoo with an exciting four-day programme. Packed with relevant presentations from leading industry figures and supported by 'hands on' sessions with the latest technology, each day is a unique event.

Always full of surprises and not a little controversy, the Digital Information Exchange is now a seminal date in pro-audio calendar.

The Digital Information Exchange takes place in the Private Members' Suite London Zoo, NW1 on November 23, 24, 25 & 26 1987.

Delegate places are strictly limited and the cost – thanks to the sponsorship of Sony Broadcast and HHB Hire & Sales – is low, not least because it includes lunch and refreshments: £85 (inc VAT) per day and only £280 (inc VAT) for a special ticket that covers all four days.

Day One (Monday, November 23rd 1987) Broadcast & Video

'The Opportunity and Politics of Direct Broadcast Satellite' – Barry Fox, New Scientist

'Digital Audio Performance Standards in a Broadcast Environment' – Allan Mornington-West, The IBA

'The Demands of CD Video on Production Techniques' – Gert-Jan Vogelaar, Philips DuPont

'Digital Audio in Video Post Production' – Geoff Irons, Trilion

'Advanced Editing Features From Direct Access Media' – Guy McNally, Digital Audio Research

'DAT: The Flexible Solution' – Mike Bradley, HHB Hire & Sales

'Digital Technology in United States Broadcasting' – David Smith, Editel, New York

'Further Proposed Digital Formats for Film & Video' – *To be confirmed*

Day Two (Tuesday, November 24th 1987) Recording Industry 1

'New Approaches to Digital Recording' – Tony Griffiths, Decca International

'Improving Digital Performance in the Analogue Domain' – Bruce Jackson, Apogee Corporation

'Enhancing Multi-Tracks & CD Mastering Systems with 4 X Oversampling' – David Smith, Editel, New York

'Working With Digital – A Producer's View' – Mike Hedges, Producer

'The Ins & Outs of Digital Rental' – Andy Hilton, Hilton Sound

'Fairlight in Post-Production' – Kim Ryrie/ Roger Bolton, Fairlight Industries

'The Role of Professional Digital Formats in the Year of DAT' – Roger Lagadec, Sony Corporation

'48 Track Digital Mixing' – Bill Aitken, Solid State Logic

Day Three (Wednesday, November 25th 1987) Recording Industry 2

'Digital Multi-Track Worldwide' – Cary Fisher, Sony Corporation, America

'Prodigi Developments' – Paul Leader, Otari Electric (UK) Ltd

'Compact Disc and the International Impact of DAT' – Nick Hopewell-Smith, Consultant

'Editing with DAT' – Richard Salter, Sony Broadcast

'The DTC console' – Andy Proudfoot & Roger Cameron, Neve Electronics

'The DTC/Audiofile Compiling and Editing System' – Stuart Nevison, AMS Industries

'Making the Transition from Analogue to Digital Disc Cutting' – Bob Ludwig, Masterdisk, New York

'Cutting Compact Disc Mechanically' – A representative, Teldec-Schallplatten – *To be confirmed*

'Quality Control in Compact Disc Pressing' – A Senior Representative, Disctec

Day Four (Thursday, November 26th 1987) Scientific & Industrial

'Digital Technology in Communications: Lowering the Bit Rate' – Martin Russ, British Telecom Research

'The Artificial Head/Accurate Spatial Recording for Industry – Dr Klaus Genuit, Head Acoustics

'Error Protection in Digital Tape Formats' – John Watkinson, Ampex UK

'The Interactive Knowledge System' – Ramsey Ismail, Sony Broadcast

'Speech Recognition & Man/Machine Interfacing' – *To be confirmed*

'New Tests in Digital Audio Technology' – *To be confirmed*

'Data Recording with DVTR and HDVTR' – A Senior Representative, The Sony Corporation

DIGITAL INFORMATION EXCHANGE

The programme is correct at the time of going to press. Some presentations (as indicated) require final confirmation, so minor changes may occur. Registration enquiries should be made to Peter Woodcock on 0992 583557. Any delegate requiring hotel accommodation is advised to contact Expotel (a free booking service) on 01-741 4411.

Please post to Peter Woodcock, Digital Information Exchange, PO Box 43, Hertford SG14 3TP, enclosing a cheque payable to **'Digital Information Exchange'**. State clearly which days you wish to attend. Should you wish to register more than one delegate, please send their details on a separate sheet of paper with the cut-off form. Tickets and finalised programme details will be forwarded towards the end of October.

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TWICKENHAM FILM

The British Film industry has its ups and downs. Twickenham Film Studios' new Sound Centre is a major investment in the industry and has been exceptionally busy since it opened towards the end of last year. Jim Betteridge managed to grab director of sound Gerry Humphreys during his lunch break before returning to the studio

Theatre One

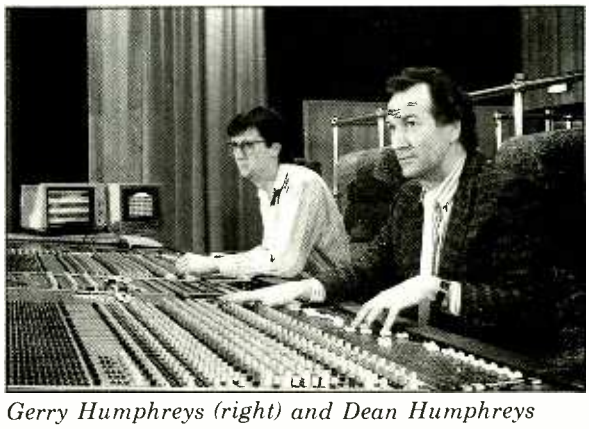
Though they've been producing films at Twickenham since 1913, the studios first really caught the world's attention in the '60s with the huge success of The Beatles' *Hard Day's Night* and *Help*. Since that time they've hardly looked back and can claim responsibility for innumerable classics including *Saturday Night And Sunday Morning, Wild Geese, Alfie, The Italian Job, Zulu, Yanks, 1984, The French Lieutenant's Woman, The Bitch, Ghandi* and *Reds*, to name but a few.

The entire complex occupies a surprisingly compact 2.3 acres and, until recently, could lay claim to only a single sound dubbing theatre and one ADR (automatic dialogue replacement) and effects theatre. In October of last year, however, a new £3m purpose-built Sound Centre was opened. Shortage of space made it necessary for the new building to be constructed on what used to be the site of an old asbestos warehouse, and so that determined its maximum overall size.

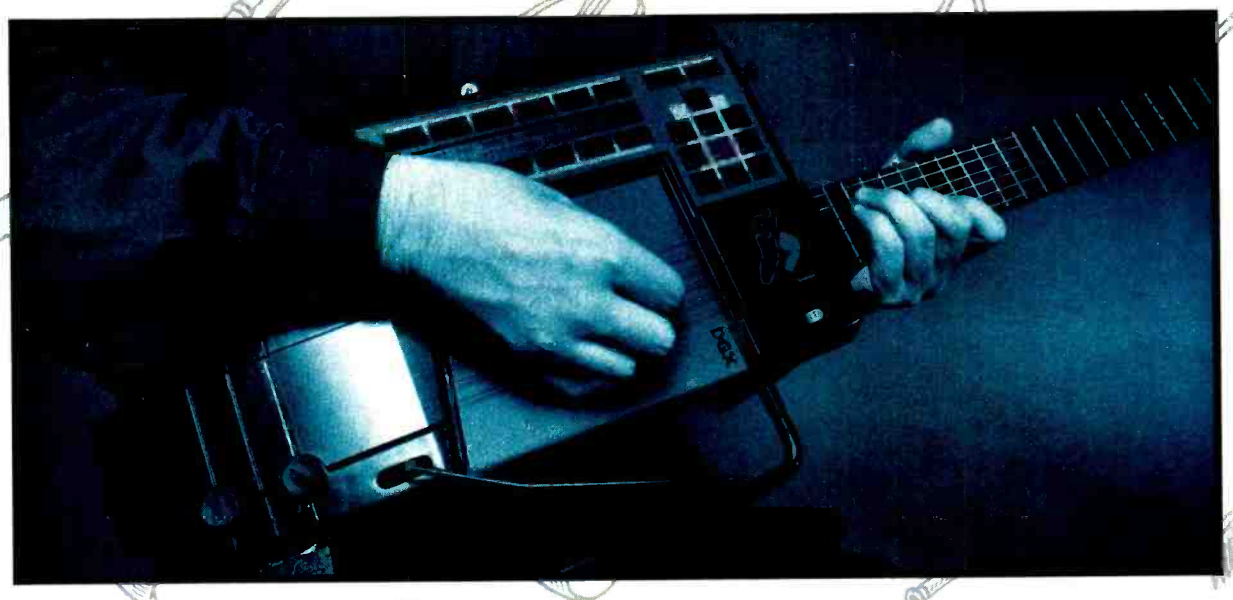
Over three floors the building houses a second dubbing theatre, a second ADR and effects theatre, no less than 31 cutting rooms and a suite of offices. Director of Sound, Gerry Humphreys, worked on the designs with architect, Jim Blackmore, who also designed the Novello Lodge, a complex of 10 cutting rooms and eight offices built at Twickenham back in the '70s. Arranging a time to speak to Gerry about the project was not easy. He had been working seven days a week for several weeks, and couldn't absolutely guarantee a day off over the following month or so. It seemed, then, that during what is a fairly difficult period for the British film industry, the studios had no shortage of work. Considering the present climate, had it been something of a risk embarking on such an ambitious project?

Gerry Humphreys: "During that period when the decision was being made, 1980 to 1985, we were incredibly busy. For every picture I was doing I was turning at least one away, and of course it hurt to see that business to go by my nose, so the decision was made to build. That boom rather tailed-off around 1985 as a result of the government withdrawing the capital allowances previously available to film makers. Until then financiers had been able to set film costs off against tax and there was a huge rise in investment both from overseas and, more noticeably, from City of London banks. After the withdrawal of those concessions in the 1984 budget, things gradually tightened up and now it's very hard to raise indigenous capital. You'll find that in countries that have adopted this capital allowances scheme there is a significant boost to the industry. Canada, for instance, has recently made it possible, and the film business there is booming. It is a great pity that it was withdrawn here but even so our bookings this year have been very good, somewhere around the 95% mark, so we're quite happy."

In terms of sound recording technology the ADR theatre is quite straightforward. The desk is a simple 8-channel Neve feeding a single 3-track Westrex Mitsubishi 35 mm magnetic recorder which, like all the 35 mm recorders in the dubbing theatre, uses Dolby *A* noise reduction. There are many reasons for post-sync re-recording. Dialogue might be obscured by an unexpected ambient noise, or a plane might rather incongruously fly overhead during a period location scene, and so the original soundtrack has to be replaced, in every detail.



Gerry Humphreys (right) and Dean Humphreys



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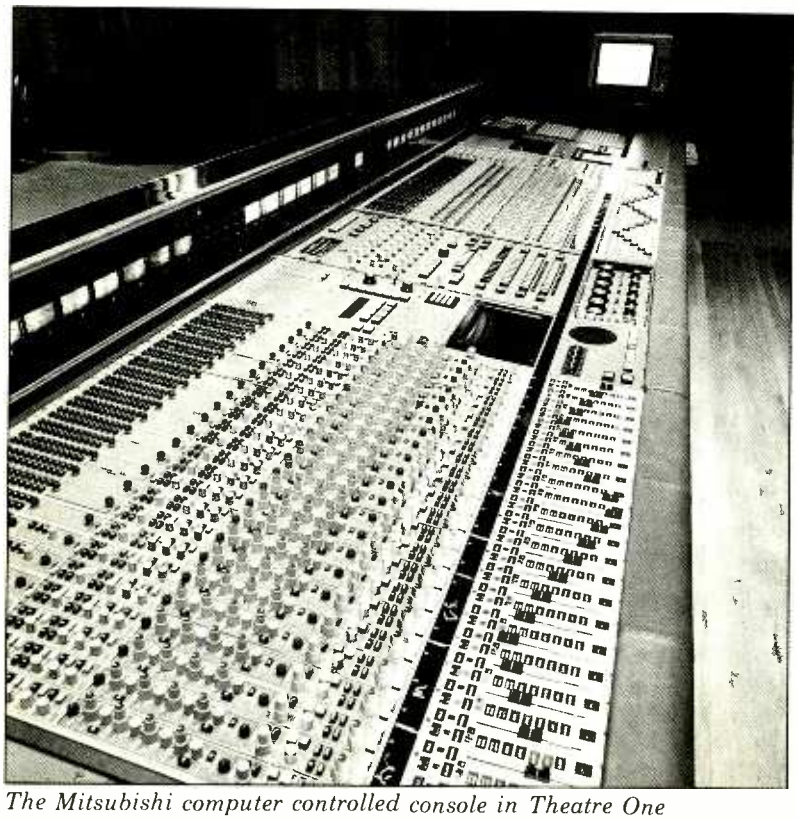
TWICKENHAM FILM

This might entail, not only the performers attempting to repeat dialogue with lip sync accuracy but also the recreation of all the ambient sounds such as a restaurant, a football game or a busy Saturday afternoon high street. Hence, the skill of the ADR theatre is in finding the right clothing to rustle, shoes to walk on the spot in, surfaces to walk on, doors to slam and, of course, the right selection from effects records.

At the ADR stage realism is sought purely through attempting approximate mechanical replication of the original situation, no electronic effects are used. If the original voice track was recorded far away at the other end of a large hangar, for instance, a more distant microphone placement will be used for the re-recording but no digital reverberation will be added until the dubbing stage. Thus the ADR theatre really only needs a screen, a projector, a playback machine, a record machine and a simple console plus a vast selection of effects records and mechanical facilities. When a film is sent abroad for a foreign language version to be made, it will often be delivered with the complete soundtrack, including re-recorded ambience but minus the dialogue, allowing the new dialogue to be recorded without difficulty.

Greater demands are placed on the dubbing theatre. It is here that the dozens of audio tracks including music, production and post-sync dialogue and effects are combined into the final mix. More sophisticated cinemas also have facilities to play 70 mm prints and 6-track Dolby Sound with mono or stereo sound. There will be five channels behind the screen spanning its width. Tracks one, three and five are left, centre and right, whilst two and four are for low frequency 'bass enhancement' for such events as Mother Ships landing or particularly gruesome monsters rising from the deep. The sixth track is for ambience and feeds speakers along the rear and back of the auditorium allowing a mono front to back effect to be created. Some theatres also have facilities for stereo surround where a Dolby decoder creates a stereo image from the remaining MF/F areas of tracks two and four with LF from track six. Standard Dolby cinemas will receive a standard left, right and centre SVA (stereo variable area) optical print decoding to L, C, R+S. Single track mono mixes are also made available for older theatre systems.



The Mitsubishi computer controlled console in Theatre One

What's the process of reducing the many sound sources to the final six tracks?

Gerry Humphreys: "We've just started work on a film called *White Mischief*; we're at the pre-mixing stage where different areas of the sound are brought down to a number of 3-track submixes, eg I might have a couple of dialogue mixes, four or five effects mixes, and so on. Originally there might be about nine or 10 dialogue tracks to a reel that needs to be balanced and equalised, then there will probably be 30 or 40 effects and ADR tracks created here post-sync.

"The composer will have produced the music recording at another studio and it will be given to me usually in a 4-track or 6-track format, although sometimes they will insist on giving me a final stereo mix. This might be intended to ensure that the music is heard exactly as the composer imagined it, but nine times out of 10 it actually works to its detriment because, for instance, to allow the dialogue to be audible it might be necessary to drop the brass down a little, although the strings could stay up, but if the mix is fixed the whole track has to come right down, which is a shame."

The final dub is mixed down to 12 tracks—two 6-track machines locked together. The dialogue requires three tracks, left, centre and right, to allow for the possibility of panning. Similarly, the effects and the music will also each need three tracks with the final three being left for ambience. All recording is done on Westrex Mitsubishi 35 mm magnetic machines capable of 1-, 3-, 4- or 6-track operation. As yet there are no digital recording facilities but are there any plans in that direction?

"Not at the moment, although it certainly will come. One could quite easily get a Mitsubishi 32-track and lock it up with timecode, and I know that Warner Brothers in the US do their TV series that way. The problem is, of course, that you lose flexibility in terms of being able to edit individual tracks. Over the course of a production there are always so many little changes made, not big deals, but just little edits made throughout most of the reels. In the dubbing theatre I can do such an edit in about a fiftieth part of the time it would take me on multitrack tape. Once that 35 mm tape is locked into a sprocket, it's there for good. I can come back to it in six month's time with no fear of timecode slippage, or any worries about discontinuous code due to cuts. Cuts can be made simply in terms of feet and frames and there's never any doubt that it will be absolutely dead in sync."

What about digital recording to RAM or hard disc?

"We've had *Synclavier*s in, and I think all that kind of gear is marvellous to have but they're not the ultimate, as yet. I'm sure that's the way it's got to be for the future, but I'm not sure it's ready now. I think George Lucas out in San Francisco has found that the electronic systems aren't quite as flexible or reliable as he'd thought. Originally he had intended to have an entirely electronic system but he's now started to install a percentage of sprocket equipment. It's just a lot simpler and more reliable, and does the job well. There's so much money involved in film making and the production has to run to a very tight schedule for all the different elements to come together properly. I'm always amazed at how relaxed the music recording world is about time, there just isn't room for that kind of leeway in film, everything needs to be absolutely reliable."

The acoustic treatments of both the ADR and dubbing studios were designed by Tom Hidley. The need for a neutral environment meant that the ADR theatre was made very dead, while the dubbing theatre was designed to give more the feel of a theatre auditorium, with a reverberation time of approximately 0.5 s, and it can actually be used as a preview

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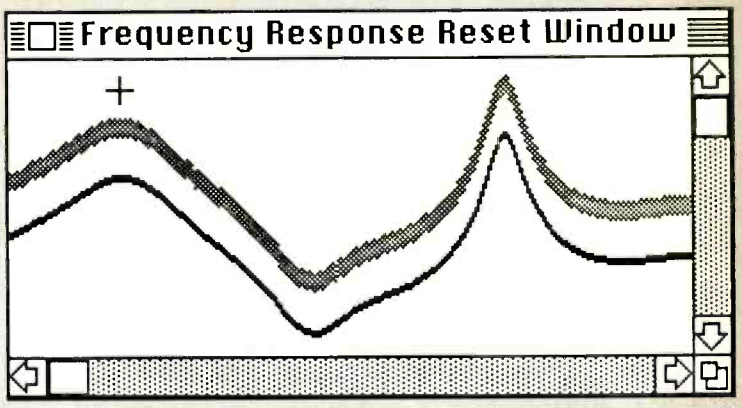

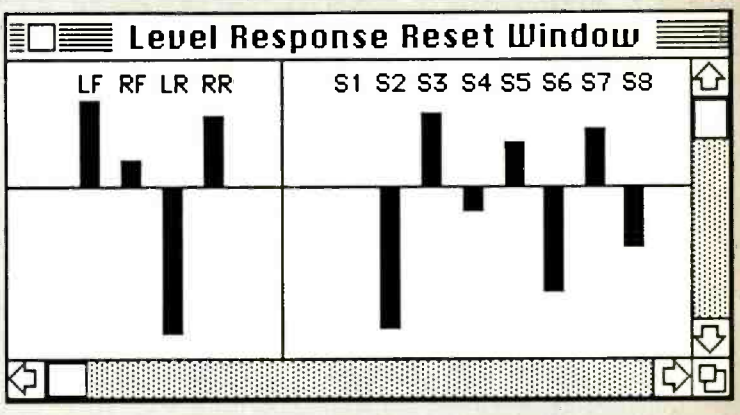

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TWICKENHAM FILM

theatre. This is in contrast to the existing dubbing theatre, which was designed as a multipurpose studio space and hence has a decay time of around 1.0 s.

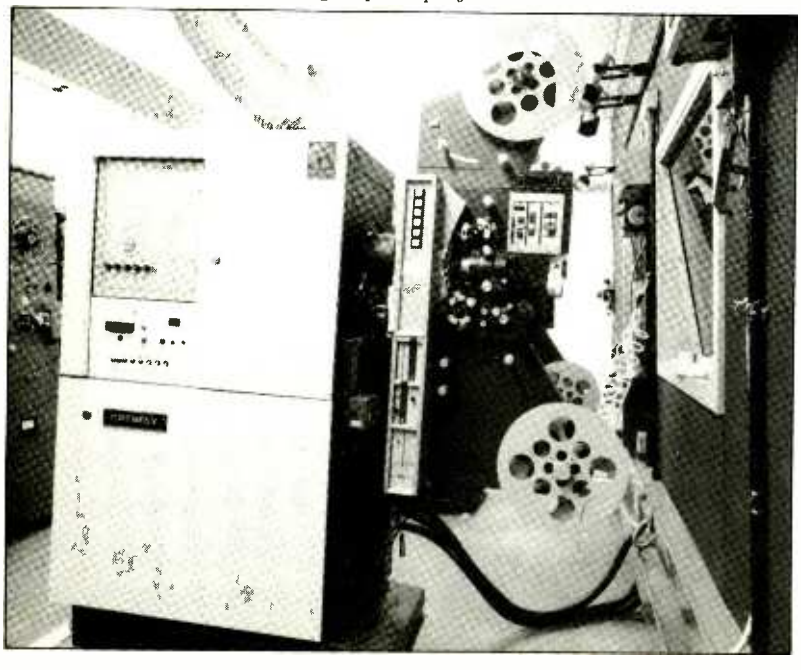
The console in the new dubbing theatre is a Mitsubishi/Quad Eight. I asked Gerry about his choice.

"Right up until the time when I was about to order the console I was going with another manufacturer's product. But throughout all the discussions we'd had over the nine months, I'd really received no significant input from them, no new ideas. Every facility on the desk, and its general layout, had been suggested and designed by us, by Twickenham Film Studios. It seemed that the new console would be virtually identical to the one we designed 14 years ago but with up-to-date electronics and moving faders. I really felt that, although we might have lots of clever people working here, we're not actually design engineers as such, and it seemed there must be some things going on out there in the world of console design that I needed people to tell me about. I was really quite worried about it but could see no alternative at that late stage than going ahead with what we had.

"During this period I was getting all the playback and record machines from Westrex who were starting to get into financial difficulties and finally went bankrupt. At the eleventh hour Mitsubishi stepped in, bought them out, and picked up the contract. Their managing director from Los Angeles came over to see us about the audio machines and asked if they might put in a bid for the console. I said that it was simply much too late, that I'd been working on the desk design for months, and there was just no time. Finally, he did send a design engineer over from America to see me, and in one afternoon meeting he gave me more good ideas than the other manufacturer had done in nine months. So then I knew I was going to go Mitsubishi/Quad Eight. I must say that, I think we were seen as being something of a showcase for the company in this country, and so the price offered was competitive."

Above: Twickenham's ST 12000 Series dual dubbers from Westrex

Below: Westrex RA 1729 high speed projector



The console is basically a 48/24, with the output buses splittable into A and B to give 48 feeds, if required, for multitrack applications. Four auxiliary send controls on each channel can be assigned to 10 send buses via pushbuttons. There are 24 moving coil VU meters for the output buses. A separate section of the mixer has a row of six large black rotary pan controls, which are switchable to pan between two, three or five channels, or from front to back. Via a jack patchbay, the 24 output buses can be assigned to these six panpots. They will often be manned by their own dedicated operator so while the dubbing engineer adjusts for level and overall balance, the assistant will take care of panning tanks from left to right as they trundle across the screen, or bring an aircraft screaming from front to rear as it flies over the camera. Six smaller pots set the width of the image movement effected by a complete turn of the pan control.

There are 14 35 mm playback machines in the dubbing theatre machine room, each with up to six tracks. The routing of tracks to mixer input channels is handled by the mixer electronically and up to four configurations can be stored on floppy disk for future recall. A VDU on the desk allows selection of the machine (referred to as the head) track and channel simply by touching the relevant touchbuttons on the screen. A separate TV monitor to the side of the console shows a matrix of 48 boxes denoting the console inputs, and in each box are shown the details of the head and track routed to it: H16T6, for instance, would indicate head 16, track 6.

"The console is a real pleasure to use. Levels and mutes are automated and the way the level update works makes things very easy: when you go to change a level, no matter where the fader is, as long as it is within 25 dB of the actual signal level, it will take that point as current. So you have immediate effect and there's no moving the fader up and down looking for the pick-up point. Also, the equalisation is excellent (4-band fully parametric). It's not ostensibly as powerful as some but it gives very fine control and just sounds extremely good compared with other systems."

The dubbing theatre's screen can be configured to any ratio at the touch of a button. Behind it, spanning its width, are six identical speaker systems each consisting of a JBL *2445J* compression driver on a JBL *2360H* bi-radial horn, and a JBL *4675* 2×15. The wall-mounted surround sound speakers are JBL *4401*s. Apart from his own personal preference, Gerry chose this JBL arrangement to be in line with the accepted standards in most of the larger dubbing theatres in America. The main screen systems are powered by Crown *D75*s (HF) and Crown *DC300A*s (LF), while Quad *510*s are used for the *4401*s.

The new Sound Centre, and indeed Gerry himself, seems set for a continually busy year with Sir Richard Attenborough, Michael Radford and Ridley Scott all scheduled in with large projects. It's good to see a part of the British film industry expanding and doing so well.□

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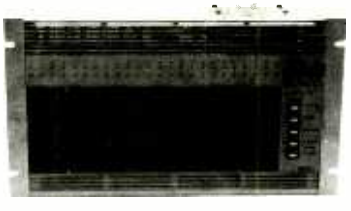

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USING THE STEPP DG1

The Stepp DG1 is a major advance in putting synthesis and MIDI control in the hands of guitarists and, probably more important, away from the domination of keyboards. In this article Ralph Denyer presents the operational aspects of the DG1 and the way the system may develop in the future

The Stepp *DG1* digital guitar is the first electronic guitar that gives a guitarist an entree to the world of synthesis without making radical adjustments to playing technique. Plug in, switch on, and in default mode the instrument plays like a guitar in many respects, far more so than any previously available pitch-to-voltage guitar synthesiser or guitar MIDI controller.

The instrument differs from electric, acoustic, semi-acoustic and solid body guitars in one fundamental respect. Neither the sound nor the pitch is generated by the *DG1*'s strings but by the system's own dedicated creative synthesis module. The guitarist's playing techniques trigger the *DG1* to produce synthesised sounds.

Stepp's technical achievement in terms of interpreting the range of less obvious guitar techniques and translating them into digital information, is considerable. The *DG1* responds in a very 'guitaristic' way to strumming, fretting, left hand mute, right hand mute, string bending, left hand hammer on, left hand pull off and Bigsby-type vibrato arm techniques. With the latest software the instrument can be played with the fingers or any type of plectrum. Previous software issues only allowed the instrument to respond to a metal plectrum.

Through MIDI the *DG1* has 2-way communication with a range of devices including samplers, other synthesisers, sequencers and effects processors, in exactly the same way as most professional standard keyboard synthesisers. Stepp have followed the initial launch of the *DG1* as their flagship product, with the *DGX*. The *DGX* does not have the *DG1*'s synthesis module and, therefore, is essentially a sophisticated guitaristic MIDI controller.

The *DG1* is similar to keyboard synthesisers in that you have sound creation and editing facilities; create a new sound and save it to one of the *DG1*'s 100 onboard memory locations. Additionally, a superbly flexible modular design philosophy allows the guitar techniques mentioned above to be assigned to virtually any sound editing function. The guitarist can change the *DG1*'s synthesised sound in performance in realtime. The *DG1* offers the guitarist far more than just practical control of sound synthesis. And the guitarist does not have to learn a single new technique, or grow an extra hand to operate a separate pitch or modulation wheels in order to get started. Any guitar player can pick up a *DG1* and immediately play it. Any guitarist with reasonable hands-on experience of analogue or digital synthesis should be programming within a very short time. However, using the instrument to its full potential—a huge range of tuning, sound creation and technique-based possibilities—could take up many a brain hour.

The Stepp DG1 with its LSU

Default mode

Let's take a look at the *DG1* from the point of view of the guitarist who knows nothing of synthesisers or MIDI. In fact: Synthspeak Off/MIDIspeak Off.

Plug in and power up the *DG1* and it behaves very like an electric guitar in many respects. Stepp recognise that if guitarists feel at home with the instrument in basic default mode, they are more likely to explore the instrument's full capabilities.

The *DG1* comprises two modules: the instrument itself and its LSU (Life Support Unit). The LSU doubles as a stand for the instrument but primarily houses the power supply, voices and interfaces. The instrument is connected to the LSU by means of a multicore computer bus-type cable, sockets and plugs, secured in place with knurled retaining screws. The choice of audio outputs are: headphone, unbalanced jack and balanced *XLR* sockets.

So, connect the *DG1* to its LSU, the LSU to the mains power, select and connect the appropriate audio output, and switch on at the LSU. A red neon indicator will light up on the LSU and the *DG1*'s LED fret markers will flash for 10 s and the TUNE button will light. There are three largish display windows grouped closely together next to the neck. The details of the instrument's software issues will briefly be displayed before the PROGRAM display tells you a sound program is loaded and the instrument is ready to be played. The membrane control panel on the *DG1* has all labelling upside down to be readable from the playing position. Apart from the large main PLAY/EDIT selector knob, controls within this panel can be ignored at this juncture while we look at the default mode.

The NECK TRIGGER toggle switch on the front of the *DG1* should be down towards the *DG1*'s tremolo arm, which is referred to as the PERFORMANCE BAR. The knob closest to the bar is the VOLUME CONTROL and the one next to that is the TUNE CONTROL. The large knob situated within the membrane control panel area and marked PLAY/EDIT will, in this start-up default mode, allow selection of the *DG1*'s range of 100 onboard digitally synthesised sounds.

The volume control adjusts in the same way as a sensitivity control and at first is best turned clockwise to maximum, with the level adjusted at the amplifier or mixer. When the TUNE control is set to its central position the *DG1* is in standard A'440 Hz guitar pitch. Rotate the large PLAY/EDIT knob until a '1' appears in the program window telling you the sound program No 1, namely 'Electric Guitar' is loaded.

So how does the instrument feel to a guitarist? The basic balance of the instrument is good and like most of the physical characteristics, closer to that of a solid body electric than any acoustic guitar. The KNEE BAR allows the *DG1* to be played comfortably in a relaxed or more upright

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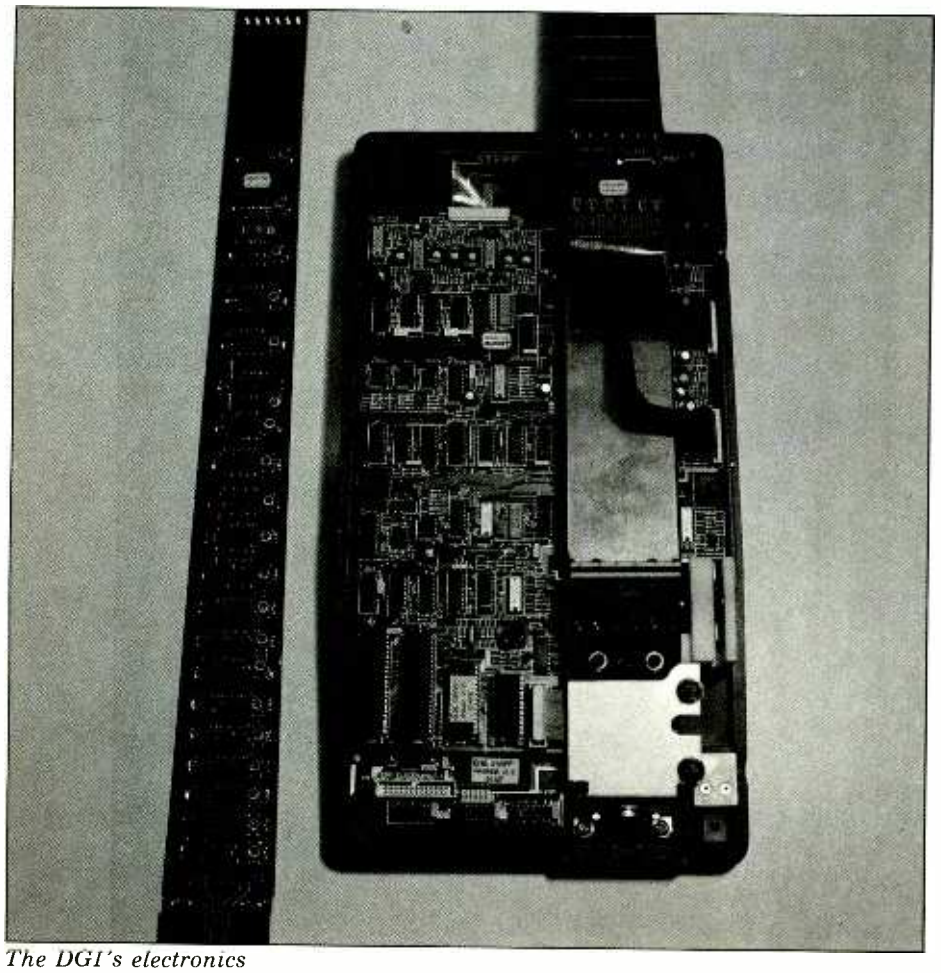
USING THE STEPP DG1

classical sitting position. Standing and using a shoulder strap, the *DG1* feels similar to a standard solid body electric. The strings and neck are not central on the body but the detachable KNEE BAR compensates for this.

At first its action feels a little strange but not a great deal more than a classical nylon strung or a steel string acoustic guitar would feel under the fingers of a player used to solid body electrics. The neck is similar to that of a Fender *Telecaster* though it is slightly longer, with standard Gibson fret spacing up to the 15th fret, then spacing up to the last 20th fret equal to the 15th. The fingerboard is flat in profile like a classical guitar but has a slight dip around the 5th to 7th fret to prevent fret buzz. The ends of the frets may feel just a little sharp at first but this is soon adjusted to.

It is the feel of the strings that the guitarist will find most unfamiliar. All six are the same gauge, about the same as an unwound B or 2nd. Each of the six strings are in fact in two sections. One end of each STRUM STRING is anchored at the bridge and the other end, under a cover next to the neck. The neck or fret strings are also anchored here and fixed at the headstock as with standard guitars. The tension on both the neck and strum strings is adjusted with a small key to give a physical response that feels comfortable. String tension has absolutely no effect on the tuning of the instrument! The split string arrangement seems far more disorientating than it really is. Three unfamiliar playing characteristics relating to the feel of the instrument immediately have to be adjusted to: there is a lack of vibration on the neck and strum strings; there is also an absence of any side-to-side movement on the strum strings when the corresponding neck string is bent by a left hand finger; and because the strings are all as light as a standard B, more left hand finger control is needed so that chord shapes in particular are not distorted. All these characteristics can be adjusted to after a while.



The DG1's electronics

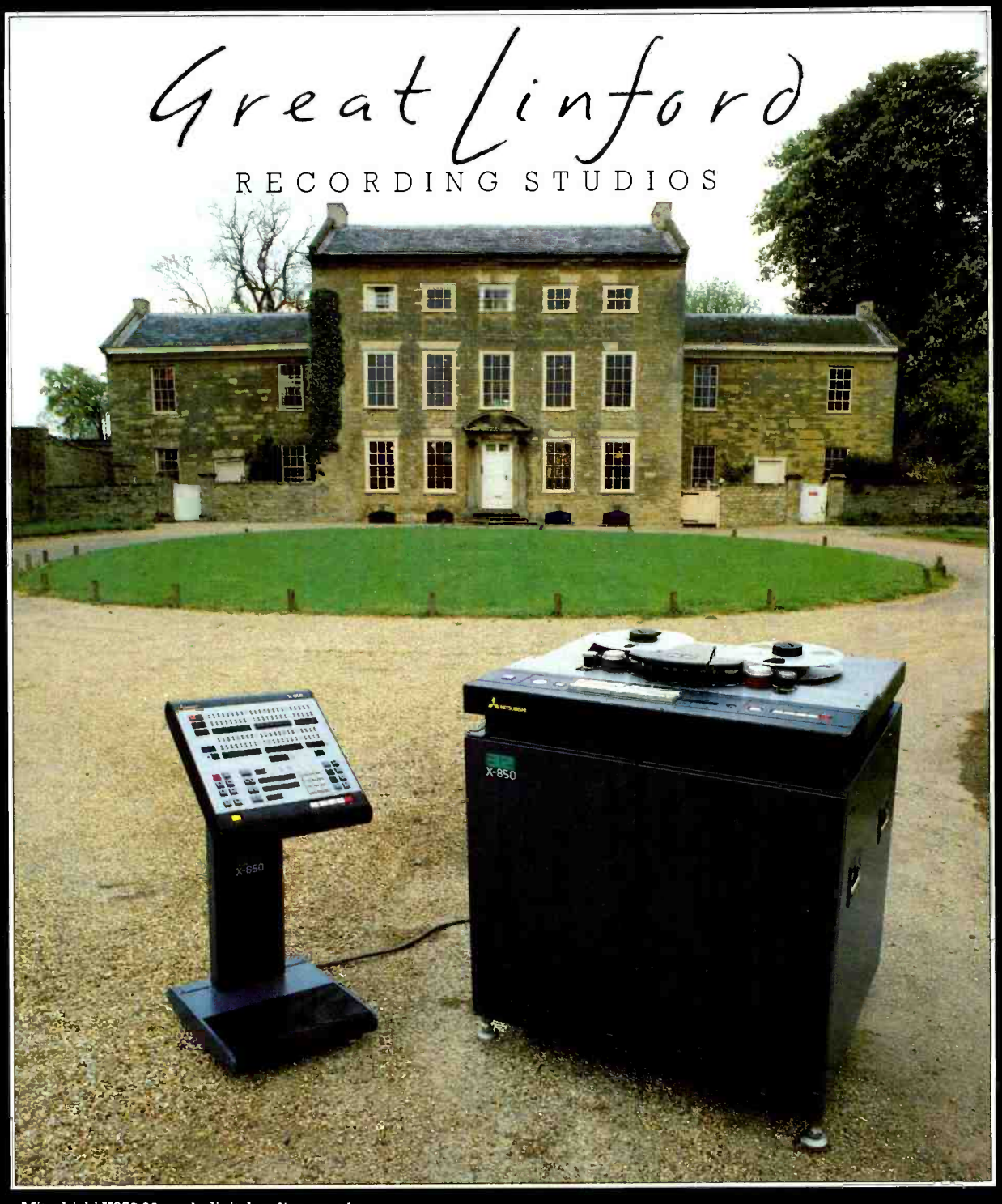
As the *DG1* is polyphonic any chord can be played on all the strings in any position. Solo or single note melody lines present no problems. Push a string across a fret to bend a note. The left hand mutes the strum strings exactly as on a normal guitar. Strike a string harder or softer and the sound is louder or quieter. Fail to push a string cleanly down on to a fret and you get the same muffled muted sound as on a guitar. Hammer-on or pull-off a note just as normal. The right hand can also mute the strings by resting the palm on the strum strings in the general area of the bridge. Stop notes sounding by left or right hand muting, or by lifting the left hand fingers from the frets. The playing response—the time the instrument takes to interpret what the fingers are doing and make the appropriate sounds—is less than is humanly detectable, somewhere in the order of 1 or 2 ms.

Although the guitarist's response to all this may be, 'So what?' anyone with hands-on experience of synthesis and digital technology will have realised that this fast response time demonstrates how sophisticated a synthesis controller the *DG1* really is.

Staying with guitar technique in the *DG1*'s default mode, there are a few limitations. Artificial harmonics cannot be played. There is no acoustic feedback through a speaker to create sustain. The popular technique of playing a forced artificial harmonic by striking the string with the right hand thumb as well as a plectrum is also not possible. Regular bottleneck playing doesn't work as the strings must be pressed down into contact with the *DG1*'s frets in order to trigger a sound. More on techniques and feel a little later.

The first 10 of the *DG1*'s 100 onboard sounds are factory presets in the permanent memory, available at the turn of the PLAY/EDIT click stop control knob. Sounds 11 to 100 are soft and will be erased by saving any newly created sounds, so a complete memory dump to tape or disk is a good idea before any editing and saving is attempted. The program number for the sound loaded is displayed in the PROGRAM window—no more involved than switching a guitar's pickup selector. The program loaded in default will depend on the selector knob position when the *DG1* is powered up.

The 10 presets are: No 1 Electric Guitar, No 2 Chorus Guitar, No 3 Bass Guitar, No 4 Electronic Bass, No 5 Acoustic Guitar, No 6 Sweeping Sync, No 7 Fifths, No 8 Brass, No 9 Organ and No 10 Strings. The 90 soft sounds include more interesting sounds, the idea being that the presets give a starting point for sound editing. Another organ sound has the distinctive click of a Hammond and is quite convincing. A doppler effect to simulate a rotating Leslie speaker could easily be added and a new sound saved. Sweeping



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USING THE STEPP DG1

Sync is a sweeping sound that is good for chords. The Bass Guitar is a fairly rounded sound in comparison with the Electronic Bass, which is a synth type of sound. The guitar sounds have an even quality reminiscent of the even timbre of an Ovation acoustic amplified via its built-in piezo pickup.

At this point we can introduce a vast new range of musical possibilities by simply changing the position of the toggle NECK TRIGGER switch on the front of the *DG1*. Flip it over to go into KEYBOARD MODE. Now any note fretted with the left hand will sound as soon as the string touches the fret. Also, hold down a chord and trigger single notes all with the left hand. Or hold down a chord with the left hand and fret a melody line with the right hand fingers fretting the notes, playing the fretboard like a keyboard.

Try to program over the preset 1 to 10 sounds and you'll get an ERR error message in the display and nothing else. Soft sound memory locations 80 to 100 have SPL included in their display message meaning SPLIT PROGRAMS and indicating they can accommodate a different sound on each string. Just as many keyboard synths can have a split program, the *DG1* can have six separate sounds—one for each string but it would be more practical to group them. The *DG1*'s inventor Stephen Randall demonstrates a mean combination of cello on the bottom two bass strings and violins on the top four. Another useable example is bass guitar on the bottom one or two strings and electric guitar on the others.

So we have a sophisticated guitar controller with 10 preset synthesiser sounds permanently held in ROM and 90 erasable sounds held in RAM that can be selected and played to reasonable effect by any guitarist able to switch on an amp and use pickup selector.

Creating and editing sounds

At this point we have to switch to Synthspeak On/MIDIspeak On in order to consider the *DG1*'s full capabilities.

Stepp saw how even the music industry's workhorse digital synthesiser—the Yamaha *DX7*—was literally around for years before program's like DX Heaven unlocked the machine's powerful programming capabilities for most mortals. They decided to configure the digital *DG1* in such a way as to use the names of basic building blocks of the more accessible analogue synthesis to make the instrument easier to comprehend. So the *DG1* touch pad membrane has terminology far more closely related to analogue rather than digital synths, yet the instrument is digital.

The following is an outline of the basics of sound creation with the *DG1*. Keep in mind, however, the possibilities for variations of digital signal path routing and parameter settings are immense.

The *DG1* is designed to be easily programmable when laid on the guitarist's lap or a work surface. The programmer moves from left to right on the touch pad when initially creating a sound. Pressing PLAY/EDIT above the main control knob puts the *DG1* in EDIT MODE. Flashing LED's indicate the parameters that can then be accessed and invite input. Press a touchpad and its LED will stop flashing and remain on, and the main control knob will then adjust that parameter.

Modulation sources

The *DG1*'s touch membrane has six pads hatched with blue diagonal lines each with an individual status indicating yellow LED. These pads control modulation sources which are selected to act upon modulation destinations. Any of these sources can be programmed to control any destination. Some examples would be:

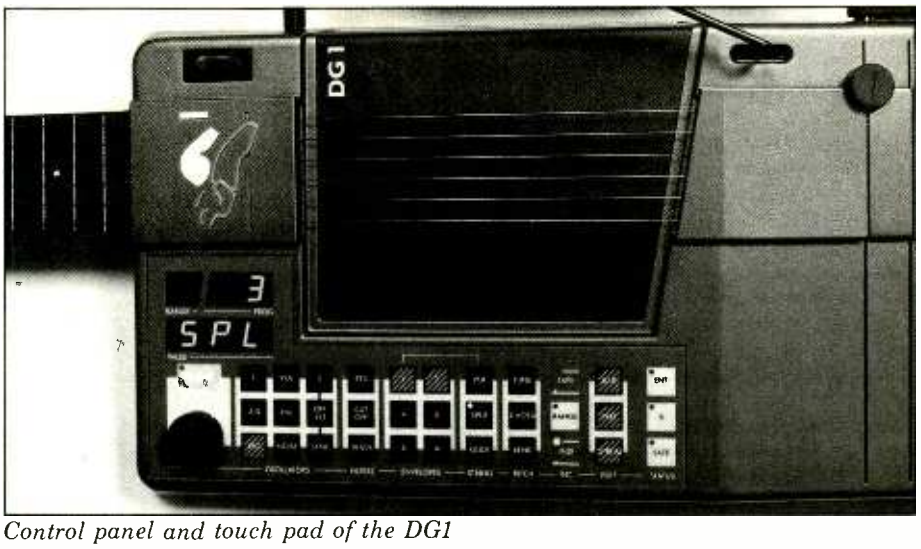
- Assign the Bar to control Pulse Width. As the bar is moved the tone changes creating a wah-wah effect, with pitchbend left on the bar or not.
- Assign the Fret to control the Filter Cut Off point. The timbre of the notes played could be changed in realtime performance by bending a string. Again, pitchbend could be left on Fret or disengaged.
- Assign Envelope 2 to control relative oscillator volumes. The character of a sound changes in relation to the values selected for Envelope 2.
- Assign the LFO to control the Filter Cut Off for an effect similar to using an auto wah-wah.
- Assign Strum to control Filter Cut Off. This time, the harder the *DG1* is strummed the more exaggerated the effect of the Cut Off. The notes sound brighter when played harder, as with an acoustic guitar.
- Assign Bar to *all* Destinations. Using the bar in realtime performance simultaneously controls Oscillator 1 Frequency, Oscillator 1 Wave Form, Oscillator 1 Pulse Width, Oscillator 2 Frequency, Oscillator 2 Wave Form, Oscillator 2 Pulse Width, Oscillator 2 Offset, Oscillator 1-2 Volume, Oscillator–Noise Mix, Filter Resonance, Filter Cut Off, Overall Volume and Overal Tuning. No description of this effect is offered!

Oscillators

Next to the PLAY/EDIT control knob is a grouped block of nine touch pads, which are used to set the oscillator parameters. The oscillators provide the raw wave forms that are the first building blocks of *DG1* synthesis. Each string has two BANKS of oscillators, with a choice of SAWTOOTH or PULSE wave forms or combination of both on each bank. The sawtooth wave forms cannot be altered until acted upon by one of the synthesiser's other controls. Pulse wave forms *can* be altered by varying the Pulse Width (**Fig 1**) thus creating a SQUARE or various

Modulation sources
LFO (Low Frequency Oscillator)
Envelope Generator 1
Envelope Generator 2
Bar
Fret
Strum

Modulation destinations
Oscillator 1 Frequency
Oscillator 1 Wave Form
Oscillator 1 Pulse Width
Oscillator 2 Frequency
Oscillator 2 Wave Form
Oscillator 2 Pulse Width
Oscillator 2 Offset
Oscillator 1-2 Volume
Oscillator–Noise Mix
Filter Resonance
Filter Cut Off
Overall Volume
Overall Tuning



Control panel and touch pad of the DG1

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RECTANGULAR wave forms. Each bank of oscillators can have a 50/50 mix of oscillators or any other proportional mix of the two. A single bank can be used, or any proportional combination of Bank 1 and Bank 2 by using VOL to control relative volumes.

The LOW FREQUENCY OSCILLATOR (LFO) can be used to introduce tremolo, vibrato, and a variety of alternating movement effects.

NOISE is a white noise source, which can be used for non-pitched, mainly percussive effects or mixed in with the main oscillators in small amounts for tonal variation.

The OFFSET control can be used to set the fundamental pitch of oscillator Bank 2 to be lower or higher than Bank 1. A small offset can create chorus effects, whereas larger offsets can separate the pitches by up to two octaves to create harmonic intervals between two distinctive different notes.

The SYNC control allows Bank 2 to be synchronised in time with Bank 1. If the pitches of the oscillator banks are distinctly different, various timbre effects or colours can be created as Bank 2 can lock on to a harmonic—rather than the fundamental pitch—of Bank 1.

Filters

Next to the oscillator controls are three Filter controls, RES, CUTOFF and TRACK. The filters can have a pronounced effect on the raw sound of the wave forms generated by the oscillators. filtering to make them mimic the timbre or harmonic structure of a note played on an acoustic instrument. A filter is placed in the signal path of the signal from an oscillator with the CUT OFF FREQUENCY set to the required value. The filter acts in a similar way to a low pass filter. Oscillator frequencies below the Cut Off frequency will pass unimpeded while frequencies above will be reduced or filtered out of the sound entirely. The RESONANCE control adjusts the level of frequencies passing above the Cut Off point, adjusting the filter's degree of Q or ramping. TRACK is an on/off function, which when on makes the *DG1* mimic the way the timbre of notes played on an acoustic instrument changes with changes of pitch.

Envelopes

The next group of touch pads are used to create sound envelopes. The 1 and 2 touch pads allow editing or creation of Envelope 1 and Envelope 2. The four touch pads A, D, S and M allow access to the ATTACK, DECAY, SUSTAIN and MUTE phases of a note. The final phase of a comprehensive keyboard envelope is called the Release phase, referring to the time taken for a note to die away completely after the key has been released. Mute is a more appropriate term for the *DG1* as the guitarist ends all notes (unless they are left ringing indefinitely) by muting the string in one of a variety of ways, **Fig 2**. Envelope 1 is used when creating a sound. Envelope 2 is used purely as an effects generator.

Mute and damp envelopes

Though grouped with the main envelope generator, the Mute phase is controlled by two separate MUTE envelopes. If the right hand damps a string after plucking it, the STRUM MUTE envelope over-rides the Attack, Decay or Sustain level of the main envelope at that point in time. If a string is muted while being plucked, the Mute envelope over-rides at that point and so the note will be pizzicato. The main envelope will not then operate. A separate NECK DAMP envelope mutes notes in exactly the same way. **Fig 3**. The Strum Mute has a variable velocity sensitivity parameter setting, whereas the NECK DAMP mute is fixed.

The next three touchpads within the grouping STRING are VOL, SPLIT and GLIDE. VOL allows the programming of an individual volume of the sound of each string. For rhythm playing, the bass strings could be made to play consistently louder or whatever. When a SPLIT is used—say synth bass on the bottom two strings

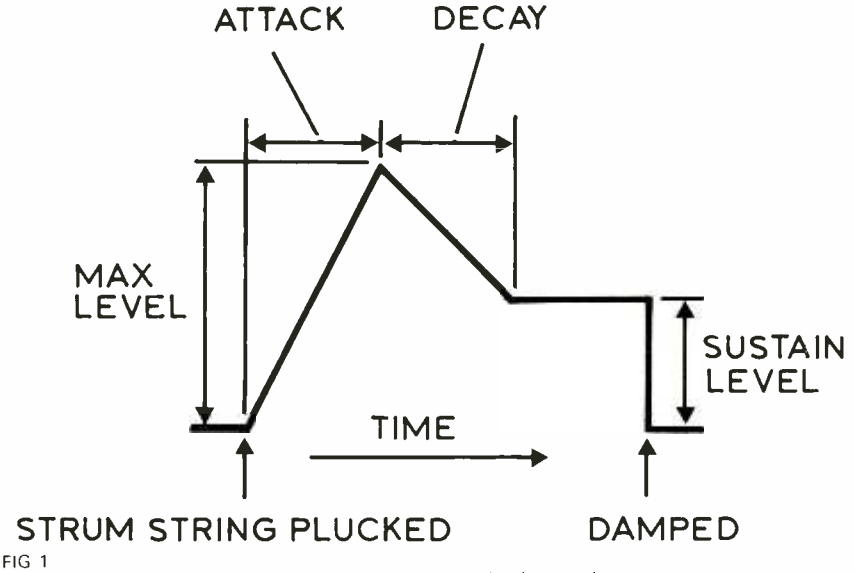
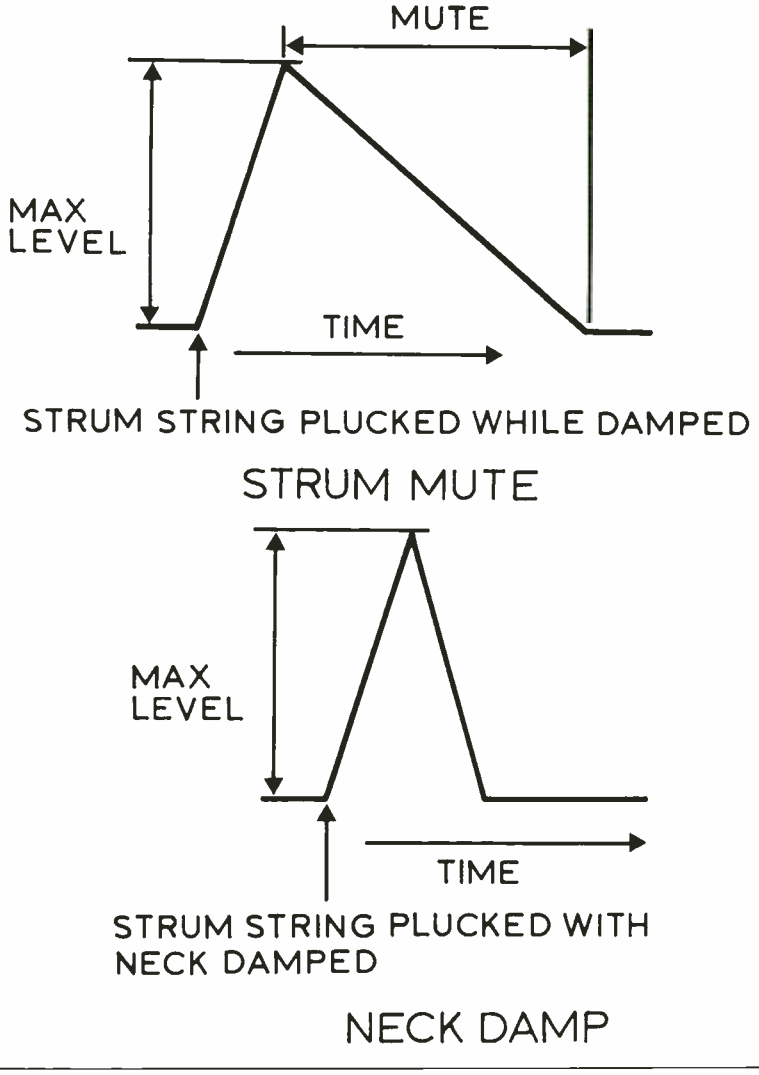


FIG 1
The DG1 has an envelope that is overridden when a string is muted

FIG 2
Strum Mute and Neck Damp envelopes, which override the main envelope when a string is muted



USING THE STEPP DG1

	VALUE	LFO	ENV1	ENV2	BAR	FRET	STRUM
PITCH 1							
WAVE 1	0-A						
PW 1	14						
VOL1-2	5-5	+8					
PITCH 2							
WAVE 2	0-A						
PW 2	14						
OFFSET	36			+9			
NOISE MIX	0						
LFO	25	OSCILLATORS					
RES	0						
CUTOFF	14		+8				
TRACK	0	FILTERS					
ATTACK 1	0						
DECAY 1	24						
SUSTAIN 1	0						
MUTE 1	15						
ATTACK 2	0						
DECAY 2	0						
SUSTAIN 2	1						
MUTE 2	5	ENVELOPES					
ALL VOL	100						
GLIDE	0	STRING					
ALL TUNE	E2				+5		
BEND	50	PITCH					

STRING	6	5	4	3	2	1
VOLUME	100	100	100	100	100	100
TUNE NOTE	E2	A2	D3	G3	B3	E4
TUNE CENT	0	0	0	0	0	0

SYNC [OFF] CHORD [NO]

FIG 3
DG1 preset sound No 7: 5ths

and Hammond organ on the top four—a difference in relative volume may also be appropriate.

GLIDE allows pitch to change from one note to another gliding (or sliding trombone fashion) smoothly between the two. If the Neck Trigger is ON, fretted notes will glide back to open strings. If the Neck Trigger is OFF, notes glide between fretted notes. Many slide and bottleneck types of effects are possible with Glide.

Pitch

Grouped together as PITCH there are three touch pads, TUNE, CHORD and BEND. Tune simply allows each string to be individually tuned with fine tuning of 1/100 of a semi-tone. CHORD allows any chord to be stored as an open tuning. Press CHORD, hold down the chord, play the notes one by one and the chord is stored in memory as an open tuning. BEND allows the amount of pitch change when a string is pushed or bent across a fret to be adjustable in relation to the amount of sideways string movement.

Interface

Grouped together as INT indicating Interface, is a TAPE LED, a RANGE touch pad and a MIDI LED.

Performance

Grouped together as PERF indicating Performance are three touch pads labelled BAR, FRET and STRUM. They are used to assign parameters to the bar, frets or strum strings.

Status

Grouped together within the STATUS area there are the three last touch pads, ENT for Enter, * and SAFE. ENTER is used to load program information from another *DG1*, or to accept MIDI from another synth or a sequencer. The * touch pad allows direct access back to a higher editing level instead of having to disengage touch pads. SAFE means that sound that has been edited and not yet saved to a soft memory location cannot be accidentally erased by loading another sound into PLAY mode.

Pre-set sound seven

The *DG1* manual contains program grids for the 10 factory preset ROM sounds. They provide an excellent starting point for exploring sound creation. The grid for sound 7, Fig 4, is basic guitar sound with the Oscillator Bank 2 tuned to a musical interval of a 5th above Oscillator Bank 1. So Bank 1 is tuned to standard E while Bank 2 is tuned to the A, five semitones higher. By looking at the grid we can see how the sound is constructed and how even a slight adjustment to a single parameter can totally change the character of a sound.

Wave Form 1 is set to 0-A which is all Pulse. The pulse width value is set to 14. An extreme rectangular pulse width makes a sound more 'Fender-like', or as if a string were being plucked close to the bridge. The nearer to a square wave, the more like that of a mellow Gibson or smooth jazz guitar the sound becomes. The pulse width setting is an important factor in creating guitaristic sounds. With Preset 7 the wave is

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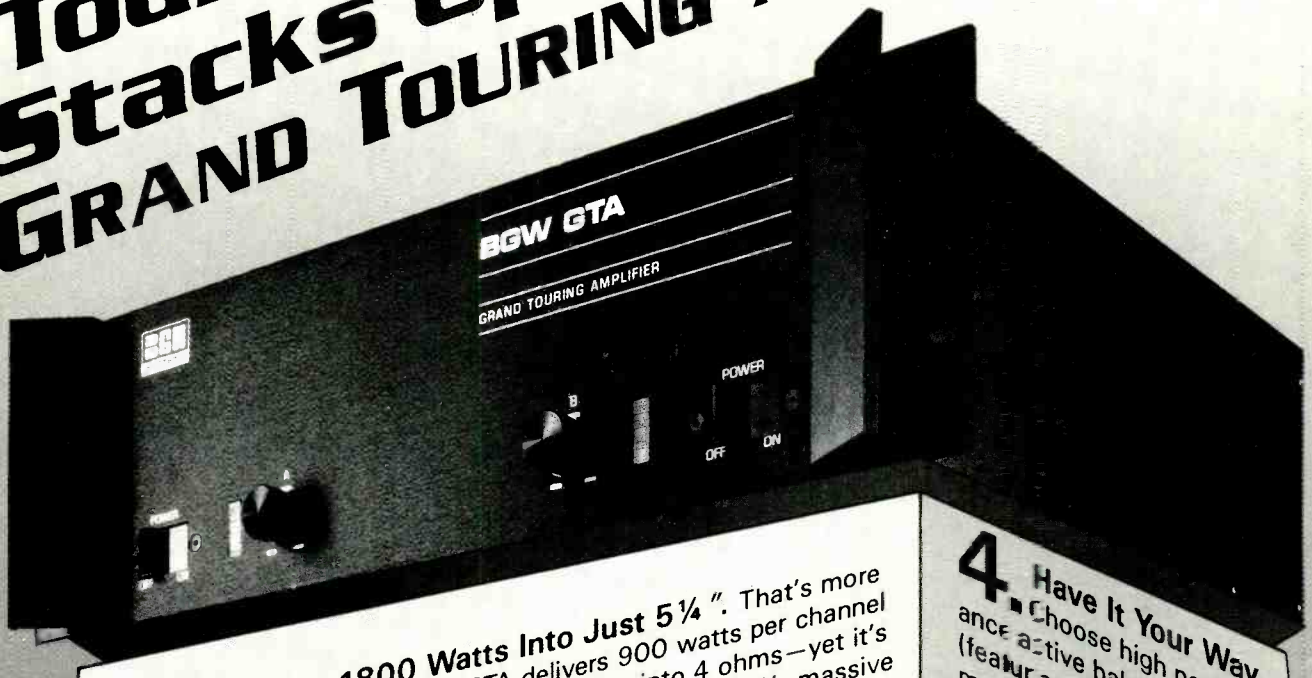

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USING THE STEPP DG1

rectangular. Values 0 to 49 give rectangular wave forms, 50 is a square wave and 51 to 100 gives an elongated rectangular wave form. So as Preset 7 has a value of 14 the sound has some of the quality of a Fender *Stratocaster*.

The tuning Offset parameter between Oscillators 1 and 2 is 36, which just happens to coincide with an interval of a 5th. Use the Offset at small values to achieve phasing and flanging type effects.

VOL 1-2 is the volume balance between the two oscillator banks. The setting 5-5 gives an even 50/50 balance. With this, sound movement is achieved by routing the balance to the LFO with a value of 8 with possible values of 0 to 100. The result is alternation between the two different pitches of the banks tuned to E and A, giving a continuous subtle trill between the two oscillator bank pitches.

Any guitar type sound needs, in some way, to have timbre changing in realtime with volume, which is what happens with a real guitar. With Preset 7 this is achieved by routing the Filter Cut Off to the Volume Envelope.

As a result, at the beginning of the note when the string is plucked, string vibration is at a maximum virtually instantly as is the brightness of the note. As the volume reduces so does the level of the Cut Off point, reducing the proportion of high end harmonics. All the *DG1* guitar sounds have no attack phase so as to sound guitar-like.

With Preset 7 the Cut Off is controlled by Envelope 1, which means the filter has a lowest setting of 14 rising to around a 30 or 40 value, with a possible range setting of between 0 and 100.

For a totally different effect, set the filter to zero and connect it to the bar. Using the bar would then result in a swell of harmonics in realtime as the bar is used. This would be similar to the effect of a wah-wah pedal.

There is no sustain phase with the Preset 7 envelope and the Strum Mute is set to a value of 5.

MIDI

The *DG1*'s MIDI IN, OUT and THRU DIN sockets are located at the rear of the combined LSU and stand.

To obtain access to the MIDI functions: press PLAY/EDIT, press MIDI, and turn the main parameter wheel to see the MIDI options on the menu. MIDI PROGRAM CHANGE simply allows a sound program to be changed. MIDI TUNING OFFSET allows the tuning of the target synth to be transposed by plus-or-minus two octaves in increments of one semi-tone.

MIDI PERFORMANCE CONTROLS allows Bar, Fret or Strum realtime performance controls to be selected and transmitted to control MIDI parameters such as Pitch Bend, After Touch and other MIDI controllers.

MIDI CHANNEL allows selection of SPLIT MODE or POLY MODE and selection of standard MIDI Channels 1 to 16 receive or transmit.

MIDI PROGRAM DUMP allows sound programs and sequences to be transmitted to another *DG1* sequencer, and stored on disk or tape.

The *DG1* has a POLY MODE and a SPLIT MODE. In Poly Mode information from all six *DG1* strings is transmitted in MIDI Mode 3 (Omni Off/Poly On) and can be used to control polyphonic keyboards or expanders. To maintain as much of the *DG1*'s guitaristic character as possible, MIDI Mode 4 (Omni Off/Mono On) is used. In this mode the *DG1* transmits in a multitimbral fashion. That is to say the top (E) string will be assigned to MIDI channel 1, the 2nd B string to MIDI channel 2, and so on.

So, if the six strings are routed to an appropriately configured multitimbral synth or expander, each string will be allocated its own voice. If you bend a note at the fret, only that string will sound with a pitchbend, the others will remain at the same pitch. In Mode 3, however, if one string were bent at the fret, all six strings would change pitch together, as if the notes were being played on a keyboard synth using a pitchbend wheel.

There are four MIDI TRIGGER OPTIONS that can be employed in both the *DG1*'s Poly and Split Modes. These MIDI options should not be confused with the Neck Trigger toggle switched, which, as mentioned earlier, causes a note to be sounded with full amplitude every time a string comes into contact with a fret without the need for a Strum String trigger.

NON TRIGGER MODE requires all notes to be triggered by a strum or pluck of the Strum Strings. Therefore no hammer-ons or pull-offs or accidental right hand triggers will start a note. This mode works well for fast rhythm playing during which it is otherwise quite easy to trigger notes accidentally with the left hand.

TRIGGER MODE is more of a lead mode and will trigger all left hand hammer-ons and pull-offs.

COMBINED TRIGGER MODE, it will come as no surprise, combines the two above modes. If only one note is played at a time Trigger Mode is operative. If two notes are played together the *DG1* remains in Trigger Mode. If three notes or more are played together the *DG1* switches to Non Trigger Mode.

LEGATO MODE is used in the Split Mode (each string to a separate mono voice via channels 1 to 6). When a note is triggered and followed by another note trigger higher up the same string, a new pitch is triggered without a new envelope being generated. The envelope continues at whatever amplitude it had reached at the time of the second trigger.

As MIDI is a keyboard language it simply cannot handle all the Stepp data. MIDI is oblivious to envelope information, seeing only Note On and Note Off messages. Play a fairly complex Nile Rogers-type rhythm guitar part on the Stepp, a sequencer, even one as comprehensive as the Steinberg *PRO-24*, will not record all of the part. With the combination of available assigned and unassigned MIDI Controller Numbers, however, Stepp have employed what they call, 'intelligent fudging' of MIDI protocol to achieve the variety of workable modes. So when operating in tandem with other devices via MIDI, the *DG1* will not always be as expressive as when employing its own internal sound modules. On the other hand the Oberheim *Matrix*, Ensoniq *ESQ*, Yamaha *FB01* and some other Yamaha synths will allow the *DG1* to drive their voices with all the *DG1* expression. Of course, some sounds do not need all the expression; when playing a piano sample for example, pitchbend would not be used for a natural piano sound.

Though all this is bound to sound amazingly complicated to the guitarist, the design philosophy is to provide a series of modes that are selected for particular playing techniques. The guitarist simply tries the different Trigger Options for whatever he wants to play and uses the one that works the best.

Construction

The *DG1* has capacitive pickups and resistive frets. The frets have two separate wafers of resistive material. One wafer registers string contact as being on or off, while the other registers sideways movement or string bend. When a string is pushed down on a fret the contact is read as a note-on message just as when a key is depressed on a keyboard synth. At the same time—even if the string has been unintentionally pushed slightly to one side—the variable parameter is set at zero. Then the amount of travel of the string across the fret in either direction is read as the parameter value. Each fret can be thought of as being similar to a fader or slider with six separate assignable controls. The same principle of movement being interpreted as a parameter applies to the PERFORMANCE BAR.

The *DG1*'s frets are made of a material that, according to Stepp, is a compound of glass and stone, which is more likely to crack if placed under considerable duress rather than wear down like metal guitar frets. Stepp say year-old *DG1*s have yet to need refretting. Time will tell. The

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USING THE STEPP DG1

action of the *DG1* is set to a standard. As there is far less tension in the strings, the neck should remain set at the correct angle. The body and neck is a one piece moulding with a steel frame supporting the body section welded to a T section giving the neck rigidity. The finish and quality of manufacture is quite exceptional. Even the material used for the neck has been selected for its warm feel similar to that of wood. The precision engineering of the neck is also impressive.

The electronics of the 16-bit, 3-microprocessor *DG1* consist of over 2,500 components, 20 components per fret, making 500 in the neck alone. The electronics have been manufactured to British Standard 50750, one of the highest military specifications. On initial issue, not one of the five circuit boards had any straps, joins or modifications, possibly a music industry first. This is all intended to give failsafe quality. Stepp feel that all eyes are on the *DG1* as it is their first product and they cannot risk the slightest chance of a bad reputation with regard to product reliability. Stepp claim that none of the *DG1*'s sold so far has come back with an electronics failure. Any returns have been accidentally damaged.

Maintenance

The string tension of both the strum and neck strings is adjustable by means of a small key provided with the instrument. Replacement metal plectrums as well as strum and neck strings are available from Stepp. The *DG1* is supplied with 18-gauge stainless steel strings; gauges 14 to 20 also available. The memory is held by battery power when the *DG1* is switched off. Flashing LEDs indicate battery power reaching a critically low level and the display will tell the user to fit a new battery.

Summary and assessment

The *DG1* is a very enjoyable instrument to play. The fact that there are two sets of strings is very soon adjusted to. At low volumes and especially with bass sounds, you can be slightly put off by the sound of the *DG1*'s strings but they can only be heard when the amplified sound volume is very low—a minor point. The thinner than normal gauge strings take the most getting used to as they simply do not present the combined resistance to movement of a set of standard electric guitar strings. Though as mentioned, the tensions are adjustable to a point. It is also possible that once they have been acclimatised to, the thinner strings may actually make playing—especially of chords—faster and easier.

Guitarists with clean technique will get on well with the Stepp. I found that the volume of up and down strokes with the plectrum varied if the angles at which the string is struck are vastly different. But again, you can soon clean that technique up. A major point is that usually an electric guitar player is muting a lot of the time in order to prevent feedback on the wrong strings. The electric guitar player has to learn to think about muting as a more creative technique on the *DG1*.

Though muting and barring techniques may need some tidying up, others are easier on the *DG1*. For example, both hammer-ons and pull-offs are much easier because the strings merely have to be accurately fretted, not caused to vibrate.

The Stepp is quite suitable as a piece of studio equipment. I have seen the instrument set up by studio engineers and placed in the hands of both a bass player and a guitarist who hadn't used one before. Both were able to start playing in a useable fashion straight away. At the other end of the scale Alan Murphy—best known for his work with Kate Bush and Go West—has started to amaze even Stephen Randall with his own brand of virtuosity on the *DG1*.

Control panel of the Stepp DGX

Many of the sounds are instantly a joy to play. Cello samples from an Akai *S900* combined with the *DG1*'s own string sound lend themselves very well to the instrument. They are compatible, of course, because they are both stringed instruments. Also the saxophone sound on the Yamaha *PB01* is an immediate success. A piano sample again through an Akai *S900* works well straight away. Sounds with a long attack do take a bit of getting used to as guitarists are so used to virtually instant sounds.

The realtime control of the modulation sources upon the fixed destinations also provides considerable food for thought. Stephen programs the Bar to do such things as bring in a harmonic as the Bar is depressed. Many of the possible effects are hard to even imagine.

The *DG1* has a tuning range from C0 (around 1½ octaves below a bass guitar) to D9, which is way above mandolins and the like. Combined with open and other tunings this gives the instrument another range of possible sounds.

The sound editing side of the instrument is very accessible, particularly as the grids for the 10 presets are provided in the manual, giving an excellent introduction to synthesis for the guitar player. The impressive analogue/digital concept leaves the door open for considerable experiment.

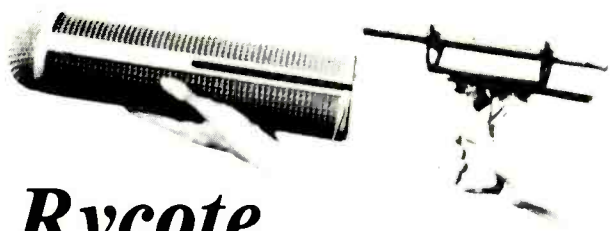
A major point to overcome is recording the *DG1* to a sequencer such as the *PRO-24*. A fast Nile Rogers style of rhythm playing works fine on the *DG1* using its own voices or those of synths such as the *FB01* or Ensoniq *ESQ* but this does not work at present with a Steinberg *PRO-24* sequencer. Stephen Randall hopes that eventually it will be possible to play a part with a sampled guitar—maybe a Jimi Hendrix *Strat* sound or an Earl Klugh nylon string acoustic—and later edit on a sequencer. That remains in the future but no doubt many a producer or engineer would consider it to be a worthwhile investment just to have a guitar that can't be put out of tune. A few hours of studio time saved there alone!

About 100 Stepps have been sold so far. They wanted to establish the *DG1* as the first complete standalone electronic guitar synthesiser before risking confusion of the instrument's image by releasing the *DGX*. There is a waiting list for both instruments.

Though the *DGX* has a different control panel both instruments are virtually the same in terms of MIDI facilities. The *DGX* has two foot pedals, one for a program change, the other is soft and can be assigned to any MIDI parameter accepted by the target synth.

The Stepp *DG1* retails at £3,500+VAT, while the *DGX* Intelligent Digital Guitar Controller is priced at £1,575+VAT.

The policy at Stepp is to make future developments in response to demand. So if enough people express interest in having onboard FM voices, sampling or whatever, Stepp will look into the possibilities. Recently yet another software development was being evaluated: they were trying a split that makes it possible to have different sounds either side of a designated fret. Combined with use of the Neck Trigger, this allows for chords to be played below a selected fret with the left hand, while the right hand can fret single note melodies above the split fret but with a different sound. Software upgrade chips are supplied free to *DG1* owners.□



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MASTERFONICS

A new Hidley-designed Nashville facility is visited by Keith Spencer-Allen

In the last two years Nashville has been through a phase of energetic studio construction with new facilities nestling among the long-established names of Music Row at the same time as the expansion and development of some of the existing facilities. Masterfonics, located on a corner of Music Square, was a well-established mastering facility with a pair of cutting rooms, digital editing room and tape/cassette copying facilities. Just over a year ago the facility was extensively redesigned: the cutting rooms were rebuilt and a very large mix room was added—the first operational Hidley 20 Hz design.

Masterfonics was started in 1973 in a Nashville suburb basement by the then owner Mac Evans and business was custom mastering for small labels. In 1975 he bought a Neumann cutting system, the third *SAL74* in the US. The move to the current location had been made in 1974 and a Westlake-designed cutting room was opened. This, plus another room, remained until September of last year when both were torn out as part of the refit.

In their place have been built an identical pair of Tom Hidley-designed cutting rooms arranged as mirror images around their rear walls. The design uses the more recent Hidley techniques of 4 in poured concrete monitor wall with Hidley/Kinoshita 28 Hz vertical monitors. The room has a structural height of 13 ft and an isocap at 12 ft, from which hangs all the room trapping. Internally the front walls have hardwood surround to the monitors with the wall at an angle to the vertical, though quite straight. The monitors are at 4 ft 9 in from the floor and angle slightly down. The side walls follow a fairly complex geometry with a variety of different sized traps behind them. The rear wall is 12 ft high and has a 4 ft deep hanging bass trap. On the surface, there is a half drape behind which is a row of RPG diffusers. This drape is apparently kept closed for most of the time as the studio feels the listening environment is more accurate for cutting in that way. According to Masterfonics president Glenn Meadows, the diffusers don't produce the same effect within the Hidley design as they would in a LEDE-type room. With the diffusers 'open' there is a much better stereo effect anywhere within the room but it makes the working environment difficult particularly with localisation of the centre image. So when working the drapes are kept closed and are opened up for playback parties when the effect is more desirable.

The control room

Although referred to here as cutting rooms, Glenn said that these days ony about 10% of time is actually cutting within them. The current thinking is to move the lathes into a common production cutting room in another part of the building and turn the two cutting rooms into audio preparation rooms for digital editing and EQ preparation only. Although both the rooms are fully equipped in an identical manner for analogue cutting (with the exception of the cutting system) most work these days is being prepared digitally.

Glenn Meadows: "We probably generate between six and seven CD masters a week and have been generating CD prep masters for longer than anyone else in Nashville. We can now convert from virtually any format to prepare masters."

To undertake this work the facility is well equipped with JVC digital products. A sister company, Master Technologies, has six digital JVC systems that are rented out to studios in town although more of the time they are needed in-house. CD preparation is done on the *DM900* disk mastering system and there are plans to have a console built specifically to house the digital mixer, editor control head, the computer that ties the whole thing together and the monitor section for one of the audio preparation rooms. They will probably retain some analogue EQ for those transferring in from analogue, as well as some outboard compression facilities until the JVC limiter for the *DM900* arrives. If a client needs to cut a lacquer at the same time then the digital video format signal would be sent to the production cutting room and cut via a JVC processor and DDL there. All digital processing and editing is completed in the JVC format and then converted to Sony for the customer's master.

As if to emphasise their commitment to digital working (which is not in doubt) Glenn briefly ran through the analogue equipment in the room including the Sontec *MES-430B* parametric disc mastering equaliser (EQs preview channels simultaneously), Sontec model *200* Dynamic Range Controller, an unusual stereo widener made by a company from New Orleans called Outer Ear and known as the *Image Recovery System Master Series Control* (that is used to slightly widen narrow singles mix for album use and sometimes finds it way into the mix room) and the Neumann *SP75* cutting system not forgetting the Studer table (?)—something that the analogue reel-to-reel finds itself being when Glenn estimates its use as currently just once a week.

Masterfonics has five cutting engineers on staff and the rooms are busy with clients about 60% of the time. The rest of the time is taken up with production cutting and the rooms keep pretty busy. Nashville has perhaps six or seven mastering rooms, most of the key facilities being within a few blocks of each other. Although much

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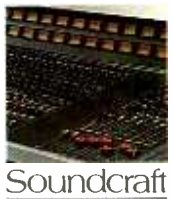

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MASTERFONICS

of Masterfonics' work comes from local labels, there is a significant amount from out of town.

Glenn Meadows: "You have to think that in one direction there are now real mastering facilities between here and Miami and in the other direction the next nearest is Memphis and the only one that I know of there is Ardent. That is about it."

But what is it about Nashville that has meant that digital audio has become such an accepted way of working? Glenn has a theory that in the initial marketing of digital processors Nashville was omitted from the big push particularly by Sony. Because of this Nashville was not subjected to any experience with less than perfect earlier systems. When the Nashville community were ready to use digital a few years later they went straight into the later generation machines with none of the reservations and bad memories that are still found in other recording centres. I commented that despite seeing more 32-track PD format machines in one town than anything else, I had seen very few digital mastering machines. Glenn explained that rental was popular and that some of the facilities were mixing back on to a pair of the digital 32 tracks and then copying from there to whatever format the client required and therefore hire was probably easiest.

On the other side of the corridor to the cutting rooms is a tape copying room with a fairly mobile combination of equipment that allows a wide variety of copying to take place. For realtime copying they have a bank of 10 Aiwa *F660*s. According to Glenn, with these machines, Dolby *HX Pro*, a digital tape as source and TDK *SAX* tape the results are... "frightening. You can take normal 15 dB headroom digital tapes and just let +10, +12 peaks hit and it is clean and it works."

The focus of attention for Masterfonics has undeniably moved to the mix room. It is one of the largest control rooms I have ever seen and certainly one of the most impressive. The layout is very simple and clean and is something that really only works when you can do it on this scale.

The design for this room was also by Tom Hidley. It uses the largest of the Hidley/Kinoshita vertical monitors to meet his 20 Hz approach and was the first operational room of this design, just pipping Studio des Dames in Paris. Due to the increased amount of LF energy, the isolation parameters are very demanding. Aside from floating floors and structural considerations entry to the room is via airlock doors on either side of the room and both of these lead into rooms on either side; one is used as a machine room to house the Otari *DTR900* 32-track PD multitrack, the studio computers and the other outboard equipment that can be removed from the control room. Via these rooms there is access to the area behind the monitor wall and behind the rear wall of the room, so the structure is totally isolated from the rest of the building. Glenn said that it is possible to stand behind the poured concrete monitor wall while the monitors are running 120 to 125 dB in the room and not hear much.

The console is 16 ft of SSL *4000E* with 48 channels in a 64-channel frame. Normally one would expect such a console to dominate such a room but it seems quite in proportion with the surroundings. The modules on the SSL are arranged so that the first 16 channels are right up against the centre of the desk, which is also the centre line of the room making the primary 32 channels within easy arms reach of the engineer.

The internal design of the room is a hardwood front wall with an absorbent panel at the centre of the monitor wall between the monitors. The distance between the monitors is 16 ft with the bottom of the vertically mounted cabinet being 4 ft 9 in off the floor. The monitors are minimally angled and the rear of the console has been covered with a frame filled with *Sonex* foam to reduce reflections. Five video screens sit below the monitors for SSL info, front door security, digital tape machine camera and the others for use with additional video sources.

The floor is oak panelling with all of the side walls finished in a black grille cloth as is the ceiling. This means that the front monitor wall is clearly visually defined but the blackness of the walls completely hides the geometry of the room further enhancing the effects of the size of the room—there is the front of the room and something behind you but it appears neutral both visually and acoustically. The rear of the room is broken up with a row of eight RPG diffusers that normally remain covered with drapes for exactly the same reason as those in the cutting rooms.

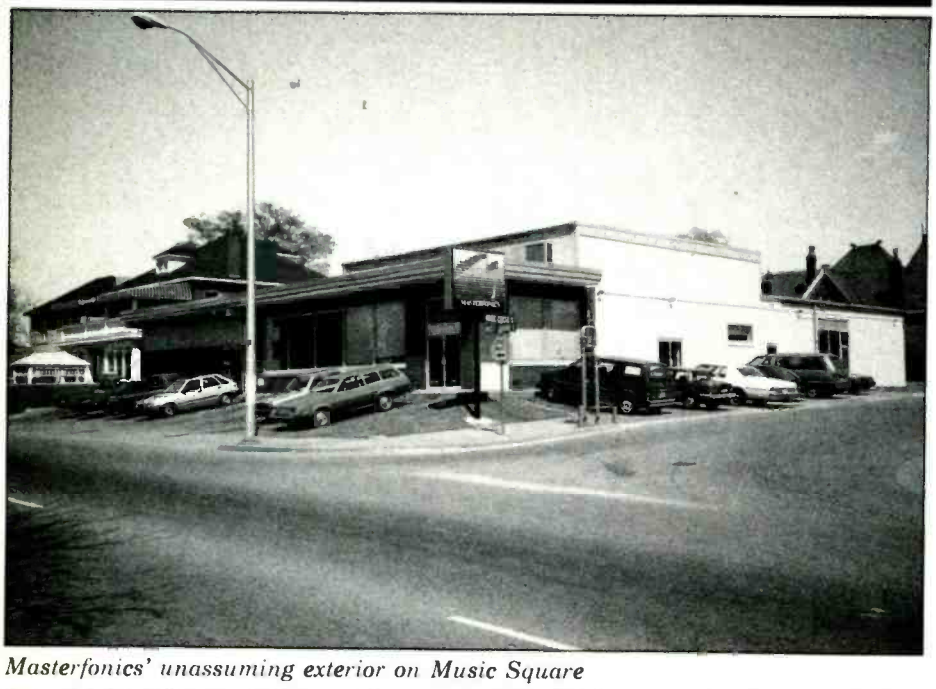
Standing at the back of the room you immediately notice that the SSL has four legs. It was mentioned to Tom in the design stage that they wanted to be able to move the console back from the monitors if clients wanted to mix further back. All connecting cables are on umbilicals that will allow 3 ft of movement and the console is mounted on wooden blocks. Moving the console is not something they would undertake lightly, however. The console is also equipped with a second keyboard at the extreme left by the patchbay so the second engineer can operate in parallel.

The rest of the room is completely clear. There are two equipment racks that were made locally and are unusual in that the equipment is at a 45° angle to prevent reflections. These are on wheels with long umbilical cables that allow them to be wheeled right up to the console, adjusted and then wheeled to the back of the room out of the immediate acoustic field. The cables are long enough to be rolled up equally on either side of the console for symmetry. The cabinets use wooden mounting strips that help prevent ground loop problems between the equipment chassis. The only piece of equipment in the racks that makes a noise is the fan in the Publison *IM90* but this is of little real consequence.

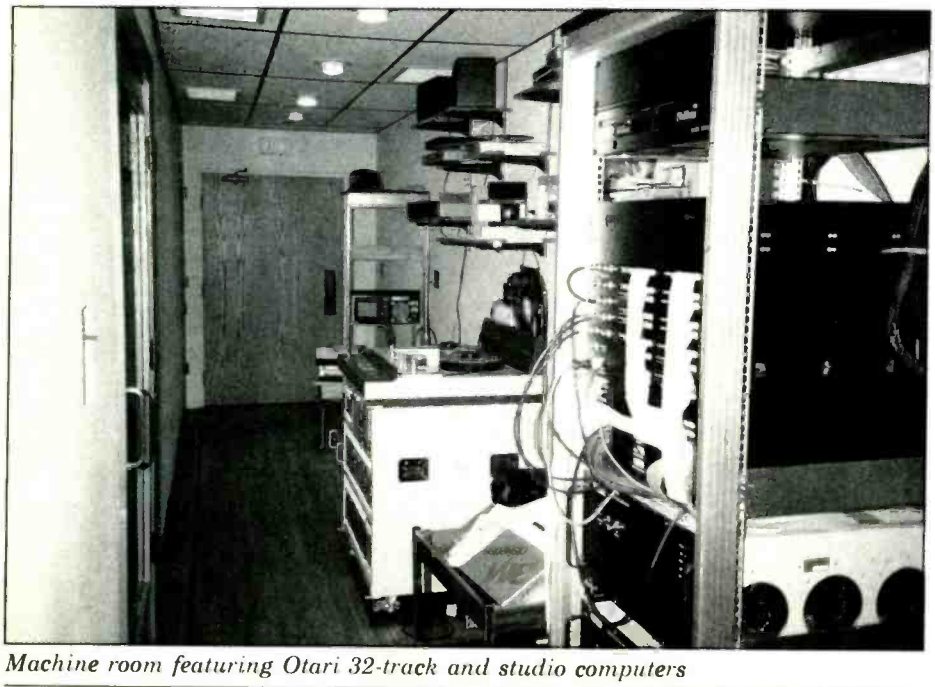
Equipment in the racks included a pair of rebuilt Martin Audio equalisers with a new

Glenn Meadows with Hidley/Kinoshita 20 Hz monitor

MASTERFONICS



Masterfonics' unassuming exterior on Music Square



Machine room featuring Otari 32-track and studio computers

discrete component circuit; an older Sontec 2-channel parametric EQ; two UREI *550* universal filters; Valley People rack with *Kepex, Gain Grains* and *DSPs*; Neve limiter/compressors *2254/E*; Dolbies; Quantec *QRS*; Eventide *Harmonizer 969*; *Infernal Machine* with 21 s memory, Lexicon *PCM 70*, *Teletronix LA2A*, pair dbx *160X* and *165A*, A+D *Vocal Stressor*, Aphex *Compellor*, two Lexicon *224XL* and EMT *252* and *250* reverbs. There is also a much smaller rack that houses a turntable, cassette machine and a modified Studer compact disc player. Mastering machines are rolled in as needed. This equipment layout leaves the room free from clutter and allows the popular studio pastime of indoor softball (with foam bats) to remain unimpeded by equipment.

What about the choice of multitrack, the Otari? Glenn Meadows: "We opted for the Otari because of its features: active balanced inputs and outputs, we think a better layout of remote panel and at the time we ordered they were offering a digital peak meter display for very little extra. Having worked with digital equipment for six years we felt that this was a worthwhile feature. This was also the first machine in the US, which from a marketing standpoint is valuable, and finally it is a pretty looking machine. I haven't had any problems with it at all."

The Otari sits in the machine room as mentioned earlier. The studio, interestingly, run all their multitracks and power amps on 230 V feeling that these devices draw large amounts of current anyway and that running at 230 V will mean drawing half as much current with less losses in the wiring, leading to better performances from the equipment. All power plugs for the equipment are on twist locks, so they cannot accidentally fall out, and perhaps more importantly unauthorised equipment cannot just be plugged in without obtaining an adaptor box from maintenance so that the equipment can be checked. All the power circuits in the studio are run off power conditioners.

The machine room is wired to handle two 32-tracks. There has been an unofficial agreement among most of the current Nashville SSL studios to standardise on the pin out layout on multitrack connection so that machines can be moved between studios easily. The machine room is fed by three tons of air conditioning with a separate five ton supply for the control room. There is provision for running both rooms off one unit in the event of failure. The system includes two reheat strips, humidifying and dehumidifying facilities.

Construction of the room started on July 1st and was finished October 14th, which, considering the scale of construction, is pretty fast. The site was a photographer's studio originally and that all had to be gutted. Major structural work included cutting through the existing foundation slab for the structural walls, and the 14½ ft high 6 in poured concrete monitor wall. The roof had to be raised by 7 ft, which was done by lifting it off by crane, building up the walls and craning it back on. This took about six weeks and the rest was construction by Hidley crews. Even then time was tight with 18 people running double shifts 24 hours a day. Despite Rick Landers, chief of technical services, prewiring and crimping ahead of time, and with the addition of four freelance wiremen, the room was finished just two hours before the first booked session.

This was one of the few rooms I had been into for some time that did not have the console piled high with reference monitors. Glenn: "Most of the people working in the room have been quite

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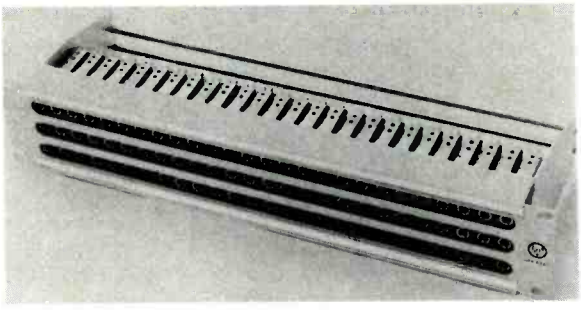

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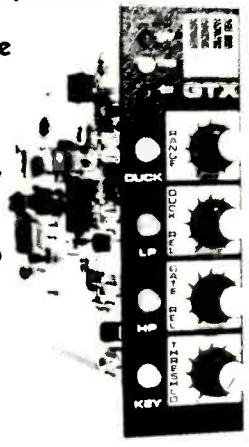

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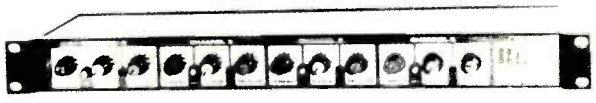

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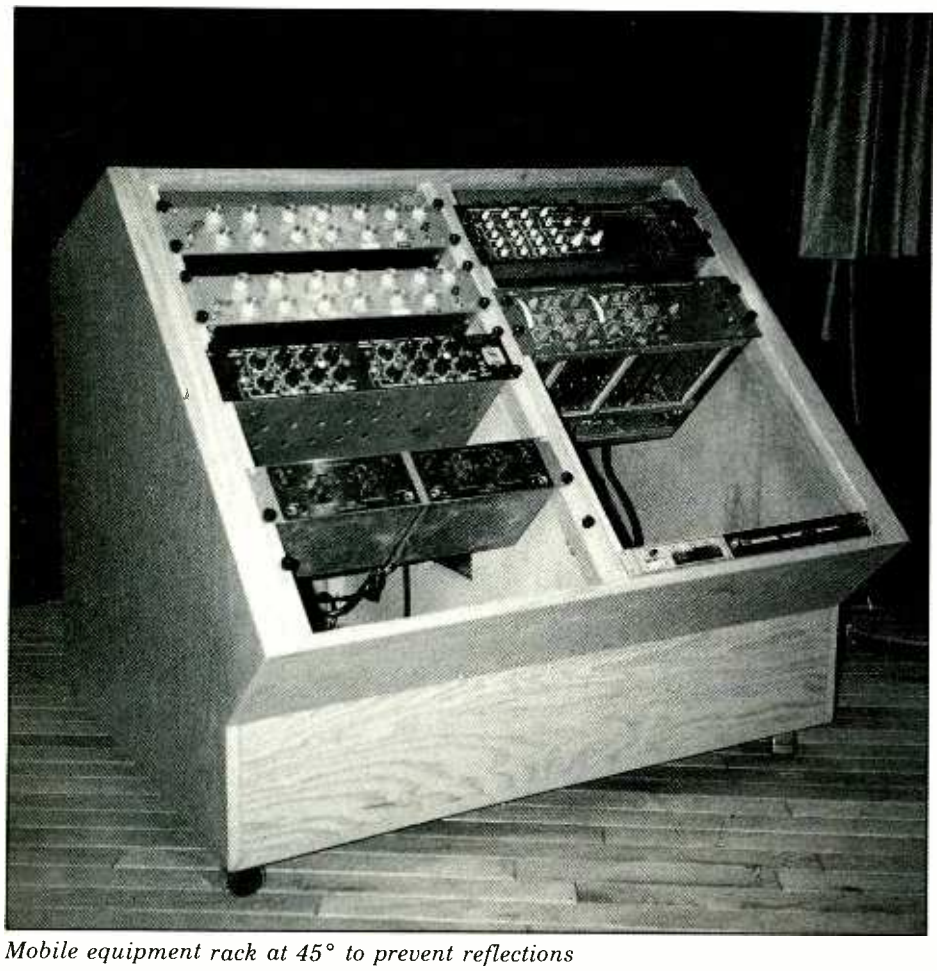
MASTERFONICS

pleasantly surprised that mixes made on reference monitors sound good on the large monitors and also the other way round. Our whole design concept with Tom on this room was, 'Hey let's build a room that people can get back to using the big monitors in again'. With compact disc you cannot accurately mix the bottom end on a pair of *NS10*s. With electronic music you have to be able to position that low end. Tom said 'How wide do you want the monitors?' and I replied 'Tom this is the space that we have to work with. If you were going to design the ideal mix room what would you do?' and this is what he came back with. We made no changes and with several month's experience the only change I would make now is to have made the machine room a little deeper!"

What did Glenn feel that he gained by having easier access to that lower octave? "It is important as I said earlier for CD."

Glenn felt that aside from the importance for CD work, a room that rolls off too early will give a misleading character to the LF response. Engineers who have worked in the room for several weeks have said that initially they were sceptical, not knowing if they were going to like working with this extended response but came out of the experience smiling. Listening to CDs in the room, there was no obvious increase in bass performance although it did seem rather less effort to reproduce some of the very low frequencies.



Mobile equipment rack at 45° to prevent reflections

The main monitors are powered by FM Acoustics *FM1000*s (*FM801*s are used in the cutting rooms) using FM Acoustics *Forceline* speaker cable. The amps are positioned under the monitors keeping cable very short. The cabinet has six pieces of cable going to it as each of the woofers are brought out to the crossover individually and paralleled there rather than at the cabinet.

Glenn: "This is the way we installed them, trying to eliminate anything in the mechanical side of wiring that could contribute to differences in imaging from side to side. We decided that all cable runs would be cut the same length and when you start talking about high power levels the amount of current travelling down the wire becomes significant. If we now run two woofers that at times will reach 1 Ω impedance with them paralleled at the cabinet, then you are asking that cable to handle double the amount of current. So we are trying to eliminate as much drop as we can and get all the power to the speaker rather than dissipating it in the wire. You put speaker cable in one time and it is one of the most critical lengths in your entire chain. If this is not correct then everything you reference to is wrong."

It does not stop with the monitors. All the audio wiring in the studio is Mogami oxygen-free multipair. The internal workings of the equipment is also looked at with a view to improving the quality of any bits of poor quality wire and Glenn was able to mention several circumstances where they felt there was a worthwhile improvement. Even the SSL has not been ignored, although not as regards wiring.

They have been talking about modifications to the console with SSL. Glenn: "Business-wise buying this console has been one of the best decisions we have ever made. But now from our standpoint we have got to say let's increase the sonics; let's make it better. We are the kind of people that split the hairs and get that little extra out of it and make people say 'Yeah, this one sounds better than that one over there.' Unfortunately it is expensive and you have to plan on some down time. You have to have time to make the changes once you have decided what to do."

What about other aspects of the room for the future? At the time of construction an overdub room was discussed but there was no available space within the complex. It is still a possibility, with the area being remote from the mix room connected by video and the control room and being projected on to a screen between the monitor by an overhead projector. In the meantime, however, this has not stopped limited amounts of recording in the room. Emmylou Harris did a vocal track in the control room. Glen Campbell did harmony parts. The group In Pursuit used the area between the mix room doors for the vocalist so they could match her voice to an existing track. Additionally, instruments such as high hats, sax, pedal steel, guitars and of course synths are quite regularly recorded in the room.

Glenn: "Tom has done an admirable job on controlling the reverb times as you go down in frequency. It is real short at the bottom end but it is comfortable in the mid and top bands. It is not dead and doesn't suck out everything when you talk in it. You can't load up this room acoustically."

At the time of my visit Tom Hidley had not seen the room finished and working. And I somehow don't think that he will be disappointed when he does.□

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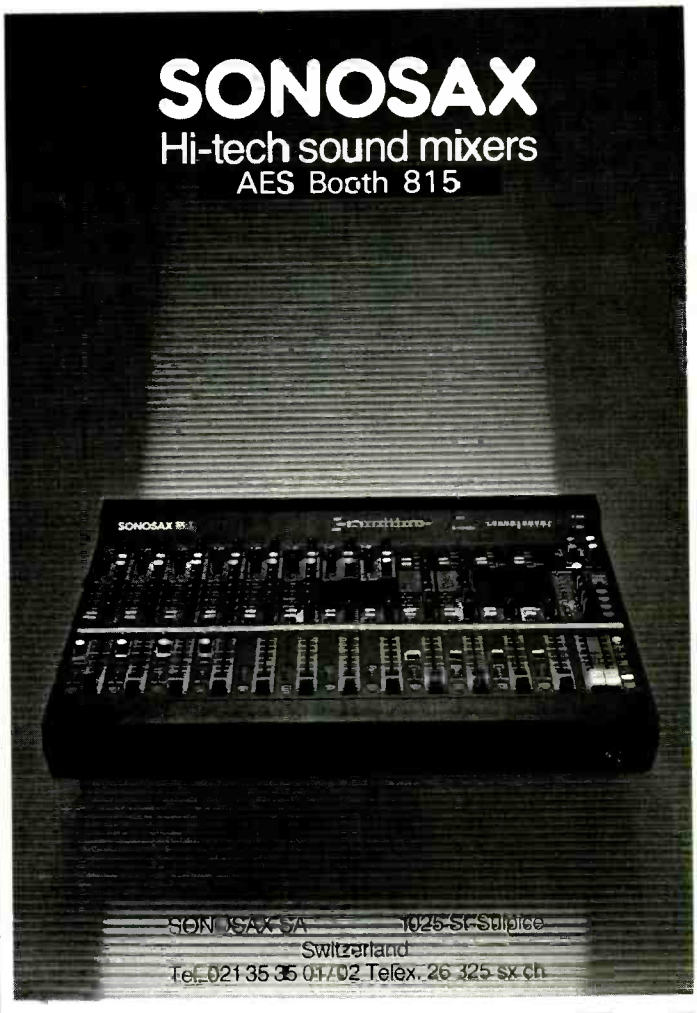

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COULEURS

Terry Nelson sketches his impressions on French studio, Les Couleurs.

Mention Auvers-sur-Oise to any art lover and he will almost certainly reply, 'Impressionist country!' Ask an informed music fan which French studio made a big impact in the '70s and he will almost certainly reply, Le Chateau d'Herouville!

As far as Couleurs' Studio owner, Laurent Thibault, is concerned, 'Le Chateau' is an episode that is over, "though looking back on it now in an impartial way, it was a great experience. However, I am more concerned with now and the future and whereas people may be interested to know where I am coming from, the new studio has been built to stand on its own feet and not have the shadow of a former studio behind it."

Laurent Thibault is a well known figure on the international scene and has numerous credits as an engineer/producer and musician (he was the bassist for the French progressive group Magma at one time). After the demise of Le Chateau, Laurent took the opportunity to step back from the hectic day-to-day running of a studio and lay plans for his next venture.

"I wanted something that would be on a more manageable level but still out of the centre of Paris. The studio would also have to be at the front of technology as far as possible and at the same time offer a different atmosphere than that of 'just another studio'.

"I have always interested myself in how things work in a studio and this time I really started getting deeper into the acoustic and structural design of things. I wanted the new studio to be self-made yet I didn't have the pretention that I knew it all, so I took time to learn—and get expert advice when it was needed."

As most studio owners will already know, the difficult part of planning is not what equipment to buy but finding somewhere to put it all. In Laurent's case fate dealt a kindly hand in the shape of a property in the village of Auvers-sur-Oise.

"I have always loved the paintings from the French impressionists and Auvers is the village of Van Gogh, Cezanne and many other famous artists. The village is protected as part of the national heritage and as such, is virtually unchanged from the time when these painters lived and worked here. In fact, you can recognise a lot of the area from their pictures.

"I naturally could not let the opportunity pass by so we bought the house and set to work restoring it."

In case anyone is thinking that Auvers is a sleepy village lost in the hinterlands, it is in fact less than 25 miles from Paris. But when you are in Auvers, the atmosphere, light and everything else makes you feel that you are miles away from the big city.

Overlooking the village, the studio is situated in a separate building across the road from the control room. The house contains a living room cum studio (or vice versa) plus a separate isolation room. This makes the atmosphere very informal. At present there are two guest rooms available for clients and accommodation can be arranged in the village or nearby, to suit all budgets and tastes.

The studio area (designated Studio A) has black and white tiles on the floor, and the walls and ceiling alternate between white and light grey. The original beams on the ceiling have been added to with several false ones, which are in fact cable ducts—a neat way of preserving the overall atmosphere of the room. The other feature is lots of daylight.

The overall response of the room is very bright and it has proved to be a very 'natural sounding' recording room. Though the initial impression may be one of four bare walls—with the attendant standing waves, flutter echoes—the shape of the room is quite irregular.

"I don't think anywhere is parallel to anywhere in this house!" laughed Laurent. "It's an old building and in those days they just tended to put them up and that was that." However, the construction is very solid, which helps to contain the sound, and though the sound certainly is live, it is more real than studio-clinical.

"In the short time that we have been open (the first months of 1987), we have already noticed how much musicians like to play in the studio—both acoustically and electrically. It is a mixture of being at home, jamming, and playing onstage. This in turn gets everyone playing really together, which provides great rhythm tracks, horn or string sections, and so on. The room has also proved marvellous for chamber music."

Resident in the studio is a Bosendorfer grand piano and a few notes on it confirmed the acoustics of the room. What about separation?

"We can put up screens but we have found that it isn't really necessary. People don't like them, anyway. Taking care with microphone placement solves most problems—if there are any—and if real isolation is required we have Studio B which is the isolation/overdub room. We can also put down rugs and carpets to deaden the response a little."

Studio B is through a short corridor from Studio A and, because of the large Van Gogh reproductions on two of the walls, is known as the Van Gogh Room.

Apart from the uneven surface of the paintings, the room features a parquet square that takes up most of the floor area—the remainder is yellow carpet—with the remaining walls covered with absorbent material under light blue fabric. There is also a large glass panel for reflectivity. A closed-up corner fireplace adds to the irregularity of the room together with a large recessed window. (This is a double window system as are all windows in the studio areas.)

An unusual—and striking—feature of the plaster ceiling is its tent-like shape, the effect being emphasised by a variety of coloured stripes emanating from the offset central point.

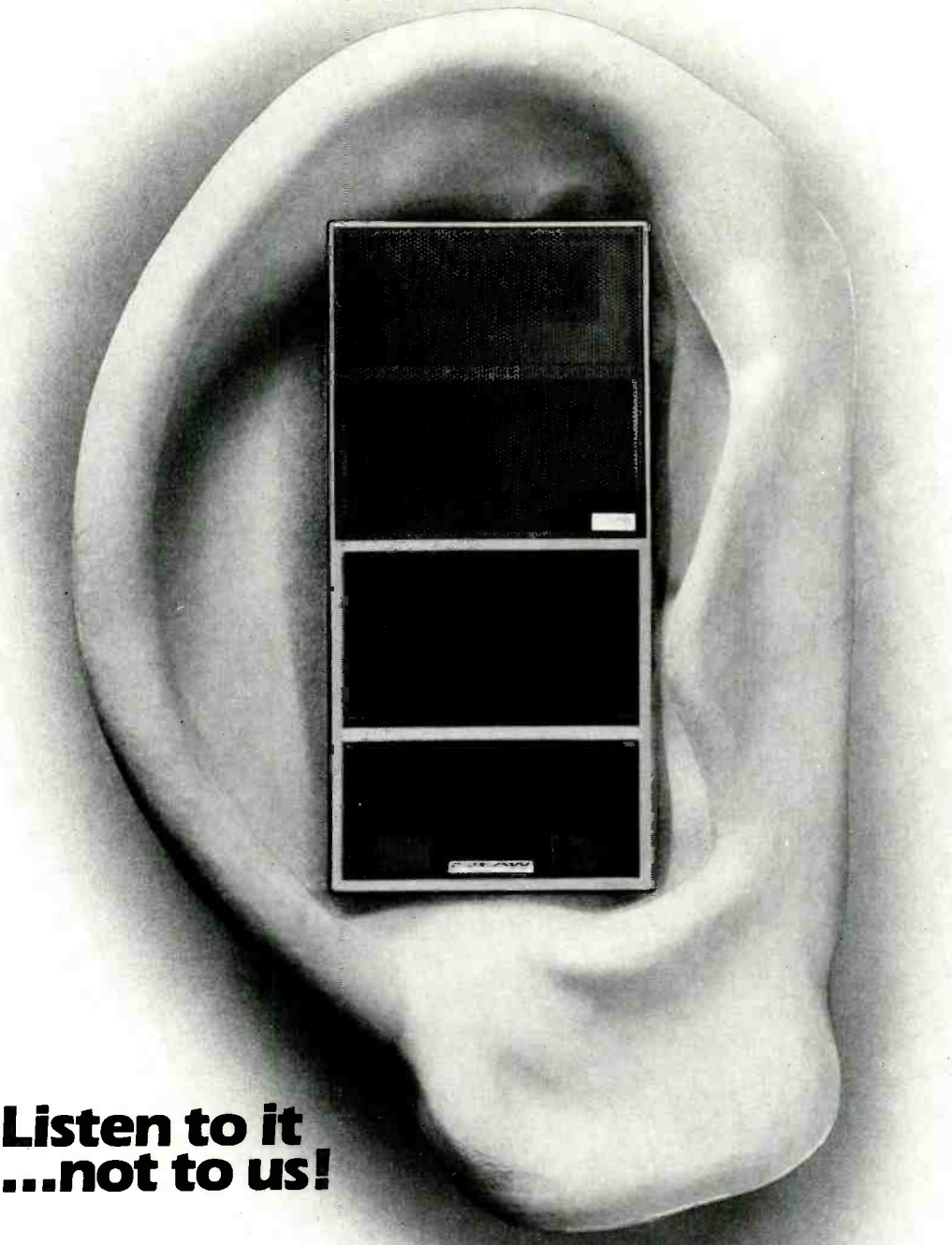
"We are able to get a very bright sound in here," explained Laurent. "Drummers love it! Depending on how we place the microphones, it is possible to get a doubling effect, which is really interesting. The sound is very natural and would be virtually impossible to get electronically. Though I am not at all averse to electronic effects, I think people tend to forget nowadays that you can get a lot of effects acoustically that sound better than even the best outboard equipment."

Studio A is equipped with 36 microphone lines appearing on wall boxes placed strategically around the room together with tie lines and video lines for CCTV cameras. Studio B is similarly equipped with lines 1-24 in parallel with A.

Couleurs Studios feature a very comprehensive microphone collection that has been built up over the years and it would almost be easier to list what it doesn't include rather than the converse.

"Every microphone that I have come across I keep," explained Laurent. "I suppose you could say that I am a real fanatic. I would much rather spend time trying out a selection of microphones in order to get the sound I want than try doing it on the board. It all has to do with how the sound is being captured from the source you want to record before it starts to go through any processing—it is far more 'real'!"

As previously mentioned, the control room is over the road from the house/studio and this adds to the 'non-studio' atmosphere of Couleurs Studio. "We have video camera contact," said Laurent, "so we can see what is going on. However, the musicians are soon unaware of this and they don't have the pressure of people peering through at



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COULEURS

them from the control room."

Access to the control room is at street level via a heavy sliding door and at once you feel as though you have made a time jump of at least 100 years. The studio and exterior could easily be turn-of-the-century but the control room resembles the command post of a large spaceship more than anything else.

After the initial shock you start to notice that there are lots of windows providing daylight and pleasant views of the surroundings, sober tape recorder soffit and corner couch to remind you that it is still the 20th century.

"It is quite amusing to watch the different reactions of people when they come in here for the first time," muses Thibault. "Some make it seem as if there is nothing special about the place while others go and look outside to make sure they are still in Auvers!"

The Couleurs control room has the immediate advantage of being very spacious and has a very uncluttered air about it. An unusual point is that the console and monitor bridge are oriented across the room at an angle and though it appears at first that the layout is asymmetrical, the room is in fact completely symmetrical either side of the centreline.

"In order to make the best use of the room available it was necessary to use this layout. This way we have lots of room to move and we can have keyboard stacks and musicians in here without feeling crowded."

The latter situation has been catered for with a recessed distribution panel in the floor behind the console. This contains 12 microphone lines, MIDI distribution, tie lines and interface lines into the AMS effects equipment. Mains outlets are also provided with 110/220 V, which means that a stand can be set up over the panel and thus avoid wires trailing everywhere.

The control room also has a good-sized overdub booth, with 12 microphone lines built into the corner behind the monitors, large enough for instrumental dubs, vocal group, etc. The acoustic treatment consists of a mixture of moquette, glass panelling, the control room and exterior windows, and what can best be described as a 'silver paper ceiling'. As would be expected the sound is bright without being overbearing and with a very short reverberation time. If necessary the brightness can be damped down with drapes in front of the glass surfaces though most people tend to like it the way it is.

Returning to the control room itself, this has a soffit in the rear left corner housing re-built MCI 24- and 2-track machines with four rack strips for outboard equipment above them.

The right corner features a similar construction with the difference that the rack space is used as storage cupboards and underneath is the seating for clients and visitors. An interesting point is that the couch is wired for sound with headphone points placed at strategic intervals.

"People will always want to listen over headphones so rather than have them asking for 'phones to be plugged in and being near the console we thought the best thing was to have them permanently available where people sit. They can then listen without bothering the session."

The centrepiece of the control room is the monitor bridge/overbridge construction, the monitoring being a Quested *412* system powered by 3.5 kW of LPS amplifiers.

"I wanted to get away from horns and I had heard a lot about Roger's system. I went to have a listen in several studios and decided to install the *412* using LPS amplifiers (made in France). The system has worked out very well and I am more than pleased with the result."

The speakers are almost nearfield in relation to the console and have a clean line of fire to the mix position.

The futuristic look of the Couleurs control room is down entirely to the overbridge/ceiling that starts from the top of the monitors and extends out over the mix position. The aerodynamically-shaped construction has been moulded out of glassfibre and provides an even, fan-like dispersion of the signal from the monitors into the room. The ceiling also has an overbridge built into it that houses the CCTV monitors, a central video monitor for the console automation and two small 5 U equipment racks.

A listening test showed that, to all intents and purposes, the overbridge did not interfere with the sound when standing up or sitting down, meaning that effects can be adjusted in realtime without having to sit down to make sure the effect is right and then going back for fine-tuning. Laurent commented, "A lot of time was spent in the design of the ceiling so that it would not interfere with the sound. Overbridges, while being very useful, often do tend to obstruct the sound and this is something that has to be thought very carefully about."

Recording centres around a SAJE *ULN* MkII 56-channel mainframe fitted with 48 channels and equipped with *Optifile* disk automation system. In order to help isolation from static there is a computer floor under the console and covering the chair area. "This might be considered a little excessive but every little bit helps."

The main multitrack is a Mitsubishi *X-850* 32-track that is housed out of the way in its own machine booth. "A variety of factors decided the choice but basically I preferred the 32-track format and the sound of the Mitsubishi compared to the Sony. However, other people have different opinions and we are more than pleased to hire in other machines should they be required. The control room has also been wired for two 24-track recorders in order to accommodate different methods of working.

"I must admit I still like the MCI *JH-24* for lots of things and we have already run sessions with the 32- and 24-track machines synced up. Analogue is still probably the best medium for the heavy rock stuff, especially the rhythm, though one shouldn't be tied by preconceptions. It is really just a matter of using what works best for a particular project."

The synchronising system is an Adams-Smith *2600* and Laurent reported that he was delighted with it.

Mastering is on an MCI stereo recorder, Sony *F1*, etc, and a Mitsubishi *X-86* digital master recorder should have been delivered by now.

The outboard equipment at the time of my visit earlier this year comprised an EMT *251* digital reverb, AMS reverb and delay units together with bar code option, Eventide *SP2016* digital effects processor and various *Harmonizers*, Stocktronik stereo plate, Lexicon *Delta T* DDL system, Drawmer and UREI gain reduction equipment, Deltalab DDL, and so on. "We are in the process of expanding our outboard equipment but as requirements often differ widely, I almost think it is better to have a good basic complement and hire in the rest!"

We talked a little about the decision to install the SAJE console. "Not to beat about the bush, SSL are very much the 'in' console in France at the moment and I didn't want to just follow a trend. I was tempted to put in my MCI *556* from the old studio, if only for the sound, but it really was necessary to get a new console. The SAJE just seemed to fit the bill in every way; it offers the facilities required today: a dynamics section for each channel, comprehensive EQ, flexibility of operation, etc, it is very quiet and offers a very high standard of performance for a reasonable price. The other advantage is that the factory is just down the road at Argenteuil so service is literally just 30 minutes away!

"It could be thought that I am taking risks by departing from the mainstream but all the SSL-oriented people who come here are delighted with the console, which proves that sound is not a name but something that you hear!"

Apart from the centrepiece, the control room construction looks quite simple, though this is in fact quite deceptive.

"The internal structure is completely floating and we have noticed no structure-borne noise coming in from outside at all, even though the road is just outside. However, it is hardly a busy thoroughfare. The overbridge construction took a lot of time to get right—especially in the design stage as it gets rather expensive doing mould after mould!"

Walking round the control room showed good imaging in general with a stable image across the width of the console.

"One thing we noticed straight away was that we could do long sessions without feeling any fatigue. We often thought we had been working for only three hours or so when in fact it was for over 10. This was part of the design brief, of course, but it is always nice when things do turn out as you planned them."

While Couleurs has been built as a commercial venture, Laurent is also interested in doing more productions of his own and promoting new talent. "Heavy metal is the thing at the moment in France (outside of variety) and we have already done several new productions here. One of the lighter sides of this is that the musicians often turn up looking like something out of Mad Max when in fact they are the most gentle people you could wish to meet!

"My aim has been to provide clients with today's technology coupled with the artistic atmosphere that pervades Auvers and the surrounding countryside. There is something here that sparks off creativity and it is this which I hope will give the studio its character."□

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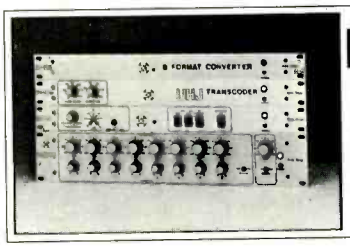

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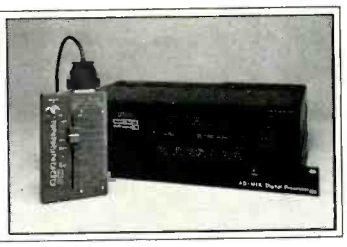

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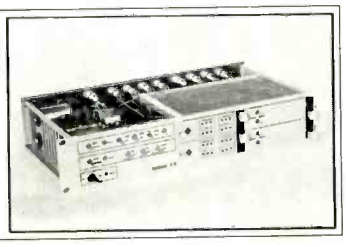

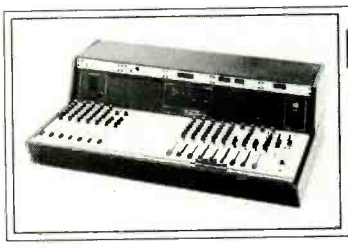

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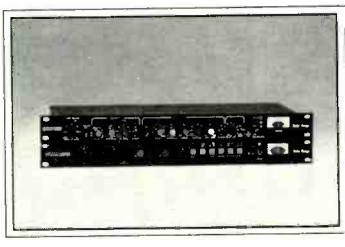

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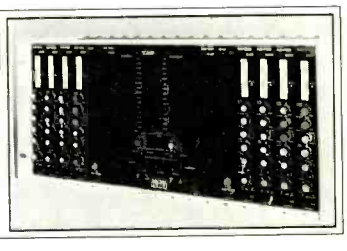

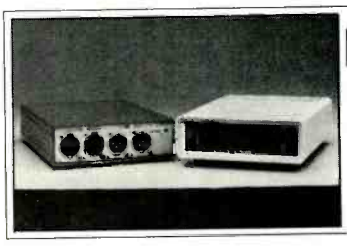

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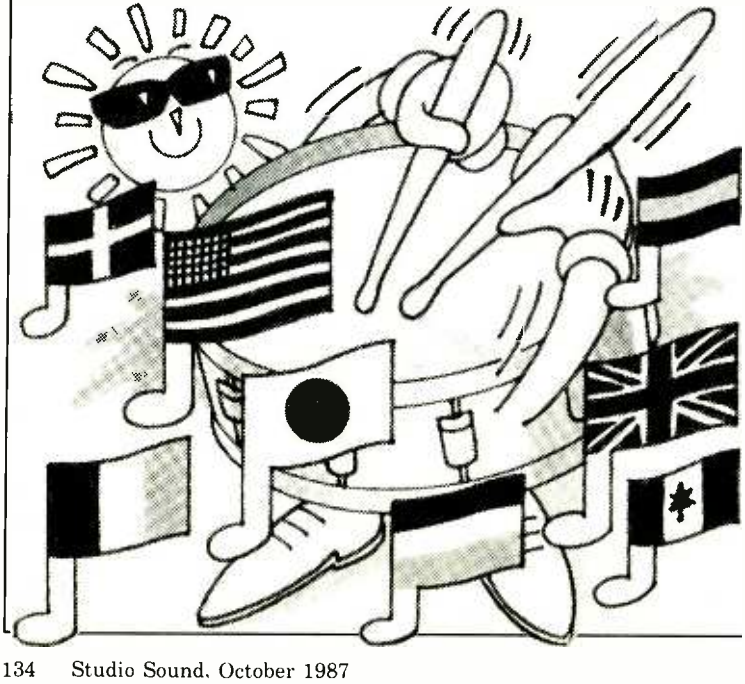

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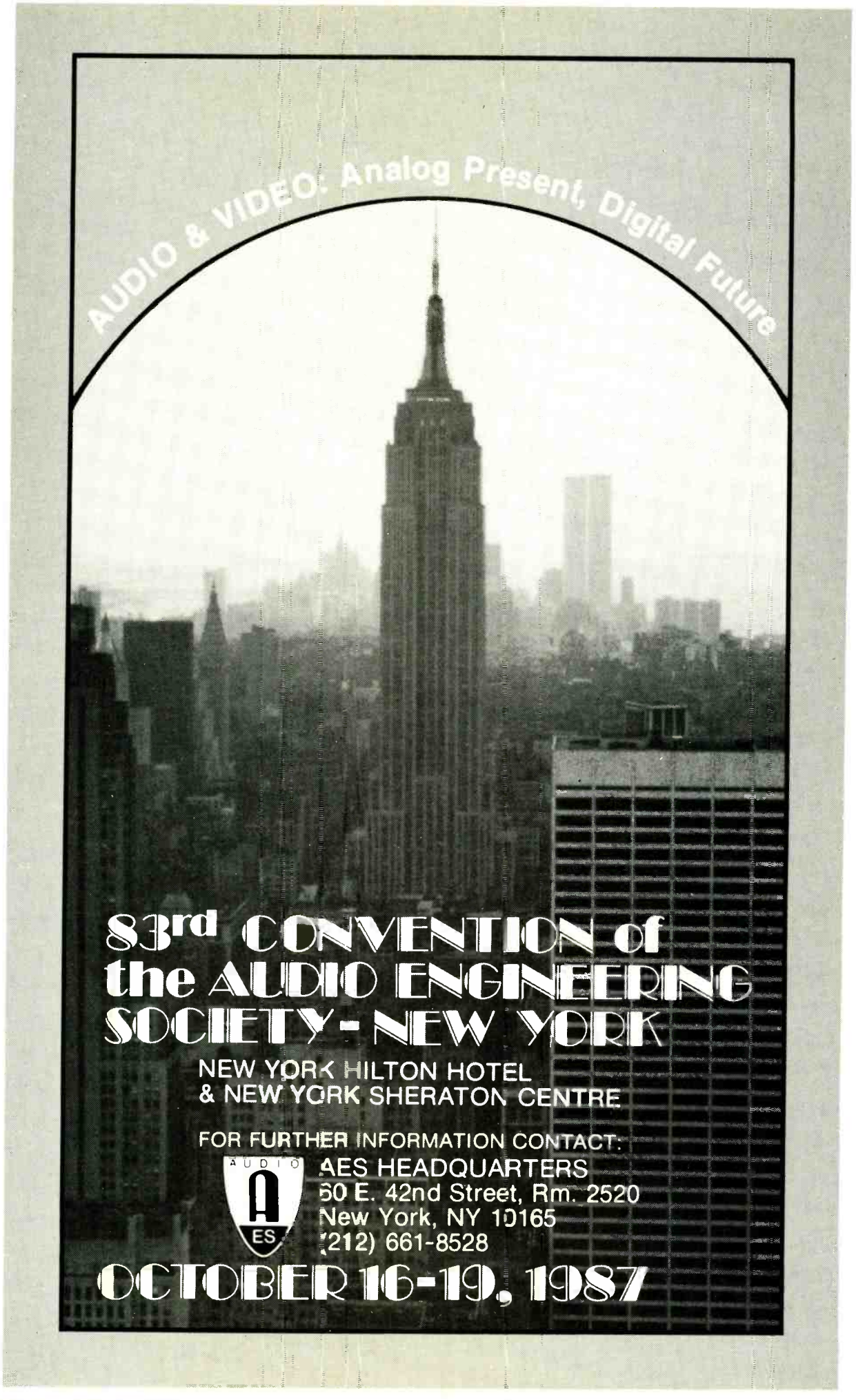

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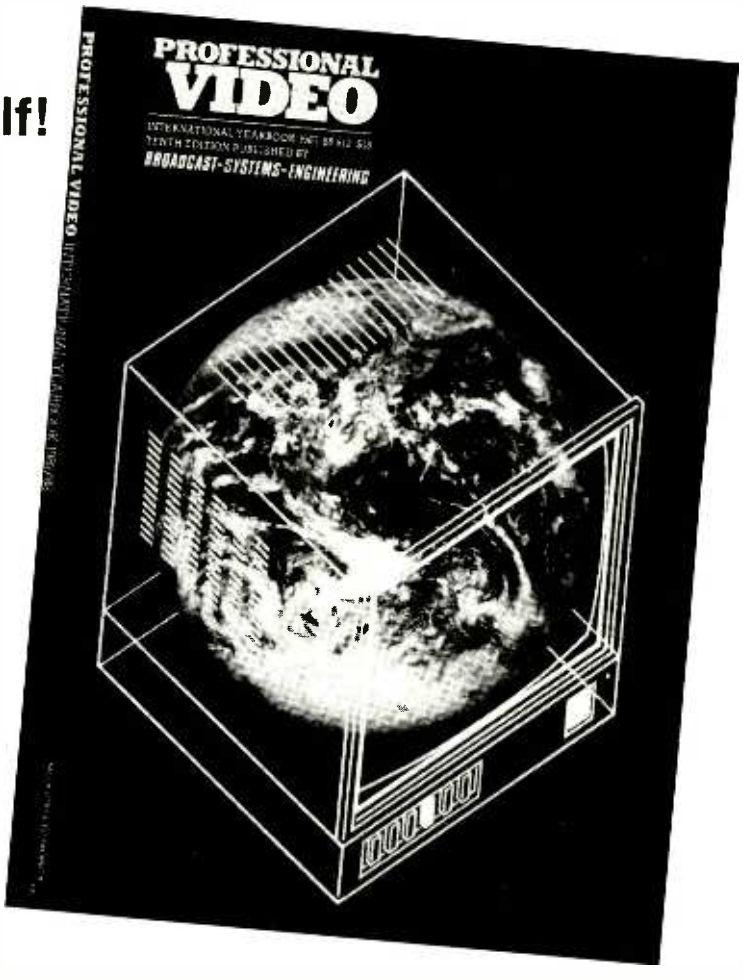

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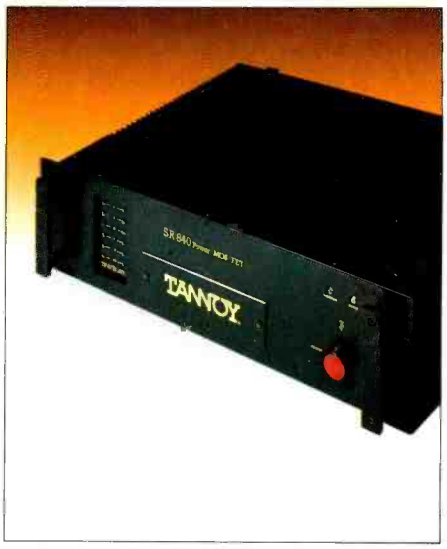

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