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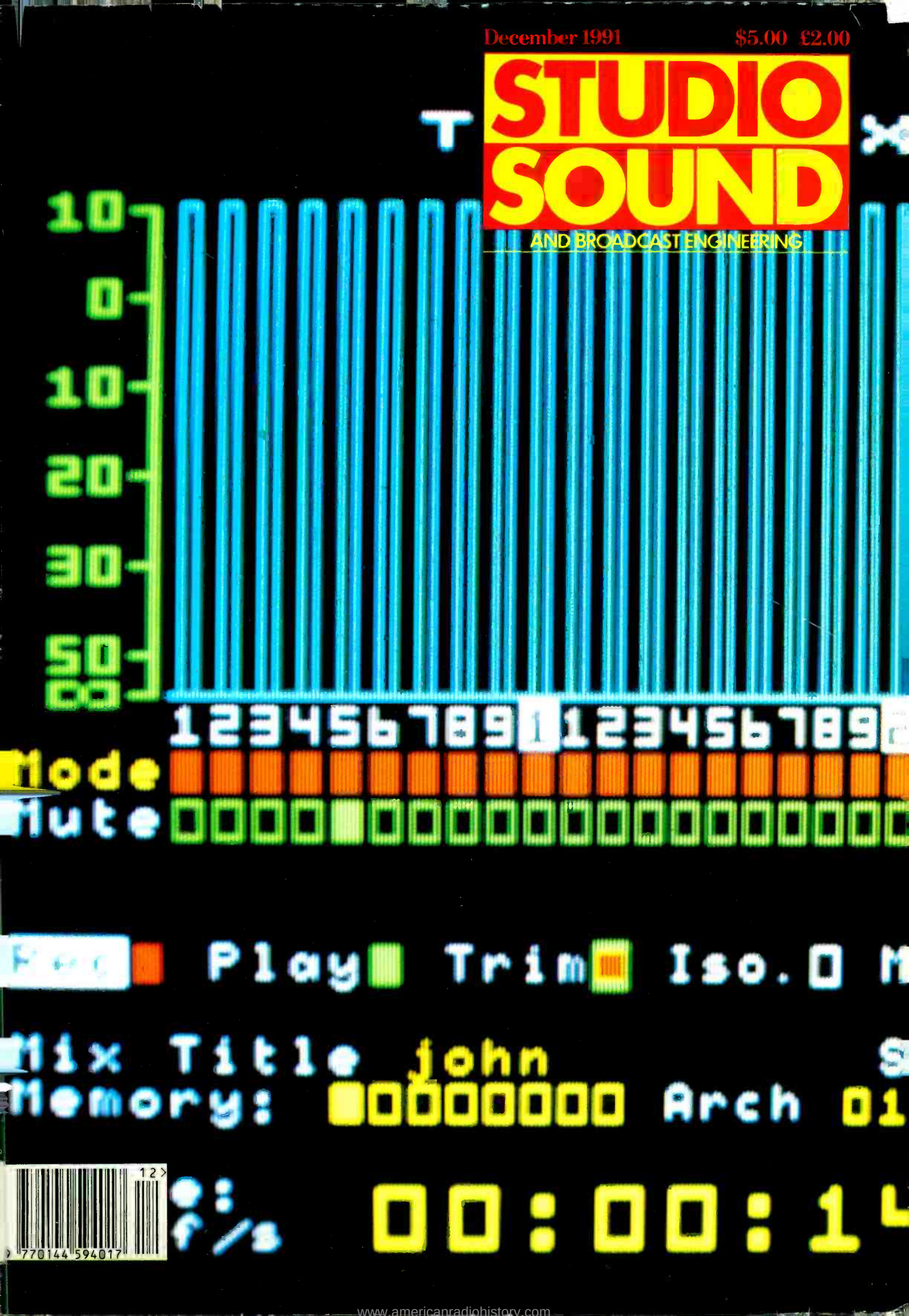

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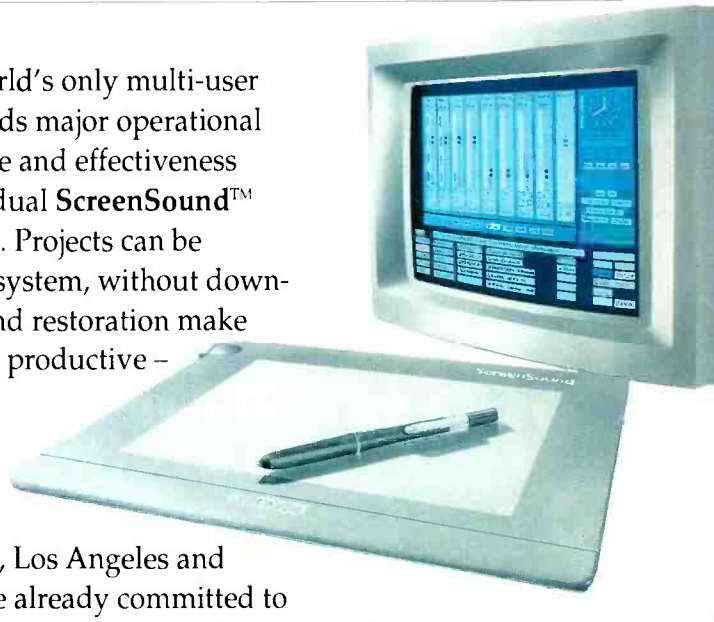

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STUDIO SOUND
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ABC

PPA PERIODICAL PUBLISHERS ASSOCIATION

Total average net circulation of 19,166 per issue during 1990.
UK: 6,655. Overseas: 12,511.
(ABC audited)

Wrapping up another one

Magazine publishing is an odd business because you are always out of time. This issue carries a cover date of December and as such is nominally the last issue of 1991. This page is, however, being written in early October and it is hot outside and as such very hard to think about any form of end of the year comment.

Last year I said that 1991 looked like more of the same as 1990 — the same problems and the same topics. I have to admit that I was wrong — it was far worse than one might have imagined. The economic situation has been very difficult in most areas of the world and there is no denying that this has had its impact on the sound recording industry. There are, however, a few more positive pointers. Just prior to the New York AES I met two companies who said that they were actually doing better at present than at any time in their history and no, they weren't receivers or accountants but pro-audio manufacturers.

The New York AES also seemed very buoyant with good attendance on all days and a general feel of positiveness about it. So if there is a gradual improvement in business towards the end of the year at least there will be a more promising start to the New Year.

In other areas '92 is shaping up for a rerun of the same subjects in a different guise. One of the areas that has been concerning record companies over the last few years has been the emergence of the 'perfect original' in the form of the CD and, of course, the 'perfect copying medium ' in DAT. The unpreparedness of the record companies and their representative organisations to deal with the copyright problems that might arise from consumer use of the new media arguably killed off DAT as a consumer medium. Philips DCC will incorporate SCMS 'single copy' from the start and we might assume that there will be something similar with Mini Disc. We understand that next year we will see attention turned to DAB as the early noises have already been made.

Digital Audio Broadcasting is something that will revolutionise radio by the use of digital encoding of the actual broadcast signal. The BBC held practical demonstrations earlier in the year and it was one of the featured topics of the NAB Convention in Las Vegas. It will mean allocation of new radio frequencies and a complete reappraisal of radio. More importantly, although some from of data compression will be used, the quality will most likely be superior to conventional FM. And it is this last point that appears to be concerning copyright holders. So the rights and wrongs of this new medium are now bound to be a matter of conjecture until an agreement is reached. To the best of my knowledge there are no dates for the future implementation of DAB as yet so speculation will just run and run.

Yes, 1992 looks much like 1991 from here but maybe I'll be wrong again, and maybe this time for the better.

To close may I wish you, on behalf of the staff of *Studio Sound,* a very Merry Christmas and a prosperous New Year. □

Keith Spencer-Allen

Cover: Tracmix II screen from Soundtracs

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SCV KEPPENS

Night shift

Ray Withers is a radio communications expert based at Birmingham in the English Midlands. His company, Raycom, has established a troubleshooting reputation for sorting out radio mic problems at major pop concerts in Britain and abroad.

It all began when Michael Jackson came to Britain and brought his own personal radio mic system for his stage shows. Just 24 hours before the first show someone discovered that Mr Jackson's mics, tuned to American UHF radio mic channels around 900 MHz, would be overpowered by a babble of cellular telephone conversations in Britain.

The mics were made by a major international company in the pro-audio field, which has a large British subsidiary outside London. Could they fit new crystals to shift the mics onto British radio mic frequencies? Yes, but it would take about three weeks, however, they suggested that Ray Withers, a former employee, might be able to get it done overnight.

A motorcycle courier collected the radio mics from Michael Jackson's London hotel and took them to Raycom in Birmingham while Withers arranged for a firm in Kent to make the necessary crystals immediately and get them delivered to him by that evening.

When the radio mics arrived at Raycom it turned out that one of the mains powered receivers had been connected to a 240 V British supply while expecting 110 V American and the specially designed transformer was blown.

By this time the manufacturers' British office was closed for the night. Withers had the car phone number for one of the staff who just happened to be in his car, on his way out for a meal, and agreed to return to the office. He phoned Ray Withers to report that the technical stores were all locked up and he didn't have a key.

"Do you want to do Michael Jackson a favour?" Withers enquired.

So the stores door was opened by 'alternative means' and the replacement transformer was found.

No motorcycle couriers were available so a local taxi was hired to take the transformer 100 miles to Birmingham. When the taxi arrived Withers asked the driver to wait, promising that Michael Jackson's people would provide tickets and back stage passes for his family, he had four teenage daughters, if he took the radio mics back to London.

The transformer was fitted, the radio mics were delivered in the middle of the night, the taxi driver got his promised reward, Ray Withers was well paid and Michael Jackson was happy.

Tim Leigh Smith

Liverpudlian Paul Downes has just opened Cavern Studios in Amsterdam. Designed by Recording Architecture, the studio features Soundtracs *Quartz* console and 24-track recording on two Akai *DR1200* digital recorders.

Contracts

● SIS studio in Paris is the first French facility to install **Audiomation System's** *Uptown* moving fader console automation system. The studio have ordered a 40-channel system to be fitted to its Trident *TSM40* console.

● **OLE Ltd** has recently received its first order for its recently launched *Lightworks* Random Access Editing system from Soho-based production and post-production facility, Rushes.

● Seattles new 'MIX 101' radio station has recently installed a **Studer** *Dyaxis* digital audio workstation.

● The national Spanish television company, Television Espanola (TVE) in Madrid, Spain, has ordered eight television OB vans plus three stationary new studios. The vans will be equipped with **Studer** *990* consoles each with 24-input channels.

● The Sealink Stena Normandy ferry operation in the UK has installed a **Soundtracs** *Megas Mix* console in their main show lounge. In Finland a *Megas Stage* 32/8/2 sound reinforcement console is to be installed in the show lounge of the Sally Euro Cruiser.

● Over the past six months BBC TV has purchased 70 tracks of **Dolby** *SR* spectral recording in the form of 35 Model *363* 2-channel switchable *SR/A* units. This seems to be part of a general upgrading of soundtrack quality brought about by the advent of NICAM stereo, and brings the total **Dolby** *SR* used by the BBC in London close to 200 tracks.

● Decca Records have placed an order for a custom-made **Raindirk** *Symphony* mixing console for making live classical recordings all over the globe. The 40-channel console with remote patchbay is to be built into a flight case for easy transportation.

● The Lloyd Webber musical Cats opened in Zurich recently and featured a 68-input **Cadac** *E-type* console. This is the sixth international production of the show in which **Cadac** equipment has been specified, with sound design in this instance by Terry Jardine of Autograph Sound Recording.

● **Pro-Bel** has supplied Ampex with a switching system as part of Ampex's contract to building a large OB vehicle for Studio Hamburg in Germany.

● New **Audio Kinetics** distributor for Malaysia, Meteor Sound & Lighting System, has supplied three *ES 1.11* synchronisers to film facility Total Audio Production Studio.

● **Ampex Systems Group** has recently won a contract from a new independent television studio, Studio TOP, in the Soviet republic of Byelorussia. The studio has placed an order worth nearly $1.3m for a component edit suite, small studio and field acquisition facilities.

● Hip Pocket Recording studios in New York have recently opened their studio D featuring an **MCI** *416* console; a **Sony** *APR-24* multitrack and a fair selection of old and new synthesisers.

● Parkgate Studios, Hastings, UK, has installed a **Neve** *VR60* console with Recall and *Flying Faders* automation.

● The Finnish Broadcasting Company (YLE) has bought three **DAR** *DASS 100* units for their TV1 and TV2 post production facilities.

● Two pairs of **Genelec** *1035A* have been ordered recently by Paris studios Studio Plus 30 and by Conservatoire National Superieur de Musique de Paris.

● WDR (West Deutsche Rundfunk) have selected DynaudioAcoustics, *M1* nearfield monitors as their reference nearfields for their Big Band studio in Cologne. Euro Disneyland have ordered another five pairs of *M1* monitors for engineers monitoring on shows.

● Pro-Bel, Reading, Berks, is to supply a new audio monitoring system for the central technical area of BBC Belfast.

● The first three *Optifile 3D* console automation systems to be sold in the US have gone to INS Recording; Ghost Town Productions; and Brigg's Bakery, all in New York City.

● Cable New Network (CNN) have selected a NED *Postpro SD* system as the centrepiece for their new digital post-production facility for the Atlanta HQ.

● Plasmec Systems, Surrey, UK, have supplied and installed a 4000-input audio monitoring matrix in the control room at BBC Broadcasting House in London.

● The Japanese Festival in London during September featured a Kabuki production of the musical *'Jesus Christ Superstar'*, together with an *'E'-type* audio console supplied by Cadac.

● Recent SSL contracts for new *SL 4000* consoles with *Ultimation* have been delivered to: Astron Studio, France (the home of Vangelis); Capri Digital, Italy; ICP Studios, Belgium; House of Hitz, New York; and For Life studios in Japan.

● Priority studios, Sheffield, UK, have installed a new 20-channel Soundcraft *Sapphyre* console.

● WestWorld studios, the pre and post production facility in Middlesex, UK, has just installed Digidesign's *Pro Tools* into their studios.

Electrosound liquidates

Having sold off its manufacturing division to Mark IV two years ago, tape duplicator Electrosound announced in late September that it is to cease operations and go into the orderly liquidation of its assets.

Reasons given for the closure were cited as the downturn of the record business in general and a lack of interest in Electrosound's products and services.

The Board of the company said that it had tried to examine potential in other markets but had concluded that this would have only led to further losses.

The company closed its New York plant with the loss of 95 jobs at the end of October. This followed the closure of their mid-west plant at the end of August. Electrosound has reached an understanding with its principal lender for the restructuring of its existing credit facility and mortgage loan, which is designed to accommodate the planned shutdown and liquidation.

While the company is unable to anticipate the volume of its business in the upcoming weeks, it plans to take appropriate steps to avoid any interruption of supply for customers.

Studiomaster Statement

Due to historic problems, Studiomaster (UK) plc has been unexpectedly taken into receivership. Studiomaster Diamond Ltd will continue and are operating from Unit 5A Chaul End Lane, Luton, Beds LU4 8EZ. For sales and service contact Studiomaster Diamond Ltd. Tel: 0582 494341. Fax: 0582 494343.

ATC Award

UK speaker company ATC won the Critics Choice award at the recent Australian CESA Sound & Image Awards for their SCM 100A active monitor. The award is made to the product that in the opinion of the judges is the most outstanding of the year regardless of price or category.

Address changes

● **WaveFrame Corp** has relocated to 630 Ninth Avenue, New York, NY 10036.

● **Soundmaster USA** has relocated to 900 A Hampshire Road, Westlake Village, CA 91361. Tel: (805) 494 45545. Fax: (805) 494 4936.

● **Marquee Audio *Scotland's*** new address is 30 Erskine Square, Hillington, Glasgow, G52 4BJ. Tel: 041 810 3375. Fax: 041 810 3475.

Malcolm Hill Associates

A new company, Malcolm Hill Associates, has been set up to design, manufacture and distribute professional audio products from the designs of Malcolm Hill. His designs until recently had been manufactured and distributed by Hill Audio Ltd. The first of these products is the already established *Chameleon* power amplifier.

Malcolm Hill Associates plc, Hollingbourne House, Hollingbourne, Kent ME17 1QJ. UK. Tel: 0622 880601. Fax: 0622 880 664.

People

● It has been announced by Gerry Block, president of TimeLine, that Tim Cuthbertson has been appointed director of sales and marketing of the company. He has spent the last four years at Stirling Audio Systems in London.

Contracts

● Prism Sound, Cambridge, UK, have recently installed their first *DEQ2400-A* Digital Audio Equalisers at The Hit Factory in London for use with the Neve *DTC* digital tape transfer console.

● London's Capital Radio is the first UK broadcast company to purchase DAR's new *SoundStation SIGMA*, the fully integrated audio production system.

● Ipswich based Eastern Electronics recently announced that it is to install studio technical facilities at Lincs FM, the new independent local radio station for Lincolnshire, UK.

● Studio design consultancy Harris Grant Associates is building a new studio complex in Japan. The construction of Shimoda Element Studios is already underway, with completion and commissioning of all facilities expected by autumn 1992.

● OLE has taken another UK order for the recently launched *Lightworks* Random Access Editing System. The order comes from Lexington Post, the Soho-based post-production house.

● Nara Technics in Seoul has recently bought a Lyrec duplication system comprising one master *P-4400* and four slaves as well as mastering and quality control equipment.

● Broadcast project management company Elliott Bros have recently completed the refurbishment of studio ID at Broadcasting House, London. This included the design, build and installation of a self-operated studio to be used as a continuity suite for BBC Radio 5.

● The Hit Factory, New York, has announced the installation of SSL's new console automation system, *Ultimation* retrofitted to their 64-channel *SL 4000 G* series console.

● Recent Neve *VR* console sales include a *VR72* console to Devonshire studios in Los Angeles; Glenn Frey's studio Mad Dog Ranch in Colorado which has bought a *VR48* with *Flying Faders*; and The Plant in Sausalito who have also bought a *VR72* with *Flying Faders*.

● Otari Corporation console products group has delivered a new *Premiere* console to the Studio 15 dub stage at Sony Studios, in Culver City, California. The console features a 60-channel *DISKMIX 3* moving fader automation system.

● Soundtracs *Megas* monitor console has been specified by BBC TV to overcome the monitoring situations in the new look *Top of the Pops* music programme.

● SBS TV in Sydney, Australia, is now using Dolby *SR* for all soundtracks and audio processing throughout the facility. SBS now has 48 tracks of Dolby *SR*.

● Videosonics, London, has upgraded two of its AMS *AudioFiles* to *AudioFile PLUS*.

● Recent Euphonix *CSII* digitally controlled studio systems include Tokyo's Dog House Studio; Triad Productions in Des Moines, Iowa, has taken delivery of a *CSII*; also a *CSII* has gone to Seattle's Music Source which specialises in advertising and audio/video post work.

● The University of California at San Diego, CA, has just bought the new API *Discrete* series console with *Touch Reset*. API are to deliver a 48x24 console with GML automation environment.

● Recent SSL *ScreenSound* contracts include Robert Pomann Sound in New York; VCA Teletronics also in New York; and in Burbank, CA, B&B Studios has been using a *ScreenSound* for editing work.

● Recent DAR *SIGMA* contracts include Central Park Video Post Production in Amsterdam, the first *SoundStation SIGMA* facility in the Netherlands.

● Solid State Logic has announced the first *ScreenSound* installation in Germany at SoundVision, Cologne.

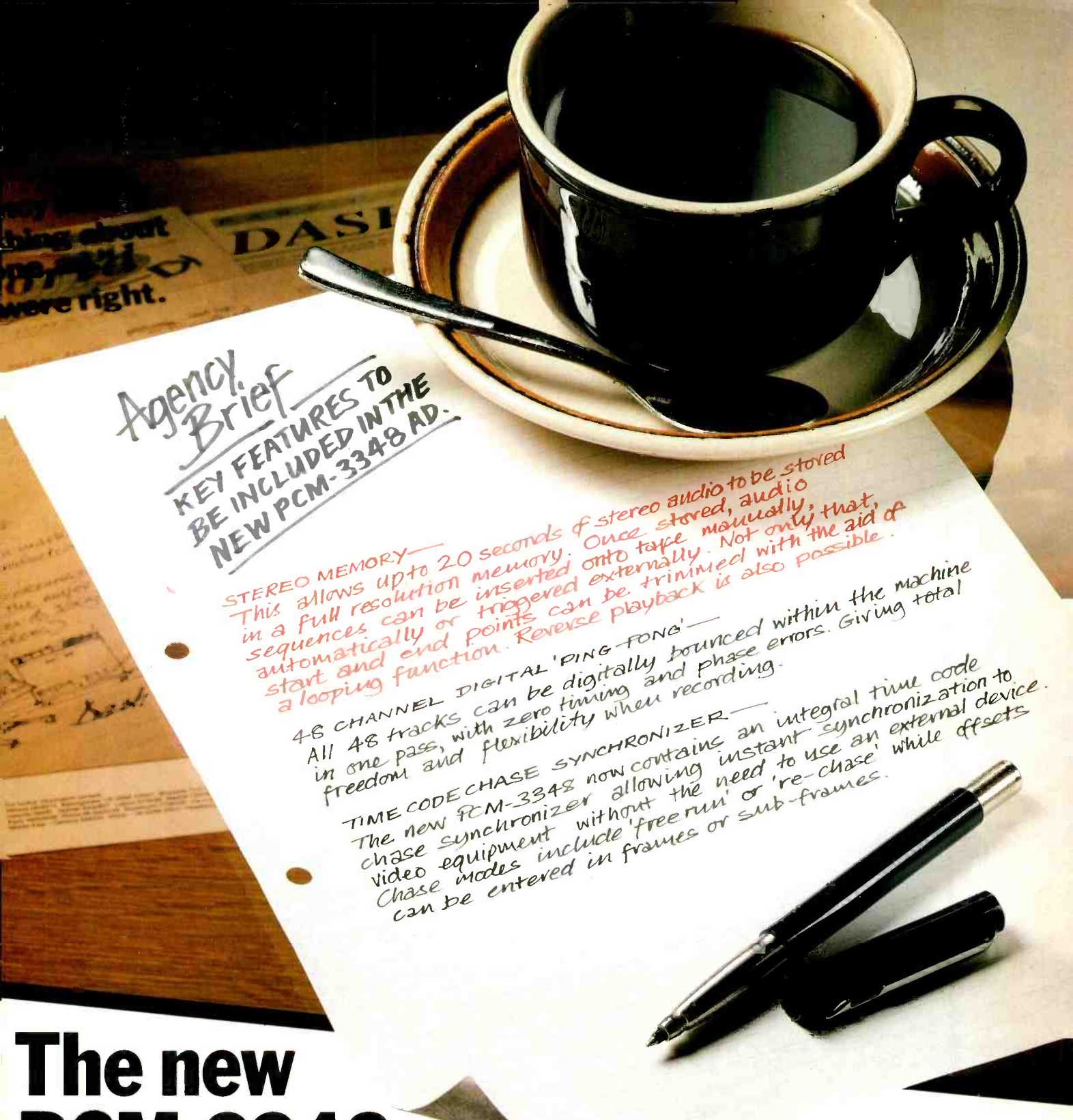
● Lansdowne studios, Dublin, have recently taken delivery of an Amek *Mozart*, 40-channel version loaded with 32 inputs and fitted with Amek/Steinberg *Supertrue* automation. This is the first *Mozart* to be supplied to Ireland.

● Two customised Soundcraft *SAC200* consoles have been installed into the new Independent Radio News studio at Mill Bank in London. The new broadcast facility will provide audio and text coverage of parliamentary proceedings to over 80 UK independent radio stations, 20 overseas stations from Vienna to Hong Kong, and BSkyB TV.

● Independent Radio News (IRN) have moved their parliamentary unit to Westminster. The design, installation and supply of new equipment was performed by Elliott Bros (Audio Systems) Ltd.

● Shep Associates, Royston, Herts, latest custom Neve console is shortly to be delivered to EGGS Studios at Lake Yamanaka, Oshino High Land, near Tokyo, Japan.

● The Other Place II, the newly built Royal Shakespeare Company theatre in Stratford-Upon-Avon has been fitted with a new JBL *Control* series sound system.



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Sony Broadcast & Communications

In brief

● London, UK. **Mayflower's new sister**: Mayflower Film Recording, a leading London ADR facility has announced the formation of a sister company called Mayflower Media Ltd. The company has been set up to handle the increasing number of in-house projects being generated by Mayflower Film recording.

● Sun Valley, CA. **DCC licence agreement**: Gauss and Electro Sound have signed a licence agreement with Polygram Record Service for the full transfer of all technology and know how related to the high-speed duplication process of the Digital Compact Cassette (DCC).

● Berkshire, UK. **Finance company offers audio help**: APT Finance Ltd has set up APT Audio Services headed by Malcolm Toft, founder of Trident Audio. The new division will offer manufacturers and distributors of professional audio products a range of consultancy services for product design, new and used equipment marketing and of course finance. APT Audio Services.
Tel: 0344 890289.

● Dallas, Texas. **New design company**: The formation of a new consulting and design firm, Joiner & Company, has been announced. According to the new president David Joiner the firm will offer consulting and design services in acoustics, communications and security.
Tel: (214) 392-7800 Fax: (214) 991-3781.

Book review: Digital Audio Operations

by Francis Rumsey

Francis Rumsey is a lecturer in Acoustics and Sound Recording at the University of Surrey, UK. He is also known within the pages of *Studio Sound* for straight ahead technological articles that manage to convey the theory with an understanding that you need to make this theory work in practice.

Without a doubt, one of the problems that presents itself in our industry today is that new technology is presented to users at a rate faster than they can assimilate it. It may also be the case that it is presented faster than even the manufacturers themselves can fully come to terms with. They need to understand what they are marketing and its implications for the user particularly in areas such as the interfacing of digital equipment. Because of this situation the equipment user may easily run into a non-satisfactory working combination of equipment and be unable to find out what is wrong. Or he may suddenly realise that he knows very little of the internal workings of the equipment he is dependent upon. So where do you turn for help? Books are one possibility.

Unfortunately for those more practically orientated there has not really been much choice. Although almost the definitive book, John Watkinson's *The Art Of Digital Audio* is not really for the casual reader and many of the other available books are just not good enough for a variety of reasons.

In *Digital Audio Operations*, Rumsey has almost started with the assumption that this is a book that you will be reading because you need to. Although he does begin with a small amount of theory this is over by page 10 and we are then into areas such as hard disk recording and the various types of drive and the relationship between capacity and recording time. An approach that I do applaud has been the use of what Rumsey calls 'Fact Files'. These are more detailed explanations of items mentioned in the main text that the reader may not wish to read at that point in time and so may almost choose how technical a book they want. In many cases these Fact Files are reference items such as closer examinations of the SPDIF, Yamaha or Mitsubishi formats and interfaces with pin numbers identified, etc, and so this arrangement also makes it easier to just dip in for single items.

The book moves from A/D conversion to CD pre-mastering with coverage of general digital synchronisation and working with video. In fact, to many of our readers, some of the areas covered will be recognisable as developments of articles carried by *Studio Sound* over the last few years. On the area of formats, Rumsey is very comprehensive with over 16 different systems covered to varying degrees from the obvious DASH, PD and DAT to the less common Decca rotary head, 3M *DMS* and JVC *VP-900*. Ideally this book would sit alongside John Watkinson's tome as they are fully complementary. There is a real need for independent practical information and Francis Rumsey's book goes a long way to fulfilling this — an ideal practical reference and a very accessible read.

Keith Spencer-Allen

Published by Focal Press
ISBN 0-240-51311-8 (244 pages)

Courses

Campus AV, Huntingdon, Cambridgeshire, plan to run a series of short courses at Easter time March 25th to April 15th, next year. The courses are aimed at providing an update on current technology and an overview of the sound production process. For more information contact AV Campus on 0480 812201.

Exhibitions and conventions

March 17th to 20th SATIS 92, Parc des Exhibitions, Paris.
March 24th to 27th AES 92nd Convention, Vienna, Austria.
April 11th to 14th NAB Convention, Las Vegas, USA.
June 3rd to 5th 1992 APRS Exhibition, Olympia 2, London, UK.
July 3rd to 7th IBC, Amsterdam, Netherlands.
July 8th to 10th Pro Sound & Light Asia, Singapore.
October 2nd to 5th 93rd AES Convention, San Francisco, CA, USA.
January 18th to 21st 1993 Middle East Broadcast 93, Bahrain International, International Exhibition Centre, Bahrain.

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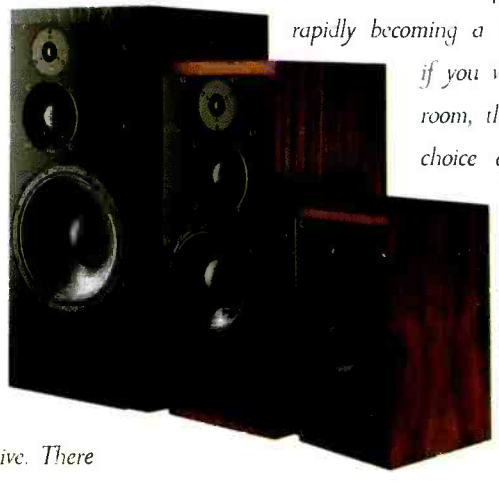
So why all this excitement about ATC professional monitors? Is it that they are hand-built to extraordinary standards, or because of their unique ability to deliver clarity and detail at any sound level? One thing is certainly clear, the revolutionary soft-dome midrange driver manufactured by ATC is the envy of monitor designers worldwide.



The ATC range is comprehensive. There are two free-standing, self-powered models for instant plug-in-and-listen professional monitoring. The remarkable SCM100A – with its hefty 312mm driver – provides a low frequency performance to match studio control systems three times its size. There's also the SCM50A, a smaller three-way unit equally popular amongst leading broadcasters and recording engineers. The top-selling passive model is the SCM20, a compact but powerful loudspeaker that's rapidly becoming a near-field monitoring standard. And if you want to build ATC into your control room, the SCM200 and SCM300 provide a choice of large-scale systems to meet the most demanding requirements.

ATC loudspeakers can be auditioned at HHB and a network of leading distributors worldwide. Once you've heard them, you won't stop talking about them either.

EUROPE: HHB COMMUNICATIONS LIMITED, 73-75 SCRUBS LANE, LONDON NW10 6QU. U.K. PHONE: 081 960 2144 TELEX: 923393 FAX: 081 960 1160
USA: STELLAR AUDIO, 58 BEARFORT ROAD, WEST MILFORD, NJ 07480. U.S.A. PHONE/FAX (201) 728 0438

Studer move further into mixers

While tape is far from dead, it is evident that tape machine manufacturers are spreading their product base somewhat wider. Having said that, it still comes as a bit of a surprise to learn quite how big a part mixers already play in Studer's business. Far from tape machines totally dominating their activities, turnover is evenly divided between multitrack tape machines, stereo tape machines and mixers. So a third of the activity is in consoles, which are strong particularly with the European broadcasting organisations.

This point was made at a recent demonstration of Studer's new post-production and broadcast *990* console at UK distributor FWO Bauch's offices. In targeting the diverse requirements of the broadcast market, Studer have the two options of producing application specific or highly configurable consoles. The consoles in their current line up reflect these options. The smaller, portable *960* series is an open frame with a multitude of channel strips. Each channel strip carries its own rear plate and connectors, so that a frame can be fitted with any combination of strips. This format allows the creation of different format small consoles, suitably configured for broadcast studio, OB, or video post applications.

The larger *900* series takes this one stage further. As well as channel strip modularity, it adds Eurostrip racks that can integrate a large range of auxiliary circuits such as EQ, telephone hybrids and line amps, so centralising these functions into the console, rather than using racks of add-ons.

The exception to these philosophies is the *D920*, which can only be described as a hybrid digital/analogue desk. This is a compact frame with analogue and digital inputs with A/Ds, which can combine a range of digital and analogue playback units to a single digital output, for the digital link to the transmitter. The route to broadcasters' hearts for the main usage is to allow the maximum flexibility while keeping the costs reasonable. This dictates away from a fully digital desk because of cost but towards the high level of flexibility and configurability that digital control offers.

The *990* reflects the reconfiguration thinking and is geared to primarily 'live' applications — broadcast, theatre and film — where there needs to be control of large numbers of inputs going to a range of output devices. Most of these outputs are likely to be stereo or mono feeds but each requiring different mixes.

Studer's 990 desk is geared to live use ie non multitrack

There is the additional requirement to send clean feeds onto either multitrack recorders or other mixing positions, so the desk must be able to switch between several very diverse applications and functions without having to be rebuilt. One of the more important cleanfeed applications is Cleanfeed—1 which supplies a module direct output containing all the clean feeds bar the signal going into that module. This, at times of nationwide events, enables the main desk to supply suitable foldback to presenters up and down the country, with each input to the desk having an associated foldback output, which is easily identified and does not send the presenter's voice back to him.

The digital control integrated into the *990* that switches all of this is not there primarily for realtime automation or recalling levels, although this can be implemented, but more to create the different desk formats so that the one unit can be configured for a multitude of different jobs.

Each module strip contains its own microprocessor through which is routed all the module's switching — a mix of FETs, analogue integrated switches and relays. There is also a certain amount of level control implemented, with input gains controlled by 1 dB digitally stepped resistors and faders controlling Studer's own VCA electronics with the option in 1992 of motorised faders, which will also be an all-Studer item.

By placing all the switching under software control, the console can be pre-configured with different inputs (from the choice of A & B line inputs, mic and optional additional mic preamps), auxs, inserts and EQ sections, groups, outputs and split faders.

The control creates a selection of different mixes to be set up for a single application. In a broadcast environment, especially in an OB situation, the main desk may be required to supply several different mixes simultaneously. The method of setting up the desk also varies between applications. For a simple project, the routing is created from the input channels, selecting on the input module the destination of each source.

On a complex multi-output job, it is easier to work the other way round. You know where the various output channels are destined, then it is a matter of grouping the sources to each of the output groups.

To enable configuration from the input or output sides of the desk, Studer have placed a processor on each module which talks to a central controller. The data flow is two-way; switch instructions are coded and passed to the central controller, which distributes them back to the relevant modules. So a function can be addressed from physical controls at either end of the desk. There is also a central keypad control facility, which will be enhanced with a display screen to give the third alternative of keying in configuration instructions. This section, along with a floppy disk drive, feeds information to and from a 'host' processor, which passes it onto the controller and then onto the modules.

Distributing the intelligence not only speeds up the data flow, so that the engineer is not waiting for the desk to react but also adds a certain level of fail-safe. Should something go amiss with one of the module processors, then only that one module is affected and even then it continues to function, albeit in manual mode.

The internal memory can store 50 snapshot configurations, which include recall, but not reset, of all pots. The snapshot blocks can be loaded from disk and they can be programmed from the desk, or off-line on an external PC. The facilities required by broadcasting, especially in the TV area, has a knock-on effect in the studio market, particularly as more studios are offering post-production facilities and need to invest in desks that can operate in several different ways.

"At the moment we don't see it as a track laying unit, the automation has to come first. We have our own faders and it would be difficult to integrate third party automation" says Miles Roberts at Bauch. "But as Studer bring in their own moving faders that drive the VCAs, then the console is really going to come into its own. As the product develops, music multitrack use will be an area that we will follow." □

Tim Frost

WHERE ON EARTH IS THE RECORDING INDUSTRY GOING ?

STUDIO THREE A2000036

FAR SOUTH ON ANOTHER CONTINENT, AN UNPRECEDENTED DEVELOPMENT THAT COULD ALTER THE DESTINY OF RECORDED MUSIC, IS FINALLY TAKING SHAPE. WHO? WHERE? WHAT? AND WHY? ALL WILL BE REVEALED. NEXT MONTH.

In brief

● Kent Audio is a new British company manufacturing a range of products for the professional audio market. Products include stereo and mono graphic equalisers as well as parametric equalisers, notch filters, spectrum analysers and realtime analysers. Kent Audio, Unit 5, Grand Union Business Initiatives, 15 Torqualy Street, London. W2 5RJ. Tel: 071 286-0121. Fax: 071 266-3268.

● **AES Working Group**: The AES have set up a working group in the US, to study requirements and to propose a standard for Remotely Controlled Audio Products. A parallel group has been established in Europe to reflect the different operating requirements. To assist in producing a workable proposal, AES WG-10 has invited users and manufacturers to submit existing and proposed applications and requirements. If you design, or use systems combining several manufacturer's remotely controllable audio products, possibly integrated with lighting, machine control, video or stage equipment, the committee would like to include your ideas and needs in their considerations. Information should be sent in the form of a system block diagram including information on equipment location and a one or two page summary, to: AES Working Group 10 (Europe), c/o Sam Wise, Sam Wise Associates, 14 Birmingham Rd, Cowes, Isle of Wight, PO31 7BH, UK. Tel: (0983) 297780. Fax: (0983) 298958.

● **New BSI standard: Helical-Scan video tape cassette system:** BSI announces publication of BS 7486: Specification for helical-scan video tape cassette system using 12.65 mm (0.5 in) magnetic tape on type beta format — FM audio recording Part 1: 1991 625 line — 50 field systems. Defines the electrical and mechanical characteristics of FM recording for 625 lines — 50 field systems to ensure the interchangeability of recorded cassettes. No current standard is superseded. Copies of this standard are available at £26.50 from BSI Sales, Linford Wood, Milton Keynes, MK14 6LE.

Preussen Studios, Germany

Control Room One

Tucked away in a 19th Century industrial back yard in what was once West Berlin, a small neon sign above a cast iron fire door announces the presence of Preussen Studios. One reaches the studios by mounting a typical Berlin stone staircase; an elderly switch makes a relay somewhere to keep the stairwell lights on for one minute with a loud clonk.

Once inside, all is air and light. Spread across three floors of what was once a clothing factory, daylight reaches nearly every room. Entering the first floor, one is greeted by an open space with lots of windows that acts as both recreation room and additional recording space. Rather than potted plants and indirect lighting, there is a ping-pong table: this is where young up-and-coming German rock bands like to record.

Studio One on the third floor is the largest of the three. The recording area is 180 m² and two huge swing doors divide the room into two. The front half towards the control room is fairly dead and this side of the doors is covered with soft materials. When the doors are opened the whole room changes size and characteristic. The walls, ceiling and doors on the live side are covered in white tiles. By changing the angle of the doors, almost any acoustic environment can be achieved.

The control room is some 45 m² and is centred around a DDA *AMR-24* desk with 36 inputs and an *Optifile IIHD* 64-channel *Computermix*. The multitrack is an Otari *MTR 100*. Says Ronny Schreinzer, who is part owner of Preussen, "We did have teething problems at first with the auto-punch-in, but this was very soon remedied.

At Preussen noise reduction is Dolby *SR* as Schreinzer feels good analogue with *SR* is still better than digital. "Of course, we thought about going digital but the industry still has not been able to agree on one format. 24-track is the only universal standard and our customers come to us with a 24-track reel under their arms, never digital."

Mastering in all three studios is done on a variety of machines, which are of course interchangeable. The list is Otari *MX 55*, two Otari *MX 5050*s, one Sony and two Aiwa DAT recorders, an Sony *501 PCM* using Beta or VHS, a Studer *A721* and a Studer *A80*.

There is no shortage of tracks here as the multitracks in Studios One and Three can be linked together with a Tascam synchroniser to give 48 tracks without having to move machines or lay cables. Patch lines link all three studios, so if anything is missing from the already impressive list of equipment, it is usually just a question of plugging it in.

Studio Two on the second floor is mainly used for mixdowns, overdubs and laying keyboard tracks. Although the control room is about the same size as in Studio One, there is only one small dubbing booth of 12 m². Here the desk is a TAC *Matchless* and the multitrack an *MTR 90 mk II*. A large part of the in-house musical equipment and samplers is usually to be found in Studio Two coupled with MIDI and SMPTE synchronisation.

Studio Three has the largest control room, nearly 60 m², centred around a Tascam *M 700* 40-channel in-line desk and a Tascam *ATR 80* multitrack and 40 m² of recording space.

All three studios have Atari *1040s* with C-Lab *Notator*, *Unitor* and *Export*. And, as one would expect from a studio run by two musicians, there are more than enough musical instruments: including keyboards, electronic drums and a Simmons kit, as well as two conventional drum kits from Sonor and Yamaha. Music Man and Marshall amps and stacks round off the list.

The microphone collection is one to be proud of. Apart from a healthy collection of just about every mic you ever wanted to see in a studio, they have some 10 vintage valve (tube) mics and a Calrec *Soundfield*. In outboard equipment the choice is equally impressive. In Studio One the number of different reverbs on the shelf, including an EMT *141* stereo plate, almost goes into double figures. And if that is not enough, there are another six on the floor below. Dynamic processing and other effects, such as vocoders and exciters, are equally well represented and every studio is equipped with a Klark-Teknik analyser. Monitoring is Quested *Q412* in Studio One and Westlake in Studios Two and Three. **Preussen Studios, Hasenheide 9, 1000 Berlin 61, Germany. Tel: 30 693.30.62. Fax: 30 692.68.88.**

Andrew von Gamm

Agencies

● The full address of **Stellar Audio**, US distributors of HHB 1 Pro DAT player is Stellar Audio, 58 Bearfort Road, West Milford, New Jersey 07480, USA. Tel & Fax: (201) 728 0438.

● **Digital Audio Research** have appointed Audio Intervisual Design in Hollywood as their US West Coast distributor. Audio Intervisal Design. Tel: (213) 469 4773. Fax: (213) 962 2603.

● **RPG Europe** has taken European distribution rights for **Almute**, a new acoustic material developed in Japan. RPG Europe Ltd, PO Box 1416, Iver, Bucks SL0 0NH, UK. Tel: 081 549 6389. Fax: 081 546 2246.

Now the world's favourite recording console has added the ultimate moving fader system

THE SUCCESS of Solid State Logic's SL 4000 Series console is legendary.

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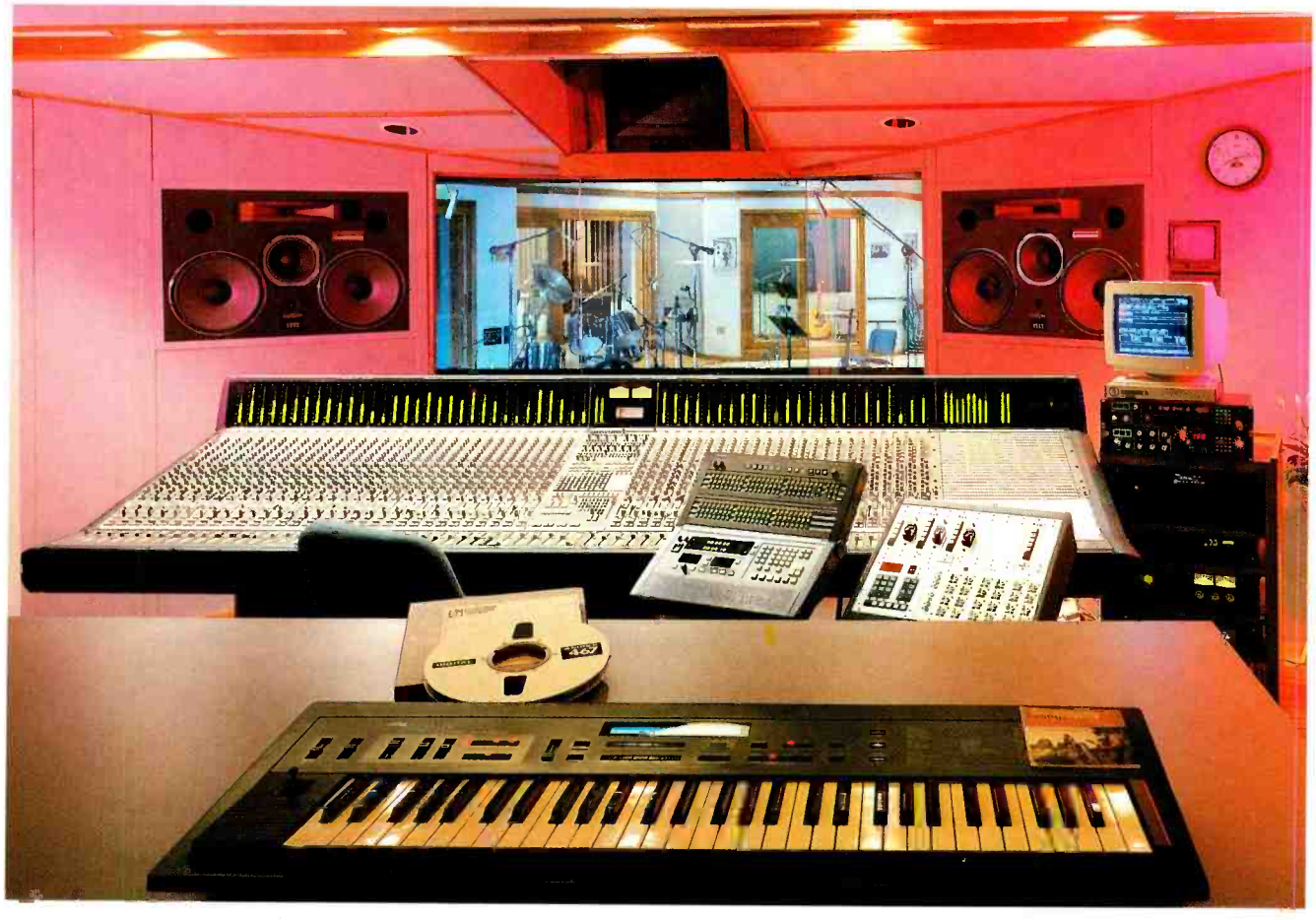

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TRIDENT AUDIO USA 2720 Monterey Street, Suite 403 Torrance California 90503, USA Phone 213-533-8900 Fax 213-533-7072

Audio Studios, Germany

Audio Studios are built into a former film studio complex, which gives a roomy feeling seldom found in cramped Berlin. On entering the first floor reception area, one is confronted by a wall proclaiming the hits recorded here; if they continue like this they will run out of wall.

Audio was founded in 1968 by Jörg Schmeier using two Revoxes, a spring reverb and a self-built mixer in a private house. Space was at a premium and sometimes recordings had to be made in the garden. Later the studio moved to a disused cinema, the move to the film studio came much later.

Manager Stan Regal says that they grew with the market. After they bought a 4-track, their main Berlin competition, Ariola Studios (later Hansa), bought an 8-track, "So we had to go out and buy a 16-track!" This 16-track from 3M was augmented by a half-finished prototype desk from EMT which took the Audio team several months to finish wiring up. The 3M was to be replaced by a 16-track Ampex and later a 24-track with sychronisation from EECO. A 40-channel Harrison with Allison programmer also brought the studio up-to-date at this time. Today this desk is still earning money in Studio Two.

Seven years ago Audio were one of the first studios in Germany to invest in SSL, which was used with two Otari 24-track machines. Today the same desk is still in business but with an Otari 32-track digital, which they bought as a three-machine package with rivals Hansa Studios, "In part to get a better price, but also to make sure that digital multitrack formed a norm here in Berlin."

Studio Two, with its ability to create various acoustic environments, is often used by German public broadcasting for radio plays. About 25% of their work comes from public broadcasting.

The business backbone remains West German music production with some jingle and advertising work as well as soundtracks for films and TV. The falling of The Wall and re-unification of Germany did not bring the sudden increase in studio business that many had hoped for. Once The Wall came down the only real change was that the people at

The control room to Studio One looks down from the right

Audio could drive into the countryside once cut-off by the infamous 'death-strip' but no rush of Eastern customers could be expected as they had not yet generated the funds needed to book studio time. Today, things are beginning to change slightly. Western producers are tapping the high standards of the former East German musical education. Classical recordings in particular are being made in the East and mixed down in Western studios with the necessary expertise.

Studio One's control room is both light and roomy: 75 m² since its rebuild and lots of daylight. Monitoring is by Quested, Yamaha and Auratone. The desk is an SSL 56-channel with *Total Recall* and printer. Multitracks are either Otari *DTR 900* 32-track digital, or Otari *MTR 90* 24-track fitted with Dolby *SR* and *A*. There is also a wide choice of mastering machines: two Telefunken *M20*s, Sony *PCM-1630* with U-matic and a *PCM-701* with VHS and Betamax, as well as DAT machines. Nearly all machines have their own dedicated NR and timecode.

The outboard equipment list is impressive and includes nearly all one could wish for by way of dynamic and delay processing, including a good selection of reverb plates.

The 140 m² recording area is a former film studio and has an appropriately high ceiling. The mic collection is comprehensive and includes all the favourites as well as more specialised models from B&K and Sanken. A Bösendorfer grand sits in the middle of the studio and a large set of Ludwigs is at hand set up in the live drum corner. All the usual guitar amps are available and a Hammond *M100* with Leslie cabinet rounds off the collection.

Studio Two is smaller and more compact. The control room is 42 m² and the recording area 70 m².

Equipment reflects the very wide variety of uses that this room serves: radio plays, soundtracks and conventional, and sometimes not so conventional, music. With plays and soundtracks in mind there is a wide selection of reverbs including a Quantec *Room Simulator* and a Deltalab *Acousticomputer*. To the same end, sections of the studio walls can be swung round exposing soft or reflective sides to change acoustics. Floor surfaces of sand, marble and gravel in one corner opposite a video projector are used for soundtracks radio plays.

A wide collection of electronic keyboards and electronic drums are set off by a conventional drum kit, and Petrof grand piano. There is also a dead room and a drum booth.

As mentioned multitrack is an Otari *MTR 90* with Dolby *SR* and the desk a 40-input Harrison with Allison programmer. A whole variety of mastering machines, both digital and analogue, are augmented by six Telefunken *M20*s, linked via an Adams-Smith sychroniser, as sources for radio plays.

A 42 m² editing suite is the smallest of the three studios. Two Telefunken *M20*s with timecode, Dolby *A* and *SR*, and *telcom* NR stand alongside three Sony U-matics NTSC and PAL, DAT machines and a Sony *PCM-2500*. Editing is done mainly on a Sony *DAE 1100*.

The room also sports a selection of outboard equipment with CD and record players from EMT.

Audio Studios, Ostpreussendamm 137, 1000 Berlin 45, Germany. Tel: 30 772. 40.54/5. Fax: 30 772. 50.13.

Andrew von Gamm

Studio One's control room

The light and airy MIDI suite

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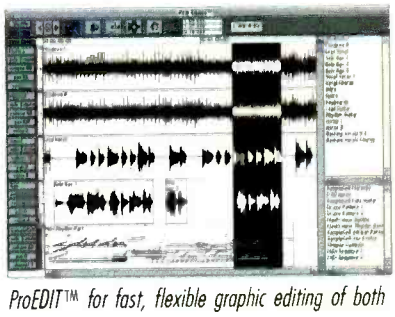

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JBL nearfield monitors

JBL have introduced the *4200* series of loudspeakers designed specifically for nearfield monitoring. Two models are currently available — the *4206* and *4208* — both are 2-way systems featuring a 6½ and 8 inch LF transducer respectively, and the same 1 inch, pure titanium, diaphragm dome HF driver. All transducers are magnetically shielded allowing the speakers to be placed close to field sensitive equipment. A feature of the design is the injection moulded 'Multi-Radial' baffle, that is said to direct the axial output of the individual components for optimum summing at the most common nearfield listening distance. The baffle is also responsible for aligning the acoustic centres of the transducers. To help minimise distortion, a ducted port has been moved to the rear of the enclosure.

JBL International, 8500 Balboa Boulevard, Northridge, CA 91329, USA. Tel: (818) 893-8411. Fax: (818) 893-3639.

UK: Harman Audio Ltd, Mill Street, Slough, Berks SL2 5DD. Tel: 0753 76911. Fax: 0753 35306.

Ensoniq DP/4 effects processor

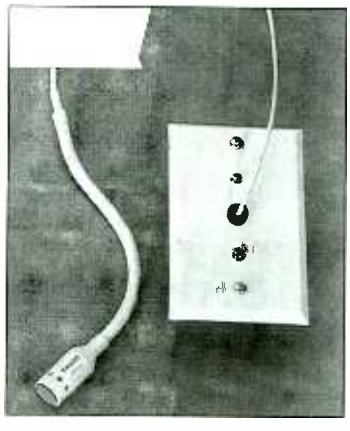
The *DP/4* parallel effects processor is the first dedicated effects device from Ensoniq. Utilising four custom 24 bit DSP chips, a software patchbay and internal submixing, the unit's four inputs and outputs can be configured in a number of different ways to produce complex chains of effects or discrete processing.

There are 33 effect algorithms providing a full range of effects, 16 of which may be produced at the same time at full bandwidth. Signal routing between effects can be serial, parallel or feedback. The unit contains 400 presets equally divided between ROM and RAM, which can store anything from single effects to complete system set-ups.

Input and output levels are controlled by dedicated front panel rotary controls and parameters are changed by a large data wheel. All effects parameters can be modulated by external sources such as footswitches, CV pedal, key velocity, and MIDI controllers.

Ensoniq Corp, 155 Great Valley Parkway, Malvern, PA 19355, USA. Tel: (215) 647-3930. Fax: (215) 647-8908.

UK: Ensoniq GB Ltd, Ensoniq House, Mirage Estate, Hodgson Way, Wickford, Essex SS11 8YL. Tel: 0268-561177. Fax: 0268-561184.

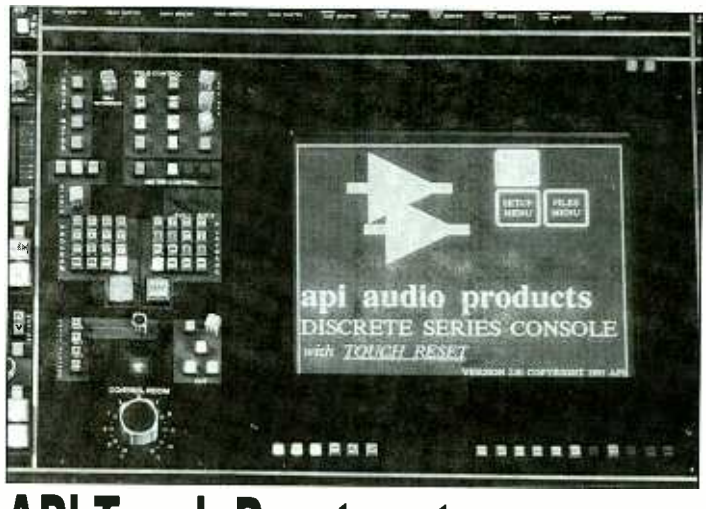


Shure hanging mics

Shure have released the first product in their new *Microflex* line of miniature condenser microphones, designed for use in fixed installations. The *SM102* is a hanging microphone suitable for overhead distant miking applications such as choirs, orchestras, stage productions and so on. This high sensitivity, low noise cardioid has a frequency response from 40 Hz to 20 kHz, and is permanently mounted on a slim 6 inch gooseneck allowing easy angling. From the gooseneck, an attached 30 ft cable connects to one of two types of preamplifier, an in-line or a ceiling plate version, both contain a low-cut switch. The mic is supplied with a black or white finish.

Shure Brothers Inc, 222 Hartrey Avenue, Evanston, IL 60202-3696, USA. Tel: (708) 866-2200. Fax: (708) 866-2279.

UK: HW International Ltd, 3-5 Eden Grove, London N7 8EQ. Tel: 071-607 2717. Fax: 071-609 0295.



API Touch Reset system

API have introduced a new series of discrete consoles featuring 'Touch Reset'. The system allows complete resettability of all switches within one frame, through the use of a gas-plasma touch screen computer. Knobs and faders can be manually reset through an optional three LED nulling system that generates an audible click as the null point is matched. Additionally, the console will feature a system whereby controls automatically assume null mode as they're touched, rather than having to first inform the computer the identity of the control or channel to be addressed. Console setups are stored to floppy disk, and all program loading and computer interfacing is done via the touchscreen.

API Audio Products Inc, Springfield, VA 22153, USA. Tel: (703) 455-8188. UK: Pan Technical Tel: 071 247 6101.

Serious users the world over are reaping the rewards that the DAT format brings: cost-efficiency, convenience, reliability and audio excellence. As you might expect from the world's No1 DAT Centre, HHB has been working closely alongside the 'World Leader in Digital Audio' to build a DAT product range that really delivers the goods. And the briefest glance at our latest Sony DAT line-up is all it takes to see that there is a solution for every application, from the simplest audio recording to the most advanced audio-for-video post-production.

TCD D3
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TCD D10 PROII

But as anyone will tell you, DAT excellence is not based on hardware performance alone.

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The Industry Standard

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PCM-2700
Affordable 4/Head Technology

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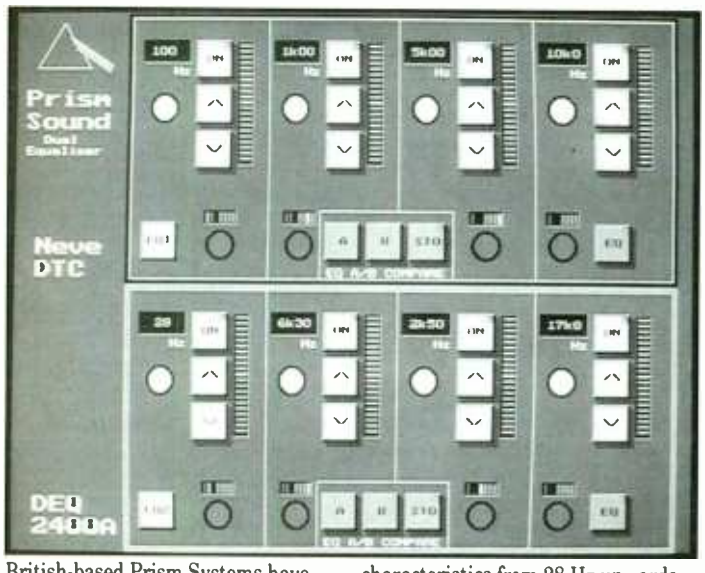
Prism for Neve DTC



British-based Prism Systems have fitted their first *DEQ2400-A* digital equaliser, into a *DTC 1.5* transfer console at London's Hit Factory. Prism have worked closely with Neve, and the 4-band equaliser is designed to complement the existing EQ, so providing eight bands of EQ on both left and right channels simultaneously, by means of a digital insertion point. The extra bands are fully integrated into the *DTC* automation system in the same way as the Neve internal EQ. The additional features offered by the *DEQ-2400-A* include range extensions, such as a LF band with a choice of slopes and peak or shelf characteristics from 28 Hz upwards.

The unit is supplied in a 4U rackmount enclosure, along with custom software for the Neve *DTC* and a replacement EQ control module that allows both sets of EQ to be selectively controlled. An optional video monitor will display both EQs.

The unit can also be supplied as a standard rackmounted EQ with mouse and screen control, or with its own control panel, or as a serially controlled device integrating with other systems.

Prism Systems, 185 Cambridge Science Park, Milton Road, Cambridge CB4 4GN, UK. Tel: 0223 424988. Fax: 0223 425023.

Dolby background noise suppressor

A new single-ended noise reduction system, the *430* series has been launched by Dolby. Based on a modified version of Dolby *SR*, the *430* offers improved performance over its predecessor, *Cat No 43*, which relied on Dolby *A* technology. The modular system provides remote control of up to six channels of noise suppression. High and low frequency stages are independently controlled, allowing broadband attenuation of unwanted low level signals; signal level in the processing circuitry can be adjusted from the remote without changing the overall gain of the unit. Level indication and bypass switching are also incorporated in the remote control modules which have been specifically designed for easy console mounting.

Dolby Laboratories Inc, 100 Potrero Avenue, San Francisco CA 94103-4813, USA. Tel: (415) 558-0200. Fax: (415) 863-1373.
UK: Dolby Laboratories, 346 Clapham Road, London SW9 9AP. Tel: 071-720 1111. Fax: 071-720 4118.

Ampex Gold

In response to professional demands for lower noise and distortion, higher output and wider dynamic range: Ampex have introduced a new tape designed to complement Grand Master *456,499 Grand Master Gold*. The tape is said to offer outstanding mechanical stability for today's high performance analogue machines along with very low print-through. Operating levels of +9 dB and beyond are achieved using a non-porous, high energy, ferric oxide formulation. The tape is supplied in ¼, ½, 1 and 2 inch widths, and comes in a new box sealed with a special coating to provide improved durability and moisture resistance.

Ampex Recording Media Corp, 401 Broadway, MS 22-02, Redwood City, CA 94063, USA. Tel: (415) 367-4611.
UK: Ampex, Acre Road, Reading, Berks RG2 0QR. Tel: 0734 875200. Fax: 0734 869882.

Yamaha digital crossover

Yamaha have announced the introduction of the *D2040* digital crossover and system controller. The 2U unit is a fully adjustable dual-channel, 4-way digital crossover using 19 bit delta-sigma A/D conversion. Each output band includes two bands of parametric EQ, a compressor/limiter, and independent delay for adjusting the time/phase alignment of various elements within a loudspeaker system. A second delay allows the entire system to be delayed by up to 1.3 seconds.

The eight outputs employ 20 bit D/As, and in order not to compromise their dynamic range, output attenuation is performed in the analogue domain by motorised rotary faders. These control settings, along with the other parameters, can be stored in one of the system's 15 protectable user memories, for future reset.

Front panel LED meters, with selectable ballistics, display input levels, while clipping indicators are provided for all outputs. Several levels of security are included to prevent tampering.

UK: Yamaha-Kemble Music UK Ltd, Mount Avenue, Bletchley, Milton Keynes, MK1 1JE. Tel: 0908-71771. Fax: 0908-368872.

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Malcolm Hill Associates Plc, Hollingbourne House, Hollingbourne, Kent ME17 1QJ, England.
Tel: #44 (0) 622 880 601 Fax: #44 (0) 622 880 664

Demeter tube products

Demeter, Los Angeles manufacturers of guitar tube amplifiers and preamplifiers, made their debut appearance at the New York AES with a number of pro-audio tube products. Among these was the *VTMP-2* 2-channel mic preamp: designed to interface the sound of tube amplification with modern consoles and tape machines, the unit offers variable gain between 30 and 50 dB with peak indication, 48 V phantom power and switchable mic/line impedance. The company also showed their tube DI box which features a 20 MΩ input and generous headroom to avoid signal degradation or colouration; the unit includes a boost circuit that will increase the output to the console by 10 dB, a ground lift, and a buffered output jack allowing cable runs of up to 40 ft between DI and amp without HF loss. A rackmountable stereo version is also available.

Innovative Audio Systems/Demeter Amplification, 1907 Parnell Avenue, Los Angeles, CA 90025, USA. Tel: (213) 470-6426.

TimeLine Micro Lynx

TimeLine have added a low-cost machine control system to their product range. Called the *Micro Lynx*, the system consists of a compact rack unit and remote keyboard, which support two transports plus MIDI. Features include SMPTE and MIDI timecode generators, two transport synchroniser/resolvers with wide band readers, MIDI to SMPTE synchronisation, computer control port plus direct *Macintosh* interface. The system can be expanded to provide: control of a third machine, a workstation interface providing synchronised sampling clocks, VITC timecode reader, and video sync generator in NTSC or PAL.

TimeLine, 2401 Dogwood Way, Vista, CA 92083, USA. Tel: (619) 727-3300. Fax: (619) 727-3620.
UK: Stirling Audio, Kimberley Road, London NW6 7SF. Tel: 071-624-6000. Fax: 071-372 6370.

In brief

● 3M have made improvements to their 275 digital mastering tape. The enhanced tape is now said to offer a lower drop-out rate and improved windability. It is compatible in all DASH, DMS and PD formats.
3M Magnetic Products Division, St Paul, MN, USA.
UK: 3M UK, Bracknell, Berks. Tel: 0344 858551. Fax: 0344 58175.

● Canford Audio have introduced a phantom-to-T-power converter that will allow T-power microphones to be used on any console outputting 48 V phantom power. The compact unit resembles an *XLR* barrel connector and simply connects in-line between the console and microphone.
Canford Audio, Washington, Tyne & Wear, UK. Tel: 091 417 0057. Fax: 091 4160 392.

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MIDI viola and cello

US MIDI stringed instrument manufacturers Zeta — makers of the excellent *Mirror 6* electric guitar/MIDI controller — have supplemented their range of products that includes violin models with the release of an electric viola and cello. Combining Zeta's penchant for the futuristic in the cause of much improved ergonomics, these models incorporate the company's patent-applied-for pick-up technology with adjustable-height bridge pick-ups with paired differential transducers per string with a settable internal preamp for acoustic balance. These pick-ups are also available separately and can be fitted to traditional instruments. MIDI is also supported via a multi-output, which, together with a'*VC225* interface, allows the player to access the world of synth control with all the serious implications that this entails.

Zeta Music Systems Inc, 2230 Livingstone Street, Oakland CA 94606, USA. Tel: (415) 261-1702.

UK and Eire: Harbourtown, PO Box 25, Ulverston, Cumbria LA12 7UN. Tel: 0229 580577.

Studio Sound's Music News is compiled by Zenon Schoepe.

Another Hammond clone

Most keyboard players would probably admit to a desire to own an old Hammond tonewheel organ yet an unwillingness to be banished from the goodwill of fellow band members and road crew taints this longing with realism. They are heavy and cumbersome and their traditional outhouse-like means of amplification are similarly endowed. Thus the quest for lighter and more modern alternatives has been carrying on with some urgency of late particularly as the tonewheel has been discovered by the latest generation of players who quite obviously like it.

Fujiha, contrary to what you might think, is actually the muso arm of an Italian company that makes a range of organs for the more traditional domestic organ markets. Its Fujiha *D9* organs were first spotted at the International Music Fair, London, UK, earlier this year and while not specifically designed for the pro market they qualify by default through a combination of features and specifications nevertheless.

There are two models to choose from, the 5-octave keyboarded *D9* and the keyboardless expander module the *D9e*. MIDI is obviously involved, the only difference being that the *D9* has MIDI In and Out and the *D9e* MIDI In and Thru.

Both use a rather out-dated material called wood for their casing, which adds an original feel and considerable strength while keeping things light enough for a Hammond roadie to sling the keyboarded *D9* under an armpit with no truss adjustment necessary.

The function buttons, assembled on a panel to the left of the keys, all have their own decicated LEDs and are similar in appearance to the sort that used to adorn the early Sequential synths. The output is mono and is controlled by a volume pot and effected by a rotary distortion control while the organ can be tuned via a small pot on the rear panel. MIDI defaults to Omni mode on power-up but individual channel selection can be adjusted by pressing a MIDI button followed by one of the other function buttons, each of which corresponds to a specific channel number.

Sound is generated through sampled waveforms and surfaces through nine drawbar type controls corresponding to the harmonics of 16', 5⅓', 8', 4', 2⅔', 2, 1⅗', 1⅓', and 1'. Sounds familiar? Access to this tier of control is via a button marked Drawstops and this totally variable patch is complemented by six presets each of which is selected via a dedicated key, which cannot be interfered with by the drawbars.

Three speeds of vibrato can be selected along with a slow and fast Leslie-type effect. An extensive percussion section allows slow/fast or hard/soft effects to be added to the 4' and 2⅔' harmonics along with a key click button that approximates the dirty contacts of a Hammond that has lived a full and active life.

The keyboard is highly sprung and suits the organ feel, and with total polyphony you can forget about the usual problems of note stealing and indulge in a little flat palm and forearm use. The drawbars work excellently adding subtlety and allowing strong imitations of the giants of old to be created with no zipper or associated glitch artefacts interfering with real time manipulation. It is therefore disappointing to discover that drawbar movement is not transmitted over MIDI as continuous controller information, as you would have expected, and switched in Vibrato and Leslie effects are also not transmitted. So you won't be able to record any drawbar sound shaping to a sequencer for later use, you'll just have to do it live. The presets are good but one particularly 'glassy' tone that I associate with Hammonds is not represented although it can be produced through the variable drawbar patch. The drawbar patch and presets can be convieniently switched between by footswitch and volume can also be controlled on a pedal.

On the whole the sound is distinctly gutsy and considerably different to the organ simulations of many modern synths. However, the *D9*'s distortion circuitry is pathetically weak adding more fizz than honk and far more satisfactory results can be achieved by processing externally through something like a tube amp. In many ways this is perhaps also a more correct way of creating that screaming tone that still manages to make the hairs stand up on the back of my neck after so many years. The three-stage Vibrato section makes an honest attempt at copying the phasey sound of the originals — more accurately described as tremolo — although I would have preferred a slightly faster modulation speed on the top setting. Fujiha's 'Intersound' rotary speaker effect is stunning even as a mono source and changing up a gear from slow to fast rotation — by footswitch if desired — actually has the gradual speed increase to full throttle, like the originals, and the faster treble movement can be clearly heard. The *D9* amounts to a very satisfying instrument to play that manages to present some old ideas in a very friendly way and as such is comfortably geared to performance.

In many ways the subtlety of the old organs is a major part of their charm and the *D9* certainly goes some way to offering this. While I do not for one minute think that this instrument would ever fool a real old Hammond devotee, I do consider it to be capable enough for those who are prepared to wear the difference.

Ultimately its suitability will depend on the user's acceptance of some of the device's limitations particularly when viewed in the context of what is achievable with modern technology: the lack of MIDI output on drawbar movement, the lack of MIDI output on function button selection other than presets and the drawbar patch, the inability to alter presets in drawbar terms or rewrite over them, the mono output, and poor distortion circuitry. These may well be outweighed by the qualities in the *D9*'s favour: an excellent organ keyboard, an unusually convincing sound with plenty of clout, a corking Leslie-type effect, a sympathetic vibrato and very sound construction.

If you are tired of committing a synth to your best attempt at an old organ sound then these products are really worth investigating especially as they are reasonably priced. They also manage to capture some of the flavour of the old monsters: low tech and earthy with not a pretension in sight. Maybe too low tech for some players but there is much that certainly warrants a listen all the same.

UK: BCK Products, 136 Hornchurch Road, Hornchurch, Essex RM11 1DP. Tel: 04024 48799. □

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Yamaha PM4000 'due soon'

As exclusively revealed in *Studio Sound's* Live Sound Consoles survey in August, Yamaha is poised to launch its widely-rumoured successor to the workhorse *PM3000*. Despite earlier denials by the company that any such console was planned, a non-working prototype of the *PM4000*, was shown publicly at the New York AES in October. It was the finalised version of a design which has undergone numerous revisions following 'invitation only' previews at recent shows including the NSCA 1991.

The FOH desk, which represents a comprehensive upgrading of the *PM3000* (though not a radical departure as early rumours had suggested), is due for release next summer, and will be available in 24, 32, 40 and 48 input frames. The *PM4000M* monitor version, a 22 mix/52 input console, will follow six months later. A Yamaha spokesman said the console incorporates sonically improved electronics — including new VCAs — as well as numerous new facilities, added after consultation with users.

JBL installs more

JBL has announced two major installations. Birmingham's new 13,000-seat National Indoor Sports Arena, officially opened on October 14th alongside the ICC complex, is touted as Europe's premier sports venue with a 100 x 61 m floor area and 19 m headroom; concert productions are also scheduled. Tannoy Audix won the sound contract and in conjunction with JBL built a tiered time-aligned central cluster using JBL's CAD software and cabinets. C-Audio amps were flown in the rig, which is intended for speech, commentary and music playback.

Meanwhile, Teknique Systems in Scotland won a £200k contract to supply a package of JBL *Sound Power* SR, video and intelligent lighting systems in five venues at the University of Edinburgh Students' Association.

Studio Sound's Live News is compiled by Mike Lethby

tc rescues Guns'n'Roses

Following the infamous riot at one of Guns'n'Roses' US shows — in which much stage hardware was either looted or trashed — tc Electronic proudly claims to have ridden to the rescue by replacing a crucial component of the monitor system overnight. SR company Electrotec used the remote-control 16-channel *TC1128/TC6032* system to set monitor EQ via the remote head's motorised faders, anywhere up to 100 m from the audio connection.

Turbosound TOTP

Britain's longest-running TV chart show, *Top of the Pops*, has been given a facelift by the BBC with an updated format and an emphasis on 'live' performance. Whenever possible, vocals are being recorded live in the Elstree studios, and the BBC has purchased eight Turbosound *TMW 212* low-profile floor monitors: one pair apiece for vocalists on each of the show's four performance stage areas.

BSS Varicurve EQ at AES

A beta test prototype of BSS's *Varicurve* remote/programmable equaliser aroused considerable interest among designers and SR hire firms at the New York AES show in October. Although many details of the unit's specifications (and particularly the remote control's software) have yet to be finalised, BSS's Dave Haydon says feedback from the sample module's brief appearance has already been absorbed and that a production model will surface early next year

Marquee supply SR Soundcrafts

Marquee Audio has announced sales of budget Soundcraft consoles to two SR hire companies. John Henry's hire arm, JHE Hire, has bought its first *Delta Monitor* desk, while Skan PA Hire took a *Venue* console. Skan's MD Pete Howard commented: "It's the only desk for the price with such versatile features and capabilities."

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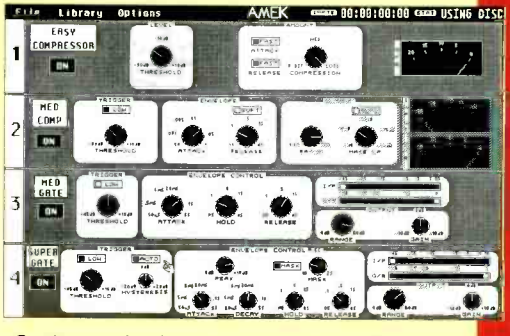
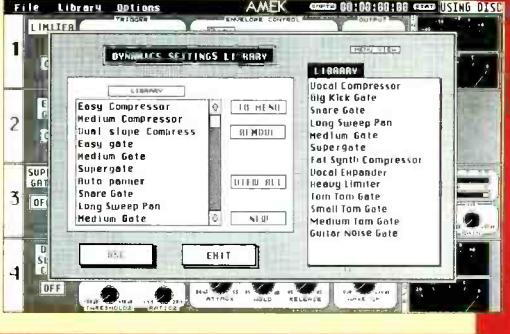


In addition to the Dynamics the system package provides a MIDI in and out for every 8 channels, leading to new possibilities in MIDI gating and control. Furthermore, each Virtual Dynamics unit can be switched in or out of circuit against time code via the automation master Cue List.

AMEK/Steinberg SUPERTRUE automation provided a new level of sophistication in automated mixing. The first major enhancement was a complete machine control system, Superloc. Now Virtual Dynamics is an even more revolutionary step forward which brings the possibilities of console automation into a new era.



AMEK Virtual Dynamics is available on SUPERTRUE automation systems fitted to AMEK MOZART and HENDRIX consoles.

AMEK

Head Office, Factory and Sales: AMEK Systems and Controls Ltd., New Islington Mill, Regent Trading Estate, Oldfield Road, Salford M5 4SX, England. Telephone: 061-834 6747. Telex: 668127. Fax: 061-834 0593.
AMEC/TAC US Operations: 10815 Burbank Blvd, North Hollywood, CA 91601. Telephone: 818/508 9788. Fax: 818/508 8619.

John Paul Jones is still primarily recognised as one quarter of the phenomenon known as Led Zeppelin. To call him simply 'the bass player' would be to disregard his considerable contributions to that band not only as a multi-instrumentalist (keyboards, mandolin, recorders, etc) but also as writer, arranger and producer. What is less well known about him is that his 25 year career in the music business has taken in everything from the arrangements for Donovan, Lulu and Herman's Hermits; film music for Michael Winner, producing Ben E. King, Madeline Bell and The Mission and prior to the Led Zep era, being a session musician for 'just about everybody'. Listening to a recent 90 minute '60s retrospective radio programme with some amusement Jones remembers playing on every British single in the show.

Today he is as busy as ever. Recent projects have included producing an album of 'industrial flamenco' for the Spanish avant-garde music/theatre group, La Fura Dels Baus; music for a television series; three extended songs in Spanish with figured bass notation for the experimental/early music group Red Byrd (whose instrumentarium includes lyrone and chittarone) and a big multi-media promotional presentation for Mercedes Benz. He has been commissioned to write a full length chamber opera for Red Byrd based on a short story by Oscar Wilde and is currently working as producer of his daughter Jacinda's album.

John Paul Jones runs his own studio somewhere in the wilds of the south west of England and it is well equipped. He has recently acquired a Mitsubishi *X880* 32-track recorder which he uses

Photo: Chris Rydlewski

JOHN PAUL JONES

As a session musician, as a member of one of the most influential bands ever and now a record producer, John Paul Jones has his own methods. Peter Ridsdale asks the questions

with a DDA *DCM232* desk. His Soundcraft *762* is still in use (slaved to the Mitsubishi) and this gives a total of 56 tape tracks. This is in addition to a virtually unlimited number of MIDI tracks while in conjunction with *Studiovision* (and hopefully soon, *Digital Performer*) he is able to have acoustic tracks recorded on the hard disk and running as a MIDI sequence. Having begun his recording career with a 'sound-on-sound' Revox he believes that he has "finally got it right" and will no longer be running out of tracks.

"I remember the days when there was the leap from 4-track to 8-track and people used to say 'What are you going to do with all those extra tracks?" — there was much derision — and 16-track was ridiculous! 'You'd never be able to mix it. You'd have people crawling all over the desk.' I like lots of tracks because you can try things out without having to make decisions. You can try things out and make sub-decisions — there's nothing worse than having 20 stereo guitar tracks and then having to choose one at the end of it. At least you can go for another take immediately knowing that you can keep your previous performances, so it's not 'We have to make a decision about the backing vocals before we do that' — that's always really boring. Basically the idea is to make records in the best possible way and that is to have unlimited tracks so you don't have to think 'Have I got room for this?' The actual process of recording should be transparent — you should be able to get your ideas down onto tape or into the computer with as little fuss as possible."

Jones has owned both *Fairlight* and *Synclavier* systems but has now opted for a less costly but no less impressive system based around the *Macintosh IIcx* with Mark of the Unicorn's *Performer* and Digidesign's *SoundTools*. The *Mac* has an internal 40 Mbyte hard disk and there is an additional 640 Mbyte hard disk which allows for an hour of stereo sound at 44.1 kHz. An enthusiastic and knowledgeable computer buff he is nevertheless an unshakeable adherent of live playing.

"There's nothing like a good drummer for bringing colour and feel to the thing. Programming is time consuming but it's worth spending time on if you're going to do it at all — otherwise you might as well get a musician to play it. There are times however, when you don't want the looseness of a drummer — dance records are a prime example — you want it impossibly tight as part of the sound and the feel."

Jones has been in a position to have seen at first hand the development of recording technology over the last 30 years. What did he feel had been the main changes between then and now?

"Well, it certainly takes much longer. We used to make Herman's Hermits' albums in two days. A day for the tracks and a day for the voices and mixing. It's easy to get sidetracked by the options now.

"The session scene was much different then — you would do three sessions a day and whole orchestras would be moving en masse from studio to studio. Of course in those days the rhythm section was set up in one corner, the brass in the middle, the strings on the other side and you'd do three titles in a three hour session — they would mix it in the next hour and everybody would go home with another record under their belt."

One studio that was far more important to British '60s pop than its size would suggest was Denmark Street's Regent Sound. "Regent Sound was mono. If you did a Regent Sound session, that was it — it was mixed at the end of the session. In one take it was mixed with the reverb on it and

everything. And that actually teaches you a hell of a lot about engineering. You EQ everything as it comes in, mix it all down, put the reverb on . . .

"Later there was a time I went through when I didn't like to EQ anything; I'd do it afterwards; but you find that you don't really have much idea of what you were going for by the time you get to the mix sometimes. I now pursue a half-and-half approach where I EQ a bit at least to give me some idea of what I want but not so much that you then have to un-EQ it at the end. The one thing that I have retained from those days is the importance of mic positioning. I don't think that EQ should be an excuse to iron out the problems that a badly placed mic has brought about. I'd rather spend time, say, with an acoustic guitar, really getting the best sound from the mic without touching the EQ and then using the EQ later if you need to for the sound of the song rather than the sound of the instrument. I know people who put a mic up and EQ it immediately and I don't think that that is the right way."

Jones claims to have learnt his craft by spending as much time as possible in the control box when he wasn't actually playing. "I'm talking about the days when Glyn Johns was the tape-op at Decca (at least I think it was Decca). We would both stand there listening and watching what was being done; Gus Dudgeon and all those people. I can't remember the names of most of the engineers; there was so much recording going on . . . literally three sessions a day for years on end. I actually joined Zeppelin just to get out of the studio — because you go crazy after a while."

One senses a reluctance in Jones to say much about the Zeppelin era. This is not so much false modesty nor that he is Not Talking About That but rather that he feels the whole subject has been done to death and that he would much rather talk about the present than the past. He was at first reluctant to give me a blow by blow account of how a classic track like *Kashmir* was produced but later relented and revealed that the basic track was recorded at Headley Grange using Ronnie Lane's Mobile, a compact studio built inside a silver Airstream caravan. Headley Grange is a large Victorian workhouse which Zeppelin rented and they had four entire storeys at their disposal. It was here that they experimented with recording each amplifier in its own room and with John Bonham's drums set up in the hallway. These were miked at a distance of 10 ft on the first landing and at a distance of 20 ft on the second landing. A similar process was used on a number of other tracks including the oft-sampled *When the Levee Breaks* from Led Zeppelin 'IV' (Runes). The strings and brass parts for *Kashmir* were overdubbed at Olympic, as was Jimmy Page's guitar. Jones then added Mellotron to get the Arabic String Orchestra sound and he used his experience of listening to Middle Eastern music on short wave radio at the age of 14 to achieve this.

"Basically Jimmy's name was on the records as producer but that was due to some contractual thing. In the early days we all produced. Jimmy and I were in the box most of the time . . . we would produce each other if we were doing overdubs and we would sort out the other two between us. We did what was always done in those days: a track goes down live and then you overdub anything else you need."

Which is to easily gloss over what was at the time a quite innovatory approach to the recording of rock music. Not many bands managed to capture on vinyl the 'live' sound that Zeppelin achieved, especially in the rhythm section. A sound who's vibrancy remains undiminished, as is evidenced by the number of times that *When the Levee Breaks* has been sampled in recent times.

"I was very pleased with the boxed set, the remastering that Jimmy did. The CDs sounded very dull before — they were a great disappointment. The new CDs however sound very good and the order that the songs are in is very interesting too. I know Jimmy took a lot of trouble digging out the original masters — some of the stuff I hadn't heard for nearly 20 years. There was a great sounding organ intro to a track called *Thank You* that I'd totally forgotten about."

In more recent years Jones has become a much sought after producer, and as has already been mentioned, is active with a wide variety of musicians. What are his personal guidelines in this department?

"My attitude towards production projects is that basically I will not do anything that I'm not really interested in. I get a lot of requests for bands to be 'Zeppelinised' or now, 'Missionised' but unless I'm excited by the band I won't go ahead with it. Consequently I've turned down many projects and I haven't done any production for the last year or so . . . which is alright by me."

At first glance it would seem that Jones and The Mission would make unlikely bedfellows so how did this collabration come about?

"I'd heard the single *Wasteland*, which I quite liked and then I heard some demos which sounded very good. The material was strong which is very important to me. Wayne (Hussey) is a good writer. I went along to see them in Leeds and they were, well, terrible. I had been warned that they were fairly boisterous in their recreational activities and they were completely paralytic when I saw them on stage. I spoke to them the next morning and they were very, very serious (laughs) and so I agreed to come along to the rehearsal. They were actually very good. I liked the material and I thought that it would make a good record.

"I like to go to both a gig and a rehearsal because the thing about a rehearsal is that a band tends to balance itself in a small space and you probably get a pretty good idea of how the band themselves feel that they should sound — apart from all the other obvious insights you get such as how the band members interact with each other and generally who does what and how things work.

"They sounded very good in rehearsal; quite solid which was something that I hadn't really got from their earlier records — I wouldn't say rockier but they had a much more rounded and solid sound. When I'd heard the demos I'd decided that this was what I'd wanted to bring to the band; to bring them slightly out of the Gothic 'reverberant environment' that they tended to inhabit and bring a little bit more detail — generally bring the bass and drums up. So when I saw in rehearsal that this was how they tended to see themselves I knew I was on the right track. I used an engineer called Mark Stent who had previously worked with ABC, Steel Pulse, Hugh Masekela — the list was so diverse that I thought he's got to be alright. He had tremendous enthusiasm and commitment and was very conscientious — you had to literally go and dig him out of the studio otherwise he would be sitting there fine-tuning everything all night.

"We went round and looked at studios and chose The Manor — in those days it was one of the few that had a really good drum room; they'd just built a stone drum room and it sounded fantastic — I wanted a big, live, ambient drum sound . . .

"It was also set out nicely — the control room was separated from the main studio by glass doors so as you sit at the console you look through into the main playing area and then there's another set of glass doors at the end which lead into the drum room; everything is in line of sight which I found quite attractive. Everybody can see everybody else but you can also close doors and get separation. I wanted to at least get the rhythm section down live. In fact we recorded everything live and then replaced guitars and voices as we needed but the feel was there — live. They were very happy with it as hitherto they had all played to a click-track. OK, I record like that but there's only one of me — for a band to do it seems daft — you always get that mark-of-the-click-track feel.

"I did some tracks for Ben E King a while ago and the musicians said to me at the time how nice it was to be sitting in the studio with other musicians because they were usually all called in to do overdubs where they would come into a dark room with a click-track." The Ben E King sessions were recorded at CBS with Mike Ross, "one of the engineers that I used to watch in the old days" and the mixing was done at Jones' home studio.

The last year has been a particularly frustrating one for Jones as a house move involving serious building setbacks necessitated putting his entire studio into storage. An urgent recording project caused him to seek temporary accommodation in Peter Gabriel's writing room at Real World where he installed his own equipment but had the advantage of using Real World's administration and maintenance.

"I set it up from scratch in two days and then after 4 or 5 weeks had to take it all down, put it in its boxes and put it back into store again . . .

"I like Real World a lot. Real World is a really nice place to make records. It doesn't have that claustrophobic feeling that some residential studios have. There's a lot of people working there but you don't really notice them — they're all very nice people and it has a great atmosphere.

"We mixed Jacinda's album in the production room — it's the second project I've done at Real World, the first one being for La Fura Dels Baus. I actually recorded them in a farm-house in the mountains half an hour outside Gerona in Northern Spain. I had a 24-track Akai *A-DAM* system and did a breakneck album which took 3

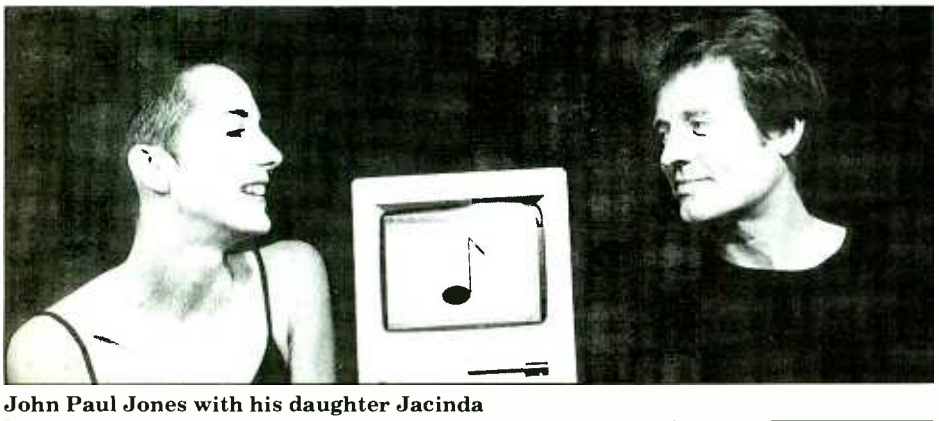


Photo: Chris Rydlewski

John Paul Jones with his daughter Jacinda

weeks — low budget stuff but it came out sounding very good indeed. I doubt if it will ever be widely available as it was hardly available in Spain when it came out . . . although it did win the Catalan Record of the Year Award of which I'm very proud."

It is also doubtful that we will ever see the live show in the UK as the act is reputedly wilder than 'Archaos' and has not managed to adhere to British fire safety regulations.

Through working with 'La Fura' Jones has been asked to be musical director of part of the Spanish Pavilion at Seville in 1992. This will involve putting up an hour long show with computer graphics, five enormous screens and actors from a group called Art Futura. It will be a showcase for technology and art and Jones will be writing a piece of music for it. There will also be contributions from Peter Gabriel and Laurie Anderson. It will tour America and Japan after opening in Barcelona but whether or not it will come to the UK remains to be seen. There will however be some kind of media coverage of the event and possibly a video as well. With all these Spanish connections and the fact that Jones chose to set the Red Byrd songs in Spanish one could be forgiven for thinking that perhaps he had Spanish blood. This however is not the case — he does not speak the language and the fact that his daughter has a Spanish sounding name is purely coincidental.

Jacinda recently married a man called Jones, oddly enough, and so cannot be accused of cashing in on her father's name. Her father, for his part, is extremely enthusiastic about her voice and her songwriting abilities and adds that reactions to her demo tapes have been very favourable.

"As usual they felt that they couldn't really 'hear' the single but this has always been the case in the 25 years that I've been in the business. No-one can hear the single until it's a hit and then they knew it all along!

"We work pretty well together. We generally have the same idea of what it is we want to achieve musically. There's no question of manipulation — (laughs) she knows what she wants and she knows how her songs need to be. All of the music is hers and she played all the keyboard parts. I would rather have her play the keyboard parts than for me to play them because she has her own way of playing which I really wouldn't get the essence of. It would be me playing and I wanted it to be her record. I have to try and talk her out of things sometimes but then she talks me out of things — you know, 'A little bit less rocky on the bass there, Dad.' That sort of thing. Apart from that she was a very handy assistant. It's great having the artist go in at the beginning of the day and set everything up for you. Clean the Mitsubishi, put the computer on, put all the software up — not many artists do that. So that was nice — she's very keen and very dedicated — she's interested in the whole process of performing, recording and all the business side, promotion; everything. She'll do really well."

The album has had a fairly long gestation period due to other commitments and was recorded and partly mixed by Pat MacCarthy, who has worked with U2 and Japan amongst others. Further mixing was done at Real World and Richard Evans, the chief house engineer there and Jones speaks highly of both of them.

Working on this album has given Jones an opportunity to really get to know his new equipment and this has yielded a pleasant surprise.

"I now also have the Mitsubishi *X86* 2-track which is very good; plus, it has the AES/EBU card and one of the things we were doing was using the *X86* as a converter — using a digital output from the Mitsubishi multitrack taking it into the *X86* and then taking an EBU signal out of the *X86* directly into *SoundTools* so you could fly off, say, a vocal into the computer, clean up any pops or clicks and move things around if need be. For example there was a final consonant — a 't' or a 'd' that just happened to come underneath a hi-hat beat so it sounded like there was no end to the word. So we put it up on the *SoundTools* screen and moved it so that it avoided the hi-hat and then flew it back via the *X86* into the *X880*. It never left the digital domain and it was all under SMPTE timecode control.

"I don't know many people who do this. Converters are very expensive but if you have an *X86*, which for me is very desirable for mastering on anyway, you have this added bonus that it is able to convert the digital format both ways; once you've got the digital in and out on both the multitrack and the stereo and the in and out to *SoundTools* it's just a matter of flicking a couple of switches — very quick and very useful."

All of which is a far cry from the days of the *VCS3* and the Hammond organ, both of which are still in evidence in Jones' studio.

"To go with one trend and then when another one comes along to completely abandon the first one seems lunacy. You should use everything. I've still got my *VCS3* and my *Minimoog* and I wouldn't part with them for anything. If I want the sound of a filter opening I don't try and program it into an FM synthesiser — it would take me all day and it still wouldn't sound convincing . . . but just plug the *Minimoog* in and turn a rotary pot and there it is — a wonderful sounding filter opening."

He still has an affection for the Hammond organ and remembers the times when the band would tour with both a Hammond and a Mellotron.

"Those were the days! Creeping up on the Mellotron and wondering what it was going to do when you got there. That was probably my spur to seeking technology that would work. My whole technological career has probably been based on trying to replace the Mellotron."

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EQ EMPIRICALLY

Keith Andrews of Amazon studios talks to Tim Smith about experiments to find an equaliser design that appeals.

The way an operator perceives an equaliser is as much governed by the range and function of its controls as by the actual circuit," says Keith Andrews of Amazon Studios. "If you take an existing equaliser and extend its ranges so you have another ½-octave sweep either side, more control for narrower or wider bandwidth and a few extra dB cut and boost, then many people will perceive that equaliser to be entirely different, despite the fact that all its previous settings can be duplicated exactly. It has more to do with the way it could be set, if they know that one can reach settings that the other can't."

Keith Andrews joined Amazon Studios on the outskirts of Liverpool in the UK, 10 years ago as a trainee maintenance engineer. There was no full-time maintenance engineer so he started out mending mic leads and gradually got to fixing faults on the consoles. Using parts provided by Amek he built a set of modules to extend Amazon's Amek *M3000* from 28 to 36 channels.

In 1984 Amazon added a 24-track studio with an SSL *E* series console and needed an extra balance engineer so he got into balancing. Amazon subsequently replaced the Amek *M3000* with a second SSL desk and took on a full-time maintenance engineer. In the late 1980s Keith Andrews spent about 18 months going around Britain, Europe, America and Japan working on live balances before returning to Amazon as chief engineer to oversee the current move from the outer limits of Liverpool to the heart of the city while still doing sessions as a balance engineer.

In the past three years Amazon has replaced the SSL in the Tracking Room (Studio Two) with a Neve *V3* console, largely as a result of dissatisfaction with the SSL equalisers, and tried out various types of equaliser on the SSL *E* series console in the Mixing Room (Studio One). When SSL first became the console of the decade many enthusiastic users had nothing but praise for the consoles. Although there are still many enthusiasts there has been less favourable comment on the equalisers in recent years. SSL responded by offering various *E* series versions such as the EQP Pultec version, the Brown Knob and the Black Knob, all of which were tried at Amazon.

Then came the *G* series equaliser. One change was that switches providing bell or shelf characteristics for treble and bass on the *E* series were used instead for frequency multipliers on the mid-range. Low-mid covers 49 Hz to 500 Hz and 200 Hz to 2.1 kHz and high-mid covers 610 Hz to 6.2 kHz and 1.8 kHz to 18 kHz with ±22 dB bell characteristic, which effectively overlaps the bass and treble with ±20 dB shelf characteristic. This was tried at Amazon but by then there were other plans.

Despite all the variations offered by SSL there was still a tendency for Amazon clients to favour the type of equaliser used in the earlier Amek and the present Neve. Part of the 'SSL sound' comes from the use of Wien bridge filters for equalisers where many other console makers, including Amek and Neve, use bi-quad or state-variable filter circuits.

Andrews decided to build a state-variable equaliser card for the SSL desk. Based on a standard circuit the design was largely empirical, a matter of trying different component values until the sound was right, and it proved very successful Initially the equaliser was tried out as a pluggable lash up and then a single card was fitted in one channel of the SSL desk, using the normal panel controls. Even this change from outboard to on-board had a subjective effect.

"Despite the fact that the circuit was exactly the same and when I measured the ranges of all the

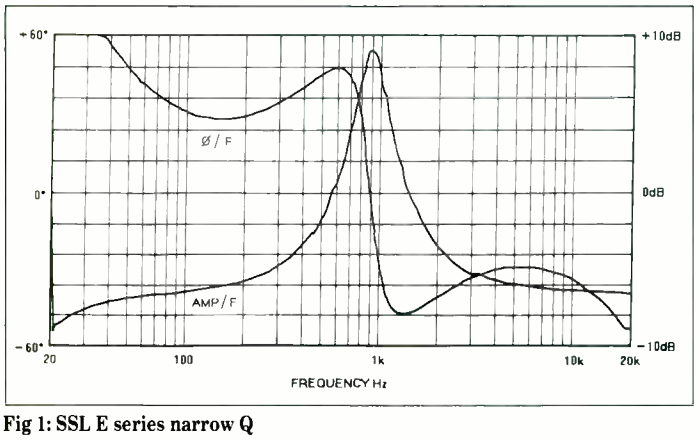


Fig 1: SSL E series narrow Q

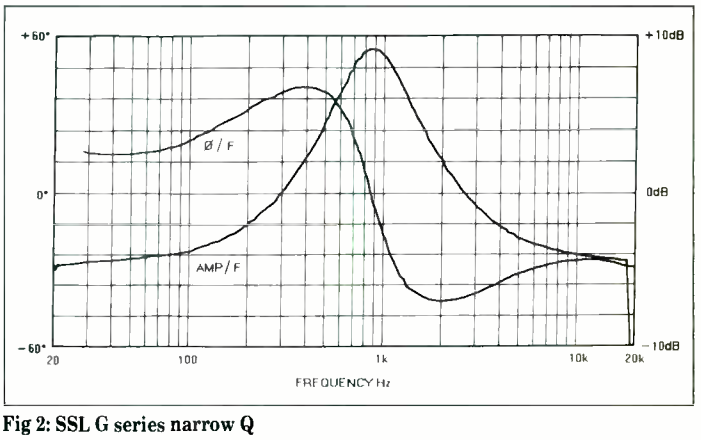


Fig 2: SSL G series narrow Q

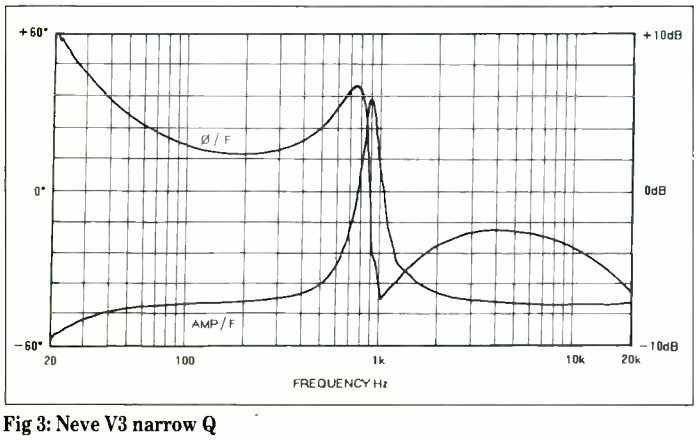


Fig 3: Neve V3 narrow Q

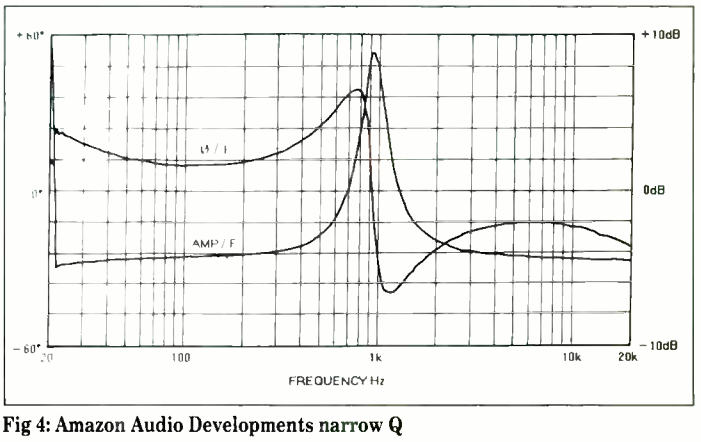


Fig 4: Amazon Audio Developments narrow Q

controls they were the same, it still felt somehow different because it was there at the touch of a button as opposed to having to be patched in, and instead of having big knobs it had little tiny knobs. The actual control layout can make an equaliser seem different," says Andrews.

In due course every channel was fitted with the new equaliser and clients who had not been told about the change began to comment on the 'good sound'. Then came the idea of making objective comparisons between several types of equaliser in an attempt to find out why they sound different.

"Anybody working in professional studios has heard people loudly expounding their opinions about which of the equalisers included in the top line consoles they prefer, and for what reason, but I've never seen any direct measurement to compare between them."

Andrews had already concluded that people's stated reasons for preferring a certain type of equaliser were not necessarily supported by its technical specification. For instance the Amek *M3000* console equaliser (the same type as is used in the *G2520* console) had only 14 dB cut and boost and yet it was perceived as a powerful beast offering around ±20 dB. This may in part have been due to the range of the frequency sweeps with low-mid covering 30 Hz to 800 Hz and 300 Hz to 8 kHz in two stages. More recently SSL *G* series modules with 22 dB mid-range cut and boost were perceived as less powerful than the Neve *V* series with ±18 dB.

An article by Michael Gerzon on why equalisers sound different (*Studio Sound* July 1990) raised several points, including the idea some people have put forward that most of the subjective effect of equalisers is due to their phase response. Gerzon relates this to Phil Newell's observation in an article on monitors (*Studio Sound* August 1989) that a loudspeaker system with a very flat frequency response achieved at the cost of its phase response will not sound as clean as a system with good transient and phase response, even if this results in an audible dip at the crossover frequency.

An Amber *4400* audio measurement system and Hewlett-Packard plotter were available so Andrews ran tests on equalisers from SSL *E* series and *G* series, the Neve *V3* and the in-house design. The graphs (**Fig 1** to **Fig 8**) show output amplitude and phase response against frequency with mid-range controls set for maximum boost at 1 kHz at both maximum (narrow) and minimum (wide) settings of Q.

Initial interest was in the shape of the amplitude bell curve. A curious factor in the subjective assessment of equalisers is that the ear apparently detects a small anomaly within a narrow bandwidth more easily than a larger deviation spread over a greater bandwidth.

Gerzon mentions the work done by Roger Lagadec while with Studer, investigating a digital linear-phase filter system that split the audio into 512 bands for noise reduction processing. The combined output was nominally flat but it suffered from colouration, which was traced to changes in amplitude between each of the 512 bands causing a ripple of ±0.1 dB in the frequency response. This error had to be reduced to about ±0.001 dB to prevent audible colouration.

Andrews suggests that even at ±0.1 dB the bell curves caused by the amplitude changes would have fairly steep sides. He believes that steep sides with a sharp peak create a very noticeable effect to the ear and he expected to see a clear distinction between the amplitude curves of the state variable equalisers (with a sharp peak) and the Wien bridge equalisers. He was surprised to find that, particularly on the wide setting, the curves were of broadly similar shape.

The SSL *E* series showed a sharper bell on the narrow setting (**Fig 1**) than subjective assessment had predicted. More surprising was the difference between the *E* series and *G* series narrow bell

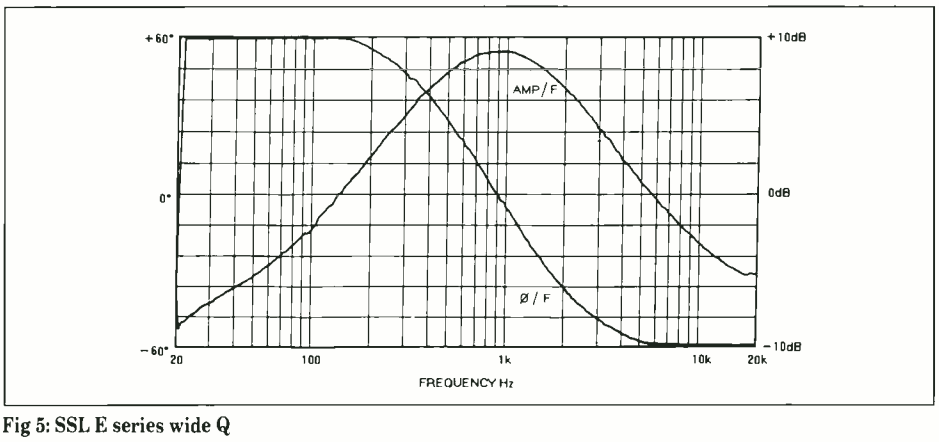


Fig 5: SSL E series wide Q

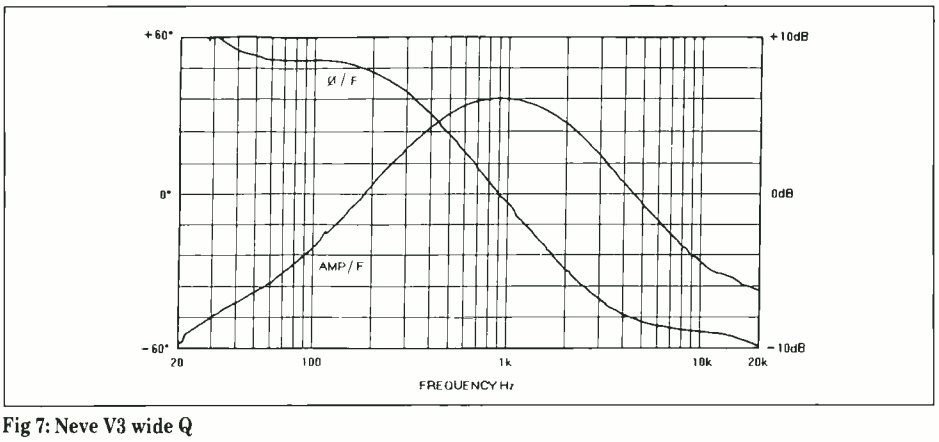


Fig 7: Neve V3 wide Q

curves (**Fig 1** and **Fig 2**), showing that the maximum Q has been reduced on the *G* series.

Having used the SSL variations Andrews feels that, in some respects, the *G* series does offer less range of control: "The cut and boost range is greater but, without resorting to the multiplier, the frequency sweep range is reduced and bandwidth range is certainly less than the others we looked at. However, I don't know of anybody who's commented on the fact that they can't get a narrow bandwidth out of it."

Possibly people are using the 22 dB cut and boost to achieve more 'aggressive' settings which required higher values of Q on the *E* series with only ±15 dB.

On the narrow setting the stat-variable equalisers by Neve (**Fig 3**) and Amazon (**Fig 4**) do show a slightly sharper peak than the SSL *E* series: "The shape of the bell is subtly different but I'm not convinced that that has a direct effect on the perceived difference in sound." So attention focused on the phase response.

These curves on a scale of ±60° show that with maximum boost at 1 kHz all the equalisers cause positive phase shift (advance) on frequencies below and negative shift (retard) on frequencies above the centre frequency. The boost is achieved by the equaliser side chain adding a signal that is in phase at the selected frequency so there is no phase shift at this point. The curves for maximum cut would be a mirror image of the boost curves with no phase shift at the centre frequency where the side chain is 180° out of phase and perfect cancellation takes place.

The frequencies at which maximum phase shift occurs are closer to the centre frequency on the narrow setting where phase cancellation is used to shape the curve, but the maximum shift is generally similar for both high and low Q. An exception is the SSL *E* series on the wide setting (**Fig 5**), which exceeds 60° and goes off scale at 150 Hz and 6 kHz, so the phase difference between the lowest and highest frequencies is over 120°.

The two state-variable equalisers have almost identical phase response curves towards the middle of the scale although the Neve shows a greater phase shift towards the extremities. The Amazon equaliser was intended to emulate the Neve type of sound so a similarity in the amplitude bell curve was expected but the difference in phase response was a surprise.

On the wide setting there is a very close comparison between the SSL *G* series (**Fig 6**) and the Amazon unit (**Fig 8**) although the two are quite different on the narrow setting. On the narrow setting the SSL *E* series (**Fig 1**) and the Neve (**Fig 3**) show a dip followed by an increase in phase shift towards the extremities. This is also visible, to a lesser extent, on the Amazon equaliser (**Fig 4**) and Andrews will investigate further.

It is tempting to think of an equaliser as only affecting the signal over a small band of frequencies around the centre frequency but, as these graphs show, at maximum boost there is a distinct shift in the phase response of the direct signal extending to both ends of the spectrum. Thus an equaliser used on the mid-range has an effect on the whole signal and a 4-band equaliser has a more complex effect resulting from the combination of four sets of phase shift of varying amounts and polarity around four centre frequencies.

The conclusion seems to be that the 'sound' of an equaliser is related to the amount of phase shift it causes. Also that Wien bridge filters, at least as used in the SSL *E* series, apparently tend to cause greater amounts of phase shift than the state-variable type.

As a future project Keith Andrews is considering a study of outboard equalisers, particularly tube types, with the idea of building a passive equaliser using quiet solid state op amps for gain make up. He believes that if he gets the control panel to look right many people will assume it is a tube unit.

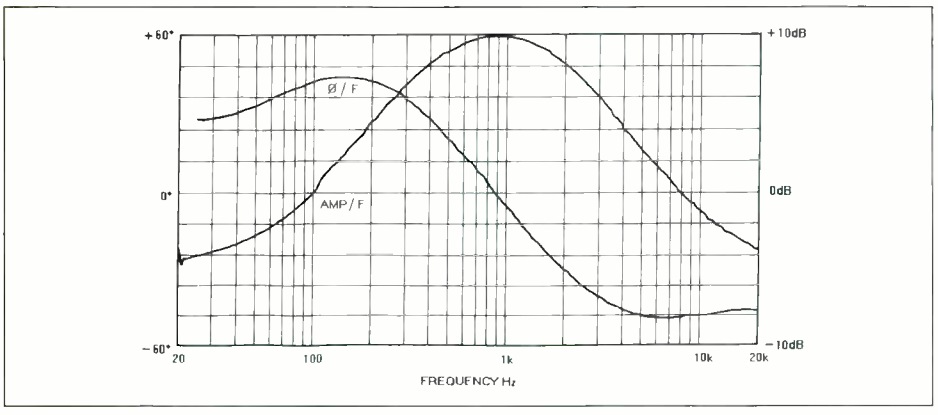


Fig 6: SSL G series wide Q

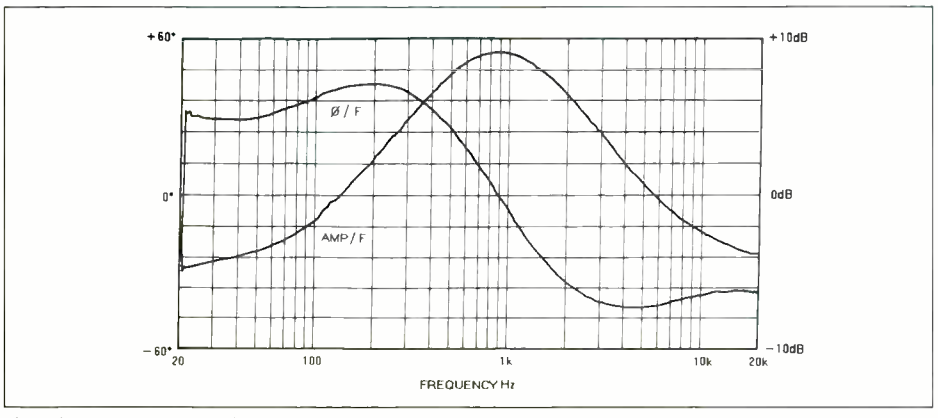
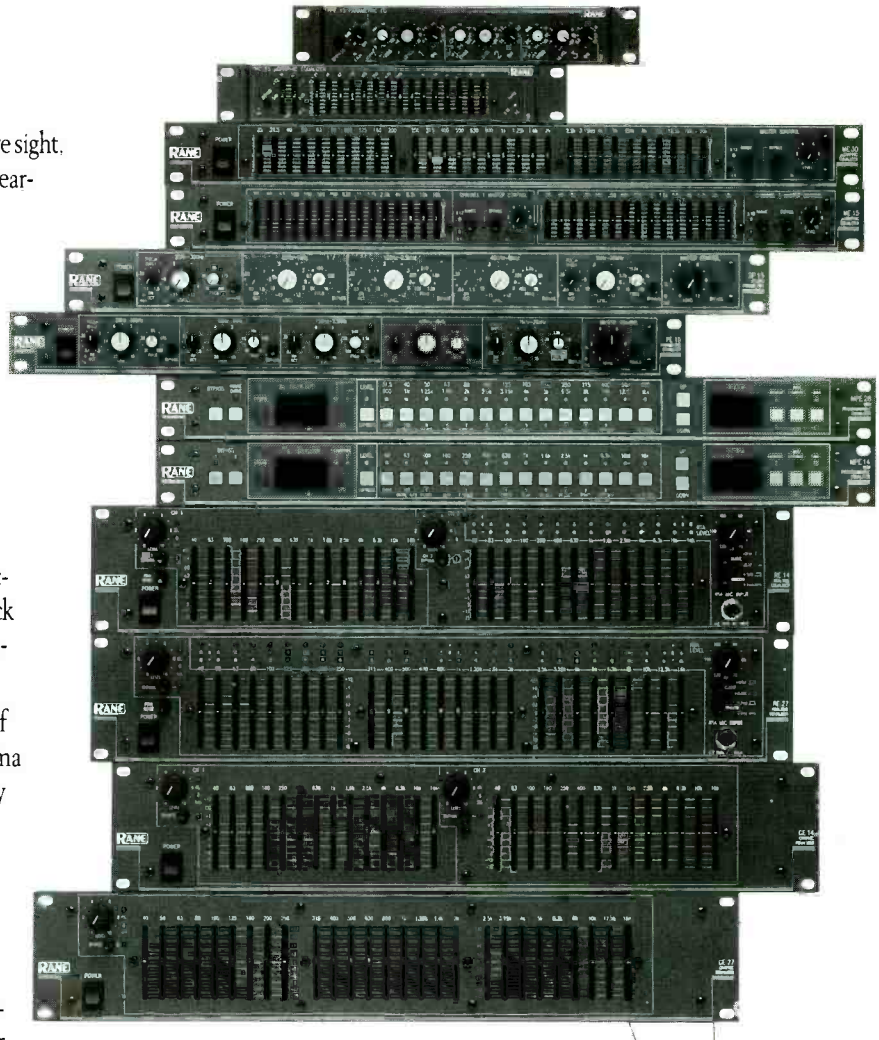


Fig 8: Amazon Audio Developments wide Q

"LOOK NO FURTHER"



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WESTSIDE

Janet Angus visits a UK studio with facilities in London and in the country

All too often the music industry is criticised for its lack of business acumen. Gifted musicians do not necessarily good entrepreneurs make, as many have found out to their cost. Every producer's dream — a studio of his own — requires a particular blend of dedication and realistic understanding of the music market as well as common or garden book keeping. Many have failed but the partnership of Alan Winstanley and Clive Langer has proved successful. With two thriving recording facilities, their personal production successes contribute to the studios' stability and they have more than enough of their own recording projects with which to keep the rooms busy. Langer and Winstanley operate with great enthusiasm and quiet confidence in a market which fluctuates daily.

Situated in a quiet industrial area of West London (hence the name), the studios are housed in a modern factory unit, purpose built by Edward J Veale Associates. Winstanley discovered the premises by accident while taking a short cut through the rush hour traffic. He had particularly wanted an empty shell within which to work rather than considering conversion, which inevitably leads to compromise.

"I wanted something like the Power Station in New York which is brilliant, whereas most New York studios are housed in tower blocks with no headroom, etc," explained Winstanley. "With a warehouse you get the height and freedom to build whatever you want."

In spite of the fact that initial funds did not extend to building two studios, the duo decided to implement the building work for two facilities so that when money was available they would be able to install the second studio with minimum disruption.

"We could actually have crammed more rooms into the area we had available but didn't want to. When it comes to recording live music here, as it is, you've really got everything you need. The whole complex is very spacious — you're not tripping over each other all the time."

Just one year later, in 1985, Westside was financially strong enough to support the second room. The young producers went from strength to strength and both felt the need for recording facilities that suited his own specific requirements.

Eddie Veale recalls that these requirements were quite unusual: "The recording area for Studio One was quite outrageous in that the upper band reverb time was longer than most studios of the time. There was a particular desire on Winstanley's part to have a studio that would create open live drum sounds. We therefore had to adopt techniques that were really quite extreme in order to avoid introducing screens. With the room empty you can get an unusually long reverb time. It gives a very open large sound to ambient mics for drums. Although we designed the room specifically with that drum sound in mind it has subsequently proven popular with recording engineers for other things like brass. Designed as a fairly live studio, the overall concept was for a reasonably long mid band reverb time, long upper and short lower band to give control."

The main recording area is 36x32ft. A small drum booth provides fairly dead acoustics, resulting in a tight drum sound. A piano booth houses a Bosendorfer 7 ft 9 in grand piano (with MIDI modification). Eddie Veale: "The piano booth was designed to naturally enhance the piano's sound without adding acoustic flavour. If a piano is in a dead room the sounding board cannot behave in a natural way and it is difficult to create a musical sound."

Acoustic finishes throughout the studio are a combination of hard flooring, brick and timber. The floor is covered in *Granwood* — a combination of woodchip, cement and colorant (in this instance black), which produces a terrazzo-like material that is very hard. The *Granwood* tiles are polished off and

sealed producing, in effect, a concrete floor.

"The brickwork gives diffusion of the high end," explains Veale. "Elsewhere timber slatting diffuses the mid band and fairly small areas of textile cover other reflective surfaces or absorptive surfaces to combat standing waves."

Natural daylight is a feature of all the rooms, providing a pleasant healthy working environment.

Studio One's recently refurbished control room has been updated to accommodate current recording vogues, ie a raised floor has been implemented at the rear of the room supporting a keyboard bench/outboard equipment racks with plenty of room behind for keyboard players to move freely around the instruments. In order to fit this in, the console position was moved further forward and the acoustics adjusted accordingly.

Veale: "The acoustics needed to be modified because of the layout of the room, not because anyone wanted anything changed. Alan and Clive wanted to retain the acoustic character of the room while changing its use and appearance. Therefore the acoustics are based on passive absorption giving a medium reverb time — flat over the audible spectrum."

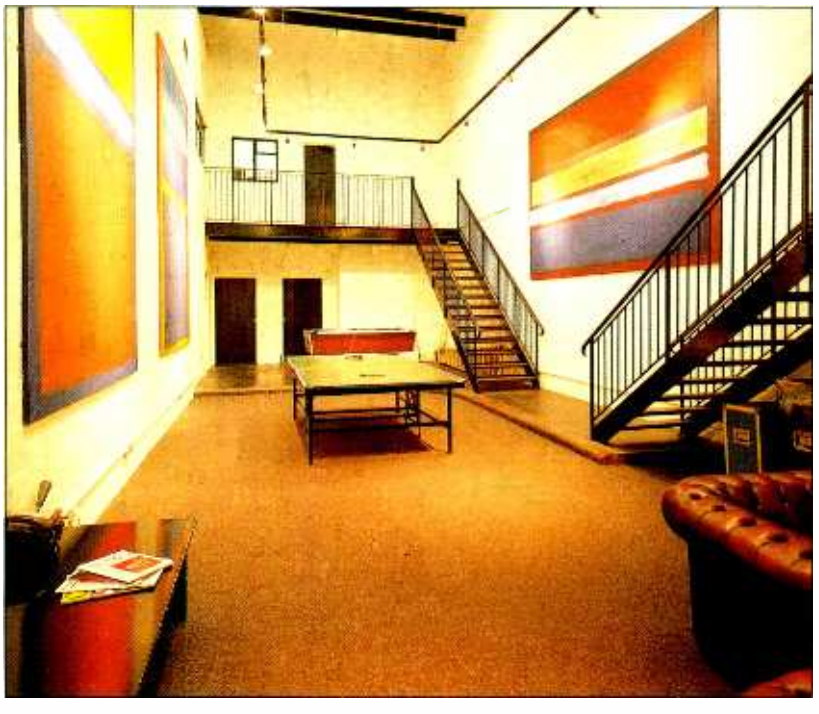
Studio Two's 24x21 ft control room emulated the original design of Studio One. The recording area itself is smaller (30 x 24 ft) and acoustically offers a shorter reverb time, its intended application being as a general pop studio.

In the refurbishment, Studio One was furnished with a separate machine room, occupying a former lobby area, which to all intents and purposes was wasted space. The colour scheme in Control Room One is turquoise (walls) and black (carpet). It was Winstanley's ambition that the room should emulate the acoustic properties of his former facility at Genetic. Above the control room is a brand new lounge area offering TV, video, hi-fi and tielines from the control room.

Star of the refurbishment, however, is the brand new 60-channel Neve *VR72* mixing console, equipped with recall and *Flying Faders* automation. Replacing an SSL console, the *VR* series was chosen not only because Winstanley himself has always been a fan of Neve consoles, but also to offer an alternative to the SSL *4048* in Studio Two.

"We felt that clients are going to want to use a Neve console," explains Winstanley. "I have always thought they sound better, although, of course, the SSL computer is brilliant. The thing is that young up-and-coming engineers find the SSL very easy to work. But it was time for a change of console and for us it was a choice between Focusrite and Neve; at the time Focusrite did not offer recall facilities.

"I must admit I wasn't a great fan of *Necam*, but these *Flying Faders* are great — there are no VCAs in the signal path, it's a reasonably logical system to use, and it is easier and cheaper than the Massenburg system. In a year's time this console is going to be second nature to all recording engineers."



Furthermore: "The sound of the board is brilliant after years of recording on an SSL. It has a transparent sound; clear. I started using Neve in 1981 with Madness at Air London and have been a Neve fan ever since. They have done their homework with this console and put more features on it. Even when you first use it, it is easy to get on with."

Opportunity was taken during refurbishment to upgrade the studio monitors from a 2x15 Quested system to a 4x12. Winstanley : "I like Quested monitors and these ones in particular. A lot of people seem to like Genelecs at the moment but I find them over-impressive."

Unfortunately, Westside's £400,000 investment in the *V* series and the studio refurbishment coincided with a slump in the British recording industry. At the moment Westside can afford to see the ironic side of their predicament while being hopeful that the new console will give them the edge they need to stay head of the competition.

Occupying a market niche alongside the likes of Townhouse, Sarm, Air and Olympic, Westside, while not immune to the industry's troubles, are keeping their heads well above water for the time being. Winstanley regrets that although studio bookings generally have picked up, the rates people find they can charge have not. "The troubles have been caused by record companies jumping on the band wagon," he says. "Studios who can get through the next few months...No one in their right mind would invest in a studio now. Basically a few more studios need to close down I'm afraid.

"Every industry in the country is in trouble. As a business you can only do projections on your past business, so suddenly studios are over-reaching themselves...buying new consoles!"

Not buying consoles is, however, not necessarily the answer either as in an increasingly competitive market it is imperative that you offer the latest and greatest technology available in order to retain your customers. "But clients don't want to pay what we should be getting. We can't rely on the American market either as (a) the Pound isn't strong at the moment and (b) New York studios are actually cheaper than here now albeit you end up paying for all the outboard gear separately."

The two London studios at Westside share the multitrack machinery with the residential facility at Outside in Berkshire. There is a total of five Studer *A800 mk III* 24-track analogue tape recorders and two Sony *PCM-3324* 24-track digital recorders.

"Digital is getting more and more popular," observes Winstanley. "It seems to me that we have an awful lot of analogue machines sitting around doing nothing at the moment. We acquired the Sonys in April 1986, and I would love a *3348* if I could justify the investment. I have become a big digital fan because the sound is the same when you come to mix whereas analogue needs re-EQ'ing. Analogue sound degrades and you get problems like oxide left on the head. The Sony sounds the same when it comes back. People say the sound is brittle but I can't hear that. The transport is a bit slower on *3324* than *3348* but I have never had any problems with the Sony machines. No tape hiss; easier lining up...I hate tape hiss — my pet hate. Even when I used to work in analogue I would use Dolbys but I always had lining up problems taking the tapes to different studios. I have never made a safety copy with a Sony machine and everything has always been fine."

Mitsubishi digital multitracks are hired in on request, while many clients seem happy to transfer to Westside's two Sonys locked together. After four years, the digital multitracks have paid for themselves and are now a valuable asset. "We can afford to let them go cheaper than before, using them as an incentive without having to drop the studio rate."

An extensive outboard equipment complement is the result of a combination of client demand and owner favourites. Most recent additions include an Eventide *H3000SE* with sampler and time squeeze. "I love it; brilliant; it's got everything in it — delays, sampling, Harmonizer, reverb, wacky effects. I use it on everything now. As a rule we have bought equipment that we want to use although we have to kind of follow what the clients want. For example, I much prefer the Klark-Teknik *DN780* reverb although most other producers and engineers prefer the AMS *RMX.16* reverb, hence we had to buy both."

The outboard equipment at Westside includes Lexicon *224XL*, AMS *RMX.16*, Yamaha *REV7*, Klark-Teknik *DN780*, Lexicon *PCM70* (*Version* 3 software), Yamaha *SPX90* and EMT *140*

stereo plate reverb; AMS tape phase simulator, Audio+Design *Panscan*, *SCAMP* rack, Eventide *H3000SE* special effects; Neve *2252*, dbx *160* and BSS *DPR 402* stereo compressors; UREI *1176*, Audio+Design *F760X* and Summit *TLA100A* tube limiters; Drawmer *DS201* stereo and *Kepex II* noise gates: AMS *dmx.15-80S*, Bel *BDE 2600S* (with *D400* disk drive), Lexicon *Prime Time II* and tc Electronic *2290* delays; Focusrite *ISA 115* stereo, TubeTech *PE1B* valvetube, Pultec *MEQ 5* valve, UREI *535* stereo graphic, Klark-Teknik *DN22*, Orban *672A* and Klein+Hummel *UE400* stereo parametric equalisers.

Both rooms are also equipped with *Lynx* synchronisers for the multitrack tape machines, Dolby *SP24 A*-type and *XP24 SR* noise reduction as well as Studer *A80* ½ inch and ¼ inch tape machines, Sony *PCM-2500* DAT recorders, Sony *PCM-1630* and *DMR-2000* machines and Dolby *361 SR* and *A* noise reduction.

Creature comforts are catered for by way of an in-house restaurant complete with chef, supplying sandwiches during the day plus cooked evening meal. The dining area overlooks R'n'R — table tennis, video games, drinks machines and Chesterfield sofas.

Perhaps we should mention that an industrial unit in West London comes complete with ample parking as well as direct access to the studio areas for loading.

The engineering and booking staff cover both Westside and Outside studios. ("Outside bookings are run from here — almost as a third room; it just happens to be 45 miles down the corridor.") Bookings and studio management are in the experienced hands of Patti Nolder. The maintenance department comprises three engineers. Two recording engineers are also available for any of the rooms along with four assistants. Although not strictly involved in the day-to-day running of the studios, as Nolder puts it: "Alan is usually around somewhere; he likes to know what's going on."

Maybe that's the secret of a successful studio, whether by design or not. Winstanley and Langer were catering for themselves as much as for any outside client when they built their studios: "We wanted somewhere to make records; I wanted a live room for drums and a control room with the outboard equipment we both liked, and that would also cater for machine music too."

The Studio Outside

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Outside Studios, Hook End Manor, Checkendon, Nr Reading, Berks RG8 0UE, UK. Tel: 0491 681000.

A FUTURE OF MIXING?

Concluding our retrospective look at the Yamaha DMP series, Simon Sanders covers the digital-only models.

Last month we looked at the *DMP7*, an 8-channel line mixer, offering fully automated mixing and processing, with in-built parametric equalisation and multi-effects processors. At the input stage, the audio signal is converted from analogue to digital and all internal processes are carried out in the digital domain. The digital signal is then converted back to analogue at the stereo output, unless you are using the FMC1 to convert the proprietary Yamaha digital signal to the Sony or AES/EBU formats, in which case D/A conversion is only necessary for monitoring purposes.

Offering identical processing facilities, automation capabilities and even outward appearance, the *DMP7D* could very easily be mistaken for its sister machine. But, if you were to attempt to plug an audio lead into the *DMP7D*, you would be hard pushed to find a channel input socket on the rear panel, for the simple reason that there aren't any. This is because the *DMP7D* dispenses with analogue inputs altogether. Instead, the unit will accept input from almost any digital source — be it multi-track, stereo or even multiple sources.

Digital input

On the rear panel of the machine there is a 25-pin DSUB connector for input of up to eight channels of digital audio. Input on the DSUB connector is switchable between Yamaha, Mitsubishi and Sony interconnect formats. The DSUB connector cannot be used for direct input, but requires the use of an external interface unit.

There are five interface units available at the moment, (*IFU 1, 2 3 & 4* and the *IFUD2*), which are supplied as 1U rack units, except for the *IFU1* which is 2U high. The *IFU1* is designed to take the two 50-pin outputs from a Mitsubishi *X850* 32-track PD-DASH machine and distribute it to the 25-pin inputs of four *DMP7D*s, (which are then cascaded using the digital cascade format). When using the *IFU1*, the input format selector should be moved to the 'M' position, (Mitsubishi format). The *IFU2* is designed to take the 50-pin output from a Sony *PCM-3324* and distribute it to three *DMP7D*s, with the input format selector switch in the 'S' position, (Sony format). The *IFU3* is designed to route the left and right outputs of four Sony *PCM-1610*/*1630*s to a single *DMP7D* and the *IFUD2* routes four AES/EBU format signals to a single *DMP7D*.

The *IFU4* serves a slightly different purpose, in that it converts input signals from TTL level to RS422 level and can be used to distribute up to four clock signals for synchronising the data streams of several sources. When using the *IFU1, 2* and *3*, one or more *IFU4*(s) may also be required.

The rear panel of the *DMP7D* also allows for direct input of one AES/EBU format or one CD/DAT format signal. The AES/EBU or CD/DAT signal is automatically routed through channels 7 and 8 of the mixer, overriding channels 7 and 8 of the 25-pin input, and automatically switching the *DMP7D* to external word clock, (using the self-clocking AES/EBU signal for synchronisation).

Analogue inputs

Analogue input to the *DMP7D* is possible through the use of the *AD808*, an eight channel analogue to digital converter. A/D conversion is achieved with the same successive approximation converters as used in the *DMP7*, giving a 16-bit linear quantised signal.

The unit has eight analogue inputs, using balances XLRs at +4dBu for 600 ohm lines. The *AD808* is connected to the *DMP7D* via the 25-pin input and the input format selector must be moved to the 'Y' position, (Yamaha format). The front panel has eight peak hold LED meters and eight rotary input level controls. The rear panel has switches for emphasis on/off, sampling frerquency, (44.1/48 kHz) and word clock source selector. Signal synchronisation can be achieved either internally, via the 25-pin connector, or via an external clock source (in the Sony word clock format at TTL level). The status of each of the above functions is indicated on the front panel by a series of LEDs. The *AD808* is again rack mountable, occupying 2U of rack space.

If you only wish to input two analogue channels, it is possible to use the *AD2X*. The *AD2X* is a 19-bit analogue to digital converter, using 1-bit delta-sigma converters with 64 times oversampling. As with the *AD808*, analogue input is via balanced *XLR* connectors at +4 dBu. Digital output is available in three formats — Yamaha MEL2, AES/EBU and CD/DAT. There is a word clock input/output, enabling the unit to act as master clock source or as a slave. Emphasis can be switched in or out and the sample rate is selectable between 44.1 and 48 kHz. The front panel has two peak level LED indicators and input level controls.

The output of the *AD2X* is of high quality. The use of 19-bit conversion gives potential dynamic range of over 110 dB. The *AD2X* can be used as a stand-alone converter for use wth DAT recorders or other digital recording systems.

The *AD2X* can be connected to the AES/EBU or CD/DAT inputs on the *DMP7D*, or alternatively, to the Yamaha cascade input, effectively acting as an extra pair of input channels, (however, using the cascade input will not allow you access to the internal effects and EQ). This particular configuration could be used to route the output of a conventional console directly to the stereo bus of the *DMP7D*, allowing you to mix analogue sources alongside digital sources.

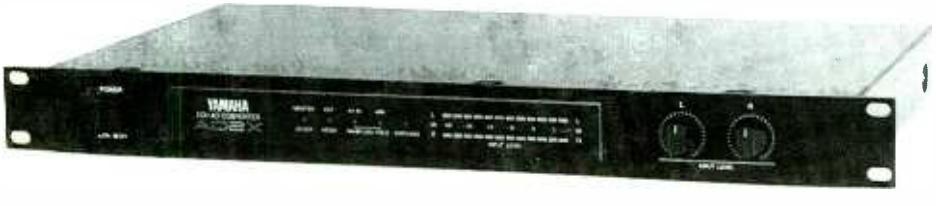
If you are using analogue sources on a regular basis, it may be a better option to use a *DMP7* connected to the cascade input of the *DMP7D*, thus giving the opportunity to mix both analogue and digital sources within the same mixing system.

Digital outputs

Output from the *DMP7D* is available in several formats: AES/EBU format via a single XLR connector; CD/DAT format via a single RCA jack; SDIF via either a pair of BNC connectors (TTL level), or a pair of XLR connectors (RS422 level). There is also a Yamaha MEL2 output (via an 8-pin DIN connector), for cascading to another *DMP* unit, (*DMP7, DMP11* or *DMP7D*).

The *DMP7D* does have a pair of analogue outputs, which are intended for use as a monitor output only, as the quality of the D/A conversion is not particularly good when compared with some of the other converters available. There is also a stereo headphone socket provided. Monitor level can be adjusted with a small rotary pot located on the rear panel — the master stereo output cannot be used to alter monitor level without affecting the digital output level.

For high quality digital to analogue conversion the AES/EBU or CD/DAT output of the mixer can be connected to the *DA202* which offers 18-bit D/A conversion with an 8 times oversampling filter. Analogue output is via a pair of balanced *XLR* connectors at +4 dBu. The unit also provides a digital thru output, so that a DAT machine, for example, can be used to record the digital output, whilst analogue output is recorded on an analogue recorder. Like the *AD2X*, the *DA202* can be used as a stand-alone unit.



Word clock

On the rear panel of the *DMP7D* is a three-way selector for word clock source. In position 'A', signal synchronisation is taken from the cascade input, in position 'B', from the word clock input, (in

the Sony word clock format at TTL level) and in position 'C', from the DSUB connector.

For signal synchronisation of external devices, there is a word clock output, again in the Sony format. The cascade output also carried a word clock signal to synchronise with other Yamaha devices to which it is connected.

When using the interface units, signal synchronisation can be quite a problem, and this is where the *IFU4* becomes necessary. If using the *IFU1*, the internal clock output of the Mitsubishi will need to be connected to an *IFU4*, with the four RS422 outputs connected to the four word clock inputs of the *IFU1*, (which then routes the clock signals to the DSUB connectors of the four *DMP7Ds)*. In additiion, the *IFU1* has a bit clock output which will need to be connected to another *IFU4*, with the four RS422 outputs connected to the four bit clock inputs of the *IFU1*, (again for routing to the four *DMP7Ds*). *Confused?*

I feel that Yamaha could have simplified matters substantially by incorporating the clock distribution into the casing of the *IFU1* and just having a single word clock connection from the Mitsubishi to the interface unit — it may well have cost more, and the unit would have occupied more space, but surely no more so than the one *IFU1* and two *IFU4*s. It would also have reduced the apparent complexity of the system and cut down on the external wiring requirements. (The same points apply to the *IFU2*, which requires one *IFU4*, and the *IFU3*, which requires three *IFU4*s).

Yamaha argue that the cost of incorporating clock distribution into the interface units would have made them too expensive and that they would still have had to produce the *IFU4* anyway. Also, producing the interface units as separate modules makes the system, as a whole, a lot more flexible.

Even with word clock being used to synchronise the data streams of the various units in a digital system, it is still possible for the data to be misread due to delays introduced by cable runs, conversion processes etc. This is not usually too much of a problem as we are normally only dealing with a stereo signal, (which in the case of the AES/EBU format, is sent as a single self-clocking data stream). But, if you are using a digital multi-track, data delays can be a major headache when it comes to laying material in sync with that already on the tape.

To account for these delays, the *DMP7D* has a 'bit-shift' facility, in the form of two rotary controls on the rear panel, (fine and coarse adjustments). These can be used to synchronise signals being sent to the recorder with those being monitored off tape. Setting the bit-shift can be done by ear, but is most effectively done with a scope — something best left to a technician!

Data synchronisation is an area where there is a lot of confusion, especially in systems which are using many different digital recording and processing devices. The BBC Radiophonic workshop have had many problems with data synchronisation in their digital audio system, but are often unable to isolate the problem to a single unit — it tends to be a 'system' problem.

External effects

Like the *DMP7*, the *DMP7D* has three internal effects processors, and again, effect send three can be used as an external effects send. The effects send itself is located on the rear panel, and consists of a digital output in the Yamaha MEL2 format. The effects return is also in this format.

The external send can be used with the Yamaha *SPX1000* or *DEQ7*, by simply plugging in two 8-pin DIN leads, giving access to very high quality multi-FX or digital equalisation with minimum fuss.

However, using an alternative external effects processor introduces problems, as the Yamaha format digital signal must be converted either to another digital interconnect format, or to analogue. It is possible to use the *FMC1* to convert the Yamaha MEL2 to AES/EBU or SDIF for connection to, for example, one of the Roland digital effects processors, although there is no box, as yet, to convert AES/EBU to Yamaha MEL2 for returning the signal on the digital effects return — the AES/EBU return must be input using the AES/EBU interface for channels 7 & 8, or by using the *IFUD2*.

If you wish to use an analogue signal processor, then you must use the *FMC1* to convert the Yamaha signal to AES/EBU, and then use the *DA202* to convert the AES/EBU signal to analogue. The return signal must then be fed into the *AD2X* which is, in turn, connected to the effects return input.

If you are going to be using an *SPX1000* or *DEQ7*, then the external effects send is an excellent facility, as you have access to high quality digital processing without converting your signal to analogue and back again unnecessarily. Using other digital processing devices, you may have to start using format converters to keep your signals in the digital domain, but if you consider the sonic advantages of this, it may be worth your while to invest in these format converters. If you want to use an analogue signal processor, then outboard D/A and A/D converters are needed and may be more bother than they are worth, (although if you are not using the effects send for an external processor, it can always be used as a monitor mix send (mono), whilst the return can always be used as an extra stereo input channel).

Conclusion

There are many engineers in the industry who have not yet begun to consider the possibilities that are opening up in the digital arena. With tapeless recording/editing systems and DAT becoming commonplace, and with timecode compatability being incorporated into these systems it will not be very long before the audio industry accepts digital recording techniques as standard practice. When this happens, people will start to realise that it is counter-productive to convert the high quality digital audio signals to analogue, and then mixing them through an analogue console before converting them back to digital for mastering.

In audio for visual applications, the use of digital recording and editing systems offers a wealth of creative possibilities, especially with the introduction of NICAM stereo in European broadcasting. The use of DAT for location sound, CD libraries for sound effects, direct digital mastering of dialogue and the increased use of CD or DAT for the music, means that the A/V engineer is going to have to seriously reconsider the mixing aspect of the post-production process.

The *DMP7D* is, at the moment, the only 'affordable' digital mixing system which can be used to mix digital signals without leaving the digital domain. It offers high quality equalisation and effects, as well as full automation. It is extremely flexible regarding the interface formats of input signals, (as long as you are prepared to put up with a pile of 'black boxes' between the various units). The *DMP7D* can also be fully integrated with the *DMP7* and *11* using the cascade I/Os, and is totally compatable with the *RTC1* for remote operation.

One of the few problems with the unit is that the input configurations are fixed. For instance, there is no way of inputing four channels of analogue using the *AD808*, whilst inputing four channels of AES/EBU format digital signal, (although there are ways to get around this, as always in the wonderful world of audio!).

Regarding its' use with digital multi-track machines, I reckon that any studio which is going to invest the huge sums of money involved in purchasing the multi-track machines, will not feel happy about using the *DMP7D* if only because of the appearance, (their clients will expect to see a more conventional console). This is not to say that the *DMP7D* is not suitable for multi-track applications.

As to the future, we are waiting for the manufacturers of synthesisers and samplers to start including a digital output on their machines. When this finally happens the *DMP7D* will come into its own and will become a necessity for any serious MIDI musician.

All in all, the *DMP* series offers the audio world a combination of facilities that are difficult to beat in terms of affordability and compactness. They represent an extremely flexible and integrated approach to the mixing of material from both analogue and digital sources. Used with the *RTC1*, the *DMP*s can be used in a 'desktop' situation, obviating the need for large premises to house enormous consoles.

Some day all mixers will be made this way!

Author's note: *I would like to thank Yamaha-Kemble (UK)*

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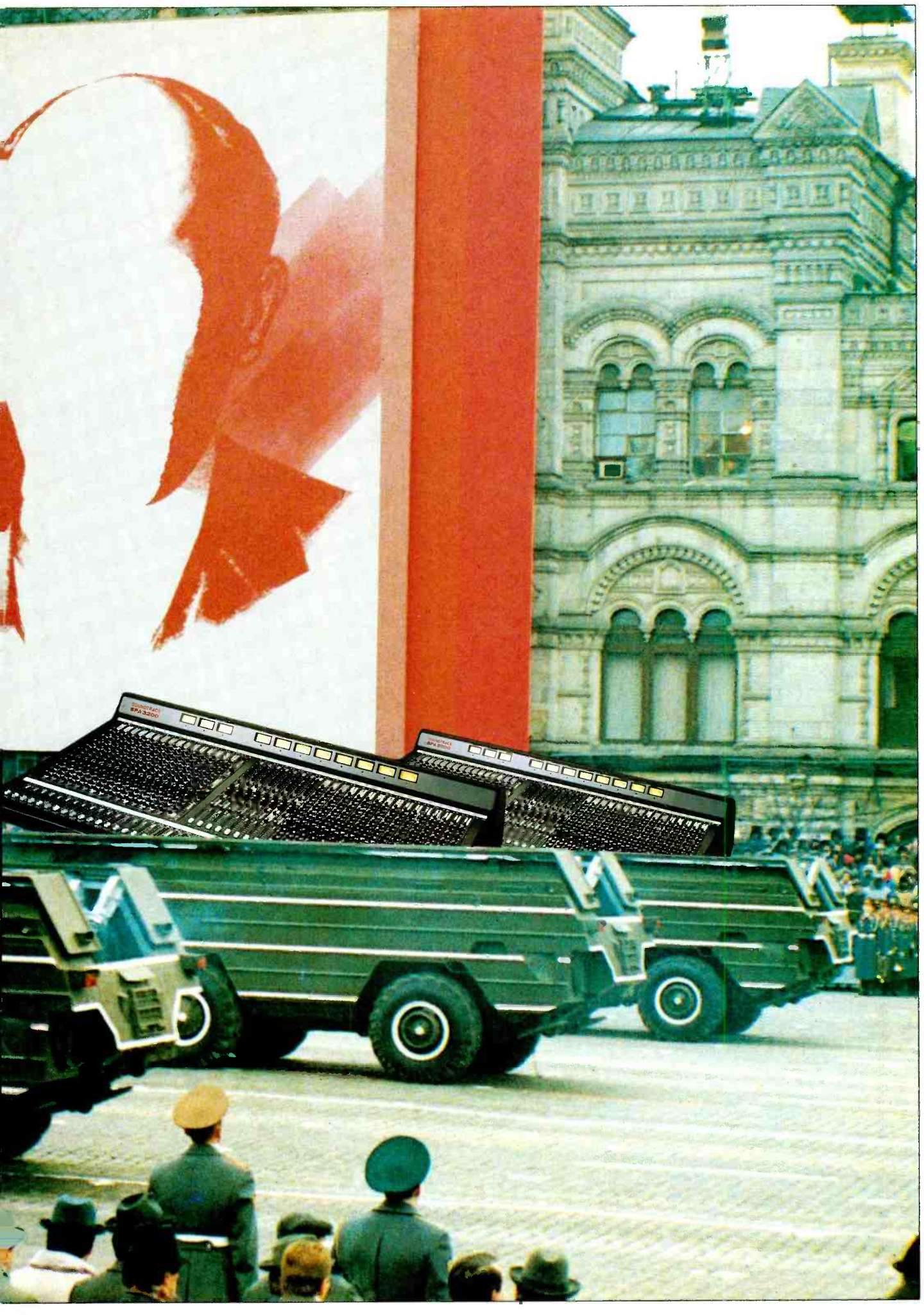

SOUNDTRACS PLC the People's Choice

KIMSEY ON FLASHPOINT

Chris Kimsey relates some of the production details of the Stones Flashpoint album and creating the I-Max soundtrack to Simon Croft

Chris Kimsey is no stranger to the Rolling Stones, having produced or co-produced *Steel Wheels*, *Emotional Rescue*, *Tattoo You* and *Undercover*, as well as engineering *Tatoo You* and *Sticky Fingers*.

So Kimsey was not entirely surprised when Mick Jagger phoned him in October last year to say they needed the live album by Christmas. His starting point was Westside Studios, where he sifted through 20 shows worth of multitracks, recorded across the globe during the *Steel Wheels* and *Urban Jungle* tours of 1989 and 1990.

The project then moved to Olympia Studio Two for post-production. Working with Kimsey was Chris Potter, who mixed all the tracks on the album, with the exception of, *Highwire* and *Sex Drive*, which were mixed by Kimsey and Mark Stent.

With the exception of two shows recorded on analogue 24-track, the concerts were captured using Sony 48-track DASH machines. While this format may seem a little excessive for a five-piece band, the line-up was extended with keyboard players, a brass section and backing singers. There was also a certain amount of sequenced material, so using the 48-track eliminated the need to repatch during the concerts.

"At the beginning of *Sympathy For The Devil* the percussion is programmed and there were six tracks dedicated to that," Kimsey explains. "If you look at the track sheet it's full but the tape isn't."

Post-production was kept fairly straightforward, due to the efficiency of the road crew in eliminating buzzes and feedback, and the sheer abundance of suitable material from which to choose.

The buzz

"We didn't do any internal editing of numbers, we just picked out the best version overall. Then if, say, the keyboards were out of time, we would repair that."

A couple of bass parts were redubbed, due to timing problems caused by the sheer physical distance from Bill Wyman and his drums. Samples were also added to the raw snare and bass drum, to lend a consistency of sound from gig to gig.

Backing vocals were replaced, as it was felt the stage mics were "very thin" and did not do the singers justice.

"All the guitars were in tune as well, which helped. Keith had two tracks: one a Marshall and the other a nice old, woody Fender amp. The Fender's a great sound — and Keith's guitar tech, Pierre, would stand by the amp and turn it down if it was getting too loud."

Keith Richards' backline totals nearly 1.5 kW, enough for Mick Jagger to question whether he has fully understood the significance of the SR system!

Despite the best efforts of the crew, the chosen take of *It's Only Rock and Roll* had a loud buzz on one of the guitar parts. Kimsey had a timecoded *1630* copy of the guitar track sent to The Exchange for *NoNoise* noise removal treatment.

But the returned tapes would not lock up with the multitrack. Suspicions were aroused when the original tapes would not sync either. The problem was solved by changing the studio's U-matic. It is not the first time Kimsey has experienced problems with the *1630* format.

"I wish they would come up with something else. It isn't the sound, it's the transports. It's antiquated, it's really a video format and there are so many problems."

Roland RSS

Establishing the musical mix for the album, once all the parts were completely satisfactory, was mainly a question of placing the instruments within the stereo field and creating some suitable reverb settings for what were generally quite dry open air recordings.

Vocals needed "quite a lot of rides" and solos were brought forward. Otherwise, the mix was relatively static.

While The Stones may be fairly consistent across the globe, audiences are not. According to Kimsey, the difference in sound between a UK and a Japanese audience is particularly obvious. So an audience 'bed' was created, using primarily the crowd from London's Wembley Arena as a reference.

Having heard about the spatial enhancement available from the new Roland *RSS* unit, Kimsey decided to try it on the audience for a 'wraparound' effect.

The unit was used to varying degrees on the audience throughout the album, the amount depending on the stereo qualities of the untreated sound. Some experimentation was made with processing instruments but it was generally considered inappropriate for a live album.

"It didn't feel right. As with a lot of music, it's almost better that it's mono. Especially with the Stones' music. If you start making it very stereo and separated, it falls apart a bit.

"We used it for a couple of effects. On *Miss You*, Keith hits a chord just before the breakdown and we gave it a spin echo, and threw it across the room." It is also used to make the French horn at the start of *Ruby Tuesday* appear somewhere off-stage.

After test cuts at Townhouse Studios, Kimsey was generally happy with the *RSS* system's mono compatibility but suggests that it needs to be listened to in a reasonably live room for the effect to be fully appreciated.

Because of the complexity of assembling the tracks and audience beds into a cogent whole, Ian Silvester was brought in with a DAR *SoundStation II*. This allowed the various segments to be brought together in a tapeless environment and offset against each other until the optimum overlaps were obtained.

Kimsey and Potter decided they were less keen on the sound quality imparted by the D/A stage of the DAR, preferring instead to make a digital transfer to the Sony *PCM-3348* and then out to ½ inch analogue.

Kimsey has apparently gone through "a big change" since using analogue 24-track on a recent session. He had been "nuts on digital" but found the analogue "wonderful".

"That prompted me to start listening to records again and that was another shock: everything sounded bigger and warmer." This is not to say that Kimsey rejects digital. He says it depends on the type of music. The 48-track format has proven especially useful and he can think of "a million things that are so much better than analogue".

I-Max

The world's biggest rock band can now be seen on the world's biggest screen format: *I-Max*. Unlike conventional cinema, the *I-Max* format uses a square picture projected onto a slightly curved screen, completely filling the audience's field of vision. Combined with the extremely high resolution available from film, *I-Max* gives an unparalleled sense of depth and perspective.

I-Max is difficult to work with, as the cameras are ungainly and processing the film expensive. Hence the majority of productions concentrate on subjects with natural movement, such as hang gliding or racing cars, and keep the cameras static.

The Rolling Stones film is not only the first *I-Max* production to feature a rock'n'roll band, it is also the first to use the rapid cutting techniques associated with conventional rock footage. Five shows were filmed: two in Berlin; two in Wembley and one in Turin.

At the time of this interview, Kimsey and Potter were preparing the soundtrack, which would then be shipped to America with "loads of notes", for mixing by Michael Bauer. Most of the *Steel Wheels* album was mixed by Bauer and the extensive list of artists he has worked with also includes Aretha Franklin.

Kimsey and Potter's main tasks for the soundtrack were the addition of sound effects and generally ensuring that the sound and picture tell the same story. Unlike the film footage, the soundtrack could not switch between different performances at will, so there were times when the raw soundtrack was missing a guitar part shown on screen.

"I have to go back and find out where that guitar actually came from, lift that guitar off and insert it. It's quite embarrassing if you've got someone 25 ft tall playing the guitar and there's no sound coming out!"

Kimsey had found effects dubbing great fun, particularly making original sounds for cues such as Mick Jagger attacking the giant inflatable dogs with a baseball bat. "We found this great sound hitting a sofa; it sounds quite painful actually."

Despite the cost involved, *Start Me Up* and *Ruby Tuesday* were printed in advance, which gave Kimsey a chance to check out the 6-channel sound format used for *I-Max*.

"*I-Max* theatres are cupped like half an amphitheatre. The six channels are Left Front and Right Front, then Top and Bottom screen, plus Left Back and Right Back.

"The back ones are not like a normal theatre, they are more to the side. I thought at first that just the audience would be fed to the back but you put the band through the back as well, to bring them out from the screen. You actually pan the band to all six speakers."

With the spatial sophistication of the theatres, the Roland *RSS* was not used on the *I-Max* mixes.

Although Kimsey found dubbing effects "easy", great care had to be taken with sync as the large screen would expose any flaws. But then, an unusual degree of care had gone into the sound recording throughout the process.

"The sound usually gets dumped on in films but Keith went to them and said, 'Listen, this is the Rolling Stones.' Originally it was, 'You can fix it in five days,' and mix it in five days as well. I thought, 'Oh no you can't, I've been here before!'."

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Barry Fox

Basie band seeths at Festival Hall; Canon's stereo by mirrors

You may well see me quoted in these pages for saying that, once again, JVC did their reputation as an audio company no favours with this year's Jazz Parade concerts at London's Royal Festival Hall. As background, let me tell you about entertaining scenes at the reception given by JVC at the RFH after the concert by the Count Basie band.

These concerts are sponsored by JVC and run by Capital Radio. So Capital book the sound system. Capital is a pop radio station and the sound engineers employed by Capital are sensitive to rock, pop and jazz fusion. But they just do not seem to understand the special needs of a jazz group, or big band, which is essentially acoustic with natural internal balance.

Every year JVC UK staff complain but Capital and their chosen sound engineers say that what the audience get is what the musicians want.

This year the worm turned.

Twice, Basie band musicians stopped playing and went off-stage to try to talk to the sound engineers about the monitor mix. Then bandleader Frank Foster read out a note publicly asking the engineers to re-adjust the mix. The audience did not realise that he was talking about the monitor mix, and started a shouted dialogue. Finally the pianist took direct action and ripped the *PZM* microphone out of the piano. Suddenly it started sounding like a piano. In the audience we heard the band sound coming from stacks of speakers at the side of the stage, not from the musicians, which is ridiculous when you bear in mind the size and acoustic power of the Basie band, and the size and natural acoustic of the Royal Festival Hall.

Just once, for a few blissful moments, someone dropped the level of the amplification, the speaker stacks 'disappeared' and we heard the wonderful live sound of the band coming from centre stage. But very soon someone got their hands on the mixing desk faders again and all we heard was sound from the stacks. There was so much treble lift and compression on the band's vocalist that she sounded like a pop singer.

I spoke with several of the band's musicians afterwards and they were seething: "It's crazy man, this is the Royal Festival Hall. You don't need that miking in here. They gave us f***ing rock and roll sound engineers," exploded a couple of Basie's crew. "We were on the point of pulling out all our mics."

Before the concert, I had been introduced to festival director John Burrows as I had complained the previous year. Burrows promised "things will be better this year". After the concert Burrows was nowhere to be seen so I collared festival producer Andy Hudson. He blamed the Basie band for not turning up to a soundcheck before the concert and said that he had been at the sound mixing desks, had "good ears" and was happy with the result. Other companies were "queueing up" to sponsor the Festival if JVC withdrew, said Hudson.

If things go on as they are, with JVC's trade guests leaving half way through the concerts to which they have been invited the JVC's staff getting nowhere with complaints, Hudson may perhaps have a chance to prove his point.

It was encouraging to hear three of music supremo George Wein's team, who were travelling with the musicians around Europe, defend the Basie band for not turning up to a pre-concert soundcheck. They had been playing in a different country every day and were dog tired.

"They rely on having a sound engineer who is sensitive to the band's music," they said.

Quite so. If you have a large powerful band with good internal balance, in a hall with a good acoustic, there really is no need to mic it like a rock group.

After 50 years of making cameras and optical equipment, Japanese company Canon are moving into the hi-fi market. Although most British manufacturers are struggling to survive the recession and glut of loudspeakers currently available, Canon's Research and Development centre at the University of Surrey have spent a million pounds developing a new loudspeaker. Head of the centre, Hiro Negishi, is a hi-fi enthusiast who has spent the last six years working on Canon's new Wide Imaging Stereo speaker.

Negishi's WIS promises to give listeners greater freedom to listen in stereo from anywhere in a room. Although the first models are intended for domestic use, Canon have been thinking about a higher end, professional version.

Conventional speakers have several drivers that fire sound direct at the listener in a tight beam. Anyone sitting in the so-called hot seat, in front of, and exactly halfway between, the loudspeakers hears a solid stereo image. But off-axis listeners hear the sound hugging the nearest loudspeaker because it is effectively louder.

Just once, for a few blissful moments, someone dropped the level of the amplification, the speaker stacks 'disappeared' and we heard the wonderful live sound of the band coming from centre stage.

Designers have for 40 years tried to widen the hot seat by making loudspeakers that radiate sound in a wider spread, so listeners hear the same level of sound from each loudspeaker anywhere in the room. Remember the Sonab designs from Stig Carlsson and the Gilbert Briggs/Wharfedale sewer pipe? The contentious Bose philosophy runs along similar lines. But omnidirectional systems give an equally loose stereo image over a wider area.

The WIS system is not omnidirectional. It radiates sound only to the front. But WIS uses an acoustic mirror, based on optical principles, to form the sound into a wide beam, which sounds louder from some directions than from others. When used in a pair, the beams co-operate to give an even sound pattern over a wide area, which Negishi calls the 'sweet area'.

Anyone listening from the traditional hot seat at front-centre hears equal sound levels from both speakers, as with conventional speakers. As the listener moves closer to one loudspeaker, the change of listening angle makes it sound quieter, while the corresponding change in angle for the more distant speaker makes it sound louder. Acoustic symmetry is maintained and so is the stereo image.

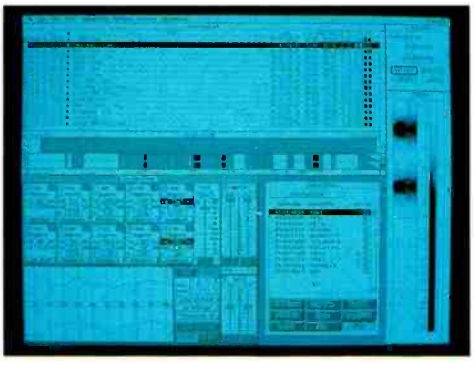
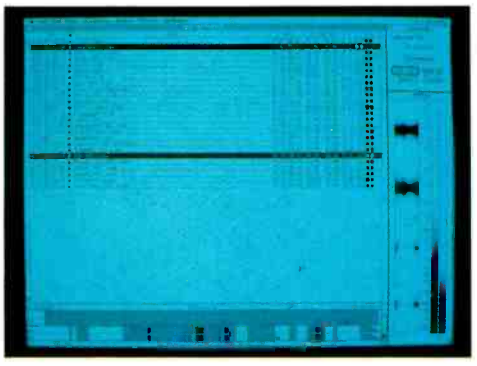
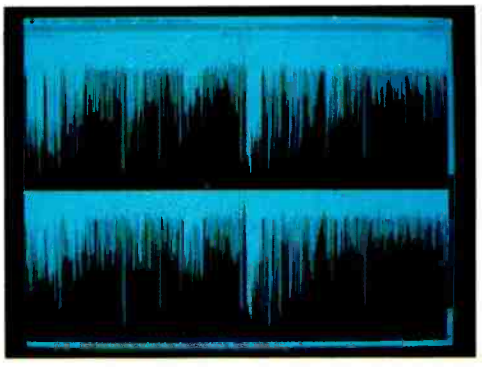
Each WIS speaker has a single driver mounted in a dome on the top of a stand. The driver fires sound down onto a die-cast zinc alloy cone, shaped like the top of a bell tent. The cone acts as an acoustic mirror, turning the sound through 90° so that it fires horizontally into the room.

The key innovations are that the driver is mounted asymmetrically, off the centre of the mirror, and the mirror has three slightly different radii of curvature, and thus three different focal lengths at different areas of its surface. Together these asymmetries produce the tailored beams, which co-operate to give an even level of sound anywhere in front of the speakers.

Although stereo is still best at the hot spot central position, it is almost as good across the much wider sweet area. The penalty is that the stereo image at the hot spot is marginally less precise than from a conventional pair of box loudspeakers. But on the whole the effect is pretty good, and the speakers look good too. They could be just the ticket for up-market reception rooms where people cannot be expected to sit or stand in a hot seat.

Canon are charging £350 a pair for their WIS speakers. All the development work was done in the UK and design was by well known British designer Allen Boothroyd. The moulds for the mirror and speaker housing alone cost £60,000. Canon is making the speakers in the UK too.

I cannot help wondering whether Canon are perhaps just a little less sure of exactly how the multiformed mirror works than the publicity patter suggests. If so, then it will be rather more difficult than expected to translate the design into a larger or smaller unit. Time will tell. The audio industry graveyard is littered with larger and smaller versions of nice-sounding speakers that did not sound as good as the original. □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Martin Polon

Is the audio industry in a state of transition? Our US columnist makes some interesting projections for 1992

If anything is clear in the world's audio industry, it is that 1992 will not be like 1982 or 2002 or even like 1991. First, there is the presence of a crippling economic recession that has slowed business activity in the Western World for most of 1991. Second, there is a healthy world audio industry, trying to cope with the onset of a mature business cycle and all that implies in terms of flat or minimal growth and single digit rates of return. There is the metamorphosis of the mainstream studios trying to retain a competitive edge over the home and project studio revolution. There is that phenomenon continuing as well, albeit at a changed pace. There are many other forces at work that will all contribute to make 1992 anything but a dull time for the audio industry.

1 The end of what has been perceived as the most devastating recession since the great depression of the '30s is warmly awaited in most audio circles. The term 'most' is probably appropriate since consumer audio hardware and software sales have been very respectable when compared with other similar enterprises during the last 18 months. No, the audio industry has not shown itself to be as 'bulletproof' as it was during previous economic slowdowns but it is still doing very well — all factors being considered. If the recession has cut business activities in professional audio, in large part it reflects less on a lack of business and more on the unexpected conservatism of lending institutions. The lack of bridge and purchase funding by the banks has injured the equipment makers and the dealers equally and has prevented many customers from making new acquisitions.

The emergence of a fully-integrated European Community (EC) in theory, if not yet totally in practice, has significant implications for the world audio trade. It presents equipment makers with a unified population of 350 million customers, more or less. Some seers add the emerging Eastern bloc to this total and achieve numbers in the 500 million person range. This to some extent pales the United States marketplace in size but not in the dimension as the foremost producer and customer for electronic entertainment and information (TV, film, disc, computer) software and hardware respectively. Respect for American technological know-how and manufacturing skills has come from the Gulf War. This has brought a new sense of the impact of American power and American business involvement in the world pattern of trade.

The Japanese are gradually and subtly increasing their involvement with the European Community while the volume of exports from Japan to the United States has shrunk from 50% of the total Japanese output to about 35% in 1991. Similarly, in Europe and the UK pent-up frustration with Japanese product 'dumping' has nearly erupted into a mini trade war of sorts with Japan. This has been sustained to some extent by the French Prime Minister's 'Rambette' stance on the Japanese as 'ants' ... eating up everything. Hopefully this nasty virtual war of numbers and rhetoric will not turn into an all-out trade battle. There are a great number of changes in procedure and policy that will have to take place in 1992 before Europe truly represents the 'United States of Europe' that the French and other 'Eurocrats' in Brussels at the EC Parliament envision.

And, oh yes, for those of you who might be interested, it would appear that the worldwide recession will be in decline if not totally abated by the midterm of 1992. However, the expected recovery will not be as significant as many would like. This prediction applies to the general economy as a whole; the outcome for audio may be better or worse than the predicted norm. Since this recession is largely in reaction to the extraordinary debt that was built up in the general economy by the business excesses of the '80s, resolution will be based on how well institutions, organisations and governments deal with that debt. If the debt remains an unsolved conundrum, all bets are off on recovery. Or better yet, check with your neighbourhood 'ouija' board operator.

2 Internecine warfare over differing standards for home digital recording and playback has erupted around the DAT (Digital Audio Tape) technology, the analogue compatible Philips Digital Compact Cassette (DCC) and Sony's digital Mini Disc (MD). This has the potential in 1992 to make the world audio community resemble nothing so much as the internal squabbles over the future of Yugoslavia. From a software point of view, you have the Philips camp with their software catalogue, the Sony camp with their catalogue software, the other record company 'players' in both camps with their respective catalogues and the DAT camp with nothing or everything — depending upon how you look at it.

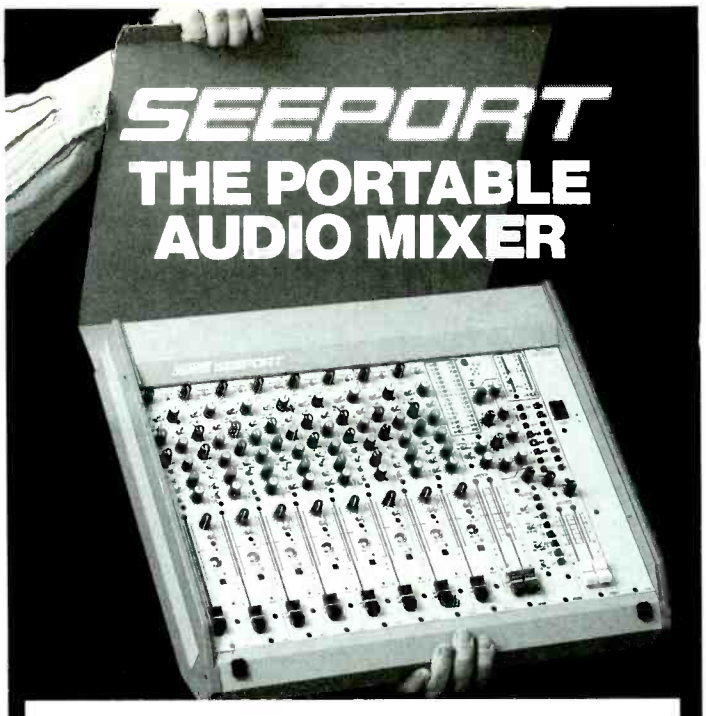
The community of recorded audio retailers has something to say about the coming expansion of digital formats as well. Record stores have little or no interest in adding two, or really three, formats to their current mix. The idea of having to stock a specific album in five different formats brings only cries of horror from disc dealer 'nabobs', considering CD, the existing ACC (Analogue Compact Cassette), DCC, DAT and MD — not to mention the odd music video on VHS and *Laserdisc*. So 1992 promises to be a lot of fun as the audio software community plays that marvellous classic game show, *Let's Make A Deal*.

3 It is approximately 10 years since the personal computer (PC) revolution sprang from the big blue bosom of IBM and the impact it has had on society as a whole, and the audio industry in particular, is just short of incredible. In the United States alone, it is estimated that there are more than 60 million PCs in use. For 1992, the relentless forward thrust of merger after merger in the computer industry will continue, increasing the likelihood of new standardised computing platforms emerging to service the several applications in the audio world currently dependent upon dedicated microprocessor technology. Consider that in 1991 we saw IBM and Apple agree to share ideas and technologies; DEC purchased the Philips computer division after absorbing Mannesmann AG in 1990; AT&T 'took over' NCR; and Fujitsu finished the process of controlling 80% of ICL. The parallel transition of the audio industry from a dedicated hardware dominated business to a software dominated business — dependent upon standard computing platforms with customised software providing the desired features for the home and project studio, the audio business office and the mainstream recording studio — will continue apace in 1992.

4 The process of audio industry merger and amalgamation plus the mounting cost of any meaningful research and development efforts in audio continues to narrow the focus of business activities in manufacturing towards the largest players. Consumer product activity will most likely see a continuance of the relatively flat sales curves exhibited in 1991. That will be as much a function of in-home product saturation and the absence of new audio 'toys' as the effects of the worldwide economic recession. New digital products released from the 'log jam' of software boycotts by the new royalty plans could put the 'E' back into audio excitement. The continuation of the conventional equipment marketplace (non-PC platforms) for home and project studios during 1992 is guaranteed, but not necessarily at the prodigious rate seen during the last 48 months.

5 On the surface, the slow financial starvation of small and mid-sized manufacturers and all but the very largest studios by the banks, will continue to control audio industry expansion and even the survival of individual companies. Long term banking relationships have, in many cases, gone by the wayside as studios are denied credit to expand, and manufacturers cannot obtain 'bridge' loans to finance unusually large orders.

Yet the economic outlook from this 'disinvestment' strategy may indeed help to refresh and restore entrepreneurial activity in the audio sector. A former banker explains why: "The Western World's banks all got into deep trouble by wildly investing in all segments of the real estate marketplace. So how did they react to having their corporate 'identities' shoved into the pencil sharpener by the banking regulators? They



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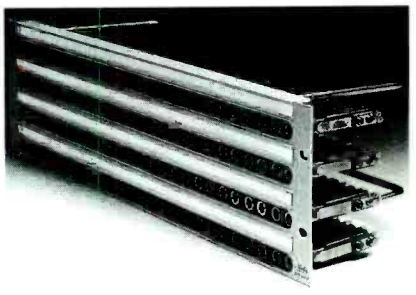

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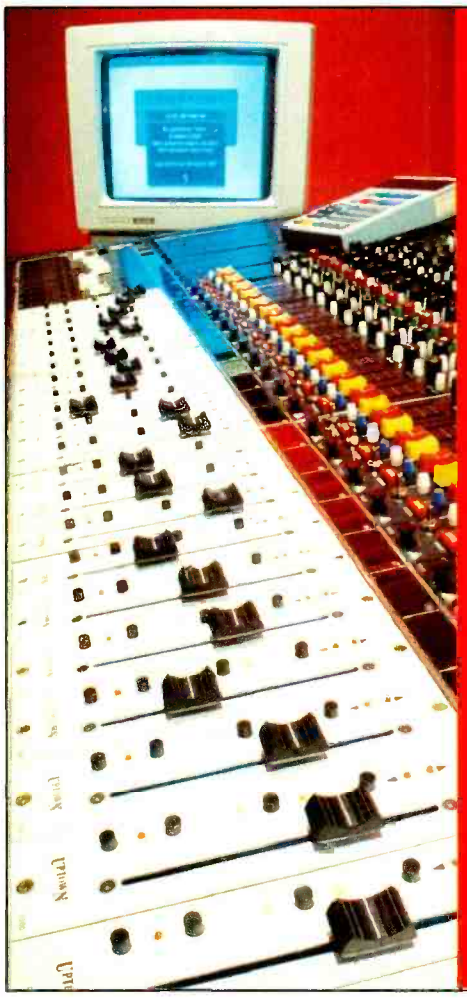

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punished *the high* technology sector in general and audio in particular. Now, since the banks are afraid to loan money, they don't need to attract it. Therefore, lower interest rates are the order of the day. But without the 'siren song' of the high, guaranteed, insured CD (Certificate of Deposit) yields of the '80s, investors are beginning to realise that they are going to have to work again to earn reasonable returns. And that, my friends, puts entrepreneurial financial activity in the high technology arena back in the ball game."

6 The trend towards the opening of new studios plus the mounting saturation of home and project studio facilities of quality will again increase the pressures extant on the existing professional studio community. Yet in some ways, 1992 will see again the phenomenon of the mainstream studios getting better. By providing exactly what the smaller venues cannot — namely large acoustically correct spaces to record in, plus the very latest technology integrated with the rest of the studio electronics and the most knowledgeable and helpful staff — the large studios will continue to lead the business of recording voice and music for disc, for commercials and for film/TV.

It has been a curious few years for the top venues as they have had to almost reinvent themselves over and over again. But the effort has been justified as clients still make their way to the most respected operations to complete projects. Completion is, of course, the key to the whole issue of studios. The very flexibility of creating the concept of a performance or album in one's own space has really driven the home and project studio revolution. It is in some strange way, the musical equivalent of a writer having a home office with a word processor. When the writer or musician is awakened with a bolt of inspiration at 3 o'clock in the morning, the tools to record that burst of creativity are at hand. By understanding the dynamic, the major studios can provide the rest of the cycle.

7 The number of jobs available in 'professional' audio will continue to contract in 1992, albeit at a slower pace. Economic recovery will impact national employment figures on both sides of the Atlantic but cannot change the basic shifts in audio industry employment. However, there are bright spots on this somewhat grim horizon. First, the jobs that were lost from the audio sector generally did not cease to exist as a result of the recession. They disappeared as a result of basic changes in the dynamics of the audio industry.

In large part, two factors shrunk audio employment beginning in the mid '80s. One was the downsizing and out-reaching of the studio marketplace as the home and project studio revolution occurred. Second was the emergence of alternatives to the dedicated audio operator in entertainment or reinforcement or audio-visual applications. The musician/technician, or video technician or even the emergence of automated sound systems all took their toll. 'House' soundmen became more of an endangered species than the good small hotel room in London costing £50 ($90.00).

Now, with economic recovery of some kind a gradual force in the marketplace, new job openings will occur. These jobs will represent in some cases economic growth and in others the greying and retirement of the 'audio pioneers' (sounds like a MIDI-based country and western group). In either case, the fact that audio had already gone through a devolution of employment, makes it more likely that an upswing will bring greater options. In addition, in instances where staffing levels are still subject to further reductions, as in several major broadcasting operations on both sides of the Atlantic, the audio staffing levels have always been minimal to the video numbers and are expected generally to be more resistant to further cutbacks. And, though it may just be a 'straw in the wind', many analysts think that 1992 may well see a surge in manufacturing activities and concommitant employment at old and new audio companies 'with a head for business and a body built for love' (of music and audio).

8 The audio education industry shows no sign that it will finally escape the painful financial conundrums of higher education during 1992. In fact, the status of audio educational programmes could continue to slip and slide from the high previous point at the end of the '80s.

There were over 150 institutions providing various levels of quality education in audio three years ago. Today, that number has shrunk, only by about 10% but some other programmes are in decline or face outright financial calamity. In fact, the problem is not localised within audio, but rather represents a combination of the downturn in demographics and the recession as the 'babyboomers' age and their baby-boomlet has yet to hit the college 'streets'.

We have seen major and minor educational institutions and technical schools build a teaching base for students that to a large extent no longer exist — at least not in the numbers seen in the '80s. Two thirds of the publicly funded educational institutions and one third of the privately funded institutions in the United States reported having to make significant cuts in equipment, building and/or teaching/operating staff. These figures represent all institutions and all programmes — not just audio!

Perhaps the most significant impact of these cuts seen in audio programmes, were fuelled to a large extent by a perception in administrative and faculty senate circles of 'zero' support of such programmes by the audio industry. By no means are all audio education programmes in jeopardy but the loss of key faculty members coupled with a lack of funding for equipment acquisition has virtually crippled more than several key entities.

9 Despite significant improvements in overall quality for film and television audio — when coupled with a visual image — there continues to be a 'back seat' mentality and audio remains subject to cost controls unrealistic to the achievement of real fidelity. In the realm of TV audio, the loss of significant advertising revenue has crippled equipment acquisition and initiated hiring freezes if not actual layoffs in some cases. The malaise has struck both networks and stations with equal severity, however, as in most cases where a financial indicator swings downwards, there is a 'Ying' to match the 'Yang'. Cautious fiscal controls designed to reduce the debt most broadcast entities incurred during the booming '80s through amalgamation or expansion, reduced the replacement of existing audio equipment to a mere trickle. Now, after 18 months of recessive conditions, there will be a pent up demand that will take several years to satisfy. The only question is whether the TV audio 'gold rush' will start in 1992 or wait until the beginning of 1993.

10 Movie sound has continued to show progress, especially with the advent and acceptance of digital sound on film, however, the current financial plight of film exhibitors, as opposed to the distributors and studios, makes the adoption of expensive new technology in theatres cost prohibitive. It is estimated that a conversion to digital audio, including new speaker systems necessary to reproduce the increased dynamic range, would cost no less on average than £12,000 ($20,000) per screen. In a 12-screen multiplex complex, that would represent an investment of at least £150,000, or well over $240,000. With exhibitors reluctant to make even a small investment in a new sound accessory card, it seems unlikely that a major expense for digital sound will be adopted *en masse* in 1992. However, 1992 could well be the year to see the beginning of the demise of 70 mm film, used primarily in exhibition to carry six discrete soundtracks; 35 mm digital will have proven its merits as a multichannel 'crowd pleaser'.

There is no question that the 1990s will find the audio industry labelled as a 'survivor'. The industry has basic strengths tied to the home consumer of recorded sound and all the concommitant concert, disc, film, home video and TV marketplaces. There will be jobs and business opportunities for those willing to work hard enough for them. Money will be made in all sectors of the audio industry albeit not at the rate of the 1980s.

But it seems equally clear that the audio business is not going to be the pot of gold at the end of the electronic rainbow for all who enter the industry. As the 1980s wound down, audio became far too trendy. Many new individuals and organisations large and small, became involved with everything in audio from studios to manufacturing. Some of the financial discomfiture we see in the industry today is a result of sector overpopulation as much as anything else. There are too many players trying to eat the industry's financial pie; a pie that grows larger these days by only about 3% to 5% per year. That is evidenced by the fact that many companies and operating entities are available for purchase at 'the right price'. But it should go without saying that well managed companies with a clear grasp of their markets and business plans will continue to exhibit acceptable growth.

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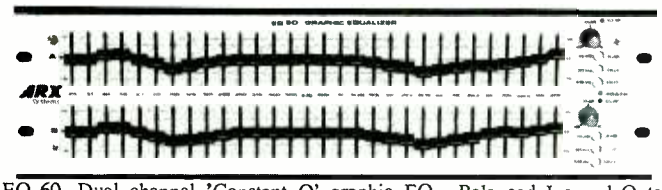

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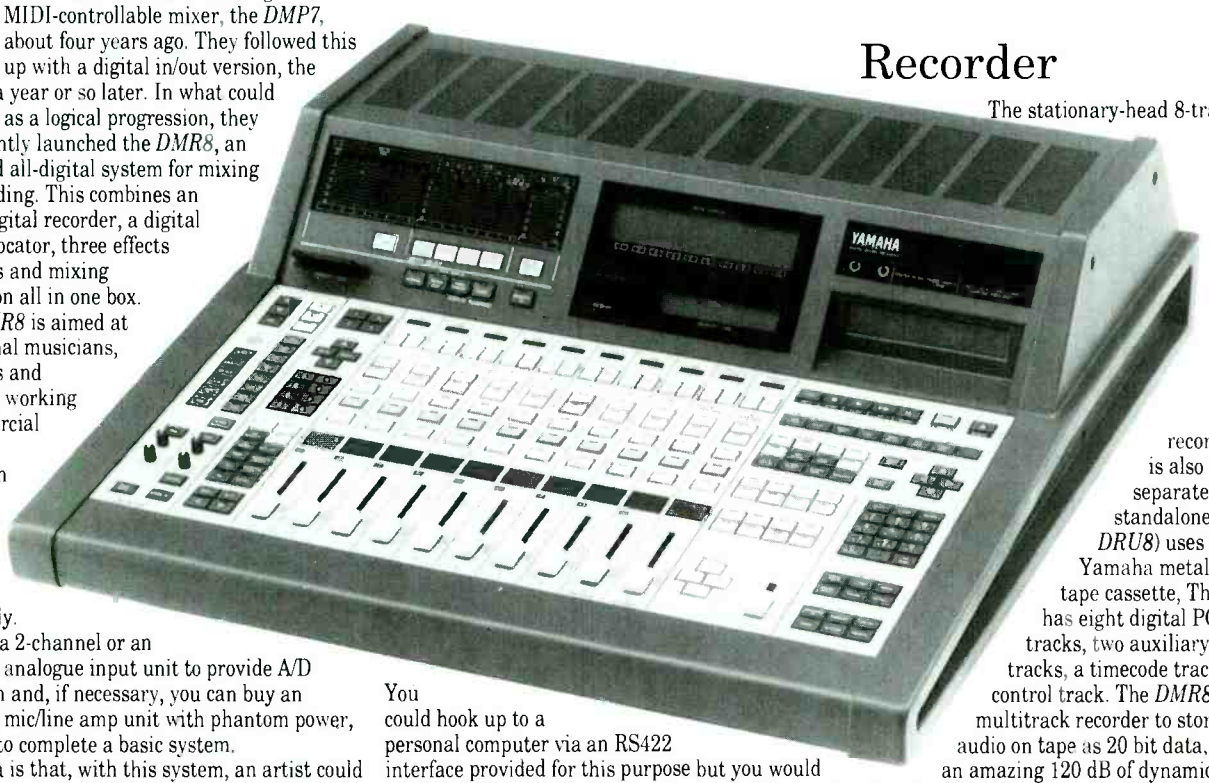
Yamaha DMR8

Mike Collins looks at Yamaha's digital mixer recorder system

Yamaha launched their first digital MIDI-controllable mixer, the *DMP7*, about four years ago. They followed this up with a digital in/out version, the *DMP7D*, a year or so later. In what could be viewed as a logical progression, they have recently launched the *DMR8*, an integrated all-digital system for mixing and recording. This combines an 8-track digital recorder, a digital mixer, a locator, three effects processors and mixing automation all in one box.

The *DMR8* is aimed at professional musicians, composers and arrangers working on commercial music production and is priced accordingly.



You need a 2-channel or an 8-channel analogue input unit to provide A/D conversion and, if necessary, you can buy an 8-channel mic/line amp unit with phantom power, the *HA8*, to complete a basic system.

The idea is that, with this system, an artist could produce a master recording in a home studio to the very highest audio standards, with a relatively affordable outlay for the equipment. Yamaha anticipate that the artist might record tracks at home and then bring a *DMR8* tape into a studio and transfer the tracks digitally to a larger digital multitrack system. Or a composer might send a *DMR8* multitrack tape to a video production facility or broadcast studio for further mixing or processing.

Mixer

The mixer section can be set up for 8-input, 8-bus recording, or 24-input, stereo output operation in mixdown mode. There are only eight sets of channel controls available on the console, but these can be assigned via the software to control three banks of eight channels (1 to 8, 9 to 16 or 17 to 24) to provide the 24 remix channels. I think this is a very acceptable way to implement a large number of channels in a relatively small unit like this. On the other hand, the two green LCD display units, although workable, are a bit on the small side. There is provision for connection of a larger VDU so you can see many more parameters at one time. You could hook up to a personal computer via an RS422 interface provided for this purpose but you would need suitable control software. Or you could control some of the *DMR8* parameters remotely using MIDI, although you would probably run out of MIDI bandwidth if you tried to control everything this way.

All 11 faders are motorised. In the normal Channel mode, the first eight act as channel level controls, the ninth acts as a stereo sub-input fader and the 10th controls the master control room level. These faders can also be assigned via the software to control various other functions, such as the EQs. The stereo sub-input fader lets you connect a Yamaha *DMP7* mixer to provide even more inputs. As on the *DMP7*-series mixers, you can quickly 'flip' the faders to a Send mode so that faders 1 to 8 would be effects sends, 9 would be the stereo effects return and 10 would be the master send level. Finally, an 11th fader is provided just for data entry.

Each mixer channel includes a Pan control, 3-band parametric EQ and three effects sends to the main effects units. In addition, each channel has its own independent effects, including a basic compressor/limiter and delay effects. These are typically used to process signal before they are recorded to tape. The three main effects units are similar to the *SPX1000* and provide good reverbs, ambience, delay, pitch change and other effects. The three stereo effects returns for these all have 3-band parametric EQ. These effects are available for use in Mixdown mode.

The digital control features allow the console to be reconfigured to suit any recording or remix situation at the touch of a button and several preset configurations are available to suit most common setups. The faders can be programmed to provide very fine resolution, and subgrouping facilities are also available.

Recorder

The stationary-head 8-track digital recorder (which is also available separately as a standalone unit, the *DRU8*) uses a special Yamaha metal particle tape cassette, This recorder has eight digital PCM audio tracks, two auxiliary analogue tracks, a timecode track and a control track. The *DMR8* is the first multitrack recorder to store digital audio on tape as 20 bit data, providing an amazing 120 dB of dynamic range. This should enable the user to allow plenty of headroom when setting recording levels and still achieve sensible signal levels. If you use the highest sampling rate of 48 kHz, the standard cassette provides 20 minutes of 8-track audio, which is adequate for most projects, but could prove a limitation on long compositions, or on an album. It is unfortunate in some ways that Yamaha have chosen to use a non-standard cassette for this system but there is little available that would function as part of a stationary-head system. However, Yamaha have done a good job in designing a working digital multitrack using such a small cassette — and you can save on both tape costs and storage space compared with analogue tapes. If you need more tracks or more recording time, you can hook up a *DRU8* recorder. This can be configured to give you 16 tracks to play with, or to double the recording time (to 40 minutes) with eight tracks. For longer times or even more tracks, further *DRU8* units can be linked in.

Synchronisation

The *DMR8* has comprehensive synchronisation capabilities, including all SMPTE timecode

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formats, jam-sync, MIDI Timecode, MIDI Clock and MIDI Song Position Pointers. There is also a V-Sync input for use with composite digital video tape recorders. In addition, there are cue list and editing procedures using control signals which conform to Sony protocols, for use with equipment using these. These facilities ensure that the unit can be used straight away in a variety of professional recording situations, especially when working to picture, with a minimum of external equipment.

Analogue I/O

The *DMR8* offers analogue Control Room Monitor and Cue Monitor outputs for your monitor loudspeakers and headphones, as well as 2-channel analogue input to allow connection of an analogue tape or cassette machine. But there is no provision for inserting analogue effects into the programme chain, unfortunately. This means that you can't hook up your favourite AMS reverb or *PCM70* effects unit to process channels within the *DMR8*. However, there is no problem hooking in effects units (such as Yamaha's *SPX1000*) with digital inputs/outputs.

Other features

If a composite video signal is fed out of the Video Out connector in the rear panel, the current SMPTE time will always be displayed on the video monitor. In addition, anything on the *DMR8* sub-display will also appear on the monitor. Obviously, these are very useful features when working to picture.

Another important feature I feel is the ability to store all the memory and automation data, along with session notes, to the Table Of Contents part of the actual tape. You can also store this information onto memory cards. There are various note 'pages' available to hold technical information (such as timecode type, sampling frequency, etc), credits (producer, engineer, etc), artists' notes and general session notes. The TOC notes and automix data are recorded onto the first 20 seconds of two tracks of the tapes. If more sets of data are needed, additional tracks may be used. It is a very sensible move to let the engineer store this information on the actual tape, as it is all too easy for extra disks to be mislaid or damaged.

The MIDI facilities are comprehensive too. You can dump most types of data to a computer or other MIDI data recorder via SysEx; use SysEx data for remote control of *DMR8* parameter changes; use MIDI Program Change messages to recall memory data; or use MIDI Control Change data to remotely control the *DMR8* control settings. Using MIDI Controllers, you could quantise and synchronise fader movements to musical events, for instance. You can also transmit MIDI Note On and Off messages from any timecode locations, and you would typically use this feature to trigger sound effects from samplers.

User report

I received the *DMR8* for review the day before starting a new recording project at my home studio. This project was to create a fresh arrangement of a song and to demo it to a high standard using MIDI equipment — with 'live' guitars and vocals. This seemed an ideal project on which to use the *DMR8*. The advantage of using

Comment: Kevin De Souza, School House Studio

School House is a newly-built MIDI studio near Farringdon in the City of London. Studio engineer Kevin De Souza reveals that they use two *DRU8*s, bought from TCD, in conjunction with a DDA *DMR12* analogue mixer.

"The sound of the *DRU8*s is startlingly good, and I think they sound even better used with the DDA console and the typical outboard effects which we use, such as Lexicon reverbs, Eventide *Harmonizers*, and so forth. These bring so much character into the sounds, compared with the *SPX1000*-type effects in the *DMR8*. We did consider going for the *DMR8*s because of the automation, but we felt it was too limiting to have to get so many extra A/D converters, or to be prevented from hooking up analogue gear, Pultecs or whatever. We can still do a lot of work totally digitally, using *SoundTools*.

"We have tried A/B'ing audio recorded simultaneously into the *DRU8* and *SoundTools*. With guitar parts, for instance, the sound from the *DRU8* just "comes out of nowhere', whereas with *SoundTools* you can hear the noise floor if you turn it up enough. When you record into *SoundTools* you have to record very carefully using limiters and so forth, so it is much better for editing stuff recorded on other machines like the *DRU8*. I was very impressed with the way the *DRU8*s stood up to the heat this summer, before we had our air-conditioning fitted — I am sure I would have had problems with lesser machines. One of the beauties of the system is the no-loss bounce-down capabilities of the *DRU8*. And you don't need any free tracks to bounce to, as they can be bounced to themselves. By having a split system (two *DRU8*s) and having the digital cascade between the two, you can achieve an amazing degree of flexibility. On another 'note', some of the remixers we work with are putting two stereo masters onto four tracks of the *DRU8* so they can switch easily between the two, or even run both together. This is not something we anticipated using the *DRU8*s for but it works great in practice!"

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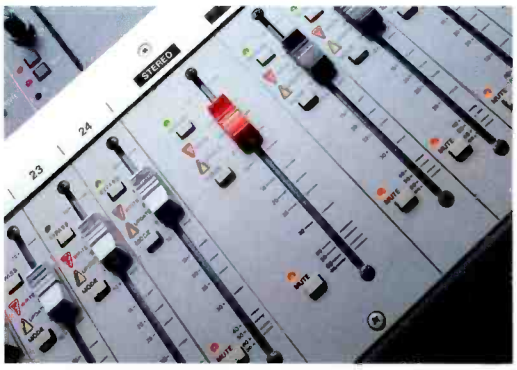

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the *DMR8* would be that if we managed to capture some 'magic' vocals or guitar parts, and the artist wanted to go on and master the track for release, we could simply get a *DMR8* into the mastering studio, and finish the recording off without the hassle of trying to recreate the 'magic' parts at much greater expense and under pressure.

Yamaha originally supplied me with an *AD8X* 8-channel A/D converter which has *XLR* inputs +4 dBm. However, most of my equipment would not provide high enough output levels without putting signals through a channel of my analogue desk and taking a direct line level output to the *AD8X*. So Yamaha sent an *HA8* microphone preamplifier. Unfortunately, two of the record tracks on this particular *DMR8* were faulty and produced a series of loud cracking sounds when I attempted to replay material that appeared to have recorded OK. A quick check using the C2 error flag display confirmed that there were problems on these two channels, and a check of the Head On Time showed that this machine had been used for a total of 25 hours since it left the factory. These two displays, which proved to be so useful at this point, were readily available from the Help Menu on the *DMR8*. Yamaha arranged to bring a replacement *DMR8* the next day.

I decided to record most of the MIDI instrument data into a *Mac II* computer running Performer MIDI sequencer. Once this was done, I took a cable from the *DMR8*s dedicated MIDI Timecode DIN socket to the *Mac*, and put the *Mac* in external MTC sync mode. I had to format a *DMR8* tape cassette before I could use it, which took one 20 minute pass, so I decided to format the whole tape at the outset. During this process, SMPTE timecode was generated by the *DMR8* and recorded onto a special track for this purpose. Once this was done, I just had to choose a SMPTE start time in the *Mac*, and everything synced up straight away.

When I was rolling the tape back, I heard various bits of MIDI gear 'firing off' in bursts as the tape rewound. This became a major annoyance as I worked on the MIDI recording, and I became adept at switching the sequencer out of sync while rewinding the *DMR8*. I enquired about this at Yamaha R&D and was told that it was due to bursts of MIDI Timecode being sent from the dedicated MTC output and intended to keep slave tape machines in sync with the *DMR8* master. This is not ideal when syncing to MIDI equipment, and there is a possibility that future versions of the *DMR8* will let you switch these MTC bursts off or on as needed. It does seem a little remiss of the designers not to have considered this usage of the *DMR8* with an external sequencer at the original design stage.

Once everything was set up properly, and I started to get more familiar with the *DMR8*, which all took about a week, things then started to run more smoothly. I worked mostly in Sync Overdub mode at first, as I was recording guitars and vocals to the multitrack while monitoring my MIDI gear, which was playing back through my Teac analogue mixer. Once I had the guitars and a guide vocal on tape, I wanted to set everything up as it would

Comment: Juni Morrison

Juni Morrison (ex-Parliament/Funkadelic) recently bought a *DMR8* system from TCD. Morrison has a production-based company in North-West London and is very busy producing a range of acts, including Mica Paris, Yazz and others.

"The way I survived was to toss everything I knew about consoles away. Once I got used to the new console it was OK. It was weird in the

sound in a mix, but still be able to drop in to record new tracks at any time. Unfortunately, the EQ is available only on channel inputs in the sync overdub mode and the effects sends are split between channel and monitor sources. In mixdown, all 24 channels have EQ and effects available.

It quickly became obvious to me that I really needed about four *DMP11* submixers to take the separate outputs from my samplers and synthesisers. Using the digital cascade connections, I could have submixed all my MIDI gear using the *DMP11*s and brought them into my *DMR8* mixes alongside the eight tracks coming off tape. I would then have had eight extra mixer channel inputs available in mixdown mode on the *DMR8* via the existing *HA8*/*AD8X*. I could have used these to hook up a couple of extra synths and a drum machine, which another musician had brought in for the session. To use the third set of eight mixing channels on the *DMR8*, I would have needed either a second *HA8*/*AD8X* combination, or a *DRU8* — the standalone recorder section, which would have provided an extra eight recording tracks. As it was, I had to feed the analogue control room monitor outputs from the *DMR8* into my Teac mixer and balance these with my MIDI gear before mixing to DAT from the Teac console.

Automation

The *DMR8* has three 'current' automix memories and eight 'data' memories. Any one of these can be replayed at any time. Memories can also be moved or copied from one location to another, and can be appended to each other to allow assembly of a mix from separate sections. The data memories can be stored to the Table Of Contents part of the tape, or to a memory card. Alternatively, they can be sent via MIDI System Exclusive into a sequencer or other software, and from there onto a computer disk.

Data is written into the current memories initially, and these are organised in a last-in /first-out fashion such that you write your first pass into current memory 1. On your next pass, this data is moved into current memory 2, and memory 1 takes the new data.

On the next pass, what was in memory 2 moves into memory 3, while new data is written to 1, so on subsequent passes, the data from memory 3 will be lost as it is over-written from memory 2 each pass. The idea is that you can quickly record a number of passes through your mix into the current memories, and then save the ones you want to the data memories. Up to three data areas may be merged into another data area, so, for instance, mutes from one pass can be merged with fader movements from another.

I used the most basic of the automation features — the channel fader automation — to 'ride' the levels of the vocal and guitar parts during one of my mix sessions. This is extremely simple to set up and use: you just press the Auto Mix Edit button, make sure the cursor is on Record and Record is activated (using the nearby left/right,

beginning but I had very good support from Thatched Cottage and Yamaha. The *DMR8* does take quite a bit of getting used to. I had one on loan for a few weeks, and it took this length of time to get familiar with the basic funtions. It was exciting at the same time, and once I acquired the machine it took me about 30 days to become really comfortable with it. I still get occasional lapses as to where a particular button or function is. You do have to get more used to working with the screen rather than having manual contact with everything as on an analogue desk."

up/down arrow keys), and then press Play on the transport controls. Now, when you move any mixer control, this change will be recorded into current memory 1. When you stop the tape, the display prompts you to select whether to keep your mix or not.

To play your mix back you press Auto Mix Edit again; select and enable Play this time; press the Shift Next key to access a display which allows you to choose which mix memory to replay; choose Absolute or Follow mode, and Continue or Return mode, and then hit Play on the transport controls. In Absolute mode, the fader movements are recorded exactly, and in Follow mode the relative movements of faders are added to the existing data. In Continue mode, the last setting of any edited mix data will continue until a change occurs in the original data that will reset the parameter. In Return Back mode, as soon as the edited data finishes, the parameter returns back to the original setting. This can produce a sudden, unwanted, fader level change, for instance, so the Continue mode is probably the one to use in most circumstances. The default settings are Absolute and Continue, so you can skip over these without having to make any adjustments most of the time. Obviously, you do have to take the trouble to become familiar with several new concepts like these, which you probably have not encountered on other mixers. Still, there is nothing mind-bogglingly difficult about the *DMR8* — it's just a matter of spending some time with the machine to get to know it.

The automation facilities provide very sophisticated control over the *DMR8*'s many control functions, and I am sure that users who take the trouble to explore the automation fully will be rewarded with an excellent aid to their creativity.

More automation

There are four sets of 'snapshot' memories, accessible from buttons labelled F1 to F4. The F1 bank of memories is used to store a complete snapshot of all the *DMR8* settings. Memories 1 to 16 are used when recording, and memories 17 to 32 are used when mixing. The F2 bank has 32 memories and can be used to store various groups of mixer settings, such as EQ, pans, or effects. The F3 bank can store further user-defined parameters, such as track and channel names. The F4 bank is used to store timecode locations, which can be used with the autolocator. More interestingly, these timecode locations can be used in conjunction with the Event Edit facility to change the mixer settings automatically to other memory settings held in the F1 to F3 banks at specified timecode locations, providing an alternative method of mixer automation. Memories are automatically stored onto a RAM card supplied with the unit, and extra cards are available through Yamaha. You normally switch through the memories using up/down arrow keys in conjunction with a Recall button, but there are also eight dedicated memory keys to which you can assign a selection of eight memories of your choice when recording or mixing — for extra convenience.

The memories may also be recalled using MIDI Patch Change messages, which provides for a third method of mixer automation — obviously very useful for working with MIDI sequencers.

Mastering to DAT

When it came to supplying the client with a DAT master of the track, the *DMR8* allowed me to choose whether to create a DAT master that would restrict the number of digital copies that could be made. This ability to set the copy prohibit flag (on a DAT 2-track master mixed from the *DMR8*) according to your needs is obviously a very convenient feature for studio users. Standard SPDIF phono connectors are available for connection to DAT recorders.

Conclusions

One of the main areas in which the *DMR8* scores is that it keeps everything in the digital domain until you finally need to play back via an analogue system. This also makes it possible for the *DMR8* to offer one of the first true 'total recall' systems. From mix parameters, including EQ level and mute settings, to total recall of effects parameters, to the final recorded audio data — everything can be automated. Also, the compromise of having only eight sets of channel controls but making these assignable to 24 channels via software for mixdown, works out very well — especially in situations where there is not too much space, or where you need to have other equipment in front of you such as video monitors, computers, or MIDI keyboards.

In practice, I found the machine to be quite easy to learn, and the sound quality to be first rate. I do like the versatile *SPX1000*-type effects but I also used various other outboard effects by putting them in-line with the analogue signal from whatever instrument I wished to use them with and recording the original signal plus effects to tape. I did miss the flexibility of being able to use any external analogue effects on mixdown but I still got good results with the built-in effects. For use in a MIDI studio, I would suggest use of *DMP7/11* submixers for most of your MIDI gear, and just one *AD8X/HA8* combination for bringing audio directly into the *DMR8*.

So did I like it? The answer here is a resounding 'Yes!' The quality of the vocal and guitar recordings was higher than anything I have recorded previously in my home studio.

The *DMR8* should appeal to its target audience of top professional composers and musicians for all the reasons I liked it, and for such people the price is certainly affordable for the range of facilities on offer. You may be tempted to think of the *DMR8* as a 'rich man's *Portastudio*', which it certainly is, but it is also much more. I believe it will find many niches in audio/video studios, where its synchronisation capabilities could find it an ideal home, and MIDI programming suites, or even for 'live' performances, which are increasingly involving MIDI equipment. It certainly shows off the new directions in which the digital technology is heading. □

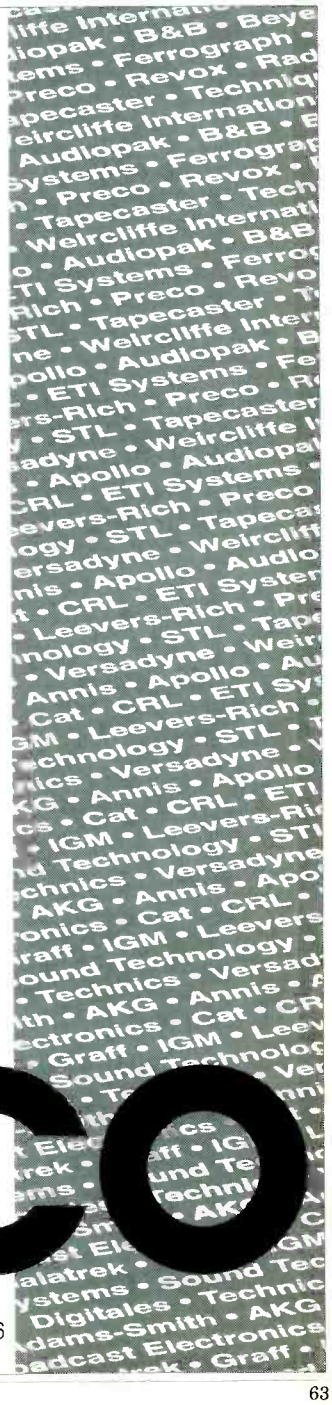
Manufacturers comment

(Yamaha UK): Just a few points we would like to clarify. Although the initial review unit was a production machine, the tape drive unit installed was a pre-production version exchanged to provide us with a spare emergency exchange production drive unit while spares stocks were low. We should have checked our loan unit status.

The 'head on time' indicator is a 'trip' meter to gauge routine maintenance (head cleaning) periods. There is a hidden 'milometer' in our diagnostics program to show total usage time.

Although *DMP11/DMP7* submixers would provide an ideal set-up for handling and automixing multiple MIDI devices, an *AD2X* 2 channel A/D converter will allow any analogue mixer to submix to the DMR8. The *FMC-1* format converter will similarly allow input from external digital sources.

It should be pointed out that the *DRU8* 20-bit 8 track recorder as provides a way of expanding a *DMR8* system up to 24-tracks with transport and monitor control from *DMR8* console.



Aiwa HHB1 Pro

David Foister takes a practical look at HHB's very compact portable DAT recorder

The *HHB 1* DAT machine is a purpose-built professional portable. Although built entirely by Aiwa it owes its conception to long-running discussions with UK distributor HHB Communications, whose name it bears. It has made early headway in a growing and competitive market thanks to a useful range of features combined with genuine portability.

One should now be accustomed to equipment that is smaller than expected, but it is still difficult to suppress a smile at the size and weight of this machine. It really is little more than pocket-sized but thought has been given to making the important bits big enough to use, so that the transport controls are big enough for a normal finger and the display is readable and well lit. These dominate the front panel so much that it would be easy to think that some familiar DAT features had been left out, whereas in fact the specification is surprisingly comprehensive and includes things missing from other portable, and even from a few non-portable, machines.

The big sales point had been the A-time implementation, which is not found on some other portables costing considerably more. The benefits of having A-time recorded on a DAT cassette are obvious enough, particularly if you have tried using one without it, but the ability of machines like the Sony *PCM-7000*s and the Fostex *D-20* to handle A-time in much the same way as full-blown timecode makes its inclusion on a machine like this all the more desirable. The A-time works much as one would expect, including the facility to find the end of existing A-time so that subsequent recording will continue from the original end. For some reason the button for doing this is labelled AARS, which, apart from raising a snigger, causes a dash for the manual. This reveals that it stands for Automatic A-time Record Standby but why the familiar END SEARCH was not felt to be good enough is a mystery. In addition to straightforward A-time display, the machine will show P-time (elapsed time since the last program number) and has a 4-digit turns-driven counter for tapes not containing A-time. Interestingly, this counter seemed to match exactly those on the Technics DAT machines, which could be useful.

The display, which is extremely well back-lit (permanently when mains powered, momentary switched when on batteries), also shows transport status, program numbers, battery state (flashing when low) and the level meters. The meters are arranged in an unusual way, with the bulk of their length given over to the top 15 dB; below that there are only two segments (–20 and –40), which means that material with a wide dynamic range will frequently not register at all. I found this unnerving to start with, particularly as my first job with the machine was a concert of modern music with long stretches with very little happening. The meters also have no peak hold facility. The manual gives –12 dB as the 'reference level', which is in contrast with other DAT machines I have used where the '0 vu' level is generally –18. This reference did, however, give unity gain.

The machine's other subcode facilities consist only of start IDs and program numbers. Access to P numbers during playback is unusually fast and accurate, with little overshoot or hunting. Writing them during recording is another matter, as the system elsewhere known as AUTO NUMBERING is permanently on. This means that every time the signal level falls below a certain threshold (which is fixed and unspecified) for 3 seconds and then rises above it, a program number is written. In the case of the aforementioned contemporary music concert — which consisted of four pieces — this meant that the machine clocked up 58 program IDs, and still managed to miss the start of one piece because it was too quiet to trigger it. The manufacturers have become aware that this is not ideal and there is now a modification available; a replacement control chip allows this function to be switched off.

Fortunately, buttons (very small ones on the side) are provided for manually writing IDs and editing them afterwards. They can be erased, written and renumbered after recording, although finding the correct places for them can be tricky as the machine has no cue, review or other slow wind facility. Skip and end IDs are not dealt with at all, and it is not possible to program the machine to play a particular selection of tracks. I think it is unlikely that anyone would pick this machine for doing any post-recording programming work if they had any choice at all, but then that is not what it is designed for; the facilities provided at least mean that location recordings (which are the machine's most likely jobs) will have enough IDs sprinkled around that most recorded items can be found reasonably quickly back in the studio.

Part of HHB's contribution to the design is, of course, the plethora of inputs and outputs of various kinds. It scored heavily over some of its competition in having balanced analogue inputs handling microphone or line level signals, and although these appear on a single 5-pin *XLR*, a short adapter cable with a pair of 3-pins on the other end is supplied. This input has a mic attenuation switch to cope with most situations, and there is also a pair of unbalanced –10 dB

inputs on phonos. Outputs are unbalanced –10 phonos only, but again this is unlikely to be used much as a studio playback machine so this should not matter too much. In addition, there are balanced and unbalanced digital I/Os, the balanced being on a tiny 8-pin multiway for which a lead is supplied with male and female *XLR*s on the other end.

The digital input format is flexible and self-sensing, handling (at least) AES/EBU and domestic CD/SPDIF signals. The unbalanced output is SPDIF while the balanced is AES/EBU, and I am told that there is very little that the machine will not copy and re-copy. Unfortunately the manual is vague on points such as these, and in several ways is less than satisfactory. Although the machine has 'Professional' emblazoned across its top, the manual contains little more detail than one would expect to find in a consumer manual where technical specs are concerned.

Besides not giving complete information about digital signal formats, nowhere does it say what the sampling rate is when recording analogue. It is apparently self-sensing when making digital recordings but the sampling rate is not otherwise adjustable. It is in fact 48 kHz and it would be nice to be told this. The manual also adopts what is surely the least readable multilingual format, having all four languages present alongside each other throughout. This presumably saves on repetitive printing of diagrams but it doesn't make it easy to follow compared with a manual where each language has its own section.

Another plus point is the variety of power sources. Naturally an AC mains adapter (a particularly large one) is supplied, and so is a rechargeable battery, which can be charged in situ by the mains PSU. The manual rates the life of this battery at 40 minutes, although I got over an hour out of it, including fast winding and renumbering. In addition, the machine can take 10 R6 dry cells, which should give a running time of 3 hours. When you realise how much of the machine is taken up with battery compartments, it leaves you even more puzzled as to where on earth the electronics can be.

Several little touches about the design make it clear that this is intended first and foremost as a location recording machine. Its carrying case includes a weatherproof transparent panel over the entire front panel (which would be uppermost when carried), through which the machine can be operated without any risk of damp getting in. A clever idea is the KEY HOLD switch, which renders the transport controls inoperative and therefore safe against accidental nudges. This feature is duplicated on the Remote Control (an item one would hardly have thought necessary since the entire machine is smaller than some remotes), which plugs into, of all places, the headphone socket. This, by the way, is a 3.5 mm jack; I hope it lasts longer than bitter experience suggests it might. *(Care should be taken as the unit only accepts a narrow-bodied jack and if good contact is not made then transport functions can be implemented — Ed.)*

The sound quality, via the machine's 1 bit converters (both ends) is all one would hope; I could hear no difference between it and the machines I normally use. Tapes recorded on it showed slightly higher block error counts on the *D-20* than tapes originated on the *D-20* itself, but as they were still in single figures per ¼ second they posed no problems. I did find, however, that tapes with larger burst errors — around 40 or 60 in a ¼ second — which were perfectly playable on the *D-20* muted briefly on the Aiwa, but then few machines are quite as tolerant of errors as the Fostex.

HHB are marketing this machine as a low-cost 'acquisition' recorder, and that clearly is where it will find its niche as it seems to provide everything that function demands. It appears solidly-built despite its light weight, and certainly doesn't mind operating while on the move — during a mile walk and a ½ hour train ride with it bouncing on my lap it behaved impeccably. As a source for straightforward assemble editing its fast access and comprehensive digital I/O make it very usable, but as a main machine for studio work it leaves something to be desired in terms of operational flexibility. Having said that, a budget-conscious commercial or domestic studio may well feel it provides a better entry to DAT than even some of the more expensive competitors.

UK: HHB Communications Ltd, 73-75 Scrubs Lane, London NW10 6QU. Tel: 081 960 2144.
USA: Stellar Audio, 58 Bearfort Road, West Milford, NJ 07480. Tel: (201) 728 0438.

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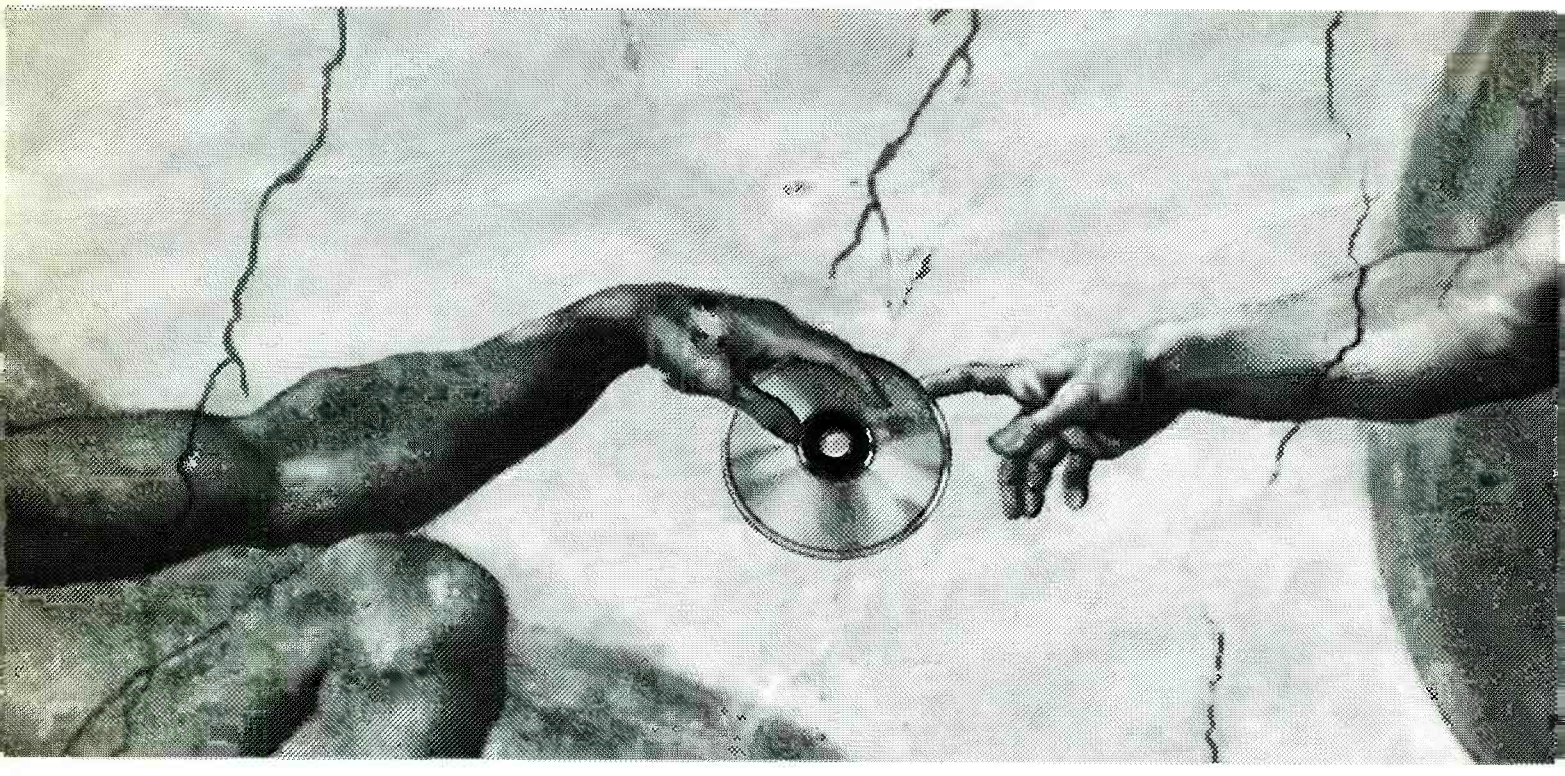

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