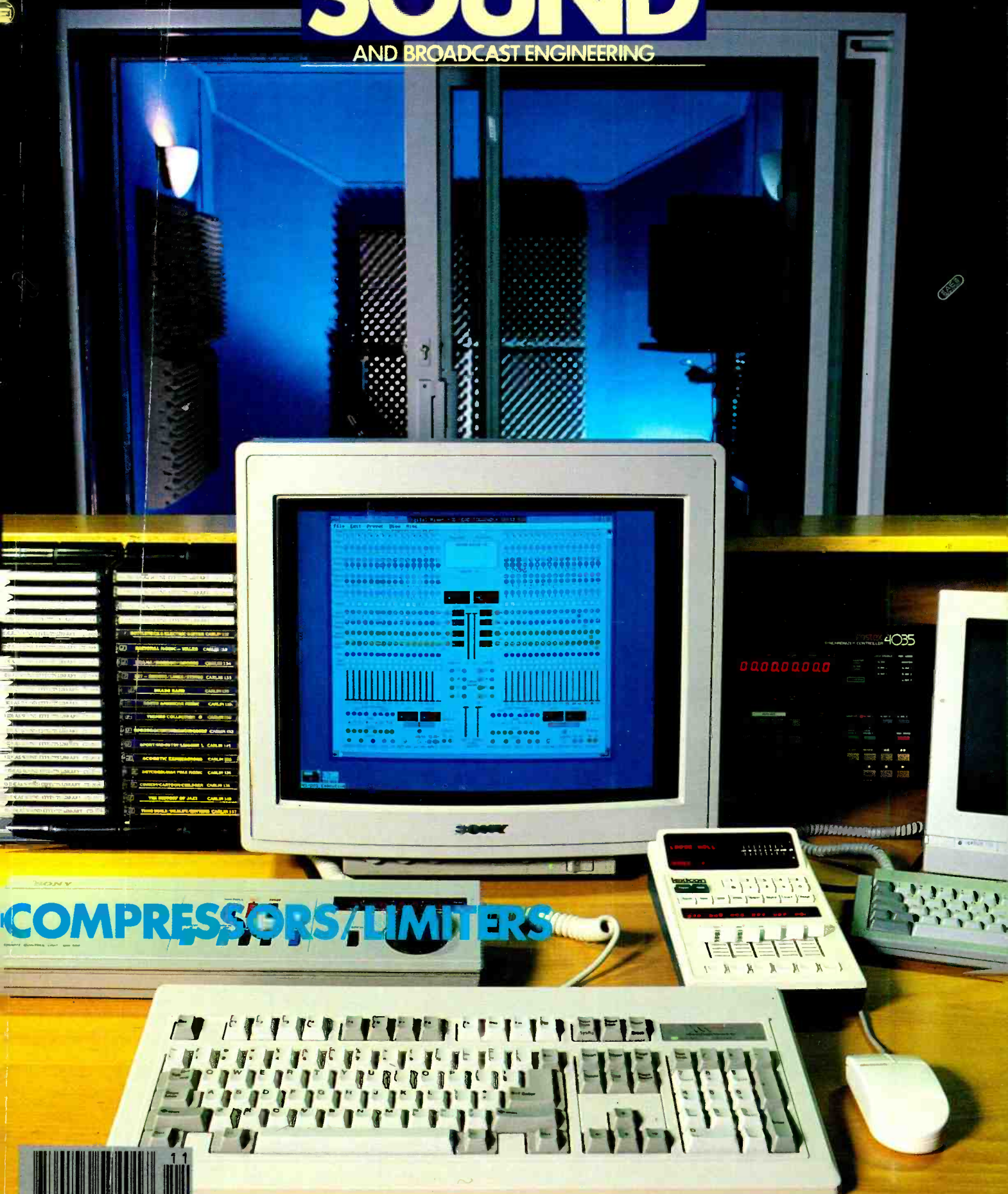


November 1990

\$5.00 £2.00

STUDIO SOUND

AND BROADCAST ENGINEERING



COMPRESSORS/LIMITERS



“I didn’t decide to buy the Soundcraft 3200. My clients did.”

Robin Black, Black Barn Studio.



SOUNDCRAFT ELECTRONICS LTD., UNIT 2, BOREHAMWOOD INDUSTRIAL PARK, ROWLEY LANE, BOREHAMWOOD, HERTS WD6 5PZ, ENGLAND TEL: 081-207 5050 TLX: 21198 SCHAFT G. FAX: 081-207 0194.

H A Harman International Company

“As soon as we saw the 3200 we knew we wanted one.” This was the reaction of Robin Black and his team at Black Barn Studio when the decision was made to up-grade their equipment.

“It’s a decision made with the head and the heart” says Robin, “the feel and sound of a desk is a very personal thing, but if you want to know if it’s the right choice for your business you ask the people who really matter – the clients.”

With this conviction and the approval of his regular clients, Robin opted for the 36 input, 32 bus 3200, fitted with Mastermix II automation.

“The beauty of the desk is that it gives you so much more room to play around in, with 64 channels on mix

down and noise gates on every channel. The logic of a split design also means that producers immediately feel comfortable with the console.”

Featuring an advanced EQ design and Soundcraft’s patented mic amp and active panpot, the 3200 offers superb performance specifications. “It is exceptionally quiet, which is vital these days when so many producers want to work with digital multitrack.”

Robin adds “buying the 3200 was the best business decision I ever made.”

Soundcraft
3200



The Wall concert, Berlin, Germany

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ScreenSound. A fully integrated audio for video editing suite



Post production facilities need to take advantage of the efficiency offered by today's technology. Speed and creative flexibility are essential to commercial success. Digital sound quality is no longer a luxury.

ScreenSound is a fully integrated audio for video editing suite. It combines digital audio storage and editing with machine control of multiple VTRs, Laserdisc or film reproducers. It also interfaces with Quantel's digital video editor, Harry.

Simple to learn and fast to use, a cordless pen, tablet and RGB monitor provide control of all ScreenSound functions.

Multiple sound reels enable music,

dialogue and effects to be laid back to picture and synchronised to the exact video frame.

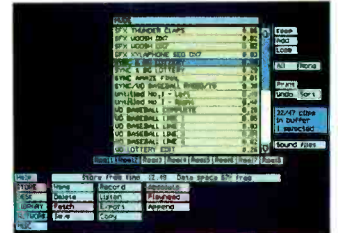
Edit, review, time offset, track slipping, cross fades and many other production techniques are available at the touch of a pen. Gain and stereo pan controls can be automated to timecode.

AES/EBU interfacing keeps digital audio transfers free of analogue distortions and losses, preserving the highest audio integrity through to the final format.

Above all, ScreenSound is a dedicated system - purpose-built to bring the advantages of hard disk sound manipulation to audio post production.

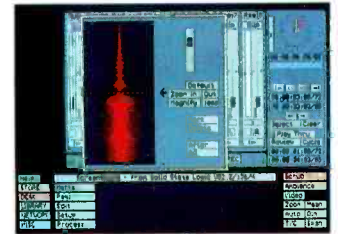
AUDIO STORE

The hard disk store of sound clips gives title and duration, in addition to powerful search and sort routines.



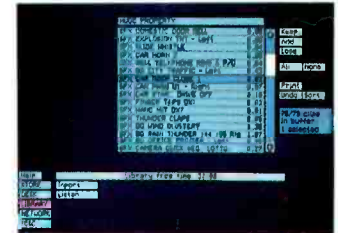
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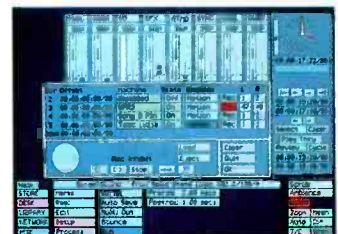
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AND BROADCAST ENGINEERING

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Editor: Keith Spencer-Allen
Assistant Editor: Julian Mitchell
Co-ordinating Editor: Ann Lowe
Production Assistant: Dawn Boulwood
Secretary: Elaine Sweeney
Consultant: Sam Wise
Columnists: Barry Fox, Martin Polon (US)
Regular Contributors:

Janet Angus	David Hastilov
James Betteridge	Mike Lethby
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Circulation and Development Manager:
Colin Enderson
Controlled Circulation Manager:
Maria Udy
Enquiries: See classified advertisement

Director: Doug Shuard
Publisher: Steve Haysom

EDITORIAL & ADVERTISING OFFICES

Link House, Dingwall Avenue, Croydon CR9 2TA,
UK. Tel: 081-686 2599. Telex: 947709. E-mail:
78:DGS1071. ESI: STUDIO SOUND-UK/US.
Fax: 081-760 5154/0973.

NEWSTRADE DISTRIBUTION (UK)

UMD, 1 Benwell Road, London N7 7AX, UK.
Tel: 071-700 4600. Fax: 071-607 3352.

AMERICAN OFFICE

Publishing Services Manager: Fred Vega
Studio Sound, 2 Park Avenue, 18th Floor,
New York, NY 10016, USA. Tel: (212) 779-1212.
Fax: (212) 213-3484.

JAPAN & FAR EAST AGENT

Contact: Mikio Tsuchiya, Media Sales Japan Inc,
Tamuracho Bldg 3 3 14, Shimbashi, Minato-Ku,
Tokyo, Japan. Tel: (03) 504-1925. Telex: J25666.
Fax: (03) 595-1709.

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during 1989.

UK: 5,272. Overseas: 13,897.
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Who's supporting who?

While I hesitate to bring bad tidings, I may be doing just that. An interesting debate is about to unfold and you will be taking it very seriously because it will most likely cost you money—maybe even lots of money. But first some background.

Many years ago, before most of us were involved in the recording industry, much of the equipment in the studio was designed by the staff of the studio, the studio being literally built on the engineering abilities of its staff. Aside from there being far fewer studios, the role of recording engineer was seen as the overseer of a technical transfer process, not a musical one, and at some facilities requiring the wearing of the white coat.

Over the years the white coats went and so did their wearers. Studios bought in more of their equipment and, as is the way with technology, this gear was increasingly more reliable. There was even less need for the now dedicated technical engineer.

Today there are many more studios, and very few work with full technical back-up. They have taken to relying on freelance technical engineers (which works sometimes) or more recently upon the equipment suppliers, be they the manufacturer or their agents.

The equipment suppliers were keen to help their customers as much as possible with advice and support. It helped them keep in regular contact with their clients and reinforced 'dealer bonding'. With this help available, studios took full advantage of what was being offered free, despite the fact that they were obviously paying indirectly. Rising costs and customer expectations have hit the equipment suppliers as well and they are now looking at all areas of their business for 'rationalisation'.

Manufacturers who supply direct are at an advantage because they presumably have a greater profit margin. Agents and dealers are those most hit by the customer expectations even though their own profit margin is being hit by intense inter-dealer competition. This inevitably leads to complaints about back-up from their customers, which may or may not be justified. In the '70s one leading manufacturer (now defunct) made a couple of deals where gear was sold with the customer contracting out of any sales support in return for a low price. That type of agreement is very dangerous for all involved and is probably legally unenforceable in many territories anyway.

The crunch is that as gear and software becomes more complex and many customers need more and more help, there is talk about charging for support. It is fairly inevitable that it will happen and that it will become a major cost outgoing. Buying any major domestic appliance, one is invited to buy the service contract. It is quite standard in the computer industry and will soon be a fact of life in pro-audio.

There will still be a basic guarantee but this may be limited to repair only over a fixed period of time. Future support will be charged for under a service contract type scheme and as such should be of a higher level than currently possible. It will mean that the customer has to give far more thought to who he buys from and ask what support levels he can expect. Studios may not like it but there seems no alternative. One service company we know has been giving telephone support on a particular product line for several years with the invoice for phone time being sent out the next day. If the customer doesn't pay it he can't expect any future help on that product and pay they do.

One could say that the removal of the technical engineer from the picture has caused a great deal of these problems but in some cases this is not so. I doubt that many studios have the technical staff with the ability to troubleshoot some of the more complex digital products. It really would not be cost effective. It's far easier to call the supplier. It's cheaper and will probably remain so even for fully staffed large studios. Expect to see these issues being raised over the next few months. But very gently.

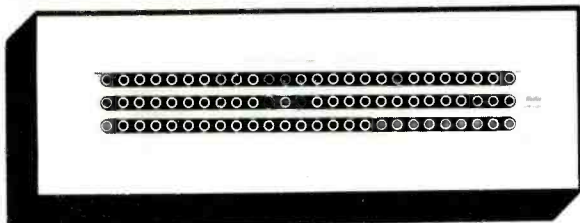
The whole area of technical support and servicing is a major concern for us and we would welcome any thoughts or comments you may have.

Keith Spencer-Allen

Cover: WaveFrame AudioFrame at Audio Outpost, London. Photograph by Roger Phillips

Media

14 The Markham Centre, Station Road,
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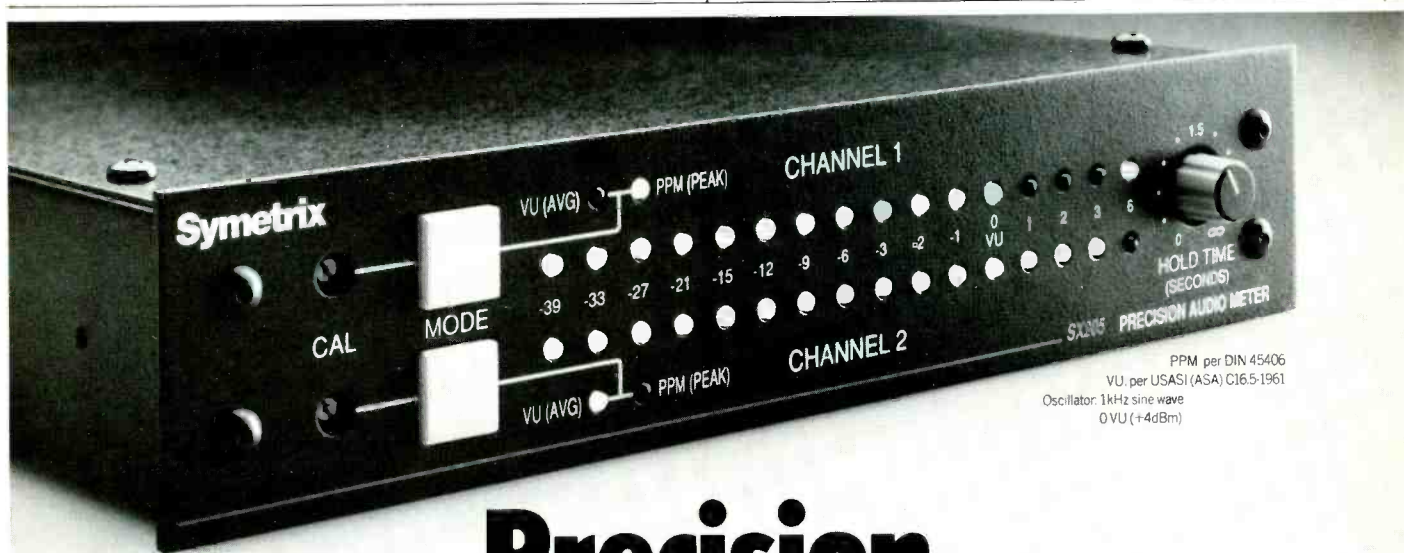
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Association for Technical Support in Audio formed

AMS bought by Siemens

An Association for Technical Support in Audio (ATSA) has been proposed in the UK, in an attempt to increase the value of technical support among customers. ATSA's initial meeting was on August 31st, with a second meeting booked for mid November. The proposed members of the Association are to be formed from the nucleus of support service departments of the main UK pro-audio companies.

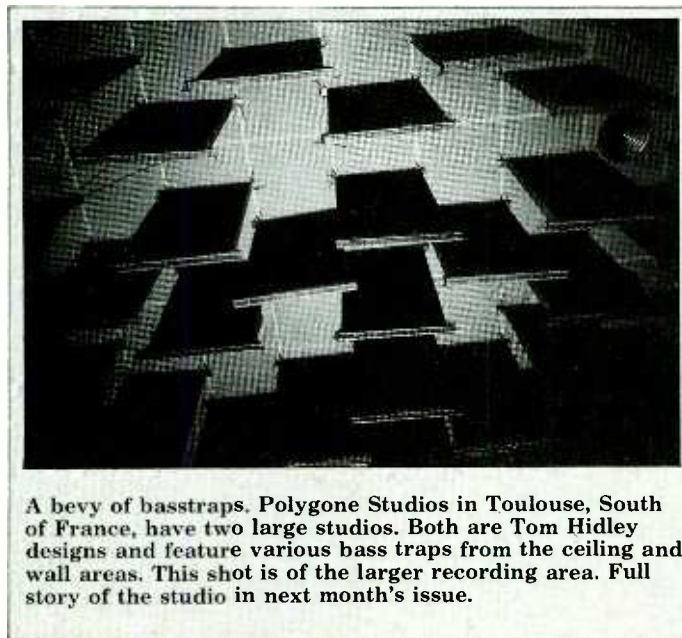
The Association's founder Rod Thear cites a grass roots movement among technicians who are unhappy about present support services as the reason for the ATSA's existence. "We are not trying to create a cartel but we are trying to define the difference for the customer between sales and service. We have to do what other electronics based industries have found they've had to do. We're trying to achieve a more professional organised support service for the customer by chasing the ideal and founding it on a proper business base."

Thear is adamant, "I don't believe that anyone in this industry offers the sort of technical support that the customer actually wants. How many customers say they can't get support at the times and urgency that they require? It costs about £70,000 in the first year to put an engineer on the road, with stock, tools, test equipment, carphone, salary, etc. If only 10 people want that sort of cover then it's too expensive for them. But we have to formulate some business plan so we can offer that type of service or the service the customer requests. The aim of the Association is to discuss these matters and evolve a workable concept of support services."

Thear concedes that many technicians could leave the industry to double their salaries in comparable jobs in other fields. He adds "Traditionally when industries have had to cut sales margins they

inevitably cut technical support in order to survive. In an effort to avoid this scenario developing in our own industry, ATSA is attempting to broach the problem before it becomes too big to deal with." Thear also states that ATSA is not there to undermine any movement that associations like APRS have in mind. In fact he would be very happy to cooperate with such a group.

Consideration is being given to the possibility of including video in the brief of ATSA as its importance in



A bevy of basstraps. Polygone Studios in Toulouse, South of France, have two large studios. Both are Tom Hidley designs and feature various bass traps from the ceiling and wall areas. This shot is of the larger recording area. Full story of the studio in next month's issue.

the world of audio is increasing dramatically. ATSA also intends to talk to studios to determine the type of support they feel they need. Thear believes strongly that technical support managers can often communicate more freely across company boundaries than their more commercially orientated sales colleagues. Anybody interested in contacting ATSA should call Thear on 0525 405366.

agreement covers Audio Kinetics' ES.Lock machine control and synchronisation products, which Sondor are to distribute in Eastern European countries through their own network of representatives.

Siemens of Austria and AMS UK have announced the terms of a recommended cash offer for AMS valuing its issued ordinary share capital at approximately £8.9 million. AMS shareholders will be offered 29p per share in cash, a premium of 53% over AMS' share price in September of 19p.

AMS founders Stuart Nevison and Mark Crabtree, who both had considerable share interest in AMS, have been kept on in the company under Siemens' control. Leslie Stevens, AMS chairman, said, "Joining the Siemens Group will bring benefits of synergy to both parties. AMS is well placed to exploit

the opportunities presented by being part of one of the world's most important international electronics and electrical groups. The board of AMS is unanimous in recommending this offer to its shareholders and to its employees."

Mr Hans Haider, group president of Siemens' audio and video systems division added, "Siemens has long held AMS in high regard. We see this transaction as a strategic step for Siemens audio processing business and are extremely enthusiastic about the opportunities that will flow from such a combination."

It is Siemens Austria's intention that AMS' separate identity be maintained and that it continues to operate under its present management team. Mark Crabtree will become managing director of AMS and Stuart Nevison will continue as a director, with responsibility for sales and marketing. The existing rights of all AMS employees will be safeguarded.

manager in September after the company was bought by AKG Acoustics.

Elliott Bros installation order books have been consistently full for the past few years in the areas of broadcast, theatres, OB and recording studios, but the marketing of the products they distribute has suffered as a result. Meridien will be able to operate totally independently of the main company, which is based in Oxford. The products that now are distributed by Meridien are NTP audio metering and telecommunications products, and Pearl microphones. The first agency agreement won by Meridien is the American intercom company RTS. Meridien have exclusive UK distribution rights.

Bruce Elliott, managing director of Elliott Bros, said, "I feel that 1992 will herald a different approach to the way products are distributed in Europe. Manufacturer representation will be more like the American approach, and I think that a kind of 'United States of Europe' will be much easier for the Americans to understand."

At the time of going to press Meridien's contact for information in London was not available, but Richard Frankson, sales and marketing manager, can be reached on 0865 79800.

Elliott Bros open Meridien

Elliott Brothers, the audio equipment installers, have gone back to their roots and formed an audio equipment sales and marketing company. The company, named Meridien Communication Ltd (its base is in Greenwich, London), will be headed by Richard Frankson, who left Turbosound as marketing and sales

In-brief

• Herts, UK: **Audio Kinetics sign with Sondor.** Audio Kinetics have signed an agreement with Swiss film machine manufacturer Sondor. The

News from the AES

Our next lecture will be held on Tuesday, November 13th, and will be given by John Watkinson on the subject of **Digital Audio in Professional Video Recorders**.

The conventional analogue video recorder has a number of conflicts in the audio recording sections, which inevitably compromise audio quality. John will begin by examining the origins of these problems and go on to suggest that the solution to audio quality is to go to digital systems. These, however, bring problems of their own.

The lecture will explore the main issues involved in correctly incorporating digital soundtracks on both analogue and digital video recorders. Reference will be made to the popular formats including Video 8, Betacam SP, D1, D2 and D3.

The lecture will be held at the IBA, 70 Brompton Road, London SW3. The IBA is opposite Harrods and Knightsbridge underground station, between the Nationwide Anglia Building Society and Boots. The evening starts with coffee at 6.30pm followed by the lecture at

7.00pm.

To help future planning, the date, speaker and title of the following month's meeting is listed below (more details will be available next month).

Dec 11th
Room & Loudspeaker Correction using Digital Equalisation
Peter Craven

Another important date for the diary is the next **AES European Convention**, which will be held in Paris February 19th to 22nd, 1991.

Many books are available which will be of interest to those in the audio business from the address below. These include John Watkinson's books **The Art of Digital Audio** and the companion **The Art of Digital Video**.

For further details on any of the above or information on joining the AES, please contact:
Heather Lane, AES British Section, Lent Rise Road, Burnham, Slough SL1 7NY, UK. Tel: 0628 663725. Fax: 0628 667002.

Correction

In September's *Studio Sound* we covered the Cadac *E-Type* console software in our Products section. Unfortunately the European contact

for Cadac we gave was incorrect. Please contact Clive Green & Co direct for the distributor in your territory. Tel: 0582 404202.

Agencies

● Symetrix, the Seattle signal processing manufacturers have appointed JWM Marketing as their international sales representative for Europe, the Middle East, and North Africa. JWM Marketing, PO Box 115, Swindon, Wilts SN2 1DA, UK. Tel: 0367 52605. Fax: 0367 52614.

● The UK branch of Danish company **tc Electronic** have agreed to act as UK and Eire distributors for the products of fellow Danes Tube-Tech and NLE. tc UK, 24 Church Street, Oswestry SY11 2SP. Tel: 0691 658550.

● AKG Acoustics have been

appointed exclusive UK distributor for AR loudspeaker systems, manufactured by Acoustic Research of Massachusetts, USA. AKG Acoustics, Vienna Court, Catteshall Wharf, Catteshall Lane, Godalming, Surrey GU7 1JG. Tel: 04868 25702.

● The Home Service are looking to appoint a US dealer for the new Optifile 3D automation system as part of its campaign to establish a worldwide dealer network for this product. Contact Louis Austin, Home Service, Unit Two, 10 William Road, London NW1 3EN. Tel: 071-388 1820. Fax: 071-388 0339.

People

● Pro-Bel, Reading, UK, manufacturers of video and audio routing systems, have appointed Peter Rawlings as their first quality manager. His role is to implement Pro-Bel's quality programme. Roger Sewell has been appointed internal sales engineer.

● Neve have added three new technical service engineers to their US staff, two in the New York office and one at the home office in Bethel, CT. Peter Lewis and Stephen Morris join Neve in the New York office, handling field service for both Neve consoles and the Mitsubishi product line. Vincent Pietrorazio, based in the Bethel office, will specialise initially in the Mitsubishi product line.

● John Carey of Otari, CA, USA, has recently been appointed vice-president of sales and marketing.

● Clarity, NY, USA, have announced the addition to their staff of Elizabeth Gillespie. Gillespie joins as marketing manager.

● Dave Ogden has been promoted to product manager for AKG Acoustics, CA, USA. Ogden will serve as chief liaison between the US and AKG headquarters in Vienna.

● ASC, Aldermaston, UK, have appointed Derek Jones as sales representative. He joins ASC from PRECO.

● Studio design consultancy **Harris, Grant Associates**, Wembley, UK, have appointed Derek Buckingham as a full time member of the team. Buckingham has been associated with the consultancy on a freelance basis for more than 4 years.

● Bob Doyle has been appointed by Klark-Teknik, Kidderminster, UK, as **Midas** sales manager to handle sales and support of Midas mixing consoles throughout the world. Doyle was previously with SSE Ltd of Birmingham, UK.

● **Angel** recording studios, London, UK, have appointed Gloria Luck as studio manager, and Frank Barreta has been appointed business manager, responsible for promoting the studios to existing and potential clients and for establishing a more personal level of contact with A&R personnel and producers.

● **The Performing Arts & Technology School**, UK, have appointed Terri Anderson as director of vocational studies. Anderson was formerly director of corporate press and public relations for EMI Records UK. The role of director is to establish links throughout the entertainment industries and ensure the school's curriculum reflects the current and future demands of these industries.

In-brief

● New York, USA: US aircraft carrier baffled by **Benchmark**. One of the most famous aircraft carriers in naval history seems an unlikely site for refined acoustic measurements. The USS Intrepid, now permanently moored at Pier 86 in New York City, houses a military museum. A 35 mm film theatre housed in the former below-decks hanger plays a 16 minute film 18 times a day. Unfortunately the sound quality suffered badly from a reverberation time that ranged as high as 3.1 secs at 250 Hz. Vin Gizzi of Benchmark Associates in New York recently performed acoustic testing and corrected the problem by strategically locating suspended acoustic baffles on the ceiling and sound absorbing panels on the side walls. The treatment lowered the time to 0.8 secs midband.

● Tyne & Wear, UK: **Canford**

Audio buy into Ferrograph. Canford Audio have purchased the assets and rights to manufacture certain products within the range currently manufactured by Ferrograph. Specifically, Canford will continue to manufacture the Ferrograph range of audio test equipment and defluxers.

● Tokyo, Japan: **Laser turntable halved in price**. Patents for the Final Turntable developed in the US during the late 1980s, have been acquired by Japanese interests. The new owners, ELP Corporation of Tokyo, have announced that the existing *LT-1* model will sell in Europe for US\$18,800 (around £10,000) plus VAT. This is half the price of the original player introduced early this year from the USA. Improved manufacturing—now in Japan—technique has enabled ELP to make this reduction.

Book review: MIDI Systems And Control

The author, Francis Rumsey, starts by saying that the book is designed as a technical and educational text and it fulfils this aim admirably. The book contains very little in the way of background waffle, getting straight to the point and therefore not really suitable for the novice. As an experienced engineer, however, I was very glad not to have to plough through the background information that I already understand well enough!

The book gives a very clear explanation of all the nooks and crannies of the MIDI specification, approaching MIDI not as a musical entity in itself but as a computer control system with many diverse applications in audio production. MIDI is described as a technical specification, with concise and logical coverage of hardware and software aspects, with plenty of diagrams to reinforce the text.

After looking at the bits and bytes of MIDI, Francis Rumsey goes on to explain the uses of MIDI in common studio situations, with very clear details on the use of MIDI controlled samplers and an excellent section on synchronisation, both between MIDI devices and to external equipment such as tape and video machines. He also includes several descriptions of practical working systems, again accompanied by straightforward diagrams.

One of the best features of the book is that it gives in-depth explanations of the more recent additions to the MIDI specification—MIDI Time Code, MIDI song files and MIDI sample dumps—areas not covered by many of the current texts and therefore invaluable to the engineer working with some of the newer equipment on the market.

All in all, *MIDI Systems And Control* is a very readable book, treating the reader as a reasonably intelligent person (not a complete idiot, or a scientific genius like some books). It offers a lot for the engineer who is looking to expand the MIDI side of their setup, giving clear ideas about what is and isn't possible with MIDI and how to build a MIDI system that will fulfil their needs. The technical details, while not blinding the reader with science, give sufficient detail to enable Joe Studio to install a comprehensive MIDI system and keep the MIDI bugs at bay. With the increasing use of MIDI control in areas such as video production, this book will, without doubt, help many engineers to come to terms with the use of MIDI technology in their work. Simon Saunders.

Published by Focal Press
ISBN 0 24 051300 2

In-brief

● London, UK: Sypha listed as consultants. Sypha, the digital audio consultancy, have been accepted on to the DTI Marketing Initiative as listed consultants. As part of the Enterprise Initiative, the Marketing Initiative will pay up to 2/3 of the consultancy costs to help businesses develop a marketing strategy within home and export markets.

● London, UK: New team for Hot Nights. Founder Sandy McLelland has sold Hot Nights studio in Fulham to the partnership of Graham Dickson, Ross Fitzsimons and Robert Ittmann. The studio will remain commercial but also be used for the owners' production and publishing companies. New equipment so far includes a Postex G16 16-track recorder.

● New York, USA: The Venezuela Symphony Orchestra, WQXR and Chamber Music Plus are among the classical projects recently completed at Digital House, New York.

DN735

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When time is of the essence, Klark-Teknik's DN735 digital audio recorder cuts your stereo lay-off editing time dramatically. Compatible to all post production environments, it makes the whole process simpler. And it's a far more cost effective solution than any tape machine.

Its primary function is to add an extra two

tracks of high quality audio to standard VTR machines in order to simplify stereo editing. The standard memory of 44 seconds stereo is expandable to almost 3 minutes. The unit can record and play back short passages of stereo audio in synchronisation with other devices via an externally applied SMPTE time code (LTC).

The RS422 interface, which is fully compatible with current broadcast serial control equipment, makes the DN735 equally powerful when adding stereo audio to random access digital picture storage devices.

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Klark-Teknik Research Limited Klark Industrial Park, Walter Nash Road, Kidderminster,
Worcestershire DY11 7JL, England. Tel: (0562) 741315 Telex: 339821 KLARKTG Fax No: (0562) 745371

Klark-Teknik (Singapore) Pte Limited
7500A Beach Road, 04-308 The Plaza, Singapore 0719
Tel: 293 9736 Fax No: 293 9738

Contracts

● A **Fostex D20** DAT recorder and the Fostex synchroniser package have been included in the new Pink Pig mobile, which has been specifically designed for TV and film sound recording. The Pink Mobile, probably the smallest dedicated multitrack mobile recording unit, is centred around a **D20** digital mastering machine, a Tascam 24-track recorder, and an Allen & Heath 32-channel *Saber*.

● Recent purchases of the **Soundtracs In-Line** consoles are Charlie Scarbeck with an *IL 3632* and *Tracmix* automation. The console has been installed in his private studio. Richie Rich has recently built his own studio and equipped it with an *IL 4832* console with *Tracmix*.

● **Audionics** have announced that they have been awarded the contract to supply and install nine mixing desks and associated studio equipment at BBC World Service, Bush House, London, UK.

● **Digital Audio Research** have announced the sale of two *SoundStation II* audio production systems to Teletota, one of France's major video post-production facilities. Part of Groupe Tectis, a film/video consortium, Teletota have a new TV commercial A/V post centre planned in Paris to serve their advertising agency clientele.

● **Yew Tree Farm** studio in Nottinghamshire, UK, which until now has been mainly used as a private studio, has now become more commercial. Recent equipment upgrades include a new **Soundtracs IL 4832** with *Tracmix* automation and extensive outboard equipment.

● The **Raindirk Symphony** console was used this summer to carry out live recording of the concert featuring three of the world's top tenors Luciano Pavarotti, Placido Domingo and Jose Carreras. The recording was made by the Fleetwood mobile who have now placed an order for their third Raindirk. The *Symphony* console was also used in recording *The Wall* concert in Berlin by

Virgin's Manor Mobile.

● The BBC have recently signed a large order with Hayden Pro-Audio to supply 40 channels of **Sennheiser** radio mics to be installed in the TV Centre at Wood Lane.

● Recent **Allen & Heath** console sales include a *Saber* for Ocean Sound Radio station, UK; a *PA Saber* for the Barbican Centre in York, UK; and two *Sigma* consoles to Maurice Starr, producer, of among others, *New Kids On The Block*.

● The Mill Recording Studios in Cookham, Berks, UK, have opened a second studio. Studio Two is separate from the main facility and is primarily for use on in-house projects. The 26 m² control room features **Studer** and **MCI** multitracks plus **Mitsubishi X86**.

● **SW Davies** were the acoustic designers for the recently opened television studio 'The Powerstation' at Parson's Green, London. The fully floated building was built for clients Palace Video who provide the music channel for BSB, and the construction time of 5 months from

site acquisition is believed to be a record for such a facility.

● **Fostex's** Dutch distributors Prom Audio have announced recent **D20** DAT recorder orders from NOB Dutch Broadcast; Nederlandse Film & TV Academie, and OD & ME, an optical disk manufacturer near Eindhoven.

● Swiss film machine manufacturer Sendor have placed orders with **Audio Kinetics** for several *ES.Lock* systems including *ES.Lock 1.11* synchronisers, *ES.Lock Penta* controllers and *ES.Lock SSU* systems services units.

● **Nomis studios**, West London, UK, have launched a new pre-production suite, designed by Roger Hayler, technical manager at Nomis. The suite features a *Synclavier 9600* system with MIDINet as the key operational feature of the facility. Much of the work completed in the suite will be undertaken on behalf of Warner-Chappell Music as part of the joint production and publishing agreement signed between Nomis and WCM at the end of last year.

The Eventide range is now so good it's moved some to tears.

Whereas many of today's most popular signal processors are of Eastern origin, there's one name that stands out from the crowd. The name is Eventide. American innovation and design flair have been combined to create Eventide's H3000 Ultra-Harmonizer range – an answer to any audio professional's prayer.

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HHB COMMUNICATIONS LIMITED, 73-75 SCRUBS LANE, LONDON NW10 6QU



● Square Dance Studio have announced the building of their new facility in Nottingham, UK. The Square Centre is a purpose built three studio complex. The first studio is now fully operational, equipped with a fully automated **Amek Mozart** desk, **Quested** monitors, **Otari** 24-track recorder and 2 Mbyte **Akai S-1000s**.

● Skyview Film & Video have recently installed a new **Harrison Series Ten** console. Skyview have recently relocated to the entire 22nd floor of the new Time-Life building in downtown Chicago, USA.

● **Pro-Bel**, Reading, Berks, have sold their first high density routing switcher in Australia to QTV via their agent IRT Electronics Pty, Ltd. The order from QTV was part of a major expansion programme to provide television coverage to all regional Queensland. Pro-Bel have also received an order for video, dual-channel audio and timecode switching systems for the Prado Del Rey Centre in Madrid. This is Pro-Bel's first major Spanish contract for

routing systems and was negotiated through their agent, Broadcast Sistemas SA in Madrid.

● The Finnish Broadcasting Corporation have purchased a further 10 **Audio Kinetics ES.Lock 1.11** synchronisers to bring their total to 62 units. Over 50 of the **ES.Lock 1.11s** are networked with **ES.Lock Eclipse** controllers to form a single machine control system.

● The Finnish Broadcasting Company have purchased two 16-channel **DAR SoundStation II** digital audio recording, editing and production systems for their TV Transmission Centre in Helsinki.

● The BBC have ordered an automated **Neve 66** series console for their new Sypher 1 suite, the fourth to be built in the Sypher complex at the London TV Centre.

● Westside studios, London, have installed a **Neve VR72** console with recall and **Flying Faders** automation as the centrepiece of a complete studio refit. The console will run in conjunction with Quested monitoring and a choice of Studer analogue or

Sony digital machines.

● The newest station to join London's community radio scene, Kiss FM, has gone on air using three **Soundcraft SAC 200** radio consoles. Installed by Michael Stevens & Partners, two of the 24-channel consoles will be used for on-air broadcast with the third used for programme production. Further **SAC 200** sales include a 16-channel console to Radio 5.

● Ian Taylor has been using a **TAC Scorpion** console and **QSC** amps from Music Lab for A-Ha's new album being recorded at his home studio near Bath. Alison Moyet has been laying tracks for her album at Brit Row with the help of 48 tracks of **Dolby SR** supplied by Music Lab.

● A trio of top studios in Denmark—Puk, Sweet Silence and Medley—have all invested in **Neve** audio technology. Puk have installed a 72-channel **VR** with recall and **Flying Faders**, automation in Studio One. Sweet Silence have installed a **VR72** with recall and **Flying Faders**, and Medley Studios have upgraded with a **VR60** with recall and **Flying Faders**.

Address changes

● **Philip Drake Electronics** have moved to new 44,000 ft² premises. Their address is 26-28 Hydeway, Welwyn Garden City, Herts AL7 3UQ, UK. Tel: 0707 333866. Fax: 0707 371266.

● **Digitec and Digicable** are moving to new combined premises. The address is 25 Avenue de L'Europe, F-78400 Chatou. Tel: (1) 34 80 87 00. Fax: (1) 34 80 87 79.

● **Electrosonic** are now at Hawley Mill, Hawley Road, Dartford, Kent DA2 7SY, UK. Tel: 0322 22 22 11. Fax: 0322 28 22 82.

● **SW Davies Ltd** have moved to Link House, Heather Park Drive, Wembley HA0 1SX, UK. Tel: 081-902 8994. Fax: 081-902 9228.

● **Advision** have opened a new studio at 1 Montague Place, Kemptown, Brighton BN2 1JE, UK. Tel: 0273 677375.

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We could go on to talk about the H3000 series' versatile MIDI implementation, the informative LCD display and the ease of programme editing — but that might be rubbing salt into other people's wounds. So call HHB for a demonstration, and you'll understand why there are a few tears being shed in the East.



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Sonic Solutions NoNoise II

Sonic Solutions have announced a second generation of NoNoise, the digital noise reduction signal processing system. NoNoise II offers a number of enhancements including a new algorithm to remove crackles from old disk recordings by the application of artificial intelligence. The program has to examine each sample and decide if it is music or not, and if not then the program has to compute a replacement value. NoNoise II is also much faster in the hiss removal program having been speeded from 3X realtime to realtime.

The speed of impulse/click removal has been increased by 20X over the original version. Lastly with NoNoise II, Sonic Solutions has announced that it is unbundling the NoNoise system allowing customers to buy the components for de-clicking, de-noising and de-humming separately and as they need them.

Sonic Solutions, 1902 Van Ness Avenue, Suite 300, San Francisco, CA 94109, USA. Tel: (415) 394-8100.
UK: FWO Bauch Ltd, 49 Theobald Street, Herts WD6 4RZ. Tel: 081-953 0091.



Tascam have launched a version of the 24-track 1 inch MSR-24 equipped with Dolby S-type noise reduction. Dolby S is the most recently introduced of the domestic Dolby formats and is a 2-channel system derived from the SR format. Tascam say that it is the most effective noise reduction format they have tried (outside of the full pro formats) and will be in production with the machine by the end of the year.

UK: Teac UK, 5 Marlin House, The Croxley Centre, Watford, Herts WD1 8YA. Tel: 0923 225235.
USA: Teac Corp of America, 7733 Telegraph Road, Montebello, CA 90640. Tel: (213) 726-0303.



Cipher digital disk system

Established as manufacturers of timecode, synchronisation and editing products, Cipher Digital showed a new direction during the AES Convention with the CDI-328 Random Access Recorder. This is a low cost digital recorder using hard and magneto-optical media offering recording and editing. The 328 is available in 2- or 4-track versions and samples at 48 kHz, 44.1 kHz and 32 kHz. A/D converters are oversampling Delta/Sigma types and the complete unit can be referenced to external timecode, video or word

clock. The 328 has its own remote control unit although control is also possible from the front panel of the rackmounted Sound Storage Processor or other external edit systems. The unit has basic editing capability allowing manipulation and assembly of audio material. The 328 system has built-in back-up, network capability and can record 2 track hours of 20 kHz audio.

Cipher Digital Inc, PO Box 170, Frederick, MD 21701, USA. Tel: (301) 695-0200.

DAR SoundStation DSP

Digital Audio Research have added a DSP card option for the SoundStation II digital audio record/editing system. This will now allow realtime EQ and mixing of audio tracks. Segment Based Processing allows the user to independently adjust EQ with the internal 4-band parametric equaliser, alter gain and panning in the digital domain. The settings are attached to the audio segments and remain with them regardless of other

SoundStation functions upon them. The DSP card has provision for the integration of further DSP chips for other signal processing functions. The card will fit to both new 16 channel systems and as an upgrade to existing systems.

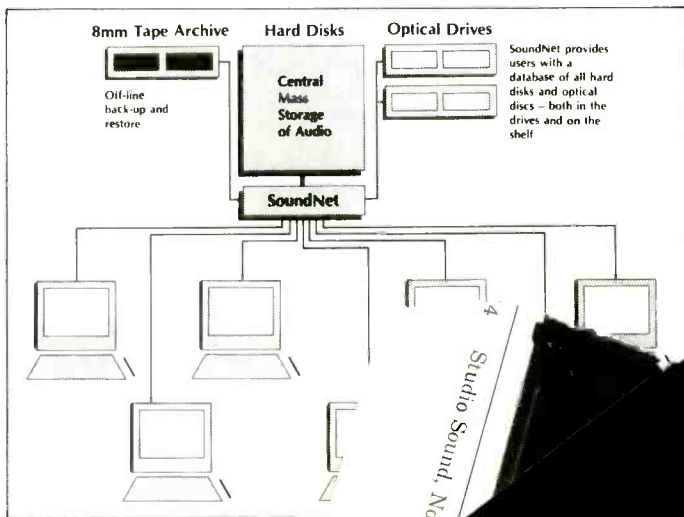
Digital Audio Research Ltd, 2 Silverglade Business Park, Leatherhead Road, Chessington, Surrey KT9 2QL, UK. Tel: (03727) 42848.

SSL SoundNet for ScreenSound

Solid State Logic have introduced a digital audio network for the ScreenSound video orientated audio editing system. SoundNet will allow up to seven operators to share and copy work as well as providing central mass storage of audio and a database of sound clips. The ability to share and copy work reduces the need for upload and download of projects while the mass storage aspect also enhances the ability for multiple users working on the same project to have easy access to material. The network also has provision for up to 16 SCSI devices

that users can determine such as all hard disk (up to 48 hours fully loaded) or a mixture with opticals. Back-up and restoration of projects can be an off-line function. Lastly, although with significant implications, is the ability of SoundNet to allow multiple ScreenSounds to slave to a master allowing up to 56 channels of control.

Solid State Logic, Begbroke, Oxford OX5 1RU, UK. Tel: (0865) 842300.
USA: Solid State Logic, 320 West 46th Street, New York, NY 10036. Tel: (212) 315-1111.





Audio Animation Paragon

Audio Animation have introduced a digital audio dynamics processor known as the *Paragon*. Intended primarily for broadcast applications, it has four bands of compression and four bands of limiting with user adjustable crossover frequencies, attack time, release, coupling and mix level. It employs a technique Audio Animation refer to as instant-attack-time limiting that avoids any clipping type function.

The unit designed in a 5 U rack format with a 9 inch black and white monitor equipped with a touch screen. When editing, the user presses the screen control icon

required and then turns the knob to change that control's value. The *Paragon* has factory presets for processing seven different audio signal types with each category having five setups of processing degree. For user assistance there are help screens and the ability to lock-out the front panel for security.

Future hardware and software additions will include a digital 10-band graphic EQ, a digital FM stereo generator and an AES/EBU input/output package.

Audio Animation Inc, 6632 Central Avenue Pike, Knoxville, TN 37912, USA. Tel: (615) 689-2500.

Crown Studio amp

Crown launched a new power amplifier for studio applications during the recent AES known as the *macro-Reference*. Crown stated that the design approach taken was to look to the needs of 20-bit digital audio—the dynamic range, speaker control and interface requirements. The input is modular and comes as standard with an analogue circuit but there is provision for plug-in modules to meet digital interface requirements. Facilities include front panel level controls and settings for two sensitivities, the ability to work bridged or parallel mono modes, with

a claimed bandwidth of between 3 Hz and 100 kHz and a damping factor of 20,000 at 8 Ω. Cooling is by convection with additional 'on demand proportional speed' forced air. The unit weighs 62 lbs.

Crown International Inc, 1718 W Mishawaka Road, Elkhart, IN 46517, USA. Tel: (219) 294-8000.

UK: (as Ameron) Shuttlesound Ltd, Unit 15, Osiers Estate, Osiers Road, London SW18 1EJ. Tel: 081-871 0966.

UK: HHB Communications Ltd, 73-75 Scrubbs Lane, London NW10 6QU. Tel: 081-960 2144.



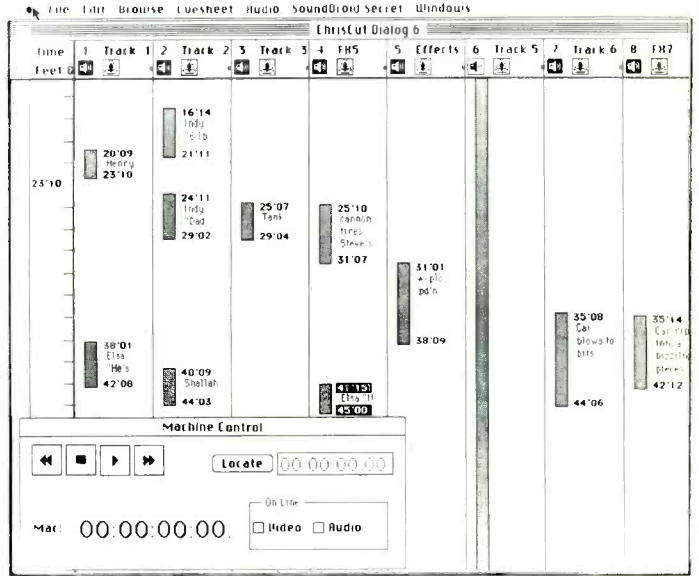
NED DSP and SoundDroid

NED has unveiled their previously announced DSP option for the *PostPro* and *PostPro SD* digital workstation. This DSP option incorporates what NED refer to as *MultiArc* technology that offers an open system design allowing future multitasking/multiuser capabilities. The DSP option offers onboard mixing capabilities—5-band parametric EQ with high and lowpass filters, shelving and auto level control; multichannel digital I/Os and sample rate conversion. The multitasking aspect will allow background functions simultaneously with 'on-line' processing. The multiuser aspect will allow the formation of systems based around centrally shared processing and storage.

The first third party software for the *PostPro* using the DSP was also shown. Developed by Lucasarts Entertainment and NED, the *SoundDroid* Audio Editing System is

a package for film and video audio post-production. The system uses some of the approach developed by Lucasfilm in the mid '80s. Screen displays are graphic representations of mixers cuesheets and users can move and edit sound within this display as required. Sound can be moved track to track or time slipped and cuesheet files can be transferred between users. The software has the ability to control the complete post process including spotting, editing, dialogue splitting and filling, picture changes to final mix. *SoundDroid* continually updates EDLs with reports or cuesheets available at any time. Future releases of the software will use the DSP and mixing capabilities of the DSP option.

New England Digital, Rivermill Commercial Center, Lebanon, NH 03766, USA. Tel: (603) 448-5870.
UK: NED Europe, Elsinore House, 77 Fulham Palace Road, London W6 8JA. Tel: 081-741 8411.



Timecode for the PCM-2000

Sony have introduced a timecode option for the *PCM-2000* portable DAT machine. The *BVG-200* will add read/generate timecode facilities as well as outputting a word clock signal synchronous with an incoming composite video or film sync signal. The *BVG* will generate timecode selectable as NTSC (both drop and non drop frame), EBU or film. Word clock can be output at 48 kHz, 44.1 kHz or 44.056 kHz also allowing user bit data to be added. The unit

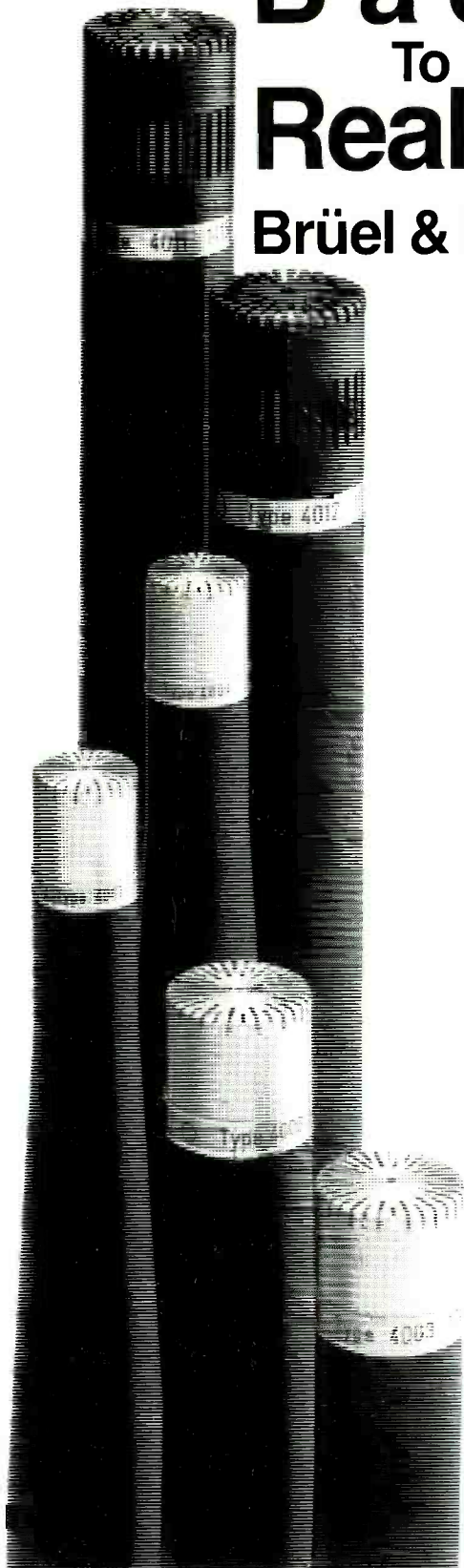
can be used standalone or mounted to the underside of the *PCM-2000* and also extends the battery running time of the *PCM-2000* to 120 minutes.

UK: Sony Broadcast & Communications Ltd, Jay's Close, Viables, Basingstoke RG22 4SB. Tel: (0256) 55011.

USA: Sony Corporation of America, 1600 Queen Anne Road, Teaneck, NJ 07666. Tel: (201) 833-5229.

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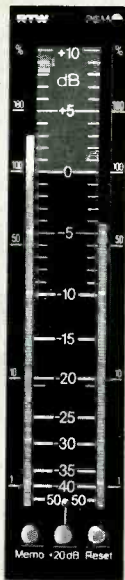
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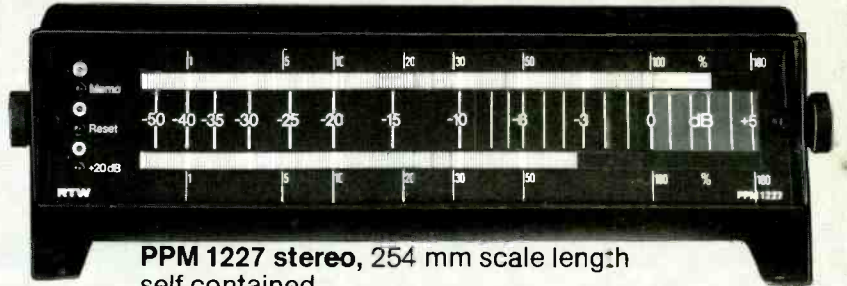
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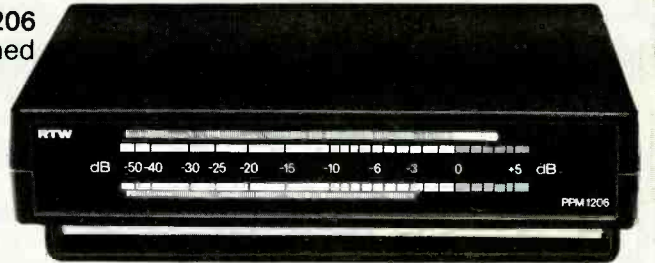


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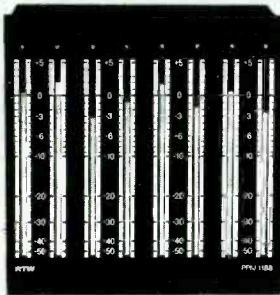
Model 1206
self contained



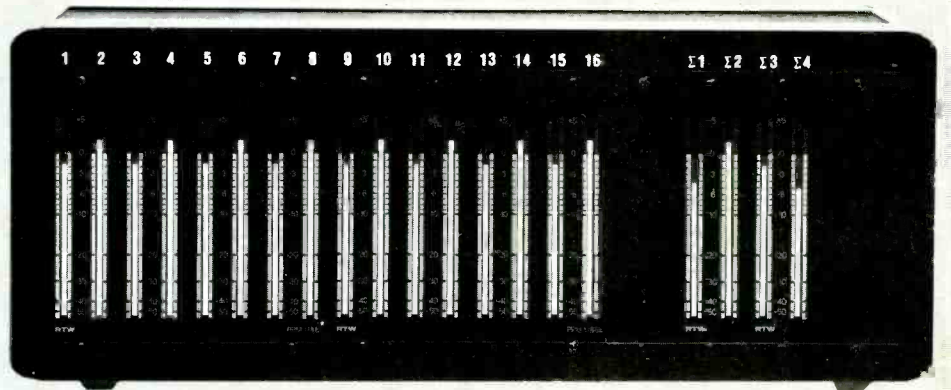
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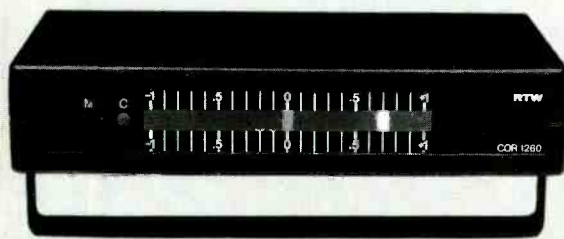
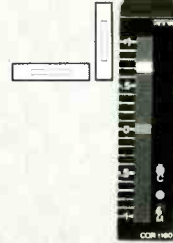
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New Yamaha digital console

Shown for the first time at the LA AES, The *DMC1000* is a fully digital console with full automation and a fairly conventional type of control surface. It has 14 input channels—8 mono and 3 stereo, with 8 monitor input channels which can be mixed onto the main stereo bus giving 22 inputs. There is also provision to cascade multiple consoles for greater number of inputs. Faders are 100 mm (4 inch) touch sensitive motorised types with data being taken only from those faders being moved. Metering is provided for all console inputs and outputs while incoming external timecode for automation control has a dedicated display. Console data is displayed on a backlit LCD display. The monitor channels level control is by continuously variable shaft encoders that use the perimeters of the control to indicate settings.

All channel parameters are realtime automated including level,

mutes, EQ, pan, aux sends and bus assignments. Referenced against timecode, all data is stored on an internal 3.5 inch floppy disk drive. Additionally static scenes of all console parameters may be stored on a RAM card. Yamaha say that MIDI is implemented on the *DMC1000* but so far there are no details of in what manner. The EQ uses a virtual control section offering four bands of parametric EQ with 20 Hz to 20 kHz on all bands—two bands being switchable shelving/peak. High and lowpass filters are included and the resultant EQ curve can be displayed on the LCD display. Each channel has two mono aux sends and one stereo with 20 bit D/A converters on the aux outputs, 19 bit A/D converters being on the stereo inputs.

Internal processing is provided in the form of two *SPX1000* processors. Bus outputs, channel and monitor inputs have *SDIF2*, *Pro-Digi* as well as Yamaha format inputs; channel



outputs being AES/EBU, SPDIF and Yamaha formats. Two channels have *SPDIF2* inputs for direct connection of CD and DAT players. A full preamplifiers, A/D and D/A converters and digital patchbays for linking to multitrack digital

machines.
UK: Yamaha-Kemble Music UK Ltd, Mount Avenue, Bletchley, Milton Keynes. Tel: (0908) 371771.
USA: Yamaha Corporation of America, PO Box 6600, Buena Park, CA 90622. Tel: (714) 522-9011.



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The DN500 is the only two-channel compressor/limiter/expander that lets you use its processing functions in any combination — with full function variable knee compression, independent peak limiting and clipping. Plus a variable ratio expander/gate for total dynamic control.

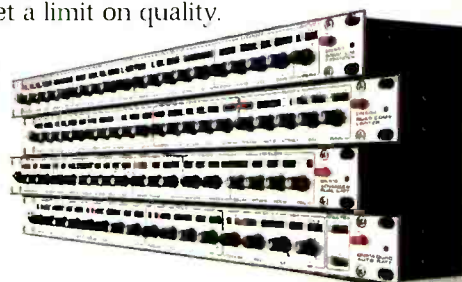
Most importantly, it delivers all the clean, quiet sound quality and reliability you'd expect from Klark-Teknik.

The same high standards are common to all Series 500 products — from the compact DN504 Quad Compressor/Limiter, to the flexible DN510 Dual MIDI Noise Gate and DN514 Quad Auto Gate.

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



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AUDIO FOR SALE



AES new products

A brief note on some products shown at the LA AES of which there was only limited information available. Full details will follow when available.

Otari showed the engineering prototype of new DAT machine for launch in 9 months time. Despite having no model number as yet the specification will include SMPTE/EBU timecode record/reproduce capability with the further ability to generate and display its own timecode. Options will include chase sync and multi machine editor/controller. New versions of established machines were shown.

The **MTR-90 Series III** features 50% increase in wind speed and a redesigned deck plate for easier threading with new features including tape load error detection/end of reel sensing, auto reel size detection and other electronic ergonomic features.

The **DTR-900-II** is the new version of the PD 32-track digital machine which now has an internal digital matrix controlled from the remote to reassign inputs to tracks. Other changes include front panel display, new D/A converters, selectable crossfade times and curves, and a time advance output for use with external digital processors and mixers.

Finally **Otari** showed the results of their collaboration with **Digidesign** who produces the software for the **DDR-10** disk based recorder/editor. Based around a **Mac IIci** it uses a dedicated hardware control panel with jog/shuttle wheel replacing the need for keyboard or mouse. DSP functions such as pitch shift, EQ, time manipulation and mixing are included.

Lexicon were showing the **300** in full production form and also the new **LXP-15**, a multi-effect system using their Dynamic Midi system to give control of 27 variable parameters. Effects include 128 presets with pitch shifting, stereo delays, gate, plate, reverb etc as well as 128 user memories. It is also controllable by the **Lexicon MRC** remote.

Akai were showing a prototype of the **DL1000** controller for the **DD1000** optical disk recorder as well as the most recent software for the **Mac** control/display system. An addition to the sampling range came in the form of the **S1100** that builds on the **S1000** with built-in DSP, SMPTE reader/generator with cue

list programming, SCSI port, standard 2 Mbyte memory expandable to 32 Mbytes. Optional Version 2.0 software will allow direct to optical disk recording.

Roland had many new products including the **DM-80** 4-track hard disk recorder with internal mixing and signal processing capabilities; the **SBX-1000** MIDI cueing box SMPTE/MIDI events generator and synchroniser; and causing much interest—the **RSS** (Roland Sound Space) *Processing System*—a 4-channel processing system that allows the user to place signals in a 3D type soundfield that is then recorded to a 2-track master.

APT were showing enhancements to the **apt-X 100** Music Coding System including the Auto-Sync mode that locks the encoder and decoder units within 50 ms without the need for a dedicated work sync signal; auto detection of aux data within the digital information; and an 8-channel de-multiplexer mode which allows up to eight coded channels to be multiplexed together for transmission over a link and connected to a single decoder—possibly allowing the system to quadruple the number of circuits available compared to a standard stereo PCM link without modification to the clocking circuits.

Studer were showing the new remote panel and sound memory board for the **D820-48** digital multitrack. The memory application includes track slipping or digital bouncing, and it may be loaded in three modes— instant, continuous or trigger.

API have introduced a new equaliser based upon the original **550** design. The **550S** has the same equaliser facilities as the 4-band **550B**. It uses two **2510** discrete op-amps allowing output levels over +27 dBm. The mechanical design allows direct plug-in replacement for the equaliser in the **Sony MXP 3000** series console. **API** also have a discrete mic preamp **212S** which is also interchangeable with the **Sony** mic pre series, available as single or dual mic preamp, with or without simple vu display.

Dolby have introduced the **Model 422** encode/decode noise reduction unit that provides four channels of **Dolby B, C** and **S** type noise reduction. It is a single U rackmount design intended primarily for encoding running masters for audio and video tape duplication, and for decoding recordings for quality assessment.

The Good Food Guide 1990



THE 1990 GOOD PUB GUIDE

Edited by Ailsdair Aird



THE GOOD HOTEL GUIDE 1990

Britain and Ireland



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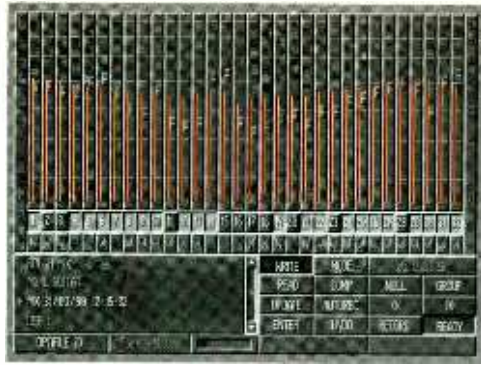
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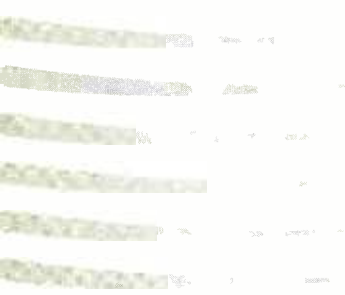
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Soundcraft Monitor

Soundcraft have introduced a 12-bus, fully modular *Monitor* version of the *Delta* console—the successor to the best-selling *200B* series, which is already shipping, say the company, in large numbers in the guise of the general-purpose front-of-house *Venue* variant.

The new *Delta Monitor* desk, available in 24-, 32- or 40-channel frames, incorporates circuit designs featured in the existing *Delta Venue* series including patented mic amp and active panpot electronics.

According to Soundcraft, its added attractions for hard-pressed monitor engineers on a tight budget include access to 12 sends via 10 mono outputs (each with a variable 'notch'

filter and 'panic' DIM button to aid swift feedback isolation) and a single stereo output. Each input has 10 rotary send controls, a 4-band sweep EQ and phase reverse. All outputs are electronically balanced and the whole thing is housed in a single-piece chassis.

Since Soundcraft have made their name in the sound reinforcement arena, many observers will be watching with interest for the company's new offerings for 1991. According to an informed source new developments are in the wings but the people at Borehamwood are maintaining a discreet silence. Watch this space.

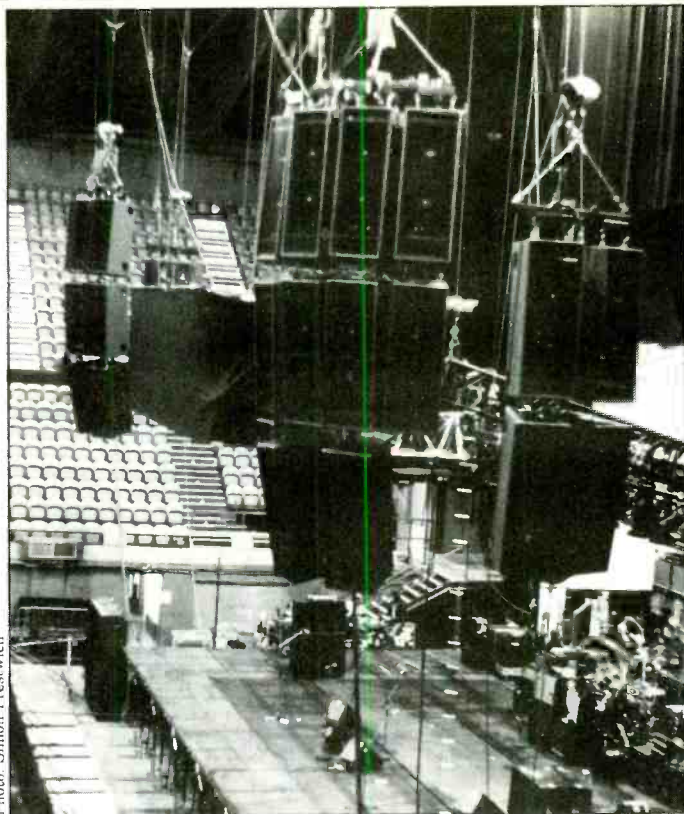


Photo: Simon Prestwich

Audiblease's MSL-3 system on Bob Dylan's 1989 UK tour

News round-up

• **Allen & Heath** have extended their *SC Plus* console range with four new 8-channel desks, launched at the London PLASA show in September. Users can choose any combination of fixed or sweep EQ, standard or matrix output and an optional talkback/oscillator module.

• **Entec** have added to their rental stock with a new array of JBL *Concert* and *Sound Power* series speakers, supplied by Marquee Audio. According to JBL, this gives Entec the UK's largest *Concert* series hire system and frees them from 'the multitude of cabinets of varying shapes and sizes it had to continually contend with on tour'.

A JBL *Sound Power* system has also found its way to Bedford-based **Loud & Clear**, who made their debut this year with comedian Bobby Davro.

• **Farrahs** have been appointed sole UK distributors for Yamaha's *PM1200* and *PM1800* mixing consoles.

• **Klotz Digital's Oak-Link** fibre optic distribution system is now up and running at London's Wembley Stadium. Its ability to switch instantly between different operational modes, according to Klotz, suits it to the role of central routing matrix, handling up to 125 physical areas and inputs from eight different sources (ranging from security control to the mix riser). Limiters and graphic equalisers process the inputs before A/D converters (sampling at 44.1 kHz) take over, routing the signals via a pair of digital switchers

to 88 digital processors, which afford independent delay and EQ control for each acoustic area. A touch-screen interface is provided to access *Oak-Link's* facilities.

• **Martin Audio** also chose the PLASA show to publicly unveil the first of a new range—the *CT* series—following a press preview at their new High Wycombe demo room in August. The compact *CT* series is aimed at corporate sound reinforcement and installation markets; it comprises the trapezoidal *CT2* full-range enclosure (featuring a new co-axial 12 inch unit—also used in the *CTW* low profile wedge monitor) and the *CTX* sub bass cabinet, which houses an 18 inch driver in a reflex enclosure. The system's performance is optimised, say Martin, by the matching *MX2* 2-channel biamp (switchable to full range) system controller which provides EQ and limiting functions.

• **The Pyramid from Mobile Entertainment Centres** of Birmingham offers an interesting alternative for concert, sport and business event promoters looking for a transportable covered arena capable of seating up to 11,000 people. Designed on the ridge tent principle, the *Pyramid's* internal steel frame has a rigging capacity of 30 tons, which is covered in turn by a weatherproof skin supported by an aluminium pyramid structure. The company states that the *Pyramid* was designed in conjunction with top lighting firm LSD. MEC, Birmingham, UK. Tel: 021-766 7969.

Audiblease and new Midas

Audiblease—the London PA rental company owned by brothers Steve and Tim Sunderland—has the distinction of fielding Midas' *XL-3* live sound console on its first professional outing.

The new board, on which the Midas/Klark-Teknik design team pins its hopes of a revival of the brand's former pre-eminence, receives its debut on New Model Army's UK and Germany tour this month.

Aimed squarely at the upper end of the market, the console (costing around £36,000 for a 36-input frame) begs to differ from the norm by offering both front-of-house and monitor facilities in a single configuration, which, Midas assert, involves no compromise whatever the application—house, monitor, theatre or installation mixing.

This has been achieved by the provision of no less than 18 sends per input channel, each routable in turn to the console's outputs or to VCA groups and masters. There is also the option of an external 8x8 matrix output mixer to cater for more complex situations.

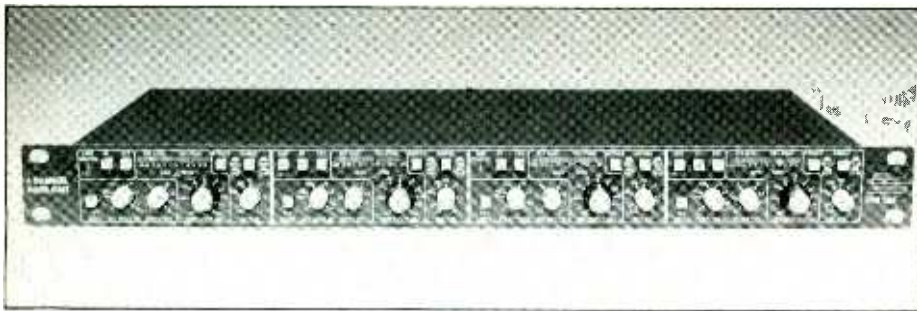
Midas see the *XL-3's* versatility as an opportunity for rental firms to maximise their capital outlay by running a board that can earn its keep in any guise. And the promise of sonic quality that will satisfy *PRO-40* users coupled with Klark-Teknik's extra design input might help put the Midas name back on the map as a manufacturer.

Audiblease's *XL-3* is in fact Midas' own demo model—flying hot from its Los Angeles AES show launch to begin the tour as, Sunderland says, an 'evaluation' desk. "We always road-test new kit before we buy, although we're already fairly convinced because from what we've heard on test it's the cleanest sounding desk around. New Model Army's engineer, Alex Fink, is very excited about it. And the 'dual use' design is potentially a huge benefit for us; so even at say 25% more than a *PM3000* it looks an exceptional desk in value as well as performance terms".

• **Going to Woodstock** Audiblease have a number of other irons in the PA fire. A new 'own design' PA system is being readied for launch, with a trial run on The Fields of the Nephilim's recent UK tour under its belt.

More intriguingly, the Meyer-equipped company have also established a US base, joining forces with Kevin Hartman's Stage Systems in Woodstock to offer an *MSL-3*-Midas *PRO-40* system to existing clients venturing across the pond. "We can provide a better service for Meyer users than most US companies," claims Sunderland, "that's what our clients told us and we are simply responding to that opportunity".

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



BSS DPR 504

COMPRESSORS & LIMITERS

A list of new compressor and limiter products introduced in the last year, from information available at the time of writing

ARSonic: Not a compressor/limiter but able to perform a similar function the *Sigma* microprocessor-based Level Control Unit independently levels out programme material by analysing the signal and 'initialising' it at the first pass. Accurate peak/transient detection, maximum S/N and no loss of dynamic range is achieved at the second pass without the use of compression limiting. The system also incorporates *Dynaflex* noise reduction as a programmable function. The unit is 2-channel and the channels may be linked for stereo operation.
ARSonic Nurnburgerstrasse 28, Postfach 100118, D-8580 Beyreuth BRD, West Germany.
Tel: 0921 57711.
UK: Radius, PO Box 3, Basingstoke, Hants RG24 9QA. Tel: 0256 477222.
USA: ARSonic US, 146 Paoli Pike, Malvern PA 19355. Tel: (215) 647-9426.

ARX: The *Quadcomp* is a 4-channel compressor/limiter, each channel being provided with Threshold, Ratio, and Output controls and a 10-LED gain reduction meter. Channels 3 and 4 can be switched for stereo link operation and each channel uses a class 'A' VCA.

ARX Systems, Audio Research & Technology Pty Ltd, PO Box 15, Cheltenham 3192, Victoria, Australia. Tel: (03) 555 7859. Fax: (03) 555 6747.
UK: MTR Ltd, Ford House, 58 Cross Road, Bushey, Herts WD1 4DQ. Tel: 0923 34050. Fax: 081-671 7306.

BSS: The *DPR 504* is four independent channels of noise gate in a single U format. Each channel features LED metering; controls for threshold and release; parametric key filter controls, switchable attack range and link capability.
BSS Audio, Unit 5, Merlin Centre, Acrewood Way, St Albans, Herts, UK. Tel: 0727 45242. Fax: 0727 45277.
USA: BSS Audio, Pleasant Valley, NY. Tel: (914) 635-9000.

Citronic: Citronic have added a 2-channel expander/compressor/limiter, the *SPX3-51*, to their range of signal processors. Each channel features separate controls with channels able to operate in stereo mode, discrete 2-channel or as slaves to another unit. Compression includes threshold, variable ratio, attack and release,

sidechain input, function bypass and variable-knee. On the limiting side the threshold is variable and there is a bypass switch. There are LED indicators for the operation of the dynamic functions as well as the other user selectable functions.

Citronic Ltd, Bowerhill, Melksham, Wilts SN12 6UB, UK. Tel: 0225 705600.

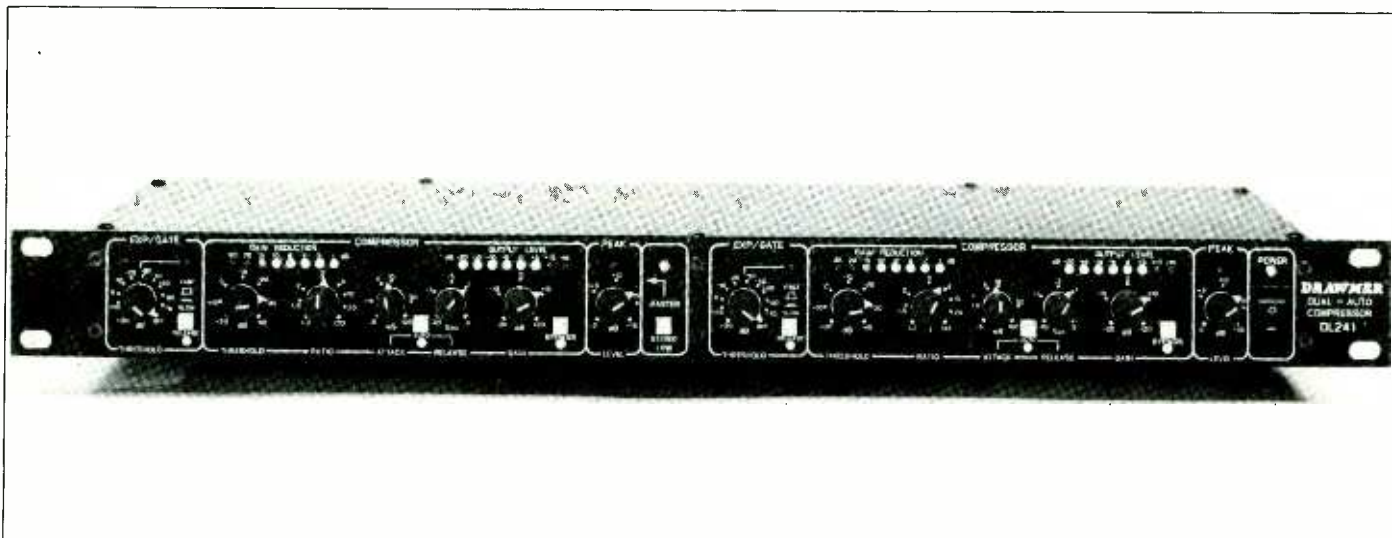
Drawmer: The *DL241* Dual Auto Compressor combines a wide range of operational parameters with sidechain automation. Features include expander/gate; soft-knee compression with adjustable threshold and ratio with manual or fully automatic attack and release times; stereo linking can be used to prevent image shifting when processing stereo signals; and a fully balanced hard-wire bypass connects the input directly to the output allowing the signal to pass through the unit with no power applied.

Drawmer Distribution Ltd, Charlotte Street Business Centre, Charlotte Street, Wakefield, West Yorks WF1 1UH, UK. Tel: 0924 378669. Fax: 0924 290460.

USA: Quest Marketing, 15 Strathmore Road, Natick, MA 01760. Tel: (508) 650-9476. Fax: (508) 650-9444.

GL Design: GL Design have introduced a 16-channel dynamics processor in a 4U rack. Each channel includes a noise gate, an expander/compressor and a sweep frequency dynamic filter, which can be switched into the compressor/expander section. Features include switchable long/short release times for the gate section as well as a Gate Hold control, master attack and threshold controls for all functions and level trim control. A control switch allows several channels in the chassis to be linked together as required or controlled via an external source.
GL Design, 1345 Le Lieu, Switzerland. Tel: 21 841 16 94. Fax: 21 841 18 83.

Klark-Teknik: Klark-Teknik have added the *DN-504* 4-channel compressor/limiter to their range of signal processors. This is a 1U 19 inch rackmount unit offering threshold, ratio, attack, release and output level for each channel. There is also the ability to switch the compressor between hard/soft knee operation on each channel as well as an auto-mode or full manual operation. There is the ability to link the channels as two stereo pairs. LED metering of gain reduction and output is included on each channel. Noise figures



Drawmer DL241

AKG
ACOUSTICS

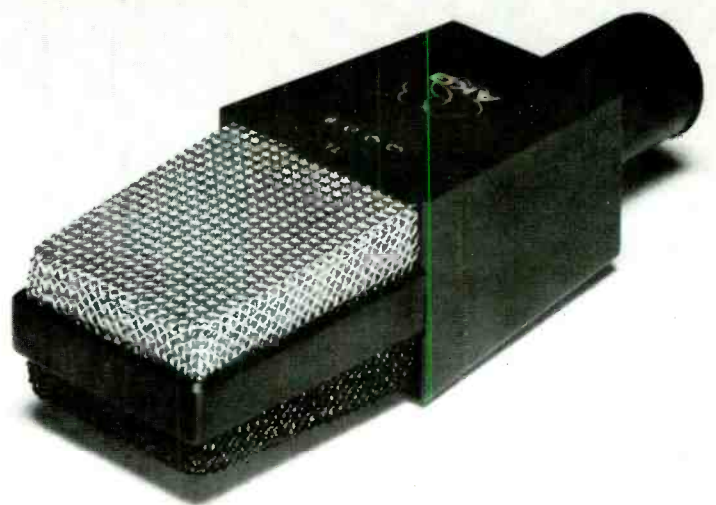
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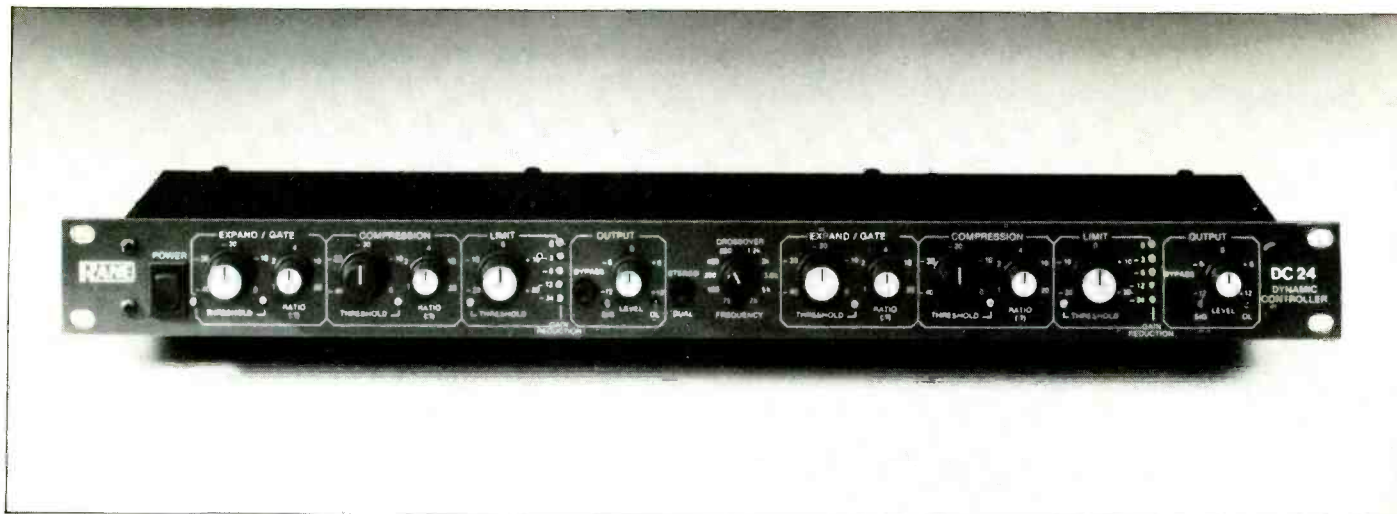
Because of the digital age specification, coupled with the four selectable polar patterns, and switchable pre-attenuation and bass roll-off, the C414B - ULS has an extraordinary wide range of uses for vocal and instrumental recordings and on stage performance.

A significant variation of the C414B-ULS is the C414B-TL, a transformerless version which some engineers prefer, for its powerful low end reproduction.

In either configuration the C414 proves yet again that AKG lead the way in microphone sound engineering.



AKG Acoustics Ltd., Vienna Court, Lammas Road,
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Telephone: Godalming (048 68) 25702.
Facsimile: (048 68) 28967.
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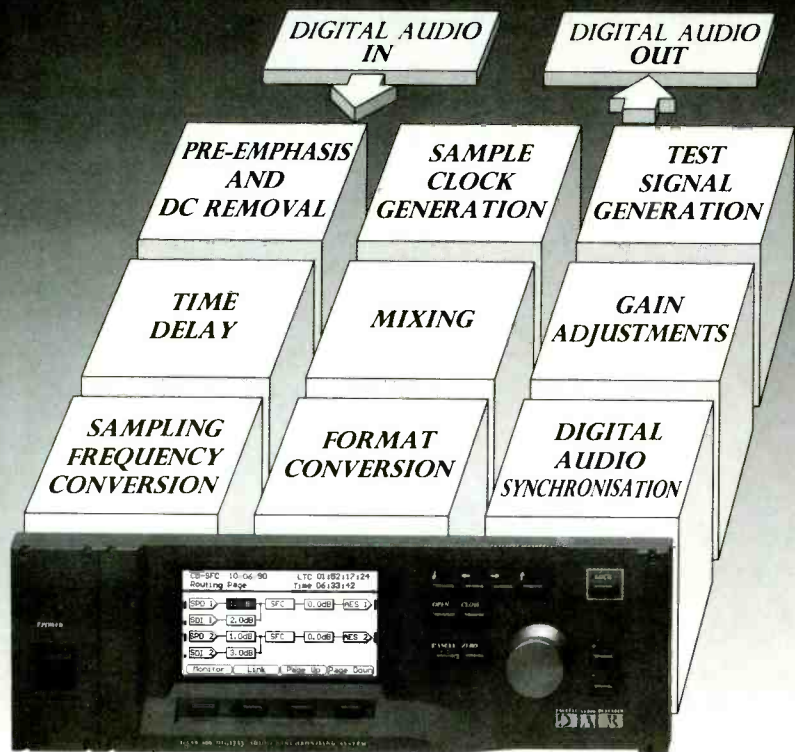
Rane DC 24

of less than -94 dBm 20 Hz to 20 kHz unweighted are quoted.
Klark-Teknik Research, Klark Industrial

Park, Walter Nash Road, Kidderminster,
Worcs DY11 7HJ, UK. Tel: 0562 741515. Fax:
0562 745371.

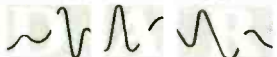
USA: Klark Teknik Electronics Inc, 200 Sea
Lane, Farmingdale, NY 11735. Tel: (516) 249-3660.
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Rane: The DC 24 Multi-Function Dynamics Controller offers two limiters, two compressors, two gates and a built-in crossover all in one unit. The unit features separate compression controls allowing dynamics to be dialled in independently of the limiter. The expander/noise gate can be adjusted without affecting the other dynamic control operations.

Rane Corporation, 10802-47th Ave W Everett,
WA 98204, USA. Tel: (206) 355-6000.

SCV: The AT422 is a dual 4-band dynamics controller and the PSD Director is a control unit for sound reinforcement. The AT422 consists of a dynamics controller where each channel is split into four frequency bands, each with its own limiter/compressor/gate. It employs low distortion VCAs and low-noise ICs and features selectable pre/de-emphasis, output gain, stereo coupling and vu/peak metering. An elliptical equaliser for modifying the stereo image is also incorporated as is a soft-clipper—or peak suppressor.

SCV Audio, 186 Allee des Erables, BP 50056
Paris Nord II, 95947 Roissy Charles de Gaulle
Cedex, France. Tel: (1) 48 63 22 11. Fax: (1) 48
63 22 92.

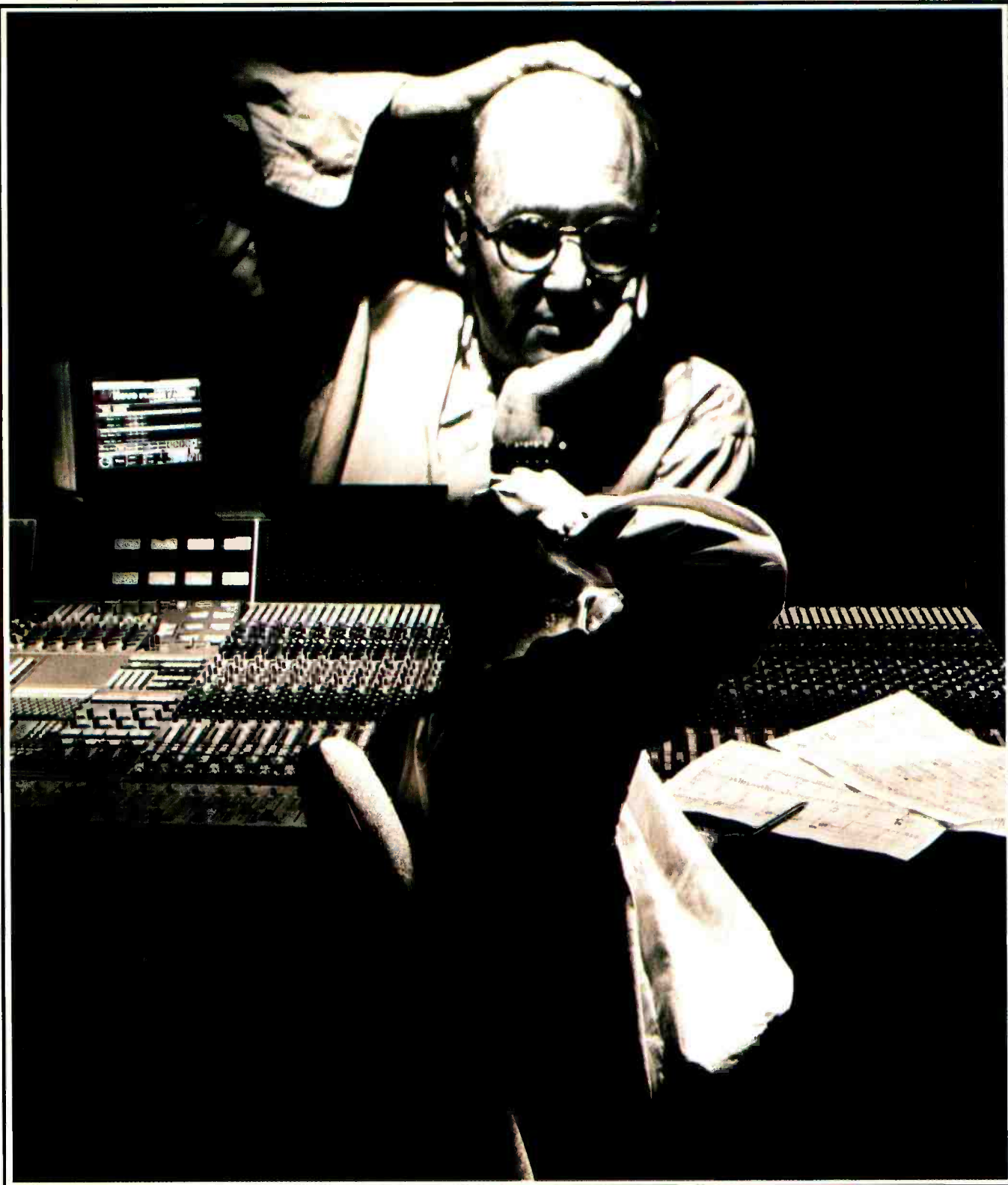
SSL: Part of the SSL Logic range of FX units is the G384 compressor, available in quad or stereo versions with both having external sidechain input switching and autofade VCA control for ratio, attack, release, threshold and gain make-up.
Solid State Logic, Begbroke, Oxford OX5
1RU, UK. Tel: 0865 842300. Fax: 0865 842118.
USA: SSL, New York. Tel: (212) 315-1111; SSL,
Los Angeles. Tel: (213) 463-4444.

Symetrix: The SX206 Multi Dynamics Processor is a single-channel device in the half-rack series, that can be used as a compressor/limiter, gate, expander, ducker or as a slave for stereo operation. A rear panel DIP switch allows the initial status-on power-up to be determined. Features include balanced input/output, sidechain access, soft-knee transition and panel controls for Threshold, Attack, Release, Range and Output Gain.

Symetrix, 4211 24th Avenue West, Seattle, WA
98199, USA. Tel: (206) 282-2555. Fax: (206)
283-5504.

UK: Sound Technology. Tel: 0462 480000. Fax:
0462 480800. □

Michael Nyman, Lansdowne Studios, Neve VRP.



Photograph: Malcolm Heywood Hand Printing: Ian Macmaster

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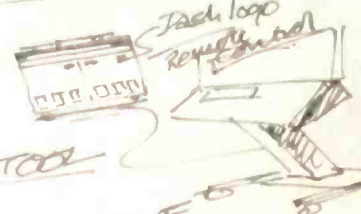
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- ④ REINFORCE SONY POSITION AS MARKET LEADER.
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- ① I
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DASH WORLD
SH climbs

DASH WORLD confirmed that Sony
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PCM 3348

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SONY COMMITTED TO DASH (LONG TERM)
AESTHETICS: 3348 IS & LOOKS THE BEST.

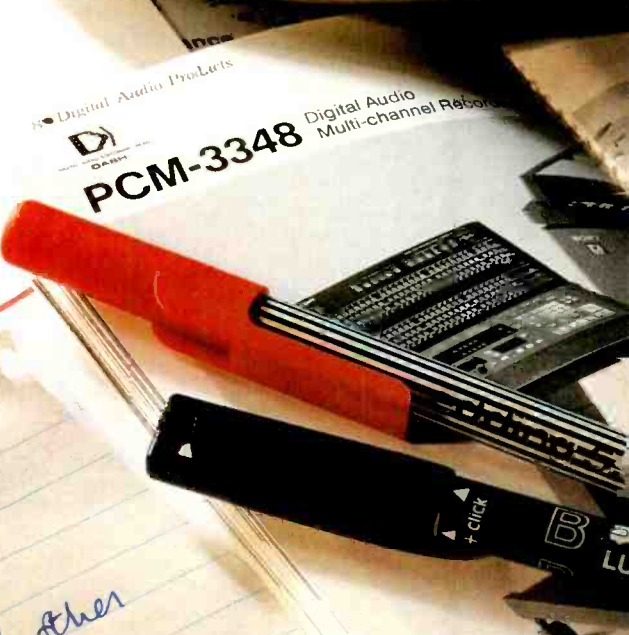
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A string quartet playing London's Royal Festival Hall? A little ambitious perhaps. But the Kronos Quartet is no ordinary string quartet, David Harrington and John Sherba, violin, Hank Dutt, viola, and Joan Jeanrenaud, cello, have been playing together for the past 12 years. During this time they have been instrumental in revolutionising contemporary classical music.

Traditionally an extremely specialist field, Kronos' work has popularised what was once deemed inaccessible music, first in their native USA and latterly worldwide. By regularly commissioning new works they have drawn upon musical cultures as far reaching as Uganda, Australia, Japan, Argentina and the Soviet Union. Their repertoire ranges from Bartok, Webern and Ives to Charlie Mingus, John Cage and Howlin' Wolf.

The quartet performs annual concert seasons in San Francisco, Los Angeles and New York, as well as touring extensively with more than 100 concerts every year in concert halls, clubs and jazz festivals throughout the USA, Canada, Europe, Japan, South America, New Zealand, Hong Kong and Australia.

In addition they produce their own radio series; Radio Kronos, which is broadcast throughout the United States. Their recording catalogue is published by WEA subsidiary Elektra/Nonesuch. For a contemporary music group to have reached such heights of popularity in itself is a major achievement. Many such groups exist on a shoe-string budget, never knowing where the sponsorship for the next concert is likely to come from.

Kronos tour with their own lighting and sound engineers, the bulk of the sound reinforcement equipment being supplied by hire companies around the world, to a very tight specification from sound engineer Jay Cloidt. Cloidt, in addition to being an accomplished audio engineer, is a composer and has worked as a sound designer for many US groups including the Margaret Jenkins Dance Company and the Paul Dresher Ensemble. Many of the groups he works with have commissioned compositions from him too.

During Kronos' European tour in the first half of 1990, Cloidt provided the sound design and reinforcement. Demands on both sound and lighting engineer are far greater than in ordinary classical music concert circumstances. Both are considered integral members of the ensemble and as such are accorded a degree of respect.

Kronos performed this concert in the Royal Festival Hall at London's South Bank Centre, as part of a Moving Forward Series, presented by Speakout and Serious Productions. Although a large hall, the balcony seats were not sold, the audience being contained within the stalls area. Even so, it was a large space to fill. Cloidt was, however, very happy with the room, describing the acoustic as, "Gorgeous; it's really quite easy to work in."

Richard Nowell Sound Services of London provided the sound system. The Kronos office in San Francisco is responsible for booking all venues. In the early days this resulted in a number of fairly hairy experiences. As time has gone on, familiarity with the various venues round the world as well as the quartet's needs has meant that a total disaster rarely occurs.

Cloidt's favourite story was an occasion when the original theatre booking fell through for some reason and they were booked instead into a round, carpeted church. "It was totally dead apart from anything else, and how can you provide sound to an audience which is all round you with

KRONOS LIVE

The Kronos string quartet's repertoire encompasses many musical cultures and styles and a mixture of venues adds to the engineer's problems when touring. Janet Angus talks to sound engineer Jay Cloidt about some of his experiences

our standard sound set up? The lighting dimmer switches were really noisy too. I just pointed the speakers randomly at the audience, it was all I could do. That concert is my benchmark for nightmare concerts.

"Nowadays it tends to be much more organised, the quartet spends 150 nights a year on the road. A couple of the venues tend to be real disasters but otherwise it is usually OK. The office staff have got much better at weeding out the bad venues."

One of the biggest hurdles is making people understand that this is no ordinary string quartet and has very specialist needs. Cloidt has a detailed specification sheet of technical requirements he gives to the hire companies. The mair system should be of high quality, with sufficient power for amplification of both quartet and tape at medium to high volume. He recommends a bi-amped or tri-amped system that must be clean and full sounding at high SPLs as Kronos tapes often contain very dense electronic music with a wide frequency range. The system

must be free of hums and buzzes and both stage and audience areas must be free of fan noise from equipment racks, which would otherwise be quite audible during a performance.

A minimum of 10 input lines from stage box to mixer should be provided plus stereo return and two monitor returns. The front-of-house mixer should have a minimum of 16 inputs with at least 3-band EQ, preferably sweepable semi-parametric. Stereo outputs plus two separate monitor sends and two effects sends are required along with phantom power for microphones.

Monitoring requirements are two low profile wedge-type speakers with a minimum of 75 W amplification each. One is placed on each side of the quartet; sidefills in the wings are not acceptable.

Cloidt provides the instrument microphones: four Countryman *Isomax* bridge-mounted mics and four floor mounted AKG 747 supercardioids. In addition, the hire company is asked to provide an announcement mic for onstage use—Shure SM58 or similar—which is placed on a pad on the floor.

The electronic tapes, which form an integral part of many of the pieces performed, require a ¼ inch 2-track stereo machine with speed control trim capable of 15 in/s operation and accommodating 10½ inch reels. They also use a Dolby C cassette deck. A stereo 31-band (½-octave) equaliser is also specified at or near the mix position, plus 10-band or better equalisation for the monitors.

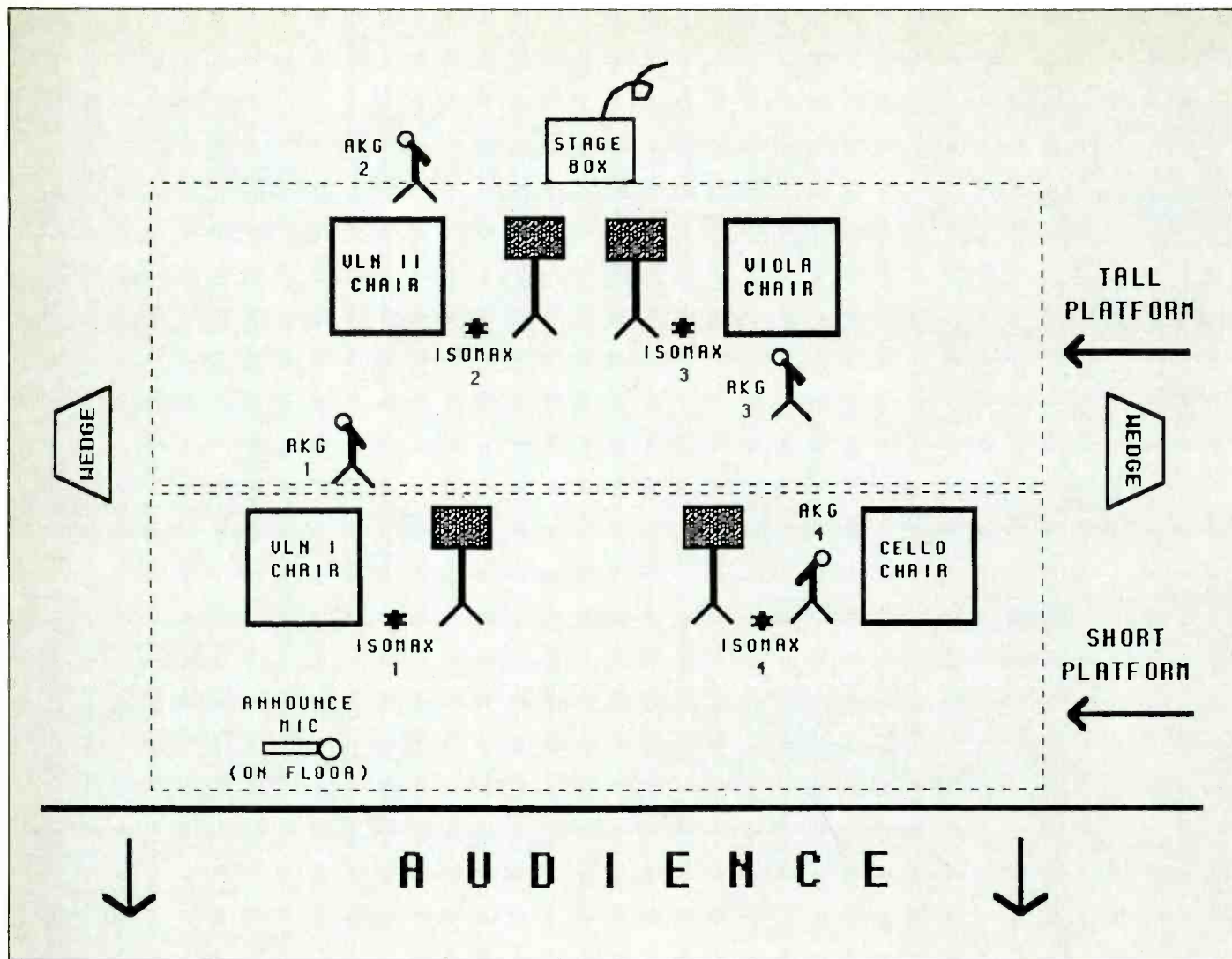
As the sound engineer is as much a member of the ensemble as the players themselves it is essential that the mix position is in the main house area, not in a sound booth. The players usually set up in a standard quartet format. The announcement mic is placed on the floor downstage of the first violinist's chair. Pieces that are more or less 'acoustic' will be amplified only to provide gentle sound reinforcement and are usually miked with the four AKG 747s. Pieces that use electronic processing and/or tape are generally miked with the four Countryman *Isomax* mics attached to the bridges of the instruments. One wedge monitor is placed to each side, between and behind each pair of players.

"The AKGs on the floor are an unusual choice," admits Cloidt. "I A/B'd them against the Schoeps cardioids I had been using as overheads and the AKGs came out on top. They are invisible to the audience and provide a really nice smooth sound. I was sceptical when I first listened to them and only put them up to prove I didn't need them. I did."



The Kronos Quartet

Photo: Michele Clement



Kronos Quartet standard setup

Cloidt places the 747s on low mic stands towards the back of each instrument. "I know it sounds like heresy but you get a lot of nice sound radiated off the instrument without the scratching and nasty midrange stuff normally associated with stringed instruments."

The Countryman *Isomax* mics have omni capsules and are mounted on the instruments' bridges with double-sided foam tape. Although not contact microphones they are so close to the bridge that they almost work in that way, avoiding overspill from the on-stage monitors.

"It's very unnatural to mic a stringed instrument at the bridge, sticking the mic between the string and the instrument's body and I am looking at alternatives," says Cloidt. The group had the Countrymans when I started working with them and although they have been good, they are an older design and I want to try to find something smoother. Kronos have some Barcus Berry contact mics but I have bad memories of their piano mics. I have tried ambience mics for recording but very few halls are good for that. With the AKGs placed 3 to 4 ft away there is a certain amount of room in there anyway."

Cloidt went through a phase of using omni condensers but was unable to get the amount of gain required without also getting feedback problems.

Mounting the *Isomaxes* on the cello bridge proved difficult: "You can't tape up a multi thousand dollar cello." The solution was found in

attaching the transformer to the spike and only the mic itself to the bridge.

Among the alternatives being considered are Beyer's *MCE5s* with omni capsules and the *MGH5* mount for string bridges.

In spite of tight technical specification, Cloidt does not have much choice in the actual equipment supplied by hire companies. "I can only specify what I need, and must have used almost every kind of desk you can imagine. The Yamaha *PM3000* is nice but I don't like the EQ on it very much. The same goes for the *PM2000* but it's OK. I've been given every variety of Soundcraft desk—fine workhorses. Playing classical music venues I rarely get a Midas or a Harrison; I don't specify enough inputs to justify that generally. A lot of *Studio Sound* readers would be appalled to read what I've been using.

"What really strikes fear into my heart is when the sound reinforcement is being provided by a rock and roll company which says 'Yeah, yeah, don't worry'."

Explaining Kronos' needs to an unreceptive ear is very tricky. Having said that, many of the companies have been very good. The system supplied by Richard Nowell Sound Services for the Festival Hall concert was very satisfactory.

Four *UPA1s* were flown in two pairs from a truss, one of each being upside down, covering the upper stalls area. Two *MSL3s* were placed on the floor to bring the sound down and cover the main hall.

"If you get a sweet sounding hall it sounds good

whatever you do. I was able to get more of the Steve Reich piece (*Different Trains*) to work in there than usual."

The Reich composition comprises, in addition to the live quartet, a pre-recorded tape, which features as many as three Kronos Quartets playing at any one time plus sampled speech and train sounds. The recordings are from many different sources including holocaust survivors and American and European train sounds from the '30 and '40s.

"The voices of the holocaust survivors were recorded on God knows what primitive tape recorders in the '50s. The tape I've got to work with was mixed by Steve Reich with the group and is noisy and gated. There are three lots of quartets recorded on three of the tracks and combined with the train sounds, whistles and sirens it is a very problematic mix to do live. I can't alter the balance of the voices and the effects are really complicated. It all has to be very strong. Steve Reich mixes it really loud when he does it."

The programme for this particular European tour comprised relatively untheatrical work, albeit involving more sound and lighting design than the average music concert. Some of the works in their repertoire are altogether more spectacular involving flying structures with ropes, pouring water, ball bearings and wireless microphones among other things.

The pieces here required varying degrees of processing. Istvan Marta's *Doom, A Sigh* calls

only for amplification of the instruments with, according to the composer, perhaps some echo as well. A pre-recorded tape uses recordings of two Romanian women singing about their families and violent pasts. This and the Reich are loud and require a good deal of amplification.

Mu Kkubo Ery' Omusaalaba by Justinin Tamusuza and extracts from Terry Riley's *Salome Dances for Peace* were altogether more straightforward from a sound point of view and required only reinforcement via the AKGs.

The Dead Man by John Zorn on the other hand had the Countrymans added in. *Jabiru Dreaming* by Peter Sculthorpe is based on rhythmic patterns found in the indigenous music of the Kakadu area and an Aboriginal chant. This work calls for an Eventide H3000S Ultra Harmonizer on the cello, bringing it down one octave in pitch.

A Lexicon LXP1 is used to provide general reverb fill. "I sometimes also use a Yamaha SPX90; reverb's a total pain in the neck for a string quartet and very necessary at times."

Sound was relatively easy at the Festival Hall. Elsewhere on the tour this had not necessarily been the case: "When we were in Germany, we played in a church in Hamburg, built in 1100, which had an RT of 10 seconds! There was no way the Reich piece was going to work in there. People heard some nice instrumental playing but not half what was on the tape. Sometimes you have to compromise.

"I'm still learning and it can be quite tough. Ninety per cent of my problem is making sure there are good enough speakers. You can specify all you want but you can't actually control what you get. With a nice sound system I can make those mics really nice. Given enough time you can generally get it reasonably good by adjusting the

crossover, spending a lot of time with EQ and moving the speakers around, trying to get a system that is 'flat'. If we arrive in the afternoon before the concert we haven't got much time to work with the EQ."

Funnily enough the most difficult part of the exercise might not be the music or the equipment at all. "Liaising with a crew who may or may not know what they are doing can be quite a nightmare. Also making them understand that I'm not a jerk and I know what I'm doing takes a certain amount of tact; I wish I could have a T-shirt with those words emblazoned across the front so that they know when they meet me. Man management and psychology are much more difficult than any technical problems.

"I have worked with a variety of people in the industry and without doubt the worst are US in-house theatre technicians. Theatre sound is very primitive in much of the States and making them understand what we're doing is hard. Having said that, of course, I have met some wonderful sound engineers; it's just that you tend to remember the problems."

Back home, Kronos regularly record live for their radio series. Cloidt works very closely with the radio engineers to make sure they know what he is doing, "So we don't end up with just a string quartet recording."

While on tour, they recorded for German Radio in Frankfurt where naturally the tonmeisters expected to mic the quartet in the conventional stereo manner. "I had to explain that it needs mixing like a rock mix. Some people can handle it, some can't."

Despite the trials and tribulations Cloidt finds his job very exciting, "I'm a composer and a new music fan. Who else has the time to sit and listen

to a new 2 hour string quartet several times over and who else gets to meet all the composers I do?"

The composers generally specify what is required of the sound over and above balance and audio quality, the engineer being a very definite integral member of the group. "I'm not strictly a technician; at least a craftsman."

For their part Kronos takes a keen interest in the technical side of their music, taking the time to consider problems and listen to microphone combinations. "I was trained as a musician but they have no technical training so I have to translate their ideas. It's nice that they get involved and take the time to sort out technical problems."


A set of electronic instruments is currently being built for the group, which will open up the compositional and sound possibilities even further. "The traditional instruments they are playing were not designed to be knocked about the way they are at the moment. The new ones being built by Zeta are going to make my life harder in that Kronos will be able to play above the bridge and do all kinds of new things with them, but at the same time it will make handling the electronics easier."

Meanwhile the Kronos European tour continued: next stop Glasgow Jazz Festival (later described by Cloidt as 'horrible')—first on a back breaking schedule ending in Barcelona where Cloidt was due for a well earned holiday. From the Cafeteria in South London, Berlin's Radio Concert Hall, the Royal Festival Hall, London, to the Kaiser Palace, Kronos spread the contemporary music gospel. "It's a soundman's nightmare," sighs Cloidt, "but it's been a lot of fun really; only because it has gone well!" □

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Over the last year or so I have deliberately avoided *QSound*, the latest in a long line of systems claimed to offer surround sound from a pair of loudspeakers. This has not been easy because the music press has been full of hype for *QSound*, and promoters Archer Communications of Calgary, with much talk of backing to the tune of \$100 million (Canadian) by investors including Todd-AO of widescreen cinema fame. An American journalist I met in Japan told me proudly how he had bought shares in the system (which made me wonder a bit about his credibility in print).

But we cannot escape *QSound* any longer. After travelling round the US and Europe demonstrating the system to mainly cloth-eared record company executives, Archer has finally got what it has been shooting for over the past 2 years. Software giant Polygram (subsidiary of hardware giant Philips) has signed to become the first record company in the world to use *QSound*.

Polygram will pay Archer a royalty (1% of the recommended retail list price) on each *QSound* recording released. Lawrence Ryckman, Archer's president, says the deal is a "significant step towards *QSound* becoming a standard in the recording industry".

Clearly Archer will now be able to use the Polygram deal as a lever on other record companies. The company is, we are reminded, one of the three largest in the world. The other record companies have all been waiting, and watching the others through clouds of hype for *QSound*. The Polygram deal could well be the trigger Archer has been hoping for.

But for Polygram the 'significant step' is clearly little more than a 'toe in the water' test. No-one yet knows whether record-buyers will like the sound of *QSound*, which creates an exaggerated stereo effect. Those who have heard it, at the closed door demonstrations and on a Coke commercial, talk vaguely of it making music 'sound louder'. Classical recording engineers are especially wary.

So, hedging bets, Polygram promises only to release 20 recordings over 18 months and take an option on buying a 15% share in Archer. Twenty recordings (pop singles perhaps?) is not exactly a major commitment for one of the three largest record companies in the world. Significantly, although Polygram's pop record labels (A&M, Island, Polydor, etc) are listed on the joint announcement from Archer and Polygram, there is no mention of classical labels Decca and Philips.

After the signing, Polygram International's head office in London said it had no technical details of the system and had no idea how it works. There have been no technical press briefings either in the US or Europe. US journalists asking Archer for technical details are told they are "proprietary and covered by patents which are still pending".

Like many North American companies, Archer appears blissfully unaware of the quirk in European law, which lays pending patents open for anyone to read and report. And by happy coincidence a recent European patent application tells how the *QSound* system works.

Barry Fox

Surround sound from two speakers; marketing problems in Glasgow

In EPA 357 402, inventors Danny Lowe and John Lees admit that there is still no satisfactory theory to account for the ability of humans to estimate the direction and range of a sound source. Previous ideas for artificially extending the spread available from two loudspeakers, by cross-mixing controlled amounts of the sound signal for each channel, with deliberate distortion of the phase and amplitude, include JVC's *Biphonics*, various 'super stereo', systems and most recently Hughes' *SRS*. All take advantage of the fact that the frequency response of the human ear varies with direction. The debit is that the effect is inevitably 'phasey' and many people find it fatiguing.

QSound, claim the inventors, can produce crisply localised sound images of great clarity, in different positions between, round, above and below a pair of loudspeakers without the listener being obliged to sit in a carefully defined position and keep their head still.

The starting point in the studio is a mono, single channel, sound signal. This is then split into two signals, and each is processed by altering its amplitude and phase in a manner that varies with frequency.

The two, now different, halves of the signal are then fed to a conventional pair of loudspeakers. The listener hears the sound at a clearly defined position in space. The position depends entirely on the transfer function, that is to say the manner in which the amplitude and phase of the two half signals was altered. The effect is thus purely artificial, and arbitrary. A single sound source, such as a trumpet, can be made to appear at any position in three-dimensional space, simply by altering the transfer function, "without constraints imposed by loudspeaker positions".

The *QSound* inventors admit that the transfer function can only be found by empirical means, ie trial and error. They know of no theory that enables the function to be predicted. With this in mind, they have been carrying out a lengthy series of practical tests, which involve splitting a sound signal into two and altering the relative levels of each with an attenuator, while at the same time altering their relative phase by introducing a slight relative delay. *QSound* has been making these tests across the whole audio spectrum, at frequency intervals of just 40 Hz.

At each frequency the amplitude and phase are varied and the position of the sound heard is plotted. In all, this adds up to around a million measurements to cover all positions at all

frequencies. *QSound* says in the patent that the collection of this vast database is "in progress".

In theory a large number of transfer functions must be applied at the same time. In practice, say *QSound*, only a few spot frequencies are worked on, like plot points on a graph which then connect to form a smooth curve.

Whereas multitrack channels are conventionally mixed together into a stereo spread, for *QSound* mixing each multitrack channel is split into two and fed through a transfer function processor to define a position in space for whatever instrument is recorded in that particular channel. When the individual multitrack channels have been split into a pair and processed, all the pairs are mixed together to produce a final pair of signals, which is then recorded or transmitted as a conventional stereo signal for domestic reproduction. *QSound* say that the signal processing will preferably be in the digital domain, to avoid the introduction of distortion and noise. It may not be cost effective to carry out this processing in realtime. Instead the processor is left to 'cook' the channels in a storage system, such as a magnetic disc recorder.

However efficiently the *QSound* system proves at positioning sound images in space and moving them, the patent makes it abundantly clear that the system is wholly artificial, with the position of sounds heard by a listener under the control of a studio engineer operating transfer function controls. It appears that the Polygram deal is designed to monitor reaction from record-buyers and audiophiles over 18 months.

If reaction is good, *QSound* might become the standard claimed by Archer. If people object or are apathetic, *QSound* will be just another stone in the surround sound graveyard.

I don't want to pursue the matter of *CEDAR* vs *NoNoise* for the sake of it. Both systems are heavily dependent on operator skill for de-noising. Industry users will very soon identify any inherent defects or advantages in either system. Other than that it is now a matter of marketing. For the sake of completeness, I have to report what happened at the Radio Academy Festival, held in Glasgow in early July.

The British Library's National Sound Archive had a stand at the exhibition, which was being staged in the same building as the conference. Broadcasters gathered from all over the UK and it was a golden opportunity to sell them on *CEDAR*.

Unfortunately, the tangled web of patent and commercial deals that gives Cedar Audio, the joint venture between the BL and Cable and Wireless, control over the *CEDAR* technology, prevented the NSA from demonstrating the system, which had begun life as an NSA project.

So at Glasgow all the helpful NSA staff could do was give away price lists for *CEDAR*, apologise for the absence of a demonstration and offer prospective customers a demonstration tape. And here, they hit another problem. Cedar's policy is to charge £10 for a compact cassette and £20 for a digital audio cassette. Not surprisingly broadcasters were none too pleased at the idea of paying £20 to hear the system they were being offered the chance to buy for over £60,000. □

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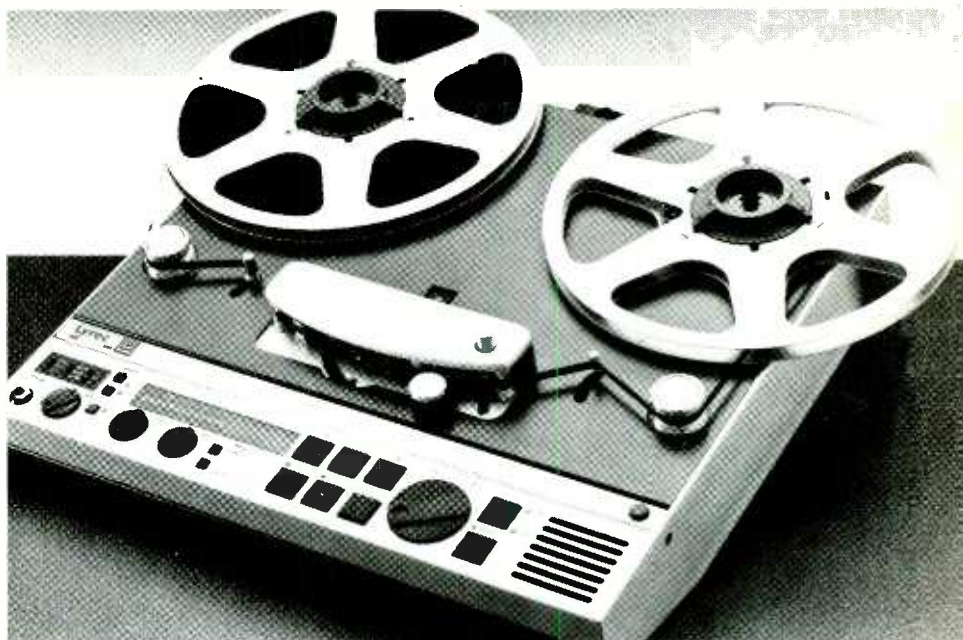
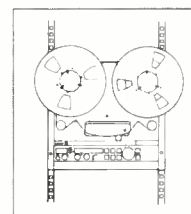


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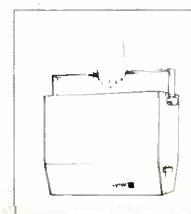
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INSIDE THE AUDIOFRAME

Yasmin Hashmi describes the operation of WaveFrame's AudioFrame digital audio production system

The **A**udioFrame is designed as a modular system offering a combination of features integrated within the digital domain. These features include sampling with sound design, sequencing, digital mixing and hard disk recording/editing. There are four main hardware options: the sampling system, the hard disk recorder, the universal digital interfaces and the DSP module. There are a number of software-based operating elements: the sampling synthesiser, an events processor, a digital mixer with EQ and reverb, the hard disk editing page and a MIDI sequencer. Routing from any module to another is transparent and is done on screen.

Hardware

The core hardware is contained in a 19 inch rack, which supports a 24 bit, 64-way communications bus. This means the system can accept 24 bit recordings from external devices. The rack contains a number of processors and a master communications module for synchronising timecode, MIDI and other control data. The user interface is an IBM 386 PC or compatible, with mouse control and high resolution window driven screens.

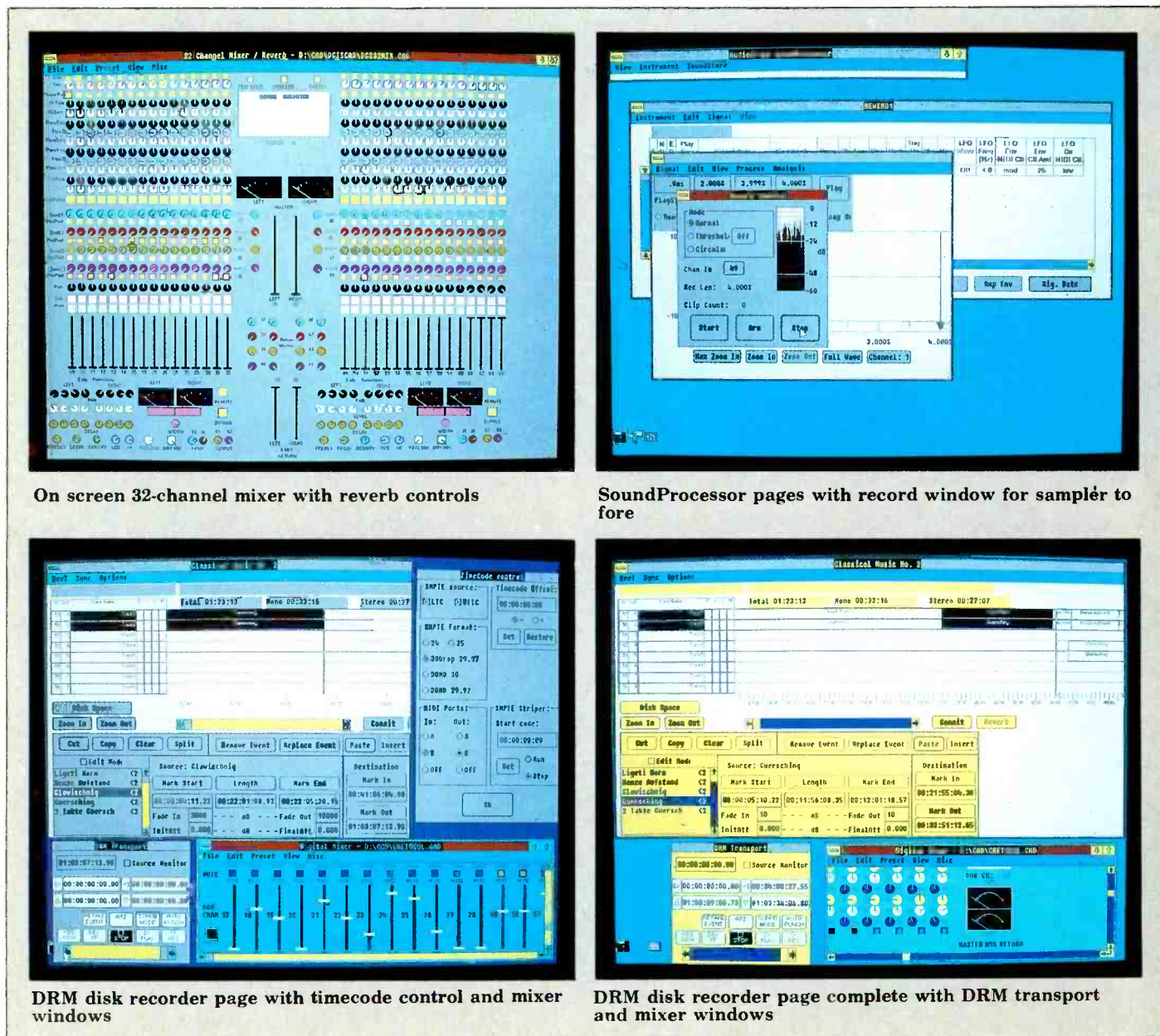
You can also specify how much or how little of the hardware options you require. So, for

example, if you wish to have a large sampling system with a lot of voices you could fill your system exclusively with sampling modules. On the other hand, you would have one sampling module, a Universal Digital Interface (UDI) module and an 8-track hard Disk Recording Module (DRM). Or you could fill up with universal digital interface modules only in order to have a very large conversion system.

In addition, if your requirements exceed capacity, you can add up to two more core systems to your existing one via a Local Area Network (LAN) connection thus tripling your capacity.

The 64-way bus

This can be likened to a 64-way internal patchbay allowing up to 64 channels of digital audio to be routed from anywhere in the system to anywhere



On screen 32-channel mixer with reverb controls

SoundProcessor pages with record window for sampler to fore

DRM disk recorder page with timecode control and mixer windows

DRM disk recorder page complete with DRM transport and mixer windows

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else. For ease of use, certain sections of the bus are software preset. For example, D/A outputs for the sampling system could be bus numbers 1 to 8, however, if you wanted to send your sequencer tracks to the mixing section first, you could assign them to the corresponding bus numbers assigned as the inputs to the mixer (say 9 to 16). The outputs of the mixer could then be assigned to the D/A bus numbers (1 to 8) or to the inputs of the UDI. Alternatively, if you've run out of voices in your sampling module, you could send your sequencer tracks (via the mixer if required) to the inputs of the DRM, record the sequence 'live' onto hard disk and continue sequencing against the hard disk recording. You could then assign the outputs of your hard disk recording and sequencer to the UDI and digitally transfer your master onto tape.

Sampling module

The software module is called the 'sampling synthesiser' although the system does not actually

allow synthesis. Each sampling module can support up to 16 voices and 30 Mbytes of RAM and a core system can hold up to three such modules—giving a maximum of 48 voices. Sampling rates supported are 44.056 kHz and 44.1 kHz although the system can convert other rates from external sources via the UDI.

The soundstore: Samples are listed in categories within the sample directory and each sample can be saved with a comment/description. Samples are found by accessing the appropriate category via the mouse or by typing information about the category/sample, which is then used to find the associated sample(s) by cross-referencing.

Playing samples: Samples can be auditioned by clicking on the sample name in the directory or can be played by connecting any MIDI keyboard to the system. One of the features of the *AudioFrame's* sampling system is that it uses a fixed sampling rate across the keyboard. This means, for example, that a sample played a few octaves lower than its original pitch will not suffer from aliasing. It also means that sequenced sounds for example, can be directly digitally

transferred without having to sample rate convert when they are played higher or lower than true pitch.

Down sampling: If space in RAM is running short, the system allows 'down sampling' from 44.1 kHz to 22.05 kHz. This basically means that half the number of samples are used for a sound thus requiring only half the amount of space. Whether or not this has a detrimental effect on the sound quality will depend on the sound in question—the process could be used just to try out various arrangements.

Editing samples: Sounds can be looped, pitch shifted, enveloped and edited by cut/paste methods. Loop points can be determined by the user or automatically by the system. In order to facilitate the user finding suitable loop points, the waveform display can be turned into a positive-only amplitude display. This allows the user to visually locate loop points of similar amplitude so that the common problem of 'beating' due to loop points of differing amplitude being joined is reduced. The user can also select a number of different crossfade types with the length only limited by the amount of RAM time (6 mins for 30 Mbytes). The system will also automatically search for loop points and will provide up to 20 different suggestions of its own. Whether or not an 'autoloop' turns out to be better than a manual loop depends on the sound and the experience of the user.

Amplitude enveloping can be imposed on a sample quite easily by means of a display on which the envelope is shaped by mouse control. This does not mean that the user freely draws an envelope but rather that a continuous series of straight lines representing amplitude (attack, sustain, decay, etc) are altered, which causes the waveform to redraw accordingly.

Cut and paste editing allows audio scrubbing and selection of specific regions by simple mouse control. A selected region can be cut or copied and pasted to the same sound or a different sound.

Sequencing samples: There are two software modules for this: the events processor and Texture, the MIDI sequencer. Timings can be displayed in beats and measures or timecode.

The events processor is suitable for laying sound effects to picture and consists of a single track (or events list), which can support up to 480 events. Samples are listed by name vertically in sequential order. Next to each sample name is its event time. Simultaneous sounds are listed one after the other but have the same event times. A sample can be marked with a sync point (a salient point that could occur in the middle of a sample, for example) and the events processor can be made to match the offset point with a given event time.

If slaving to picture using longitudinal timecode, a MIDI keyboard can be used to record sound effects into the events list either at normal speed or down to half speed. The events can then be trimmed, attenuated and pitch shifted, if necessary, by editing the events list afterwards.

If slaving to VITC, events can be recorded against a still frame. In this mode, the events processor will assume the duration of each event to be that of the sound on the keyboard. This could be an actual sample or a null sound with a user determined duration. Durations and orchestration can then be altered afterwards.

The MIDI sequencer uses the standard musical architecture of songs, patterns and tracks. Each pattern consists of 32 tracks and a song can consist of up to 96 patterns. Recording can take place in step time or live (with or without loops) and there are facilities for tempo changes,



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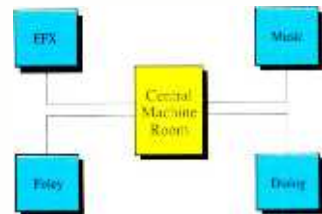
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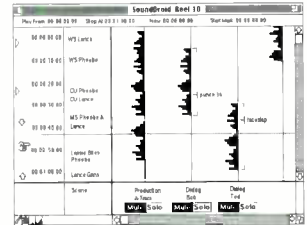
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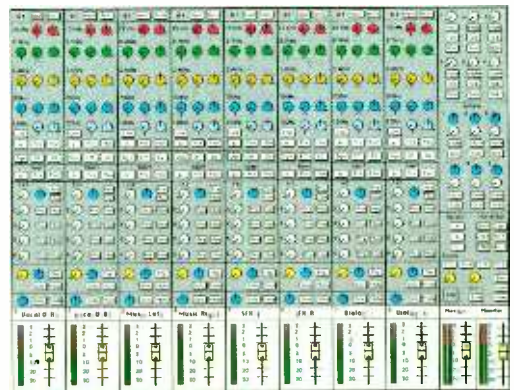
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transpositions, soloing, muting and quantising (pre or post performance). The sequencer can be used to drive other MIDI devices or can be driven by external MIDI sequencers.

Samples are intelligently allocated to the system's D/A converters, which means that you will always get the maximum polyphony supported by your system. You can elect which output(s) to send your sounds to and can adjust the volume of each output.

Mixing capability

Each DSP card within the system has provision for a 16-channel mixer with two master groups incorporating a comprehensive 24 bit stereo digital reverb. The on-screen layout can either be the default templates provided or the user can design his own using the Studio CAD object editor.

All aspects of the mixing interface are designable—position, size, grey shades or colour, type of control, numbers of channels, etc—totally editable. Each channel of the mixer has an equaliser section. This is a 4-band digital EQ with 56 bit precision—the two mid bands being fully parametric with a maximum Q value of 100 making zeroing on single frequencies a possibility. The gain range on each band is variable from +18 dB to -60 dB giving the user some very precise equalisation tools. The frequency selections can be in fixed steps that vary in increments with frequency or specific frequency values that can be keyed in on the alphanumeric.

The mixing section is very much what you choose to make it. With the development of the full digital interface for multitrack connection the mixer section has a practical use as a powerful instrument alongside a standard mixing console. For those operators requiring a hardware controller, a tactile control panel with 16 switchable faders and an assignable equaliser section and control knobs is now available to externally control the DSP card.

Hard disk module

Each module is capable of supporting eight channels of record or replay and the maximum number of tracks a system will support is 32. The standard recording time per module is 4 hours provided by a 1.2 Gbyte disk. (Further expansion is possible by adding an external serial expansion (SER) rack with additional hard drives.)

The recording/editing page uses horizontal strips representing the tracks of the hard disk recorder in which areas where audio has been recorded are highlighted. Salient points in the recording can be marked on-the-fly and audio scrubbing is possible using the mouse. There are function keys on the alphanumeric and screen that act as transport controls and operations such as cutting, pasting, deleting and copying are simple to achieve involving highlighting, dragging with the mouse and pressing a command key.

Editing is limited to the visual/aural cut and paste method. For example, a section of audio can be selected using the mouse and can be cut, copied, deleted, etc, and pasted or dragged in time into the same or another track. The timing information of the selected Cue's start time is displayed and can be used to accurately place the Cue in time. The system has a facility for naming Cues but not assembling them into an events list. Short sections of hard disk recordings can, though, be internally transferred to the sampling

module where they can be treated as samples and sequenced or used in the events processor.

For sync purposes, the system will slave to the *AudioFrame's* events processor, external timecode, house sync, composite sync and sampling rates from other devices.

The system allows auto and manual punch-in. There is also the facility for 'defragmenting' the audio on disk. This means that the system will compact the audio in such a way that any empty spaces between sections of audio are eliminated thus leaving a contiguous free space for further recording. Backup for the DRM occurs at approx 2.5x realtime and is to an Exabyte Video 8 tape streamer.

UDI

The UDI module provides four channels of 24 bit digital transfer per card. These can be configured as two inputs with two outputs, four inputs only or four outputs only. Up to eight cards can be fitted into a core system (although this would not leave room for any of the other hardware modules). The UDI performs sample rate conversion, format conversion (eg AES/EBU to SDIF-2) and has a selectable dithering routine, which is useful when mastering/converting from 48 kHz to 44.1 kHz for example. The UDI will support variable sampling rates from 54 kHz to 25 kHz thus allowing for digital varispeeding and will track any digital input continuously as long as the input has wordclock. The *MDI-32* is a universal digital interface card with 32 channels of digital I/O permitting PD, S-DIF and 2-channel AES-EBU format conversion or transfer in and out of the system.

Of particular use is the ability of the UDI to run in background mode. This means that you can carry on with other operations while the UDI is transferring/converting audio.

Developments

WaveFrame have plans for a card that would allow the system to effect one-pass transfers to/from 32-track digital tape machines. Direct to optical recording is planned with the proviso of four tracks minimum per disk. Initially the optical will be used as a backup medium and may develop to be the recording medium as well.

Conclusion

AudioFrame goes a long way towards tackling the problems of a fully integrated digital processing environment from recording through editing, mixing and transferring to a master medium. In addition, its ability to sample to RAM allows not only a creative input to the system but also means that the system's outputs can be efficiently maximised. It makes sense to use the sampling system to assemble shorter sounds (such as sound effects) rather than tie up the outputs of the hard disk recorder for such purposes. It also makes sense to use a constant sampling rate for RAM samples so that they can be transferred (or processed) directly without having to be converted or passed through the analogue domain. The hard disk recording module is easy to use but could be further enhanced by allowing Cues to be named and assembled in an events list in the same way as samples. In general, the system is easy to use, provides excellent sound quality and is suited to higher end audio post and music production. □

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STUDIO PLATEFORME

When a French dentist met a Swiss architect they decided to pool their talents and produce music for therapy. Nothing less than the best recording studio would do for their research. Now they've decided to let other people in on their studio by the sea. Julian Mitchell reports on this half research, half commercial French facility



Music has the power to evoke every emotion from the patriotic feeling of a marching band to the soothing caress of a wind chime. There are those who use this power to various ends, some use it with respect and for good.

La Société de la Cordée is a group of such people. They are based in Sete, South of France, and their aim is to use music to help others. At the moment this takes the form of music therapy for mentally and physically handicapped children and adults in hospitals and centres immediately around the area. Interesting enough, but perhaps what is more interesting to readers of *Studio Sound* is the source of this music for therapy. La Société has invested heavily in a very well equipped recording studio, annexed to their main offices. Built ostensibly for research purposes, they have now decided to hire it out commercially and at rates that include flight tickets, accommodation and a hire car.

Sete itself is on a peninsular and is marked by a large stretch of beach flanked on one side by the Mediterranean and the other by a shrimp lake. The town's main claim to fame is its busy fishing port and its phalanx of supportive harbour fish restaurants. From overseas you fly into Montpellier, which is about a ½ hour drive away on the autoroute. There are regular and direct flights from London and New York. The weather is hot all year except November and December when the rain can cause a number of problems for houses in the hills. A couple of years ago Plateforme, who are on one of these hills, faced disaster when the rains came and ran into the complex. They survived that time but have taken precautions for next time by building a moat around the whole building for the rain to run away down the hill.

La Société

La Société de la Cordée is a group of six dedicated people who have witnessed the wonders of music therapy. The two founders are neither professors nor professional musicians and come from backgrounds with no connection with therapy of any sort. Alain Amouyal is the music composer but the rest of the time is a dentist, Dominique Julliard is the studio manager and the main organiser of the Société but had been, until recently, an architect with his own practice 5 hours drive away in Geneva, Switzerland. The other members are also part time as they too have regular jobs, one's a teacher, another's a nurse.

The story goes that Amouyal had been playing bass guitar with bands on and off since he was a teenager. Eventually he wanted to start to play his own music. He had also discovered synthesisers and found a 4-track machine to record his music. So when he became a dentist he already had a library of melodies. They weren't songs, as such, just melodies or themes as Amouyal likes to call them. Soon he was introducing the most relaxing ones into his surgery for both the waiting and the pulling room. The themes were a success, so much of a success, in fact, that Amouyal was soon selling them to other dentists.

It wasn't long before another outlet was found for the themes. Amouyal and Julliard had met a doctor in Bordeaux who was already experimenting with music therapy. He agreed to try Amouyal's tapes on the autistic children in his hospital's care. The doctor soon found that the themes were stimulating the children and began introducing drawing to the therapy sessions. The results were analysed and used as part of each child's individual therapy.

The way the music was helping children was wonderful news for Amouyal and Julliard and they were eager to find out more. After attending music therapy conferences all over Europe they decided to form the Société and give the whole idea some credence. But all they had was the tapes of Amouyal's themes that had been recorded on his faithful old Moog and Oberheim synths. What they needed was a proper recording environment.

The studio

Studio Plateforme is about ½ a mile from the sea, half way up a hill in a residential area of Sete. You can't walk into the complex's courtyard without a large, solid metal gate being opened from the inside. Once inside the courtyard you'll see a

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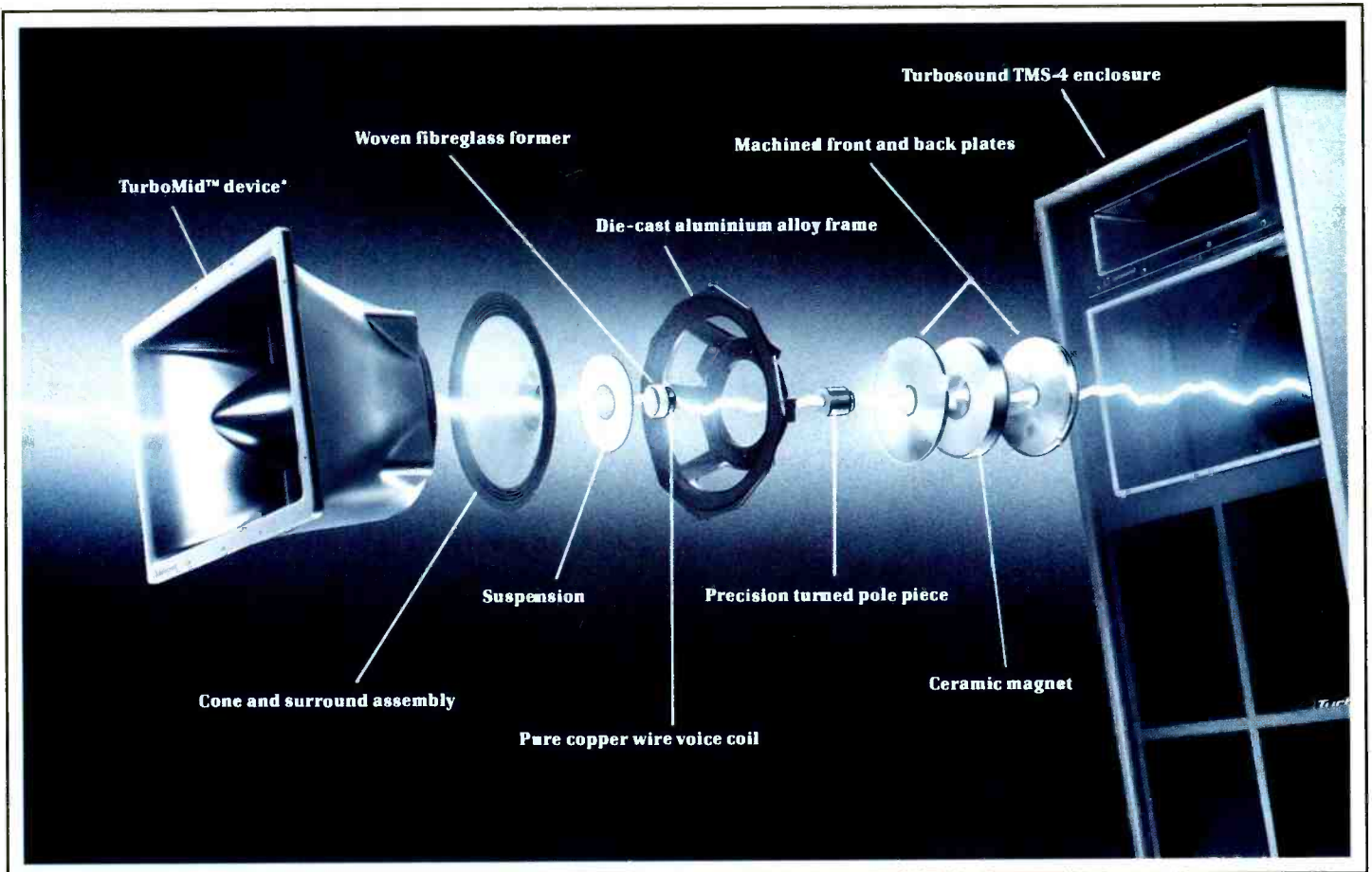
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*Turbosound Patent Information: Australia: 515, 535 Canada: 1,076,033 Japan: X113424/77 UK: 1,592,246 & 1,598,310 U.S.: 4,215,761 & RE 32,183 West Germany: P2742610/2 Other patents pending.

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tarmac area for cars and a very attractive shuttered house with a large sun terrace and a veranda for alfresco eating (while I was there an outbuilding was being built as a band relaxation area; a worthwhile extra as the studio itself has limited space).

One thing you won't see straight away is the entrance to the studio. (The studio is an annexed building to the main house.) The door is off the courtyard in the lee of a beautifully shaped Cyprus tree. Julliard had quite a battle with the studio builders over this tree, he wanted to keep it, they didn't. One up for the save the trees campaigners and quite right too as the tree lends some real character to the location.

Immediately inside the studio is a small reception area with phones and a television. Through an acoustic door is the recording area (50m²). The walls are covered with adjustable drapes for dampening purposes, the floor is polished wood. On the ceiling there are curved bars for attaching video projectors and lighting racks. To one side of the area is a door leading to a small area where Amouyal's synth racks are lined up. This area is also used for MIDI programming. Plateforme have recently bought a *Macintosh IIx* computer with *Alchemy* and *Finalé* software, a replacement for the *Mac Plus* they had been using. The other side of the recording area is the control room with a see-through glass area. A machine room is off the control room with its own door to the outside for quick equipment transportation.

Sonic neutrality

The Société met Tom Hidley at a Paris AES and were impressed by his philosophy's acoustic promise. Amouyal and Julliard had decided to invest in some kind of recording studio environment and they were making their first tentative enquiries into what

was needed. They were attracted by Hidley's idea of sonic neutrality and decided his approach was the one they would have and hopefully keep for many years.

A building of Julliard's own design was grafted onto the side of his house for the studio and then Hidley's team was called in to convert the shell into a control room and recording area within 6 weeks. The Société members had started the ball rolling and were revelling in the excitement. In fact every day and every night of the conversion they would take a video camera into the studio and catch on film all that occurred.

The studio was funded privately except for a small part that had come from a bank. The investment had been large and for a privately run research studio maybe too large. From the outset Julliard and Amouyal had planned to hire out the studio to subsidise their work before that started making money. They had outlined a business plan for the studio as it was built and calculated that if they could have the complex running commercially for around 3 months of the year they could survive.

With the money and the finished studio now both available, the equipment buying became fast and furious. With the Tom Hidley design came the Kinoshita monitors and FM Acoustics amplifiers (later to be changed to JDF amps under advice from Tom Hidley); also on the list were a Sony *PCM-3324* digital multitrack, various outboard, DAT machines and a Saje *ULN* console.

The Saje on reflection may seem an odd choice (they had to have something French in their studio!). The console had arrived wrapped in plastic sheeting (with four polystyrene corners as the only protection) in the back of a hire van. Not the kind of delivery the most major console manufacturers would make. Anyway the money had been spent and the console was installed. The next thing to do was to test the room again with the signal through the console. Place a Tom Hidley 'approved' CD into a Studer CD player, press play and... a disaster! The sound was muddled and thin, nothing like they had heard when Tom Hidley had tested the room with CD player direct to monitors.

The panic phone call to Hidley provoked a quick visit. He tested the room again with and without the signal passing through the desk. Having done that he pointed at the Saje as the culprit of the degraded sound. What could they do? They had spent all this money on a sound they couldn't work with. Tom Hidley put them on to someone who might be able to help them, David La Barre.

La Barre is an American who at the time was living in the States. he agreed to come over to France to take a look at the problems and see what he could do about them. The 2-week stay turned into 3 months. Once he started to look at the desk La Barre could leave nothing alone. He looked at each piece of equipment in turn and then turned his attentions to the grounding of the whole studio and the electrical supply.

Amouyal, "It was difficult with David at the start as his French started and stopped at 'Bonjour', and my technical English is limited. He never seemed satisfied and had some trouble with Saje about modifications to the desk. Saje would say that nobody else had complained and David would say that he was now. Eventually, I think, Saje did incorporate some of what David had done to the *ULN* although they wouldn't admit to it."

The grounding La Barre found at the studio was not good enough for him, so he set about installing a secondary ground site. It was put in the courtyard of the studio but you wouldn't know it was there as it's under a flower bed. Ingenious really because while the bed is watered the water will also keep the connection good between the copper cable and the rocks beneath. La Barre also recommended a stabilising transformer for the power supply as there was considerable electrical fluctuation.

After La Barre had finished his work he proclaimed that Plateforme had nearly attained sonic neutrality. Praise indeed! Advice about the studios was welcome and very forthcoming from a number of other sources. Plateforme heard about the modification to the Sony *PCM-701* made by Audio Design in London, so the unit was dutifully sent away. They took advice on the importance of constant temperature and humidity within the studio to avoid unpredictable acoustics. Amouyal and Julliard were striving for the best studio they could possibly get but were also bearing in mind what clients would want out of the setup.

Equipment list

Mixing console

Saje *ULN Mark II* with *Optifile* automation

Recorders

Sony *PCM-3324*
 Sony *PCM-701* (mods Audio Design)
 Sony *U-matic 5800 PS*
 Studer *A820 ¼ inch*
 Studer *A725* (modified by David La Barre)
 Sony *PCM-2500* (DAT)

Monitoring

Kinoshita, model 3 with JDF *HQS* 3200 amps
 Electro-Voice *Sentry 100*
 Yamaha *NS10*

Visonik *6000*

Auratone

Outboard

Lexicon *480L/224 XL*
 Quantec *QRS XL*
 tc Electronic *2290*
 Yamaha *SPX 90*
 ART *D1500*
 Roland *DEP5*
 MXR *II* digital delay
 UREI *1178* stereo
 Drawmer *DL221/201* stereo
 Valley People *Kepek II, DPS, Gain Brain* and *Max EQ*

Other

Various mics, synths and pianos

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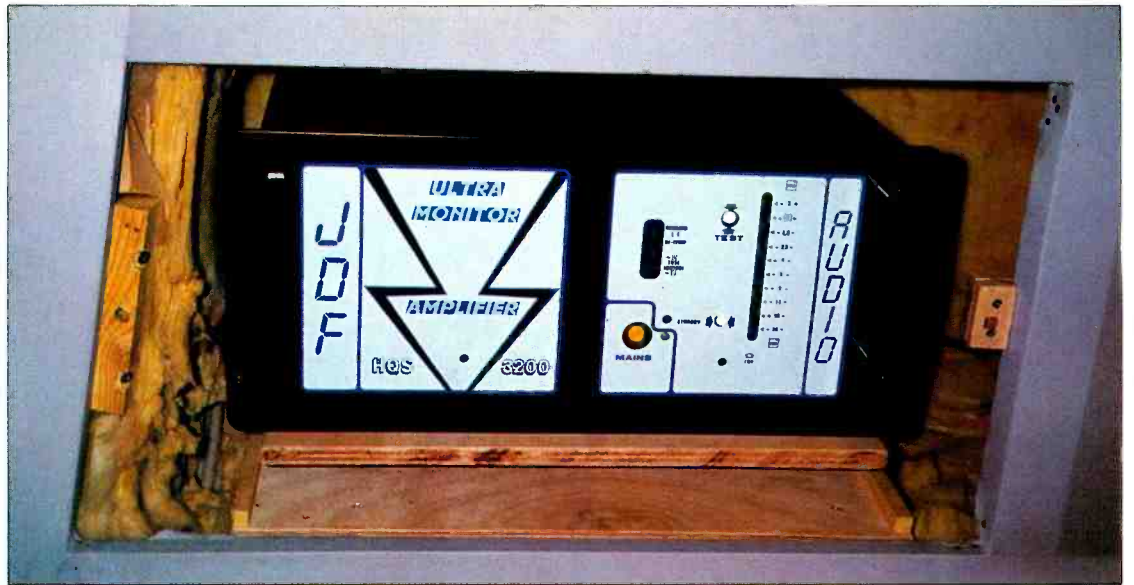
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Hiring

At the moment the South of France is not brimming with recording facilities. In fact there are only two major studios there, Miraval in Provence and Studio Polygone in Toulouse. Those studios have had difficulties prising UK and US artists away from their usual haunts, although Miraval can boast Pink Floyd and Wham among their past clients. Studio Plateforme maybe has something different to offer. It is residential like the other studios and it operates on a rate system. What Plateforme has that the others maybe don't is flexibility. Basically you can have whatever deal suits.

Julliard, "Because Alain does most of his work in the studio

deadtime, we can offer a straight 10 hours in the day but really we're here when they like. The rates can include the flight tickets, a hire car, the hotel and the studio time, but also for British companies there is a bonus, as if we can invoice a UK company the charge will be VAT free."

The studio's residence is a couple of villas further up the hill. You can either cook and eat there or in Sete but the views from the villa's terrace towards the Mediterranean are beautiful and worth staying in for.

There are two basic rate packages to foreign clients. One is called Vacation Studio, which includes return flight tickets (just over an hour direct from London), rented car with 500 km free per week; 6 days use of the studio with 10 hours a day and 1 day off per week; assistant engineer; housing in villa and/or

Parametric Equalisation



Klark-Teknik Research Limited Klark Industrial Park, Walter Nash Road, Kidderminster, Worcestershire DY11 7JJ, England. Tel: (0562) 741515 Telex: 339821 KLARKTG Fax No: (0562) 745371

hotel on the coast; breakfast and lunch. For 1 week for four people this is £5,070, this goes up to £17,640 for 4 weeks. The Full Time Studio package adds an extra 5 hours a day recording time; another assistant engineer and another day in the studio per week. For 1 week £6,775, 4 weeks £24,450. Plateforme do, however, say that all this is flexible and negotiable.

All bookings for the studio are taken by Dominique Julliard. He and Alain Amouyal do have certain ideas on the kind of artists they want at Plateforme. Amouyal, "It is exciting for me to have other musicians here as, I hope, they can contribute to my own projects. We are very proud of our studio and keep it in the best condition we can. We would want the people who hire it to treat it with the same respect as we do. We can't afford or want breakages although we know that we can probably get more than adequate recompense from the artists involved. As we are in a residential area we ask people to make their noise in the studio and to respect our neighbours when they are outside. We also ask that people don't smoke or drink in the studio, it is so we can offer a new studio to people every time. When the

Sage service man came down here he remarked how clean the fader strips were, like new he said."

Whether the promise of a Tom Hidley studio and a Sony 3324 multitrack combination can persuade people to work round these slight restrictions may or may not be a problem, at the moment Julliard has other problems when he calls record companies up. "They ask straightaway what the pool is like here. I tell them we haven't got a pool and from then on the conversation is effectively over."

Studio Plateforme need the subsidy of outside clients to survive. Julliard has given up his architectural job to market the studio full time. So he is frequently in the main European recording centres knocking on A&R people's doors. Hopefully the right amount and the right kind of clients will be attracted to Studio Plateforme. A more caring bunch of people you couldn't hope to meet and with a dream that makes the best of us feel a little bit humble. □

Studio Plateforme, Villa les Amandines 234, Chemin du Genêt, 34200-Sete, France. Tel: 67.51.15.22.

The science of music

La Société de la Cordée have a number of outlets for their music. One comes from Alain Amouyal's original tapes that were made before the studio was built. The package contains a series of cassettes with an accompanying booklet and instructions for use. It was these tapes that were used initially by the doctor in Bordeaux. The doctor coined the name 'Impulsion Dynamique Evolutive' for the tapes. A short description of what the music represents comes from the accompanying literature: 'The five musical tapes of IDE can provide the initial impulse needed to activate the potential energy which lies within everyone.' Back then, any diagnosis based on the results given by playing the music to the children was mainly based on guesswork. Things now run on a much more scientific framework.

Although music therapy isn't new, the way that La Société use it may be. Using those original tapes in consecutive order and for sessions not more than about 30 minutes, they were able to let the imagination of the handicapped children and disturbed adults come to the fore by letting them draw what they imagined. From a complex computer protocol that a

member of La Société wrote, they can now use the results scientifically and hand those results back to the children's doctors.

In this way La Société doesn't get involved in diagnosis, just scientific facts. Of course, the results can only be recognised as important from experience. Only an experienced eye can interpret something from a picture drawn with a particular piece of music being played at the time. All these results are tabulated and computed.

Most of the work Amouyal now does is transcribing his library of themes from the old days onto musical scores. From there he is slowly orchestrating them in the studio and then finding ways to market them. This is the basis of La Société's work for the next few years. But there's also something markedly different in the pipeline, a live concert of Amouyal's music to be presented with dancing and various videos. The plans for such an extravaganza are still at drawing board stage but it might not be long until we can get music therapy gigs for the masses.


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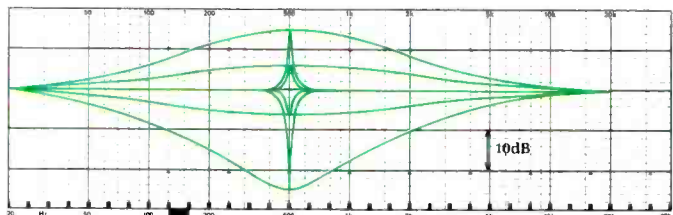
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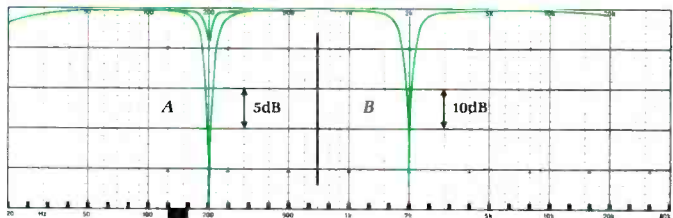
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


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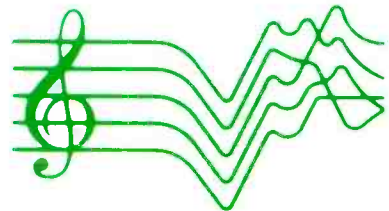


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B. Two filters



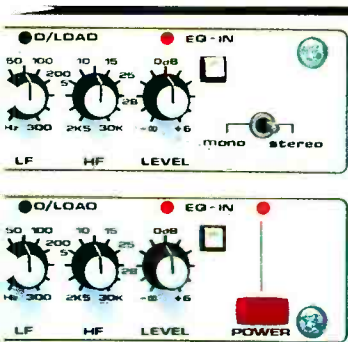
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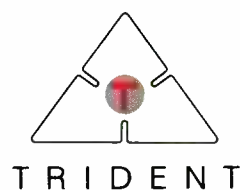
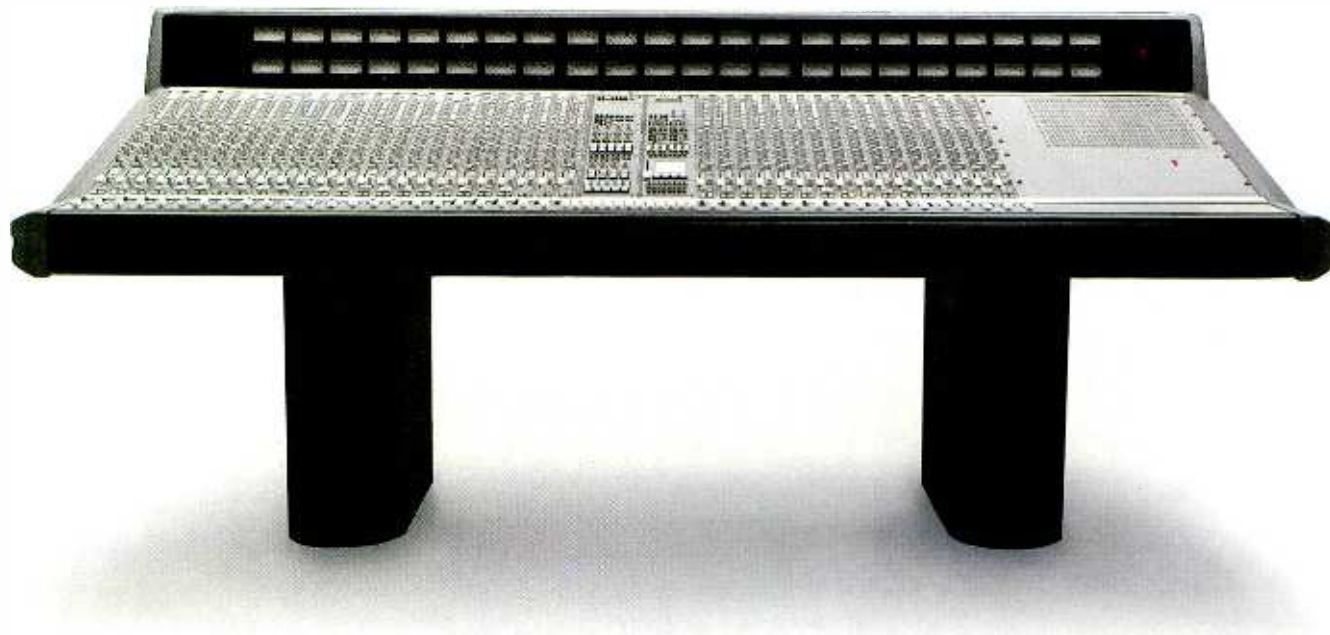
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Tonight, on July 21st in the Potsdamer Platz—an eerily barren strip of land that once divided Communist East Berlin from capitalism's brazen Western counterpart—250,000 souls are nudging (there isn't room to jostle) for breathing space in the reunited city's hot and dusty summer air.

On a steel Bailey Bridge flanked by ramps to ground level that forms a mini-stage a few feet in front of the main affair, The Band—minus Robbie Robertson—are winding up a set that has been received cordially by the crowd. It is the penultimate act of a day that has already seen two German rock bands and (to the bemusement of many) The Chieftains, filling in time while the vast site slowly filled up. But the punters have come from both Germanies and many from across Europe too, solely to witness Roger Waters' grandiose re-enactment of the last major work he wrote for his former partners in Pink Floyd.

The Wall, which had one brief and famously expensive tour (featuring graphics by Mark Fisher, co-designer of this year's stage set) after the album's 1979 release, was in many ways the last of the '70s concept album genre. But its massive worldwide LP sales provided essential financial relief from the tax burden the Floyd faced after the notorious investment debacle leading to huge losses for the band, jail sentences for their former financial advisors on fraud charges—and ultimately, to Waters' messy mid-'80s divorce from the group.

Tonight the show Waters proclaimed would never see a stage again “unless the Berlin Wall comes down” is being eagerly awaited. Enough hype has already been generated to fill a dozen front pages, even if its supposed symbolism with recent political events (ie the real Wall coming down) is somewhat tenuous—a neat bit of post-rationalisation, if you will—given the original item's obsession with Waters' personal traumas. But that's a churlish view. It's multimedia entertainment with some of the best technology money can buy, and a quarter of a million people are here to witness it.

Its beneficiary is a charity set up by World War 2 bomber chief Group Captain Leonard Cheshire, VC, the World War Memorial Fund for Disaster Relief. Its aim is to raise a permanent fund of £500 million—representing roughly £5 for every man, woman and child who died in major wars this century (so far)—the interest from which will be used for international disaster relief. Cheshire is no newcomer to the charity field. His experiences as leader of low-level bombing raids on Nazi Germany and as official observer on the Nagasaki atom bomb raid led him to set up a worldwide network of 'Cheshire Homes', tending for disabled ex-servicemen.

Once the reason for the show had been established, readying the site—a former minefield, which includes the site of Hitler's bunker and a hitherto-undiscovered vault full of Nazi war paintings—involved complex multilateral negotiations. Authorities from East and West Berlin, the four post-war allied occupying powers and various major contractors were closeted for months before an agreement was finally thrashed out, which eventually (and only after the show was twice postponed) left just a couple of months for detailed planning.

Further tension has been created by the constantly changing guest star line-up. This hasn't been helped by still-unresolved problems with the power supply arrangements, a situation made even worse by over-enthusiastic TV engineers plugging emergency lighting into the PA power supply—without bothering to ask

THE WALL

Recently performed and broadcast to launch a new charity, the show was intended to be analogous to changes within Berlin. The scale of the show was immense. Mike Lethby was there to record the details.

anyone first. (Britannia Row only discovered this when their delay system suffered a cardiac arrest this afternoon, an event which would recur during the show.)

Making up The Wall

The show is a no-holds-barred multimedia extravaganza in which Waters' and Fisher's concepts are expanded on a grand scale, courtesy of a 600x80 ft wall of styrofoam blocks plus spectacular lighting. Fisher Parks' projected graphics and a complex FOH SR and delay sound system.

A slightly incongruous list of 'guest stars' includes Bryan Adams, Cindy Lauper, Joni Mitchell, Sinéad O'Connor, Van Morrison, Jerry Hall and actor Albert Finney. And there's a huge production effort from an almost exclusively British crew embracing Britannia Row, Turbosound, Theatre Projects, Samuelsons Concert Productions, VariLites, Meteorlites and security firm ShowSec. Getting the production to this stage has involved some serious politicking. Besides the logistical negotiations already mentioned, there was also the matter of appointing a SR company—an unexpectedly

thorny issue, it transpired, for *The Wall's* production office.

Roger Waters' acrimonious split from Pink Floyd has been well documented. The outcome of their legal wranglings to date is that Waters indisputably owns the rights to *The Wall* music and—almost surrealistically—The Pig (Floyd's inflatable hog, floated over Battersea Power Station for their *Animals* LP cover and subsequently sex-changed for live shows by the post-Waters Floyd to avoid copyright snags). However, Waters didn't get the Pink Floyd name; his former colleagues, led by guitarist Dave Gilmour, won that point.

So far, so trivial. But this apparently reared its head in a big way when it came to choosing the SR company. Britannia Row Productions were owned by the Floyd until the early '80s, when directors Robbie Williams and Bryan Grant acquired the firm in a management buyout. The rub—as far as the Waters camp was concerned—is that Williams continues to be the Floyd's tour production director and Brit Row have supplied an MSI SR system and crew for the band's recent European tours.

All of which meant Britannia Row were effectively regarded as the 'last choice', purely on political grounds. Their appointment came only after the Wall team had exhausted all other potential candidates for the job, settling



Delay system during soundcheck: 11 towers of Turbosound and JBL

Photo: Mike Lethby



View from stage front showing first row of delay towers

eventually for what turned out to be the only European rentals firm equipped for the job—Britannia Row.

Overcoming that obstacle absorbed another week or two of precious time. But when the issue was finally resolved to mutual satisfaction an amicable working relationship emerged. Tonight, Britannia Row crew chief Mike Lowe laughs at the situation: "It's all been pretty bizarre, really..."

Co-ordinating the event is a major task. With so many production companies on site, backstage organisation is a sprawling, multi-headed beast. Depending on who you ask, there's a choice of two names apiece for the roles of Production Manager and Sound Production Director. And with most of the show's timing running to a master SMPTE sync track from a multitrack, including the projectors, film, lighting cues and musicians' clicktrack, co-ordination and communication is clearly of the essence.

It's only when all parties complain at once that there's no-one to sort out a particular technical problem (as, I'm told repeatedly, has been the case with the mains supply) that you feel someone ought to have a veto if these events are to become commonplace.

On stage

The stage is as complex a setup as you're likely to find anywhere this side of Jean-Michel Jarre. Waters himself performs from numerous locations scattered in and above the wall and alongside his

star-studded pick-up band on the main stage. Then there's the 'surrogate band'—in reality, The Scorpions—who open the show on the Bailey Bridge in front, where as events progress a cast of actors, soldiers and the Russian military band will strut, march and act out the plot.

Behind and above the stage is a full orchestra, miked to the hilt but also shadowed by a synchronised pre-recorded 24-track tape in case any cues are missed. And jutting out high above either side of the stage are two precarious 'posing platforms', from where guitarists will solo at various points during the show.

The stage sound system to cater for it all is, therefore, hardly simple. Robin Fox—who both designed it and is mixing the monitors—has around 120 channels to contend with.

Lowe: "I'm not sure about the final count—every day, even now, there are changes being made. We started with something like 38 wedge monitors on stage—it went down, then climbed back up again."

Eight Turbosound TMS-3 sidefills and a total of 38 wedge monitors—Turbosound 2×15 inch *Low Profiles* and MSI 2×15 inch and 2×12 inch—are in use, driven by four MSI *Switcher* amp racks, three Carver amp racks and two TMA tri-amp racks; the whole array controlled from a pair of Ramsa 40-channel consoles and one Midas PRO-40 36-channel desk.

Unfortunately, we're hardly 10 minutes into the show when Fox's elaborate system dies a sudden and embarrassing death. A rogue mains spike—Mike Lowe later asserts that the mains has been 'spectacularly dreadful'—has apparently tripped a

circuit breaker on the monitor power supply. Partial silence ensues, while those of the band who still have power plough on and a mute Waters paces the stage in a stiff-upper-lip one man mime show. The FOH mix tower crew are white-faced; only the live TV production carries on regardless, apparently oblivious to the disaster despite the availability of a synchronised tape made for just this contingency at last night's full (and largely flawless) dress rehearsal.

Fortunately for all concerned, Britannia Row's stage crew reset the breaker fairly swiftly and the cast pick up the traces again so smoothly, you'd almost suspect it's been rehearsed. Unfortunately, portions of the delay system fail to recover properly after this break, which rather spoils things for some sections of the crowd.

Robin Fox, afterwards, is understandably in no mood to be interviewed ("Three months' hard work has just gone down the drain," is his terse comment) but the fickle hand of fate shouldn't be allowed to detract from what is, in Mike Lowe's words, "a hell of a system he put together".

Potsdamer Platz SRS

Britannia Row's SR system—mixed by FOH engineer Gary Bradshaw on two Yamaha PM3000 and a Midas PRO-40—is in part experimental and in part tried-and-tested, designed to address the shape and environmental requirements of the site.

The huge stage makes the dusty arena look flat on first sight. In reality, it measures roughly ¼ mile deep, fanning out in a wedge shape from the stage width to ¼ mile across at the back and rising gently to a centre point (marked by the site of Hitler's bunker) before gradually falling away again. It lies in the former 'no-mans-land' between the main Berlin Wall (on the east side) and the secondary, Western Wall. All but a 30 metre section of the main wall has now disappeared, albeit temporarily replaced by the show's none-too-tough looking security fences. The site's tragic history is not being overly dwelt upon. Even Hitler's bunker is just an anonymous grassy mound but the names of the 230 people who died trying to flee the east across this strip will be projected onto Waters' Wall during tonight's show. Now, on the east side, apartment blocks afford their occupants (who are camped on their balconies with friends and relatives) a grandstand view of proceedings. On the other side lie the leafy acres of the Tiegarten.

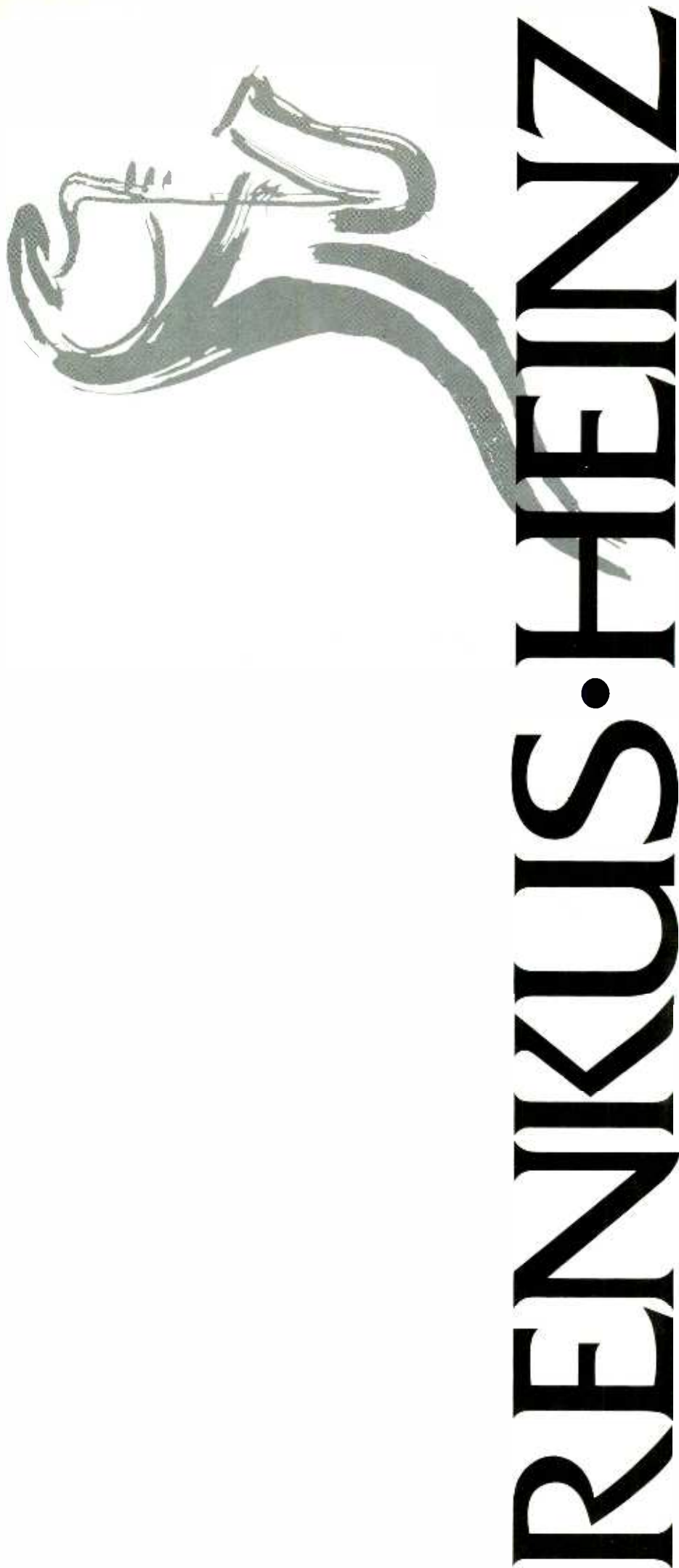
According to Turbosound's John Newsham—SR consultant to the show—there have been few objections from residents, nor is there an overall SPL limit: "But we are required not to let the sound spill out of the site too much. There isn't much red tape generally, although the curfews have been fairly strict and inspection of staging and lifting; that bloke there (points to intense-looking official balancing on the stack steels) is counting the bracing and banging his calculator."

The solution he and Britannia Row have arrived at, working from site plans and modified in a week of system setup, is a hybrid PA configuration, combining Turbosound's yet-to-be-released 'Flashlight' *Ultra High Q* long-throw system as the main FOH SR with an 11-tower delay system of Turbosound TMS-3 full-range cabinets and JBL long-throw horns and a centre fill system below stage front consisting of 16 TMS-3s and 16 Turbosound sub-bass cabinets. How was this design arrived at?

Newsham: "We've opted for three arcs of TMS-3



Engineer Gary Bradshaw with Yamaha PM3000's and Turbosound TMS-3



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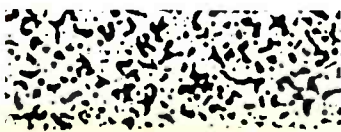
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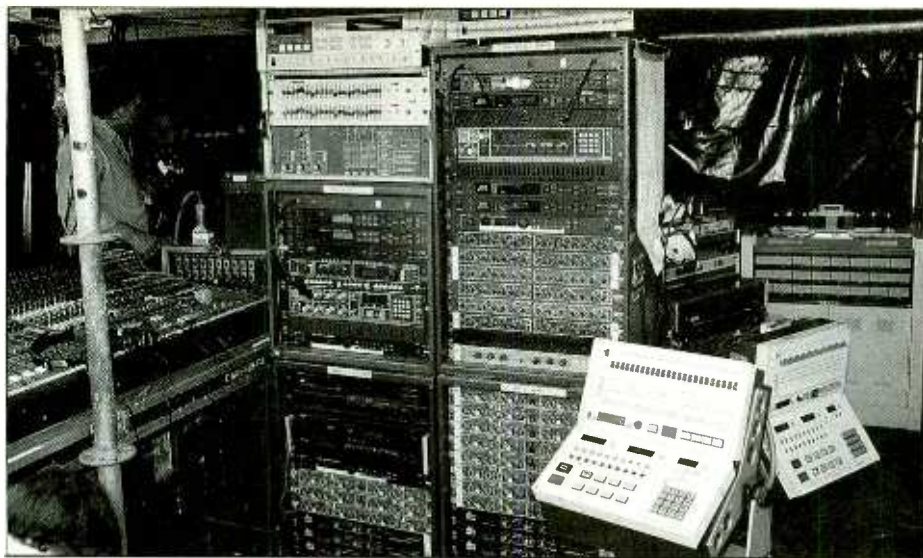
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delay towers. They're spaced about 100 metres apart and angled down (like the main PA).

"Because the site goes over a slight rise and because we want very even coverage over the whole field, a single system—not even the Flashlight—could cover it. The amount of power you'd have to put into a very narrow coverage angle would be prohibitive to get a good SPL down the field. And in case of bad weather and high winds blowing towards the stage, we wanted speakers out there so there's sound close to people; a contingency factor with power in reserve should the weather deteriorate."

As it happens, fortune has smiled on the show and the only effect of a slight but steady breeze is to stir up clouds of dust which does wonders for the lights but little for one's health.

Britannia Row production manager Mike Lowe adds: "There was concern that the sound would be consistent; there was also concern that we'd be able to control it and not let it spill out of site too much. The latter concern seems to have gone by the board a bit but because of those two criteria we opted for a lot of delay towers so we could cover the site very well, even if the conditions were windy, and still contain it. I can't think of many projects that have used so many delays but it's the only way to do it."

The first row of delays is 100 metres from the main PA with the second row at 180 metres and the third at 260 metres. Each row—like the FOH UHQ system—is angled downwards to hit the floor just before the next row takes over. The sound from each should integrate smoothly because, Newsham explains, "When the audience comes in, the air will warm up above them and the sound will bend upwards and 'skate out' a bit further."

"To set up the delays Chris Hey and I used a click-type phase checker, listening to each delay tower in turn. We're using the new BSS TCS-803 digital delay on the towers—1 in/3 out for the three rows of delays. There's a stereo TCS-804 for time alignment on the Flashlight system, taking the highs and high mids back in time with the 12 inch drivers. The whole lot is adjustable in relation to the 21 inch bins; in 'Relative Mode' you simply turn a knob to adjust the whole high end—once the bins are stacked and the high/mids are flown, you can move them backwards and forwards in time rather than moving them physically. It works extremely well; I used a Techtron TEF analyser to measure where the sound is coming from and the polar plot shows

we've got a very small point source indeed. It makes the array dispersion smoother; and if the weather changes, I'll just dial the time settings down."

An original plan to incorporate a quadraphonic element—by flying a rear set of speakers from the first row of delay towers—has also been cancelled, partly because, Newsham says, "Quad information normally comes from taped effects and nothing had been recorded, and partly because we felt the site was too large to make it effective for most of the audience."

What the crew were not aware of during the show is that when performance re-started after the enforced break, at least one of the delay towers on the east side failed to come back on. Guy Forester, owner of a Lake District recording studio, told me later that he was standing near the failed delay during the show and joined hundreds of other fans in yelling for 'more volume'. "I couldn't understand why the security guys on the delay tower didn't radio the mix tower and let them know," he says. Perhaps they didn't speak English.

The incident highlights another problem: with so many people literally shoulder-to-shoulder hundreds of metres deep, there was no chance for the crew to move around and check things. God knows what would happen if a real disaster occurred at an event like this.

Newsham explains that the delays are set to complement the angle of the main SR. "The flying system we've developed for the UHQ is the key; we're able to get a very narrow vertical angle between boxes, about 10°, to cover from stage front to the first delays. The other thing about it is the control of the horizontal. The angle we've used is a lot less than we anticipated, we designed the PA for 90° of coverage from each stack but now it's down to 60° and it's still plenty!"

The UHQ bass cabinets are stacked at ground level in a similar curve to the flown mid/high section, time aligned with a TCS-804. Another TCS-804 is timing the centrefill TMS-3 array; with a secondary output delaying a pair of TMS-3s on the mix tower, provided for nearfield monitoring during 'curfew hours' while the system was being set up.

Newsham: "When Gary started to mix the system in soundchecks he was happy with it but he felt that because the music has a deep sub-bass pulse running through it, the system needed to go very low, so we started adding subs; now there's

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masses of energy from 60 Hz down to 30 Hz. We added the centrefill forward of the Bailey Bridge, which is stacked on top of the subs about 70 ft forward of the main PA and we've time-aligned it back to the main PA—by 71 ms—so there's effectively a straight wall of PA and all the 21 inch and 24 inch bass drivers are pushing straight down the field as one U-shaped array of bass.

"We also added more subs at the sides, which, at Gary's suggestion, we put onto an aux send fader on the FOH desk so he can wind them in as and when required during the show, rather than having to adjust the crossover."

The system has been set up using CDs and pink noise, says Newsham: "To get a basic sound to work with: a clean canvas that you paint on."

He expresses slight frustration at not having the opportunity to mix the sound reinforcement. Not that he's in any way dissatisfied with engineer Gary Bradshaw's mix but it's the prototype Flashlight system's most important outing to date and he would rather be nurturing the fledgling personally. "It gets tweaked over a few days—

evolving to suit the sound of the show—and if you're not actually driving the thing yourself you're not really sure how these little tweaks affect it. But Gary's very happy, he keeps saying the system sounds great. And when he first fired it up he said it was much louder than he thought it would be when he looked at it."

An unexpected but welcome side-effect of Jonathan Parks' stage design was the black velvet cloth specified as backdrop in the stack bays. Intended to prevent light spillage, the soft material also helped damp acoustic reflexions from the Styrofoam 'Wall' bricks stowed behind it in the first part of the show. Newsham: "We were delighted he didn't specify black plastic!"

The show's timing has worked out neatly for Britannia Row. "Although it's a very big project," says Mike Lowe, "it wasn't a problem getting the gear together because a lot of our projects coincided to end before the show; the only shock came when we arrived and discovered there was to be a support line-up in the afternoon—we had to divert equipment *en route* from shows in Milan and Rome to cover it. It's all our own gear, except a couple of consoles."

Flashlight principles

The aforementioned *UHQ* represents the largest amount of Flashlight boxes that have been put together so far, with 24 mid/high boxes all side flown in six rows/four deep from about 13 metres above ground level and 18 bass cabinets in six rows/three deep stacked on stage.

A two-box, 4-way system, it incorporates the 'Turbo-loading' principles used in the *TMS-3* full-range enclosure, extending the concept into two mid range drivers: a 12 inch low mid, crossing over at 1.6 kHz to a 6½ inch high mid, which extends to 8 kHz. Their effect is to extend the range of the Turbo-loaded mid band beyond the *TMS-3*'s range. A 2 inch HF unit on a specially-designed flare completes the mid/high enclosure.

In the LF enclosure there is a TurboBass-loaded 21 inch LF driver sporting a 6 inch voice coil, whose range extends up to 150 Hz.

All the drivers were designed by Turbosound director Tony Andrews at the company's R&D facility in Surrey, England, and are produced by sister company Precision Devices. Each, says Andrews, is optimised for maximum performance in its own frequency band and for the special loading used in the *UHQ* enclosures. A chief feature is the tight dispersion (around 25° per cabinet) long-throw design whose projection capabilities are the product of their Turbo loading rather than coupling effects. This factor, combined with high acoustical efficiency, accounts for the compactness of the *UHQ* system in a typical application.

Newsham recalls: "When we first assembled the system here the production manager's instant reaction was 'for God's sake get the screams up before Roger (Waters) sees how small it is!'"

Ironically, it also marks a return to the principles behind one of Andrews' earliest designs, the modular high 'Q' Festival system

with what we've heard to date. It certainly is a system we're happy to put our name to, even though it's a prototype system."

Did Britannia Row have an input in its design?

Lowe: "Well, we were listened to in terms of size and flying requirements but there weren't too many things Turbosound's R&D department weren't aware of. When it goes into production, only a few non-sonic details will need changing, which is very good at this stage. I'm looking forward to hearing it tonight—I've heard it at Glastonbury, at Roskilde and in trials with pre-recorded music but I haven't really heard it at its best at high volumes."

Sound reinforcement control

Controlling the SR system is a substantial array of desks, needed to handle the enormous number of mic lines, which mainly emanate from the orchestra. Britannia Row's Paul 'Paddy'

Addison assembled the system and its patching, while Multitrack Hire's 24-track Otari tape machines (containing the all-essential SMPTE track sound effects, orchestral back-up tracks and a musicians' clicktrack) are being operated by Heidi Cannavo. She's pre-mixing it all on a 36-channel Midas *PRO-40* desk, before sending a stereo mix to two inputs of Gary Bradshaw's dual Yamaha *PM3000* console line-up.

The Yamaha's PFLs and various auxes are bussed together, allowing engineer Bradshaw to control most of the show from one *PM3000* board, using the second desk mainly for submixes.

An unexpected sight in a dark corner of the mix tower is a venerable EMS *VCS-3* synthesiser, bristling with patch cords, which will provide Addison with a one-off (if *unsung*) bit-part role in musical history. Newsham explains: "That's to

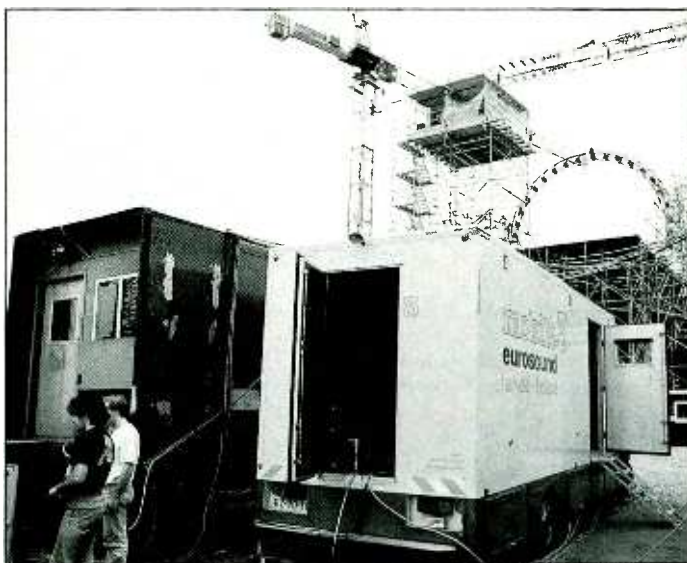
make noises for the wall falling down. When Paddy sees a brick hit the floor he has to press a button. I expect he's getting stage fright now."

It has, says Mike Lowe, been immensely difficult to eliminate hum and noise from the sprawling signal chain. "There's so much equipment on site that it's inevitable different people's circuits get accidentally linked from time to time. For example, if a sync signal has to be available on stage or on a lighting tower at a certain time and the piece of equipment it's timing happens to touch an amp rack or whatever, suddenly things start to connect up. So you get a situation where there are a lot of guys from all departments constantly fighting their corner—trying to find out who did what 2 hours ago that changed things for them! Chris Hey, who is our 'commandant' on site, has spent a lot of his time unravelling stuff like that."

Feeding the world

Brit Row's remaining task was to supply the TV and recording companies with signal feeds—accomplished through 48 channels of BSS active splitters and another 96 transformer buffered channels.

Photo: Andrew Von Gamm



The Manor Mobile and Eurosound's Mobile Three

built in the late '70s but which lacked the necessary technological sophistication for commercial success.

It's the first time Flashlights have been used alongside *TMS-3*s in a big way: how does their sound integrate with the *TMS-3* delay towers?

Newsham: "It's really easy. They do have different sound characters but the main character, the TurboMid, is there in both of them. The Flashlight's dynamic is broader, further down and further up in frequency but it's similar in character. The trick is to time-align them together. All you do is treat them as two separate systems, get each sounding good first."

"The only part of the system where integration really counts is in the centrefill immediately in front of stage, which is *TMS-3*s, and that blends very well. The rest of the *TMS-3*s, of course, are the delays but even as you walk away from the Flashlight into the first and second arcs of delays the transition is very smooth sonically. Which is not to say they don't sound different; they *are* different boxes."

Lowe: "We've been trying it out for the past 6 weeks to evaluate whether we want to take it on as rental stock. Obviously, there's an element of risk in trying it out on new projects, especially with an event of this size, but we're very happy

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Mark Knopfler & Guy Fletcher pictured in their London studio

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Low: "It's actually less complex for us, as far as the broadcast side is concerned, than, say Knebworth, where we were changing nine major acts in the course of the day."

The show—screened in the UK by Channel 4—is being recorded by West German company ZDF's 14-camera OB unit and produced by Tony Hollingsworth's London-based Tribute Productions for worldwide transmission to a total of 43 countries.

Nick Griffiths supervised TV sound and co-ordination (TV and broadcast sync sharing the common SMPTE track with TV sound mixing by Dave Richards using an SSL G series console, installed by SSL and Hilton Sound. Richards' feeds are derived, partly mixed, from the Manor Mobile, in which Nigel Jopson is recording an album mix on Sony PCM 3348.

Teamwork, says Richards, is the key. "It's like a chain—if something goes wrong in any link we've all had it. We're at the end of the chain—that's what makes me nervous!"

As to hardware and effects: "I keep it to a minimum for live mixing because otherwise it just gets too complicated. I just use a relatively long Hall-type plate on a Lexicon 480L and a short plate and some repeats, that's all. On the mics and some instruments, I'm compressing a little and because we're transmitting live on air I've got the SSL stereo compressors in. We wouldn't want to blow up the transmitter—and they have a heavy protection limiter, which is just horrible; we don't want to hit that at all. It's been a problem getting clean feeds with 19 generators and so many people on site but we're clean now."

Jopson: "As a scripted one-off show it's the most complex event of its type I've encountered. But most people are really professional and everyone's pulling out all the stops. We've had to be much better organised than we normally are in the studio—just keeping track of equipment and the artists who've been confirming and then

cancelling."

Nick Griffiths observes: "I think it's very ambitious of Roger to try something like this; to take a classic album and stage a concert around it with a bunch of guest artists who've only been rehearsed for 1 or 2 days. That's pretty courageous."

A bigger stage

The Wall is perhaps an extreme example of how much things have changed in the once scruffy and do-it-yourself world of live rock touring. People's expectations of live shows have grown in parallel with the abilities of technical innovators to satisfy them; and with home entertainment already in the realms of what would have seemed like science fiction 20 years ago, there is clearly no turning back. The same microchips that make possible high definition sound and vision in the living room also mean that instantaneous global broadcasting of rock events is likely to become commonplace—especially with satellite TV hungry for exclusive material.

You can now, assuming you have the necessary finance, hire virtually off-the-shelf sound and lighting systems, which sound and look virtually as good to 250,000 people as they do to 2,500. Add that and the economies of scale together and you've got very little incentive to tour at all unless you're starting off in a club, or milking the stadium circuit. Is that a good thing or a bad thing for rock and roll? Only time, as they say, will tell.

But this show is by and large a success. Shame about the patchy TV presentation. Shame about that mains spike. Shame about the fans who were near the muted delay towers. But otherwise, the production team have certainly proved tonight that where big shows are concerned, the industry has got it licked. □

Equipment list

Microphones

- 2 AKG D112
- 2 AKG D12
- 2 AKG C460
- 7 AKG C451
- 2 Beyer M88
- 3 E-V RE20
- 8 Ramsa WM-S1A
- 2 Sennheiser MD421
- 24 Shure SM57
- 16 Shure SM58 Beta

Stage

- 14 BSS single-channel DI
- 2 Countryman DIs single-channel
- 4 BSS 4-way DIs
- 4 Theatre Projects DI single-channel
- 4 Brit Row DI 10-channel
- 48-channel BSS active stage box
- 96-channel transformer split stage box
- 16-channel transformer split stage box FOH to stage
- 13 19-pair DPD 100 metre multicores

FOH mixing

- 1 Midas PRO-40 48-channel console
- 2 Yamaha PM3000 40-channel consoles

FOH FX racks

- 1 AMS RMX16
- 1 AMS D15-80S
- 1 Aphex Aural Exciter AX
- 1 Aphex Aural Exciter B
- 1 Aphex Aural Exciter C
- 11 BSS DPR402
- 14 dbx 160X
- 6 Drawmer DS201
- 1 Eventide H949
- 2 Lexicon PCM70
- 5 Yamaha SPX 90
- 3 Yamaha SPX900

Monitor consoles

- 2 Ramsa 40-channel
- 1 Midas PRO-40 36-channel

Monitor FX racks

- 5 BSS DPR502
- 5 BSS DPR402
- 3 BSS FDS320
- 8 dbx 160
- 2 dbx 160X
- 1 dbx 166
- 12 Klark-Teknik DN360
- 8 Klark-Teknik DN27
- 2 Yamaha SPX90
- 3 Yamaha SPX900
- 3 Yamaha SPX90 II
- Midas patchbay
- 4 MSI switcher amp racks
- 3 Carver amp racks
- 8 Turbosound 2x15 Low Profiles
- 9 MSI 2x15
- 16 MSI 2x12
- 8 Turbosound TMS-3s
- 2 TMA racks (tri-amplifiers)

PA drive racks include

- 1 Klark-Teknik DN60
- 2 Klark-Teknik DN27
- 3 BSS FDS 360 (MCS 200 on the centrefill rack)
- BSS TCS803

FOH speaker system

- 48 Turbosound Flashlight mid/high-bass pairs powered with 18 BSS amplifiers
- 50 Turbosound TMW-124 sub-bass
- 198 Turbosound TMS-3s powered with C-Audio and QSC amplifiers
- 16 JBL long throw horns

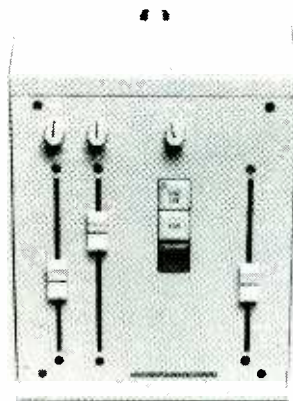
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I have noticed that over the last few years tapes have been coming in without the need for violent EQ in order to get them right. My feeling about this is that it coincides with the widespread use of nearfield monitors for actual mixdowns as opposed to using large systems.

"You get these big monitors with lots of SPL—and lots of hype—and the end result is that you have no real idea at all what the music sounds like."

Fairly hard words directed at monitor and studio designers from mastering and cutting engineer Ted Jensen of New York's Sterling Sound.

"I must admit that I don't like big horns coupled with 15 inch woofers that are crossed over way too high, blaring away at me.

"You could argue that if the monitor system is well-designed and has been put into a room that can handle it, then it should sound OK. However, these rooms are still relatively few and far between and you still find big monitors that have been retrofitted into too small control rooms.

"When the mix doesn't sound right then the standard cure is—'Turn it up louder!' and that isn't the answer to the problem. With the smaller speakers you can't do that—unless you want to blow them out—and if the mix is just not happening, then you are going to be forced to do something about it."

Background

"Prior to joining Sterling in 1976, my musical career was as a trumpeter. This came in particularly useful as I learnt to read music and this is basically a must for mastering classical music as it means that you can follow a score.

"As far as the studio side of things was concerned, I started with Mark Levinson by doing demo records. This moved on towards more general work and finished up with me joining Sterling Sound.

"While I would say that this work was not exactly glamorous, being around a perfectionist like Mark does mean that some of his attitude will rub off onto you and make you always look for that little bit extra. You also get to learn how to listen very critically and zero in to what really sounds musical and what doesn't.

"Knowing what to listen for is an art in itself and I sometimes feel that this quality is getting a bit of a rarity today. There is often an obsession with individual sounds—you know, taking 3 days over a snare drum or creating this or that sound—rather than there being a global view of how the whole song should fit together.

"It all makes it a bit of a waste of time if you have spent days over individual sounds only to find that they don't really go together.

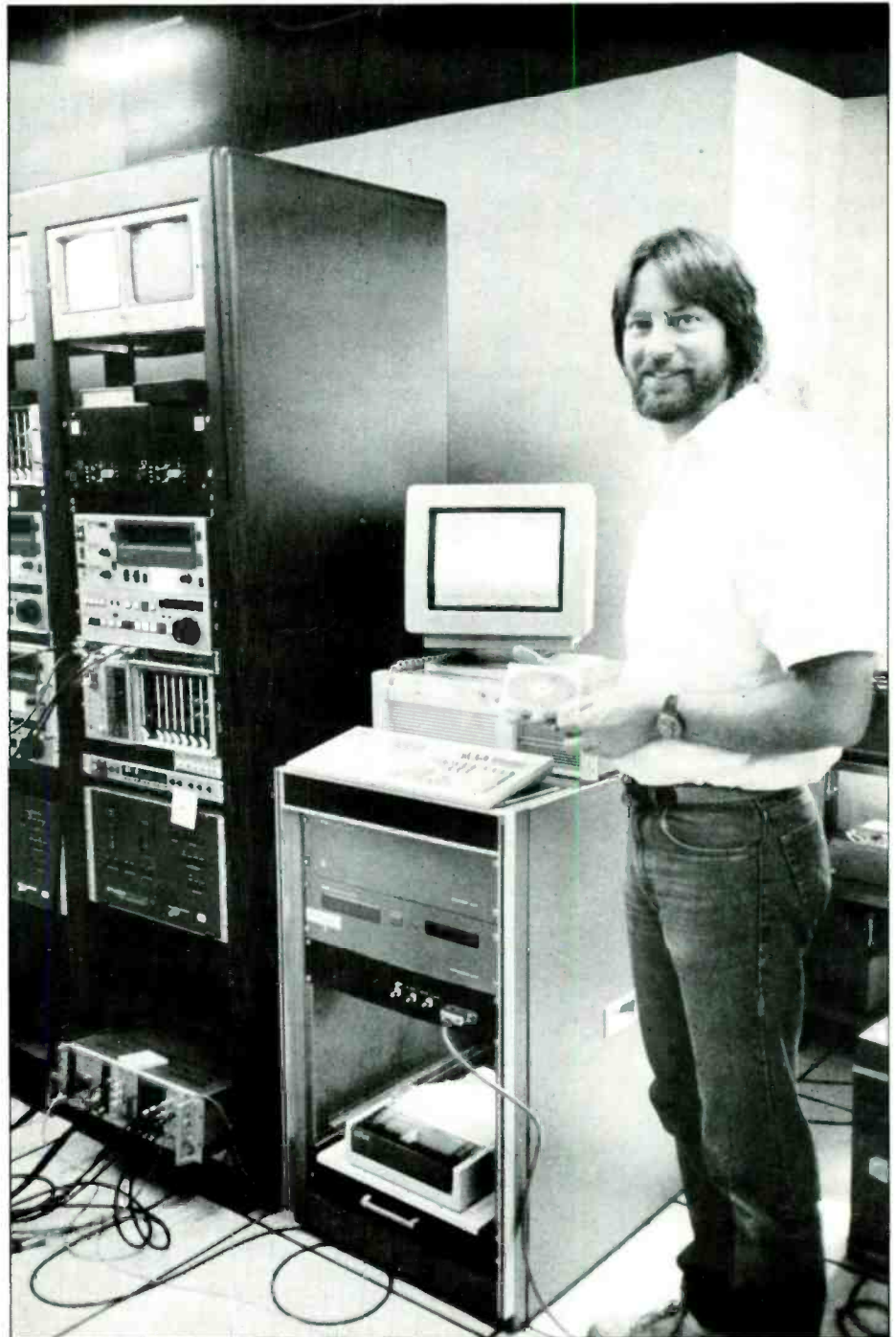
"Mastering engineers are in both the privileged and sometimes difficult positions of being the last person in the chain before a recording gets committed to its final medium: there will be times when you do a straight one-to-one transfer and others where the onus is on you to save a project that isn't quite happening. It's quite a responsibility."

Sterling

"The philosophy here at Sterling is to have rooms that have a home-type of environment as opposed to that of a studio control room. You assume that the mixdown you are listening to has been done

STERLING SERVICE

Terry Nelson visits mastering engineer Ted Jensen at New York's Sterling Sound



Ted Jensen with the Gotham CDR90 CD recording system installed at Sterling Sound

in a proper listening situation and that your job now is to make the master that will be listened to in the home.

Many people still have a tendency to forget that records are listened to in the home, not a control room, and this is something that has to be taken

into account when doing the transfer.

"Having said this, our rooms are obviously not just four bare walls with some equipment thrown in but rather what we feel could be termed 'good living room environments'.

"In practical terms, this means that no



An earlier layout of Jensen's room at Sterling

dimension in the room is a multiple of another in order to avoid room modes and the basic construction consists of double walls floated away from the main structure of the building.

"As far as the acoustic treatment is concerned, this is a mixture of diffusion and absorption and I find that it works pretty well. I'm happy with it."

The diffusion is provided by strategically placed *RPG* panels with absorption by *Sonex* panels on the walls and *Tube Traps*. The latter have been carefully placed in certain positions as over and underneath the console in order to minimise reflections and rumble build-up.

The walls are faced with a non-static moquette and the console/equipment end of the room is elevated with reference to the front of the room where the monitors are situated. A large sofa for clients also acts as a suitable absorber.

The monitoring consists of *KEF 105* loudspeakers placed on top of *Velodyne* servo-driven powered subwoofers and, when listening at the console, the sound comes up from the floor rather than down from a monitor bridge or wall.

"Again it's the home environment—most people have their speakers on the floor or at least fairly low down."

The monitors are tri-amplified with *Krell 200* amplifiers driving the 2-way *KEF*'s while the subwoofers are self-powered. The *Velodynes* feature a frequency response of 18 to 50 Hz and are invaluable in revealing unwanted very low frequencies.

Jensen played a selection of cuts and the sound in the room was very open with a good distribution of the whole frequency range around the console area.

Jensen comments: "I don't usually like to listen very loud but this system does move air if I need it to!"

Did Sterling Sound have any plans for updates? "We are planning a sixth studio at the moment that will have a more acoustical approach in the way of the design—one of the features being that we want to eliminate the ceiling as an acoustic boundary.

"I am glad to say that there appears to be a shift towards more accurate control rooms in

studios now and the new room will reflect this trend."

Moving on to the hardware in Jensen's room, the basic equipment setup includes a *Neve* mastering console with *32087b* equalisers and two *Sontec* parametric equalisers, outboard *Tubetech* valve (tube) equalisers and limiters, a pair of *Studer A80* tape machines, a *Sony PCM-3302* DASH stereo recorder and *DCS 18 bit ADC*.

"We can obviously cater for all digital formats—and of course, analogue—but this represents the basic equipment that will be found in all the rooms here at Sterling." In order to stay in the digital domain, Sterling also have a *Neve DTC* digital console which travels from room to room as required. Jensen has also been evaluating digital consoles nearer home in the form of the *Audio Animation MUSE*. After a lot of collaboration, Ted has finally pronounced himself satisfied and his own *MUSE* was installed in February this year.

A hallmark of Sterling Sound is the amount of modification that is often made to its equipment.

"All the Studers throughout the facility feature *Cello* (Mark Levinson) electronics for the preamps. The circuitry is Class A, which means that the signal is very clean with a virtually inaudible noise floor, and this makes an extraordinary difference to the master tapes when they come in here. So much so, in fact, that when clients come in with both analogue and digital masters and compare them, they always go for the analogue version!"

The *Tubetech PE-1A* equalisers have also been modified in order to make them "more open-sounding with a tighter bass response".

Different formats

"Analogue is still on top with ½ inch *Dolby SR* masters definitely on the increase. The ½ inch format at 30 ips is probably the most common type of master that we receive and *Dolby A* is now passé—it almost gets to be an event if we get an *A* encoded tape now.

"DASH digital masters amount to just under 15% of our business with some *Mitsubishi X-80* and *X-86* (high speed) coming in from time to time. Digital still has a way to go, especially in the field of converters, where the analogue-to-digital conversion is not always the same.

"All the rooms here have their dedicated set of A/D and D/A converters in order to keep consistency and we always listen to the same set of converters when EQ'ing a tape and listening to the results.

"In the early days we nearly got caught out once or twice by thinking that digital is digital, it will sound the same, but it doesn't quite work that way."

Considering the emphasis that there is on digital these days, what was Jensen's opinion on why there was proportionally little of it coming in to be mastered?

"I think one of the prime movers in the slackening off in digital masters has been the introduction of 48-track digital recording.

"Clients tell us that mixing 48-track to digital 2-track just does not come over so well as going to analogue. My own pet theory about this is that the sampling rates and processing on the master recorders are just not sufficient to handle all that information.

"If you dissect the recording process, the information going onto each track during tracklaying is not overly complicated but once you mix maybe 48 of them, you are ending up with a very complex signal and it probably needs much more powerful processing to handle it properly."

Analogue to digital

"This is something that has to be done very carefully and this requires taking the time to play around with different converters. In many ways they are like outboard equipment—a compressor is a compressor, yet they all sound different. With A/D conversion you can't take a simplistic approach and use the first A/D that comes to hand.

"This is an area where a top room can give advice and help to clients in order to make a good transfer. I always take the attitude that the customer is giving you his best and that, therefore, you should do the same."

Release formats

"You know, in the States cassette is king. The figures often differ but I would say that about 60% of record sales are on cassette, which tends to negate all that work that you just put in for that final cut! The fact is, people are spending more time in their cars and cassettes are still the most convenient way to listen to music.

"CDs are now doing better than was expected because they have been accepted by the younger people as being more convenient than vinyl records, whereas the record companies thought it would be a strictly audiophile thing.

"However, there are still a lot of turntables out there and it is a pity that *DMM* came along a bit too late to be a real competition for CD. I must confess that I do have a liking for a good analogue record—it tends to sound more natural."

A calculated balance between using what the leading edge of technology can offer coupled with the best of what has gone before keeps Jensen at the forefront of his business. He is very much aware that the final product is meant to be music and not a technical exercise. □

It was not the best of times and not the worst of times either, thought Jack Barber. Mind you, it had required some getting used to, it had! Imagine an armed guard in the studio—24 hours per day. Just to protect the blank recording tape and the vault masters. Not to forget the batteries and lubricating oil. Oil. That's what it was. Never used to take delivery of blank media via armoured car. Cosh... bloody Securicor. Still, he was ever so much in business and that was not something you could say about all his competitors.

The move had helped. With the rationing of gasoline supplies and the alternate driving days depending upon whether your licence number ended in odd or even digits, the commuting world had taken to the trains in droves. Downtown addresses became so much more important that a lowly recording studio could not justify the cost of downtown real estate. That had been coming anyway, he pondered. The yuppie developers were determined to 'civilise' London, no matter what. The snack shop around the corner from his old studio was gone. All the top pop groups had gone there on break, to eat the 'British Rail' bread pudding and the spicy onion pakoras (fritters). Now the neighbourhood had become gentrified. His old studio had been broken up to house a chi-chi hairdressing establishment—a trendy dress shop—a now notorious Mexican restaurant.

But he had played the game, too. Moved out to Hounslow West. The trains ran both ways and anyone could reach his studio via London Transport—God bless the tube train! And the trains had worked out well for people coming out to a session. A single truck was despatched by the record company to pick up musical instruments if the musicians didn't bring them on the train. The only problem was that the trains did not run after midnight and his 'after midnight' sessions had become very popular. Music makers were night people anyhow. He received much lower night-time electric rates from the authority and thus his lighting and recording charges to his customers were much lower. Since the oil problem had started, he had raised his charges five different times already because of the cost of electricity and heating.

The worst of it was the 'brownouts'. It was not so much a problem at the night-time sessions, because despite the cheap electric rates most people doing business with electricity did their business by the daylight standard. But for daytime recording sessions, the voltage would drop and that was a real problem for all his equipment. That big regulator cost a pretty penny, he philosophised but it sure has paid for itself. The voltage goes down but it doesn't.

Solar. That would be his next project. Cover all that wonderful roof surface with solar cells. Surplus military solar panels were still a good buy despite the long running crisis, since most people just did not have the energy skills to go with 'Old Sol'. He would rig all his gear that could run on 24 V off a series of alkaline 'telephone-type' float cells. Fed by the solar panels, it would provide energy sufficiency, of a sort. Speaking of energy sufficiency, he could not understand, and never would, why Britain with

Martin Polon

'Oil Be Happy Tomorrow—Cause I'm Not Happy Today'. Comment from our US columnist

her North Sea oil was supposed to 'go it knickers' like the rest of Europe. Sharing with oil-less Europeans who never shared anything with England except their opinions had certainly become a way of life under the EC (European Community), he had long since decided.

The part he liked the least was that the people out in the 'High Street' were buying music much less than before the crisis. All the record companies had raised prices by 10% after the first shock wave of the crunch, claiming undue hardships on profitability. "The expense of producing a CD was impacted a great deal by the crisis, or so the record companies told us," he thought. The plastic 'disc', the coatings, the other plastic elements and the 'jewel box' case all came from oil one way or another. So did the tremendous amount of electricity needed to run the CD plant. That despite the fact that he and many others had felt for some time that the high CD prices contained record company profits in the order of 33%. Curiously, the record companies had been wrong about the purchasing public's acceptance of the additional tariff. It had been too great an increase for the public to swallow and recorded music sales had plummeted. Studio record sessions for new groups and music had followed the same downward course.

Yet he knew that the amount of petroleum-based plastics in an LP record were negligible in relation to the total price of an LP record. Even a 25% increase in raw materials would have had little impact on the final price, especially since LPs sold for a third of today's CD pricing during the last energy 'flap'. The LP used a 'biscuit' of vinyl plastic that cost less than 50p. It was 'pressed' with heat in a metal mould. The heat could come from oil, coal or wood for all he cared. A wood burning LP plant, he snorted mirthfully. Progress, he chuckled to himself.

Now, the above tale of living under the cloud of uncertainty fostered by an oil-driven energy crisis is, as is usual for the opening of this column, a piece of fiction strongly influenced by non-fiction. It is, however, liberally interpretative of the most likely turns of such a crisis in this day and age. It has not been the best of times and it has not been the worst of times, entering the 1990s. The audio and recording community has had to worry about studio bookings more than anyone would like and the concomitant problem of having to go slow in

acquiring new technologies is equally vexing. But until the 'Summer Of Our Discontent' surfaced at the beginning of August 1990, it appeared that more or less the new decade would mean business as usual. That all changed with the appearance on the world's television screens of a swarthy faced individual bearing a walrus moustache. This worthy, Iraq's Saddam Hussein, has taken the role of the Middle East's 'Music Man' an Arab Professor Harold Hill. And you can spell trouble with a capital 'O' for OIL.

The Iraqi invasion of Kuwait, followed by threatening gestures towards Saudi Arabia and the other oil-rich Gulf Emirates has given television networks and broadcasters more news copy than almost any other event of the last 10 years. During the first month of the oil crisis, fear of the oil 'monster' cost the US close to 500 points on the stock exchange. Similarly, the Japanese exchanges fell more than 1,500 points in one day with the French, German and Swiss bourses showing equal lack of stability. Oil prices moved from \$16 per barrel to the mid-\$30 levels and could eventually exceed the \$42 level set during our last experience with the Arab version of 'Let's Make A Deal' in the late '70s. Some analysts expected \$50 per barrel oil before the crisis faded into the sunset. Each \$10 of per barrel increase could cost western countries as much as 1% of their economic growth. Since expectations for growth in the West during the early '90s are only about 2% per country, the real impact of rising oil prices can be seen. Another measure of the oil impact is that analysts estimate that every pound sterling or dollar at the oil barrel translates into £10 or \$10 per year per driver in additional costs.

What seems likely is that some of the oil producing countries, many of whom are outside the scope of the conflict, will try to prevent extraordinary rises in the price per barrel to avoid development of non-oil energy alternatives. The entire world is focused on reducing the tension in the Middle East. Whatever the outcome of this confrontation, however, it seems clear that the old days of cheap oil and cheap oil by-products seems a creature of the past. The prospect of oil blackmail also seems to be with us for the foreseeable future. It seems equally clear that oil prices at least close to double the old \$15 to \$16 per barrel level are likely to be the stabilisation point. After all, analysts point out that one of the reasons Iraq decided to eject the Kuwaiti ruling family was its intransigence on oil reaching the \$25 per barrel level.

What is important to the managers of audio studio and other facilities, and the makers of audio technology is not so much the event itself but its real and potential impact as a forced realignment of the price of oil and the concomitant inflationary push from such impact on prices throughout the audio technology sector. For the US and UK audio community, the major pricing concerns focus on oil as a manufacturing commodity (raw material), which affects the production of plastics and electronics and as a cost factor in running manufacturing plants and transporting finished audio technology goods from the maker to the customer. Oil also impacts the audio studio and other related facilities in terms

of heating, cooling, lighting, power and vehicular transport.

It might be appropriate for audio studio managers to develop some plans to reduce long term exposure to oil induced price increases, as well. A recording studio runs on energy and uses great amounts of oil-based recording media. It is interesting to note that during the two previous oil crises, the per-barrel price of oil returned to its pre-crisis level. Not so for any of the price increases in gasoline, heating and fuel oil, plastics derived from oil, etc. In each case, a new bottom plateau for prices was set. Some suggestions for future studio management action should include:

- If audio facility owners have any interest in buying new equipment, buy it now! The upward spiral in transportation and delivery, plastics and plastic electronic components, manufacturing energy costs, etc, will be felt in the marketplace. No matter how the affair in the Middle East ends, the net effect of the oil-based instability will be price increases. One could naively depend on that pricing going back down 'if and when' the crisis is resolved but when was the last time you ever heard of a price going back down to its former level in the audio business? This is one time where the audio equipment salesman's favourite plaintive whine 'Buy it now—you'll never see these prices again', is probably the gospel truth.
- Purchase ahead as much as a 2-year supply of blank media. Recording media such as audio and video tape have plastic backing and adhesive binders. Tape is definitely derived from petrochemicals. Now is the time to stock up on your recording needs for the foreseeable future. For justification—see above
- If the questions of studio facility remodelling and/or associated bank loans are floating about the management suites, swing into action! Now is the time to move your project. Oil inflation could force interest rates up or at the least, complicate a bank's loan portfolio. Cost for energy-produced materials such as steel, aluminium and cement will only go up. So will transportation costs for such commodities
- Become energy efficient in your studio or other operation. If you own or control your own

building/s, consider the installation of solar hot water heating and possibly space heating. Consider the use of heat exchangers. Install voice activated light switching in all studio spaces not directly recording related

- Install new technology 'cool light' studio lighting fixtures and lamps. Great strides have been made in achieving temperature reduction via more efficient lamps and housings. This could bring savings in air conditioning costs as well as longer lamp life
- Consider co-generation of electricity. If another site is adjacent to the studio in a large operation, for example, the combined electric bill could run close to a \$¼ million per year. The use of a new small natural gas-powered generator could bring considerable savings as fuel would be bought at a utility price
- Realise that wire and wiring-related costs have been spiralling upwards at a most prodigious pace, even without oil pressures. The various geopolitical forces that play on copper prices, the cost and complexity of wire making machinery, the audio industry demands on wiremakers to produce increasingly quiet and reliable cables in ever increasing numbers of shielded pairs has all forced prices up. Add to that the complexity and quality demands made on plastic insulation and outer jacketing, factor in any oil-induced energy and raw material costs—the sky is the limit. Some studio owners say that they are waiting for fibre optics or multichannel digital cabling. This is all well and good but, like waiting for Godot, there is the possibility that the innovation may never come or may come too late for needed expansion. Also, such systems will use cables, just different kinds. If you need cabling of any kind, it may be more than appropriate to buy it now. The same can be said of electrical wiring, which is appreciating at the same break neck pace as audio wiring.

If all this sounds like a bit of hoarding, a bit of selfishness plus the judicious robbing of Peter to pay Paul (as they say in the candy bar business), so be it! Rob succeeding years' budgets to save big bucks by doing it now—whatever 'it' happens to be. New equipment, new facilities, supplies, etc, all will cost more in the

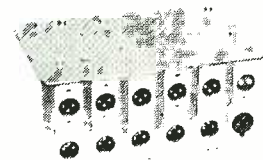
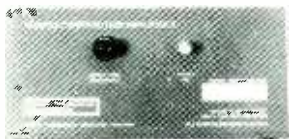
future. That is guaranteed by our over 5% rate of inflation without the oil issue. Any amount of inflation over that number guarantees that the increase in prices will cancel any savings made in waiting to purchase during so-called 'better' times. With a major oil crisis—and the Iraqi incursion into Kuwait does not quite qualify as one—the real inflation rate could leap to 15% or 20% or better. This especially if the 25% or more of the world's oil supply located in the Persian Gulf zone is embargoed in some future petroleum holocaust—intentional or otherwise. As to the issue of studio owners being accused of playing the 'me first' game, there is no question that it may be better to have what is needed to keep a studio running rather than shutter your doors with a 'moral victory'. It is clearly a damned uncomfortable position but only time and the resolution of any crisis situation will tell what the 'right' move really was for that particular crisis.

Perhaps the last note from this oil 'crisis' is the supposition by record company and consumer electronic 'old China hands' that this time around will be like the other times spent 'in the barrel'. In fact, many analysts expect the consuming public to react quite differently from what past history would suggest. The historical response for down times, oil crises, recessions, etc, was for the public to recreate themselves with electronic entertainment, ie records, movies, etc. At the same time, the necessary playback hardware was also improved in the home. Such expenditures were modest and provided a significant and needed morale boost. The entire audio industry benefited at all levels and much was written about audio rising from the veritable 'ashes' of cyclical financial adversity.

This time around, most homes in the US and the UK have sound systems that are of much better quality than in past years and do not especially need upgrading. The natural market to expand if the old 'saw' of 'audio recession boom' were to 'cut wood', would be the auto stereo market. Car stereo systems are going through a renaissance in the United States. There are now more mainstream magazines devoted to auto stereo than there are traditional hi-fi magazines still in publication. I am told that a similar condition exists in the United Kingdom. However, as gasoline prices rise and personal incomes drop—several issues have been defined by consumer surveys. The average driver is much more interested in staying behind the wheel these days than in having a glorious sound system or buying CDs for said glorious sound system.

In a word, the 1990s finds car buffs who would rather run around with 200 horses under the hood than with 200 'real' watts in the dash. With gasoline pricing out near \$1.50 per gallon in the US, drivers are spending almost 50% more than they did several months ago. The money to cope with that kind of increase has to come from somewhere. As to CD record sales, public resistance to high retail prices is not expected to wane and may indeed peak again as oil costs potentially drive CD retails up to US \$17. All in all, the outcome of the Persian Gulf standoff may not turn out to be the boom times many expect for the audio industry. □

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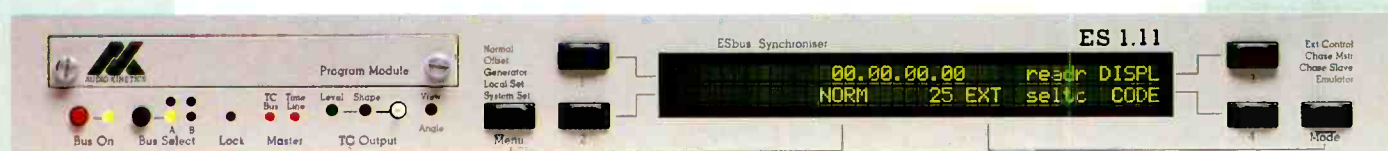
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Late '60s Soviet made film console



Film console with compressor/limiter/expander unit

SOVIET SOUNDINGS/2

Following last month's interview with Soviet engineer Vladimir Vinogradov, Terry Nelson reports his impressions of professional audio within the USSR. During travels in Moscow, Minsk, Riga and Leningrad, he discussed techniques and the types of equipment available. He also looks at some of the problems raised by the gradual appearance of modern equipment from outside the Soviet Union

When coming face-to-face with professional audio in the USSR one realises that while the industry is really small within the rest of the world, in Russia it is minute. The reasons for this are mainly commercial and stem from the system of state-run enterprises. Basically, this means that professional audio is confined to broadcast (radio/TV), film and music recording, the latter under the aegis of Melodiya, the state record company. The actual number of studios is very low and it would be impossible to make comparisons between cities such as, for example, London and Moscow in this respect.

Strange as it may seem, the Soviet Union has virtually no manufacturing base for audio equipment although this was not always the case. There are signs that the pendulum is starting to swing back in that direction.

Visits to different film studios revealed film consoles that had been designed and built in the Soviet Union during the late '60s and early '70s. Their general appearance and construction could be likened to Neumann consoles: fully modular and built like a battleship, with a good standard of finish. For their day these consoles had quite advanced facilities.

Film sound takes a very important place in the Soviet Union due to the size of the film industry and it is probably true to say that more development work has gone into consoles for film use than anywhere else. Film use, however, is not

confined to dubbing and includes music scoring, dialogue and all stages in between.

The film consoles shown here were built in the late '60s and have such features as 3-band EQ, four auxiliary buses with two assignable level controls, mono main output bus and a 6-way matrix output for multichannel sound.

A compressor/limiter/expander from the same period displays shades of the Audio & Design *Complex*! This unit combines valve and solid state circuitry and is one of the very few prototypes. Though I did not hear it in action, I was assured by the engineers present that it did work very well indeed and that the main problem would be one of spares.

It could easily be argued that a combined compressor/limiter/expander-gate in the '60s was almost *avante garde* and I asked why no units were put into production. The answer I received was that it was: "...almost certainly built as an experiment or part of a research project. Once it had been done, the results would be filed and that would be the end of it—no intention would be there to actually make the equipment. We were very lucky to be able to find this unit and keep it."

Strange though it may seem, this has been a typical situation in the Soviet Union until almost the present day. There is little or no communication between research institutes and manufacturing and a lot of work is done 'just for the exercise' without any thought of the results

being commercialised (that is the capitalist way of doing things).

The late '60s also marked the appearance of the new consoles for broadcast use that Vinogradov mentioned (*Studio Sound*, October 1990). These were also from the same stable as the film desks. Since then there has been virtually no further manufacture of professional mixing consoles apart from some custom models that are supplied to Soviet television from time to time.

Other equipment I found that was made in the USSR consisted of film recorders, microphones and a portable recorder that was heavily based on the old Nagras. However, as one film location engineer pointed out: "They copied all of the mistakes of the early Nagras and none of the improvements." The 35 mm machines (usually 1- and 3-track) are very solidly built and often feature the original valve (tube) circuitry although, in some cases the amplifiers have been replaced with transistorised versions where this has been deemed necessary.

Concerning microphones, I was pleasantly surprised to come across a fairly wide range of models made in the Soviet Union under the trade name Ecran. There were dynamic and condenser models, including preamplifiers with interchangeable heads and a series of large rifle microphones. There has also been some development in miniature microphones for lapel use, etc.

Leaving aside the non-Eastern European equipment for the moment, the main sources of supply for tape machines and consoles have been



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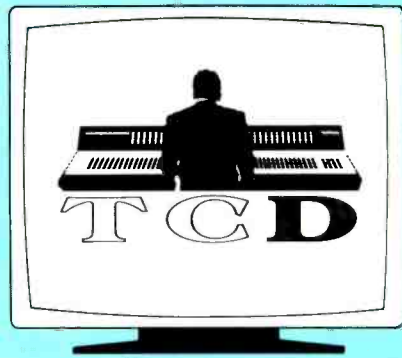
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Yamaha SPX 1000 multiprocessor	£599
Fostex 4030 synchroniser	£750
Aphex 612 Expander/Gate	£399
Korg M1	£850
Tascam ATR60 2-track 1/2" inc. trolley, mint	£1500
Electrospace Time Matrix-6 delays in one	£299
Fostex 4050 remote/autolocate/SMPT for E16	£399
Proteus 1	£550
Tascam MSR24-24 track	£5999
Yamaha SY55 (smaller SY77)	£599
Tannoy Little Gold Monitors	£499
Akai S1000 KB (full S1000 + keyboard)	£2499
Tannoy Super Golds (15")	£1299
Allen & Heath Saber 24:16:24	£5999
Tascam MSR16	£2999
Fostex 5030 8 way line matching amps (+4db-10db)	£150
Symatrix 511a single ended noise reduction	£299
Yamaha TX7 (DX expander)	£299
TAC Magnum (demo) 26-26 + patchbay	£10999
Bel BD80S (show 16 sec sampler)	£399
Bel BDE2400ES (24-see fully editable midi sampler)	£499
Soundtracs Quartz 24 channel. (3 months old)	£15999
Soundtrac PC Midi 24	£4500
Fostex R8 (demo)	£999
Saber 24:16:24 plus Tascam MSR24	£11999
Soundcraft 6000 28:24 mint	£8500

This is a small selection from our current stock - give us a call and we will be happy to send you a full up-to-date list. All prices exclude VAT.

The latest issue of our 40 page full colour magazine is now available along with our current price list. Write or telephone for your free copy.

If you require any further information on any of the services which we can provide give us a call on 0223 208110 or on the main TCA number 0223 207979 (11 lines) for full details and brochures. The faxpack, which give details of installation facilities, the service department, demonstration facilities, the recording school and the equipment should answer any questions. If you are converting any kind of audio purchase, why not give us a call - you have nothing to lose! We didn't become the largest pro-audio retailer in EUROPE without being the best!

PACKAGES

At Thatched Cottage we have put together a number of packages based upon complete systems, each offering compatible items with substantial discounts (although it is possible to change them within a given package). Whole studio systems are available for 8, 16, and 24 track, and we have faxpaks on 4 & 8 recording, MIDI, our Thatched Cottage school and finally financial advice (loan and leasing schemes available). All the details are free - just give us a call.

TCD HOT TECH

Roland S770 the ultimate sampler?
Korg Wavestation - new blockbuster.
Akai A-dam 12 track digital.
Akai DD1000 optical drive recorder.
Casio DA7 DAT.
Akai S1100 sampler
Deck C4 track software for Soundtracs
Yamaha TG77 (rack SY77)

TCD SPECIAL OFFERS

Revox B77	£999
Korg M3R	£499
Akai S1000 2 meg expansion boards	£199
Seck 12:8:2 desk	£699
Revox PR99	£1499
Function Junction Plus	£550
Alesis Microverb II	£99
Alesis Midiverb III	£189
Drawmer DS201 gates (unbalanced)	£250
EVS1 expander	£259
Akai S950 3/4 mag esp boards	£125
Alesis HR16 drum machine	£199
Yamaha TG55 sample player	£399
AIWA HDS1 DAT (inc convertor)	£550
Multiverb RT (under half price)	£149
Akai 1090 + monitor + C-Lab Notator	£750
Roland U220	£433
Korg 3500 sampled piano (weighted keys)	£799
Sound Ideas C-D library	£299
Alesis Quadraverb update chip (extra effects)	£17.99
Roland D50	£694
Alesis Quadraverb inc. update	£289

Allen & Heath Saber - £3999 + VAT

We have obtained a strictly limited supply of the famous A & H Saber. Each desk is configured 16:16:2 (giving full 32 inputs, all with eq and midi), set within a twenty four input frame allowing future expansion. This world class console has six full sends and is the ideal desk to accompany the Fostex G16 or Tascam MSR16.

This advertised at around half the retail price - if you are considering a professional sixteen or twenty-four track console - give us a call!

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TCA Travel... in case you didn't know our fully equipped ABTA/ATA Thatched Cottage travel agency has been up and running for some time now, expanding our high standard of service and great value into the travel industry, whether you are organising a tour, visiting a trade show or simply booking a holiday, give us a call. What have you got to lose? Contact Gill Scott or Nicki Brazier on 0223 314577 or 0860 450499 (mobile)
ABTA No: 89156

IN BRIEF

Recent agencies include **TAC** (look at the magnum console), **Amek, Neve, Tannoy** professional, **Focusrite** and **AMS**. We are still waiting for the **Yamaha** Digital Workstation, but the **Akai Adam12** track is selling well (we have deals on fully loaded S1000 + disk drives as well). We can package the Tascam MSR24 1" 24 track with most desks. Computerwise, **C-Lab** and **Cubase** are still most popular and the **Proteus II** full orchestra module is simply stunning.

Recent visitors to our 24 track studios include Ches Hawkes and Nik Kershaw working on a soundtrack for a new film with Roger Daltrey, and several new MIDI courses have been added to the school prospectus. Finally, last month's complete studio installations included **Nenah Cherry, David Sylvian, Barry Upton (Brotherhood of Man), LA Mix and Amazon**.

ATARI SOUND TOOLS PACKAGE

Digidesign Sound Tools for Atari. Atari Mega 4 inc monitor and mouse. DAC 200 meg. R/M Hard Drive (+ interface). Total package price **£3750+VAT**

AKAI MG14D - £1799 + VAT

A rack mounted twelve track recorder, with an additional two tracks for synchronisation, the **MG14D** is a superb quality recording tool. Balanced/unbalanced connections, a full autolocate/remote available, and noise reductions built in, give totally professional quality at an amazing price (autolocate/remote - £299 + VAT). Limited stocks available.

Sony DTC55ES DAT player - £499 + VAT

Hot on the heels of their industry standard DTC1000ES comes the revolutionary new Sony DTC55ES. With switchable rates of 32kHz, 44.1kHz and 48kHz, coupled with audio, digital and optical inputs and outputs. Unlike other cost-effective DAT recorders on the market the DTC55ES comes complete in a fully rack mounted format, with full track identification and search facilities. At present there is nothing in the market which even begins to compete with its many features and amazing price - £499 + VAT !!

TCD

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Czechoslovakia and Hungary.

Two studios visited were equipped with Tesla consoles from Czechoslovakia, though in one case (see photo) the older Tesla console had been brought back into use due to lack of service support for the newer model. Or as one person succinctly put it, "... the newer console didn't work when it arrived and I doubt if it ever will!!"

The problem of spare parts (even simple electronic components) for equipment is a very serious one and the service engineers often must come up with ingenious solutions to get round the difficulties. With older equipment this often means a certain amount of cannibalisation but it is where the new technology is concerned that the difficulties really start.

All the tape machines I saw were 2-track or mono and though it seems there have been attempts to produce multitracks, these have never been manufactured in any numbers and I have not seen any in service in the Soviet Union.

Another area that brings a grimace to the face of most recording engineers is that of tape, where the only make produced in any quantities is Orvo from (what was) East Germany. In order to get a comparison, think of the kind of tape you might have used on your old Elizabethan tape recorder back in the '60s (for rock 'n' roll generation engineers only) and you've got it.

The studios themselves range from fairly dowdy to downright depressing in terms of finish and decor, though even then there are surprises such as a dubbing theatre at the film studios in Minsk, that is almost like an early cinema in its ornate decor.

In terms of acoustics, there is often an attempt to do something in the studio and this usually consists of slat absorbers and angled walls, whereas the control rooms tend to resemble four walls with equipment put in it.

The monitoring would tend to raise eyebrows outside the Soviet Union as this often comprises speakers that have obviously been designed for sound reinforcement. A typical design is a 15 inch (38 cm) or 12 inch (30 cm) woofer with a row of piezo-style tweeters with larger models having either a mid range cone or horn driver. The speaker enclosures are either mounted on floor stands or suspended from the ceiling.

The mid-'70s really heralds the start of the importation of Western professional audio equipment (with the exception of Nagra portable recorders, which had already carved their own niche in the world) with installations by major companies such as Siemens and Studer and some aggressive marketing by Ampex and MCI. In more recent years, Amek have made a good showing with consoles at Melodiya studios and the Bolshoi theatre among others. Outboard equipment started to become more commonplace and with monitor loudspeakers, Tannoy and UREI were pretty much at the top of the list.

It is clear from talking to engineers and listening to what they produce that their standards are very high (and here I am particularly talking about studios with the majority of their equipment from Eastern Europe) and that people are doing their best with limited means.

Whereas one does not want to talk politics in a sound engineering magazine, when dealing with the Soviet Union it is an inescapable fact of life and governs how things are done. This is why there is often this great gap between the theoretical and the practical and one certainly has to be armed with a great deal of determination and stubbornness to take on the system in order to get things done properly.



Control room with Tesla consoles at Rigafilm



Music control room with Tesla console and Ampex multitrack MM1100 at Lenfilm

It is the gap between the theoretical and the practical that has to be closed with some intensive education and experience now that modern equipment is starting to be installed in studios throughout the Soviet Union. The engineers have read about it in the magazines, and can quote performance figures such as dynamic range, S/N ratio, etc, without really being fully conversant with the practicalities of the situation and how one goes about doing a session and mixing it down in real life.

Sound engineers are mainly recruited from graduating music students, which is positive in that they will understand the programme material.

Depending on the branch chosen, ie broadcast, film or records, an engineer's first sessions will be voice recording before moving onto music. Record studio recruits move from assistant to engineer. Unfortunately some paths can be dead-end and it is difficult to cross over into another field without being 'sponsored'.

Engineer Vladimir Vinogradov: "When I started at Soviet television, my first sessions were voice recording and though this may not have been exactly exciting for me, I felt that if I could get a decent vocal sound it was always a start.

"Another important factor was that the

television announcers were big stars in the Soviet Union. If I did a really good job on the sound of their voices, this would produce a favourable reaction from my superiors and get me into music quicker. I was allowed a lot of time to experiment with different microphones and placement techniques and this has stood me in good stead ever since."

Listeners to classical recordings from the USSR may have noticed that although the record may say 'Stereo' the sound is virtually mono. My first experience with an orchestral session soon showed my why: though pairs of microphones were being used (mainly U87s), the microphones themselves were placed side by side and angled only very slightly (possibly 10°) to either side. Though the sound obtained was quite full, there was little perspective to the recording. When, by comparison, I tried a crossed pair of fig-of-eights and an overhead ORTF crossed pair most people thought the sound was much too wide.

This can be explained by the fact that stereo was relatively late in coming to the USSR and many engineers did not really like it (whether this was due to the monitoring available or other reasons is difficult to ascertain) at first, mono was definitely king (or should I say First Secretary?).

Another important factor was that the vast



Microphone selection of Soviet manufacture

majority of records would be listened to in mono in the Soviet Union.

Comparatively speaking, consumer goods are

very expensive and it is only recently that a small minority have been able to buy stereo systems made in Comecon countries. Established

Do You Know these terms?

Monitor — a reference loudspeaker system for the mixing and mastering of recorded music.

Standard — a reference from which qualitative judgements can be made.

Tracks — (noun) channels on a multi-track recorder (verb) accurately reproduces the audio qualities of another transducer.

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makes are much harder to obtain and will often have been bought on trips abroad or through 'unofficial channels'. So, if the major part of the listening public is going to play records in mono, then the mixing is going to reflect this.

In the cinema, however, multichannel sound has been around for some time though the installations themselves tend to be confined to the dubbing theatres and studios rather than in the cinemas. This again reflects the divide between the practical and the theoretical where very capable people are doing a lot of work on projects that will never really see the light of day.

The other danger is that people with very high academic qualifications are called on to design and/or specify systems without ever having been in a studio, theatre, etc, let alone had hands-on experience in the situation they are designing for. The least that can be said about this is that it produces some interesting results and embarrassing situations!

Coming up to the present day, the rapid change of events in the social structures of the Soviet Union means that the situation will probably be changed from the outside rather than within. There are already signs of small studios starting out (though this could as easily be a 4-channel mixer and cassette recorder as a 16-track 1 inch studio) and now that possession of hard currency is being authorised, the possibilities will be there to buy equipment (even though it will be very expensive compared to the cost of living).

In terms of large operations, the most modern are the new television facilities at Novosti (the Soviet Press Agency) where the audio studios are equipped with SSL 6000 series consoles.

After years of almost interminable planning, Mosfilm are now constructing two music recording studios and two dubbing theatres, all of which have been designed by Tom Hidley.

For those fortunate enough to have access to modern technology, the biggest pitfall will be the 'child in a sweet shop' syndrome (otherwise known as 'see it—want it') where everyone is convinced that it is the equipment that makes the product and not the user and the programme material.

To my Western ears, the production on most modern recordings in the Soviet Union is poor and generally lacks interest, however, Soviet musicians are very talented and they undoubtedly have a lot to offer if they can be themselves—and not reproduce pale copies of Western music.

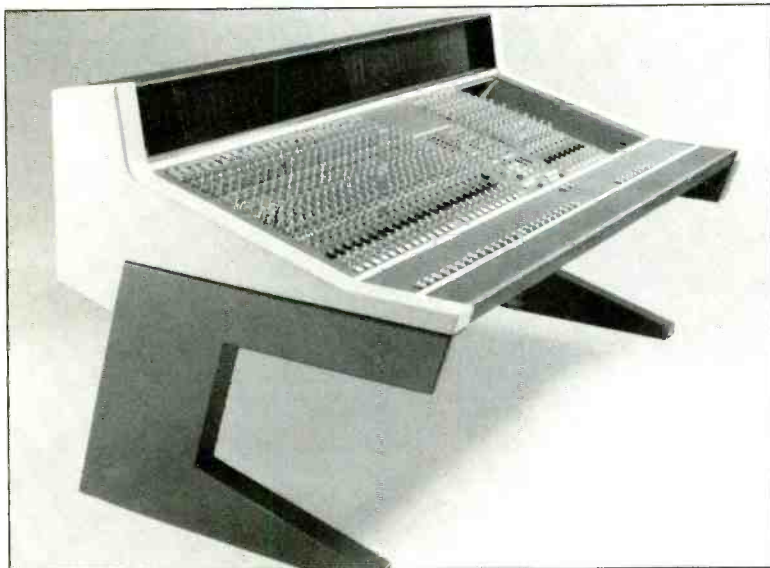
The other situation to be watched with interest is the manufacturing side of things. If there really is a liberation of the military manufacturing potential to the civilian sector then we could see some interesting new products in some years hence. Again, the challenge will be to innovate and not try to copy what was already done 5 years ago.

A sudden access to technology is not necessarily all beneficial and it is interesting to pose the question whether those much-loved records from the '60s and '70s would have been better if modern day technology had suddenly become available. Personally, I doubt it very much because they were the results of some creative experimentation rather than equipment that was full of possibilities—but there was no time to exploit them.

This is precisely the situation facing new studios in the Soviet Union today and it will, to say the least, be interesting to hear what comes out. They do have one big advantage over Western counterparts, however, and that is for the moment, time is not money. . . □



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Studer Editech Dyaxis

Mike Collins gives an overview of the Dyaxis system and compatible software

Several of the hard disk recording systems available today, are based around the *Macintosh* personal computer. The best-known, and one of the lowest-priced, systems is probably Digidesign's *SoundTools* (see *Studio Sound* October 1990), although it suffers from one or two disadvantages as far as studio work is concerned. *Dyaxis* aims to provide the system of choice albeit at a higher price.

Dyaxis was developed a number of years ago as one of the first *Mac* hard disk recording systems, by Integrated Media Systems in Menlo Park, California. In 1989, Studer bought the company and formed Studer Editech Corporation to manufacture *Dyaxis*.

Features

The *Dyaxis* system offers 2-track digital hard disk recording, playback, and editing, internal multitracking, offline sound file assembly and digital format and sampling frequency conversion. To quote the brochure, 'You can play back up to 12 hours of digital audio, freely edit any of the material to the resolution of a single sample and combine an unlimited number of high quality digital tracks into remixed soundfiles, with full control over levels and pans. On-line digital signal processing, including EQ, gain, pan, time-scaling and sample-frequency conversion is provided, and all sound sources can be referenced to internal or external timecode and slipped relative to one another.'

The system consists of an Audio Processor Rack for A/D, D/A and digital format conversion and an Accelerator card, containing a Motorola 56000 DSP chip, which slots into a NuBus slot in the back of your *Macintosh*; *MacMix* software to

control the system; and various optional configurations of rackmounted hard disk drives to provide storage and recall of up to 6 hours of 16 bit stereo digital audio.

Studer currently supply three different hard disk configurations: 320 Mbyte, 640 Mbyte and 1.2 Gbyte. These cost £3,600, £5,200 and £7,000 respectively. You do have to use a Studer hard disk system with *Dyaxis*, rather than a third party system, for two technical reasons: the average seek time of the hard disk has to be under 20 ms and the SCSI hardware in the *Dyaxis* system has been specially adapted to accommodate faster than normal data transfer via the SCSI bus.

The *Dyaxis* designers were originally involved in the prestigious Lucasfilm *SoundDroid* digital audio workstation project, which never actually made production, unfortunately. In particular they worked on the design of the A/D and D/A converters. They have built on this expertise to design *Dyaxis*, which has four times oversampling on the analogue inputs and uses a very high quality proprietary 20 kHz analogue filter on the output side. *Dyaxis* also has a variable tracking filter, which comes into play when using the scrub-editing feature. This filter will follow the playback sample frequency to provide the highest sound quality at any sample rate. If you use sample rates lower than 44.1 kHz, there is an option to 'Use Best Filter' which selects a fixed filter to suit whichever sample rate you have set, when sampling via the analogue inputs.

There is also a handy 'Digital I/O' function available via a software command, which allows you to transfer any digital format to any other, in realtime, straight through the system without putting audio onto the hard disk. This should be of interest to many professional users who for

instance, may want to transfer from Sony 1630 to DAT or *vice versa*.

Backup

Studer Editech offer a 'Computer DAT' backup system specially for use with *Dyaxis*. This is not a normal DAT machine, it is only intended to back up computer data. It is a 19 inch rackmount unit, styled to match the rest of the *Dyaxis* racks and costs £3,800. It allows you to do a complete backup of your soundfiles, including your edit information, and edit decision lists. The control software is similar to Apple's *Font/DA Mover* utility and allows you to copy folders containing your work onto a DAT tape. This is a realtime system, so the time taken to back up is about the same as the amount of time represented by the recordings you are backing up. The process can be automated, such that you could instruct the computer DAT to reload the appropriate soundfiles at, say, 8.30am the following morning, ready to start your next session at 9.30am. The standard DAT tapes hold 1200 Mbytes (1.2 Gbytes) of data, which gives you up to 2 hours stereo recording time.

The computer DAT system behaves rather like a slow hard disk as far as *Dyaxis* is concerned. It keeps all your work conveniently in one place and retains the original sample-accurate edit points, which should lead to more productivity and save you money in the long run.

Digital formats

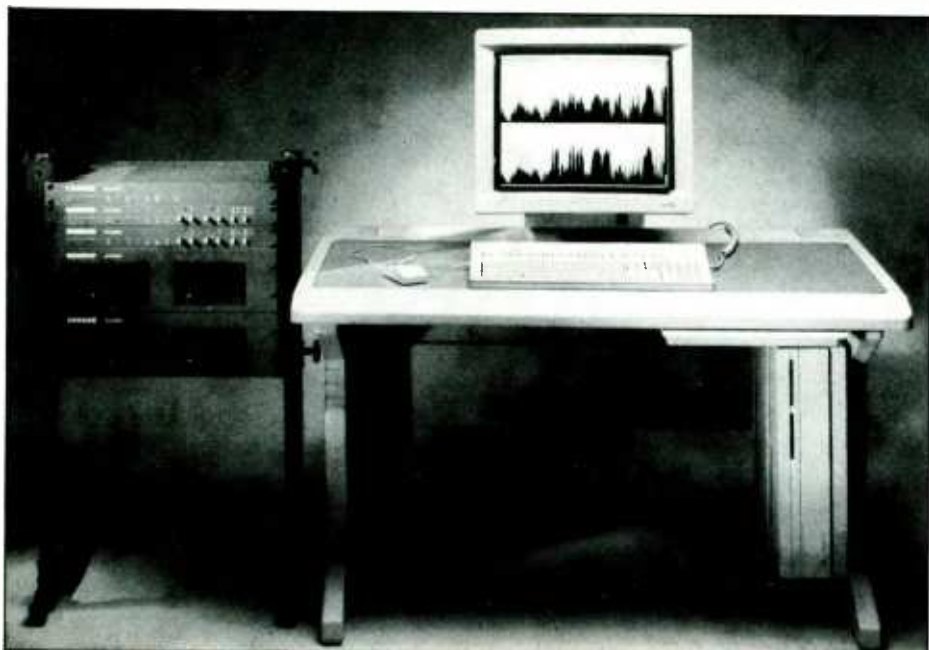
Audio sampling to 16 bit resolution can be set to 32 kHz, 44.056 kHz, 44.1 kHz, or 48 kHz rates, or to any of one of 100 other user-selectable frequencies. Besides balanced analogue *XLR* audio inputs/outputs at nominal levels from -10 to +8 dBm, *Dyaxis* also features all the most common digital I/O formats. These include AES/EBU using a 9-pin D-connector rather than standard *XLRs*; Yamaha stereo, which can be used to connect to the Yamaha *DMP7D* digital mixer via this 9-pin D-connector; SDIF-2 to interface to Sony 1600 series PCM machines via a 15-pin D-connector; and the Sony/Philips S/PDIF interface via RCA phono connector, which is used on DAT and CD players. Various of these connectors may also be used for Sony *PCM-701* format, Studer *DASH* and Mitsubishi *ProDigi* in/outs.

So *Dyaxis* can connect directly to the majority of digital reel-to-reel and PCM/video recorders, signal processors and other digital devices; to any Yamaha digital console or signal processor; and to the DUB 'C' ports of PD-format machines. As a result it is ideal for editing DAT or other digitally-formatted mastertapes where, previously, more expensive studio editing equipment would have been needed. The timecode references available for every soundfile can be used to prepare PQ Subcode lists of start/stop time durations for compact disc mastering, saving time (and thus money) if done before taking recordings into an expensive CD mastering suite.

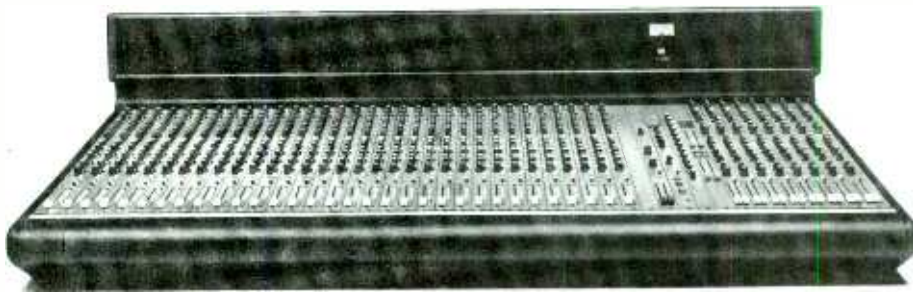
Uses

Studer quote worldwide sales of over 300 *Dyaxis* systems and suggest its use in a variety of situations:

- Music production: editing master mixes or slipping mono/stereo tracks against timecode
- Broadcast production: recording and editing



FREEDOM OF CHOICE



Concept Series Modular Mixing Consoles

Among the standard options available on the Concept series of mixing consoles are choices of: Eq type, frame size, subgroup type, number of aux sends, type of metering, degree of mute and fader automation. Special requirements can also usually be accommodated. The consoles can be configured for film or sound recording, theatre applications, broadcast and live sound reinforcement. You have the freedom of choice over the facilities you want. One thing is always standard however – the transparency of sound and technical excellence that the Concept series has become renowned for.



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dialogue, music libraries, news stories, etc, for instant-access replay either on-air or within an off-line production studio

- Video post-production: for sound effects, track slipping, music editing and accurate lock to picture

- Radio commercials: producing 15, 30, 45 and 60 sec versions of a basic ad with different tags and IDs

- TV commercials: producing various length versions of audio soundtracks with full interlock to film or video

Dyaxis provides good facilities for Automatic Dialogue Replacement (ADR) during film and video post-production and re-recording. You can mark dialogue visually, or you can use the scrub-edit feature to select sections to cut and paste. It is very easy to assemble different versions of your edits and then A/B the results. These tracks can then be slipped in time to sample accuracy. The big advantage here is the improvement in quality over the 35 mm mag tape, which has been the standard in film work for many years.

For use in video-editing, the 'Virtual Machine

Interface' lets you slave the *Mac*-based system to an external video editor or controller, via a series of custom interfaces and software upgrades. This allows audio-follow-video from an external editing system or from a video recording system of some type. In fact, *Dyaxis* can communicate with any VCRs or VTRs that use the industry-standard Ampex VPR3 interface protocol for full digital audio lock to picture.

Talking about lock-to-picture, the *Dyaxis* MIDI timecode interface includes a SMPTE/EBU timecode reader, a SMPTE/EBU to MIDI timecode converter and a MIDI to *Macintosh* serial port converter. The more sophisticated 'Dyaxis System Synchronizer' adds a VITC/LTC reader/generator, enabling the entire digital system to lock to vertical-interval timecode from videotape, film tach, or external sync clocks (it also provides enhanced MIDI capabilities).

Dyaxis includes several features making it ideal for producing digital audio soundtracks for film or video. For mastering to D1 or D2 digital video formats, or shooting Dolby Stereo L-R from a digital on-location master, *Dyaxis* can deliver

first-generation edited soundtracks in the appropriate format. Even after multiple generations, passes, or layers, there is no audible degradation in the sound quality. Also, video edit information, from imported edit decision lists (EDLs), timecode numbers, or feet/frames, can be used to configure digital audio-to-picture.

Production dialogue from DAT or PCM recorders can easily be transferred into *Dyaxis* via the digital inputs. You can record ADR, Foley and sound effects tracks directly into the system for editing to picture and other audio cues. Or you could call up pre-recorded effects tracks stored on hard disk, edit them to length, and then align them to timecode stop/start times using the paste-to-timecode function. Another useful feature is the keyboard 'macro' function, which lets you streamline the dialogue-editing process.

Dyaxis can also be very useful for radio and TV stations, especially when there is a need to edit commercials to produce 15 secs, 30 secs or other short lengths with different intros, voiceovers and tags. The timings of these can easily be adjusted, say to fit a 34 sec spot into a 30 sec slot, without any accompanying pitch shift. Using *Dyaxis*, a library of jingles and station IDs (and any other music) could be built up in digital 16 bit format to provide very high quality source material for broadcast. Again—because material originated from CD-DAT, PCM, or other digital sources can be copied directly into this system in the digital domain, you avoid the generation losses that occur with analogue systems.

MacMix

Using the *MacMix* software, soundfiles are easily edited on the *Dyaxis* system using cut and paste techniques, just like editing text in a wordprocessor. All the edits are non-destructive, so you can always recover the original soundfiles. The software conforms to the standard Apple *Macintosh* User Interface Guidelines and if you have used any *Mac* software previously (whether that be *Performer* MIDI sequencer or *MacWrite* wordprocessor or whatever), you will find the software very easy to use.

Firstly, you work with a soundfile, into which you record your audio material. (You can, of course, use existing material on the hard disk, such as a library of sound effects.) These soundfiles are always kept intact on the hard disk, unless you specifically delete them, but you have to view and edit them via a different type of file, called a viewfile. You can enter instructions into a viewfile to play back selected sections of this soundfile, skipping over or leaving out whatever you don't want to use. If you want to view the waveform on the *Macintosh* screen, then the software needs to calculate the waveform first. If you zoom in to less than 3 secs, the waveform will be displayed automatically, but if more than this needs to be displayed, you have to invoke a menu command to make a permanent waveform display. This organisation of files, while simple enough to grasp, does seem to present an extra level of complexity when compared with *SoundTools*' one soundfile window.

On the other hand, one neat feature of the *Dyaxis* soundfiles and viewfiles is that you can play them without opening them. A file is selected by highlighting it in the Open File dialogue box, and then you click and hold down the mouse on a Play button in this dialogue box. This could be very handy if you have forgotten what is in a file and you want to check it quickly without going to the trouble of opening it.

Something for everyone!

Digital Processors

Audio Design ProDat 1A

Interface to DTA2000 Report Writer
ProDat 1B (computer controlled R/DAT)

ProBox 1 (AES/SP interface)

ProBox 3 (SDIFF2/AES send/return)

LevelModflier AES Digital Fader

Sony ESD1000 32-bit Processor

Sony PCM2500 (external synch

modification plus DTA2000 interface)

RTW Digital Meters (AES and SDIFF2 lines)

Digital Recording Systems

Digi-4 16 bit Four Channel Recorder

SoundMaestro Digital Editor

Digidesign Sound Tools

Computer Concepts'

Digital Commercial System (DCS)

Gotham Recordable CD system

Ambisonic Surround Sound

Professional Multi-speaker Decoders

Transcoder Encoder

PanRotate Surround mixing

Analogue Processors

F601 SuperDynamic Broadcast Limiter

Compex 2 Production Dynamics

PanScan Stereo Effects

SPL Pro-SX2 Psychoacoustic Exciter

SPL Optimiser Equaliser

ProPak pro-consumer Interface

RTW Analogue Lightmeters

AUDIO DESIGN

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$C = \pi d$ (Archimedes: 250 B.C.)

$I = E/R$ (Ohm: 1827 A.D.)

$F = M \cdot a$ (Newton: 1687 A.D.)

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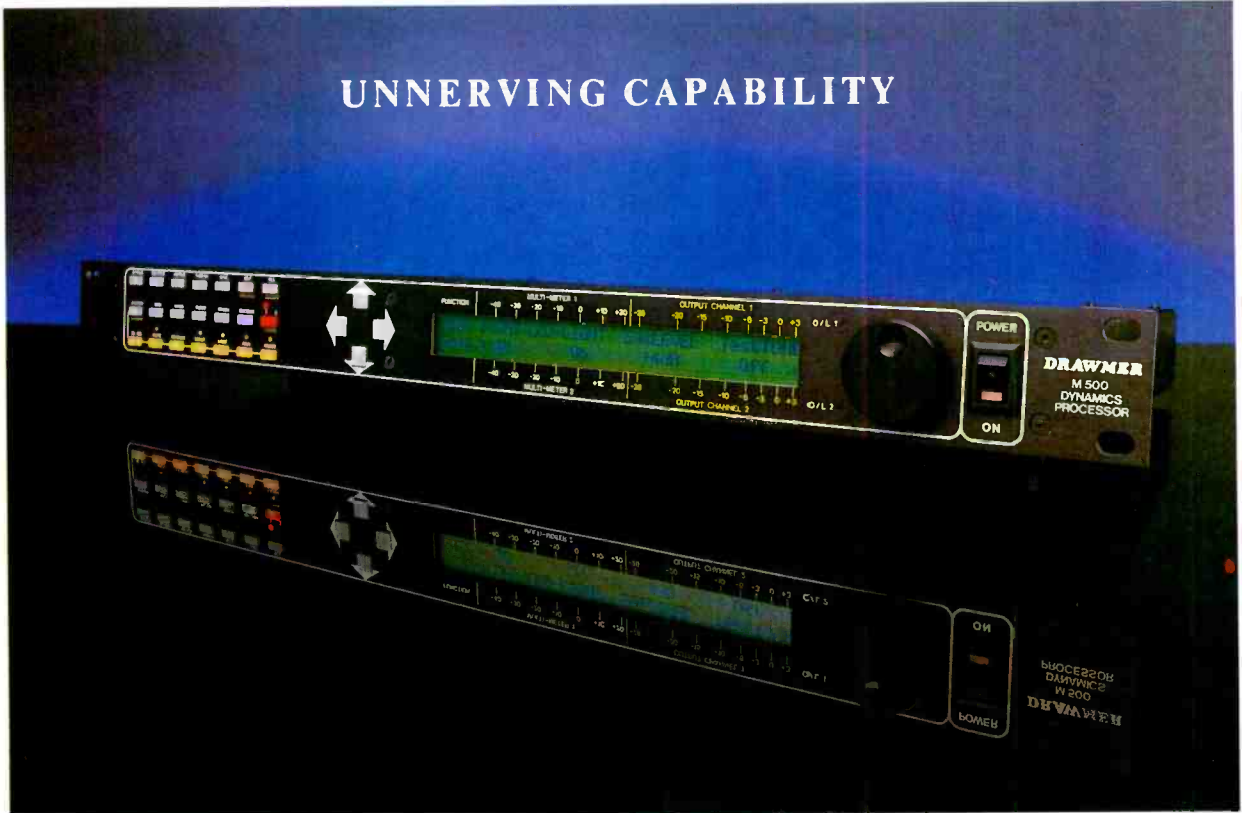
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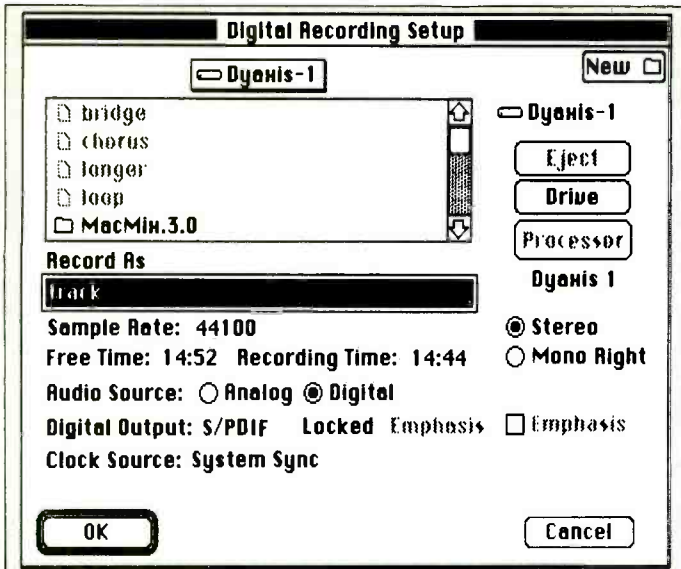


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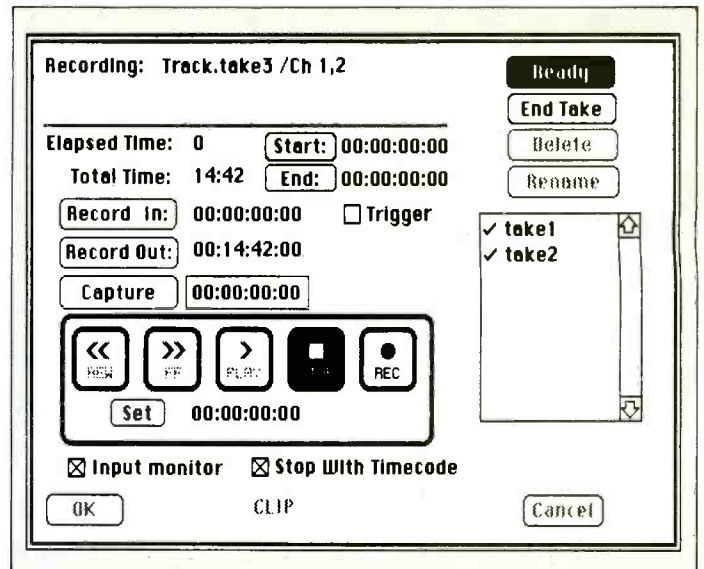
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Screendump of digital recording setup



Screendump of recording dialog box

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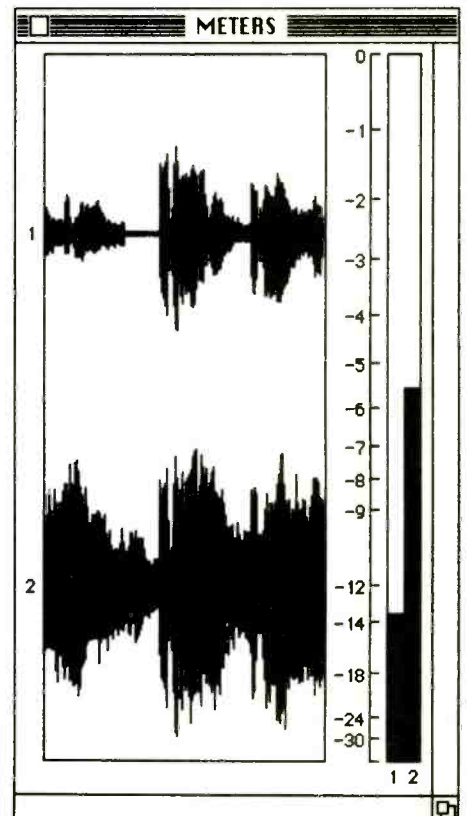
EXTENDING GRAPHICS

Recording

You select Record from the File Menu and up comes a dialogue box that allows you to enter a name and a sample rate (which defaults to 44.1 kHz) and to select a stereo or mono file. You can also enable or disable Emphasis (level-independent noise reduction) for your analogue recordings.

Once these options are set, you hit the OK button, and up comes a different dialogue box, which has the usual tape-transport style controls.

Once you have set your input levels, you have to select Record in the Recording dialogue box to start your recording. You can cancel a recording, which will delete the partially-recorded file, and then start over again at any time. Cancelling returns you to the Recording Setup dialogue box,



Meters window screendump

MS/Stereo from Shure

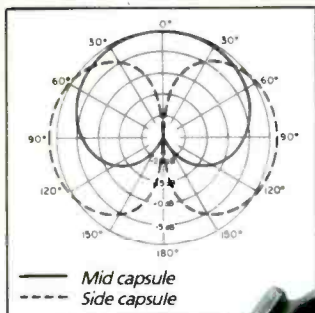
The New VP88 Stereo Microphone

TRUE MS STEREO

The Shure VP88 is a single point stereo condenser microphone that recreates the sonic environment as few other microphones can. The forward facing (Mid) capsule and the perpendicular (side) capsule, plus the built-in stereo matrix provide a wide natural uncoloured response for optimum stereo imaging – yet the VP88 is perfectly Mono compatible.

The VP88's three switch-selectable levels of stereo effects allow you to control the degree of stereo "spread" and ambience pick-up to achieve the exact image that you require.

Naturally, the VP88 also provides the low noise, low distortion and wide dynamic range that have made Shure microphones famous.



MS Stereo
Polar Pattern

POWER AND MOUNTING VERSATILITY

When you're on location you never know where the action is going to take you, so you need a microphone that can go just about anywhere.

That's why the Shure VP88 can be powered by self-contained battery (with LED indicator) or phantom power just by turning a switch.

The VP88 mounting is versatile too. Besides easily mounting on a camera, you can use the VP88 on a floor stand, fishpole, boom, or as a handheld microphone.

LOW FREQUENCY ROLLOFF

On outside broadcast and remotes you need to capture the action – not the rumble of passing traffic, so Shure have included a switch-selectable, low-frequency rolloff (12dB/octave below 80Hz) to reduce ambient noise and vibration pick-up.

And to further reduce extraneous sound, the VP88 is equipped with an advanced shock-mounted cartridge and built-in 'pop' screen to reduce wind noise.

ACCESSORY PACKAGE INCLUDED

The Shure VP88 comes complete with a 30" multi-connector 'Y' cable, foam windshield, swivel adaptor, battery and zippered carry/storage bag. Additional accessories such as locking isolation mount, 25' extension cable, phantom power supply and microphone stand are also available.

Whatever option you choose, you can be sure of years of reliable performance from the only stereo microphone that covers both sides of the story – The Shure VP88.

SHURE®

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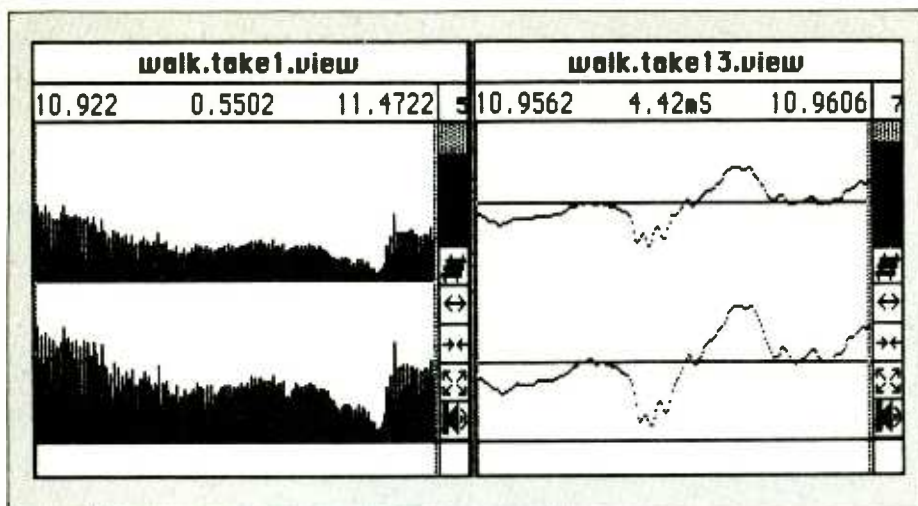
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Screen dump viewfile showing waveform display

with the options you chose originally still selected. I find this to be somewhat clumsier than having just one dialogue box that allows all these functions, as in *SoundTools*, but the system does work OK when you are used to it.

The *Dyaxis* processor is automatically switched to monitor the input when you are using the record dialogue boxes. To help you set levels, there is a window with ppm-type metering that also shows a realtime scrolling display of the waveform being recorded or played back.

When the recording is finished, a view window is created automatically called 'whatever' view.

Viewfiles

The window on the left of the screen dump contains a waveform display showing the envelope and the one on the right shows a different file zoomed in to less than 3 secs to show the waveform in much finer detail.

Editing

Once you have your viewfile, you can edit it without actually looking at the waveform if you like, moving a cursor along the file and selecting edit points by ear. When you are close to an edit point, you can then zoom in to examine the actual waveform more closely. When the view displays less than 3 secs of the recording, the software automatically displays the waveform so you can see it to edit it. If you want a waveform to be visible in any viewfile window size, you use a command to 'Make Permanent Display'. This is a realtime process while the software writes the waveform envelope file. When this is done, a waveform will always be drawn in any size of the view window.

You can place edit markers in the view window on-the-fly by just clicking on the mouse as the file is playing back. (At the time of this review, this is not possible using *SoundTools* on the *Mac*, although it is possible on the Atari version and will be added to the *Mac* version soon.) You can use keyboard commands to move two cursors, one to mark the left point and one to mark the right point of any section you wish to edit. Once you have marked approximate edit points you can zoom in and identify the exact locations visually. Alternatively, you can use the 'Scrub feature', where you use the mouse to move the soundfile playback up to and away from the edit points manually, in a similar way to rocking the reels of

a tape recorder to identify edit points. *Dyaxis* scores highly here, because this function works very well in practice, unlike the similar feature in *SoundTools*, which does not really compare.

The 'Capture selection length' command can be used to define a four-bar section, or whatever, if you are doing a dance mix for instance.

This loads the distance between the cursors into the *Mac*'s memory and you can then select four-bar sections by choosing the in or out point. When you have your edit points marked, you can check them using the 'Loop' command in the Play menu. This repeats the selected section over and over, so you can hear any glitches.

Mixing/mixfiles

Once you have one or more viewfiles prepared, you will need to open a mixfile to arrange to play your viewfiles in sequence in relation to SMPTE time and here you can specify stereo pan positions, track muting, volume level changes and crossfades between tracks. Also, individual files can be 'slipped' against each other freely in time, or locked to specific timecode start times.

If you have just defined a section from your viewfile, you select 'Copy To Mix' from the edit window and up comes a 'name this view' dialogue box. Here you name your first section, say 'Part 1', and click on the 'paste to left cursor' button. Now, finally, up pops a Mixfile window with 'Part 1 view' installed as its first element. If you need to edit any of the elements further, you can just click on its name in the Mix window. This will open up the viewfile with the waveform, and any edits you make here will be reflected in any other section of your mix that uses this element. To playback your mix while you are working on it, you will probably choose Fast Mix from the Options menu rather than create a new soundfile of the mix at this point. This option treats the Mix window as an edit decision list.

Your next step might be to return to the original soundfile, define another area in the edit window, and then copy this to your Mix. This time you could choose to 'Abut' this second section to start to play from the end of the first section. Alternatively, you could layer this, and other new sections, on top of the first. Once you have several sections in the Mix window it is easy to re-arrange, duplicate, or crossfade sections.

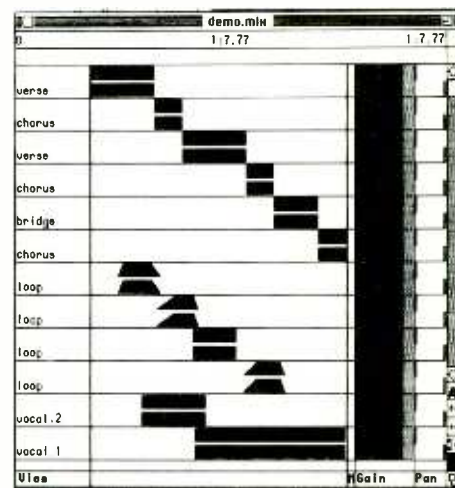
Dyaxis will even let you create edit lists using sections from different recordings, either on the same hard disk or on a different one. This is not as easy using *SoundTools*: you could always paste

in additional data from another SDII file, but no region definitions would be transferred this way, so these would have to be redefined before entering into the playlist. Digidesign can provide an additional utility program called Master List, which lets you import playlists from various files into the current playlist but this again is less convenient. Also, *Dyaxis* lets you make crossfades directly from hard disk without using the *Mac*'s RAM, whereas *SoundTools* needs to use available RAM. So there is no limit to the length of crossfades in *Dyaxis*, whereas lack of available RAM may limit these in *SoundTools*. On the other hand, the crossfades may be executed more quickly in *SoundTools* via RAM. So both systems have their strengths and weaknesses.

Mix window

In the screen dump you can see the verse, bridge and chorus sections of a song abutted to form a typical song-arrangement running order. Two separate vocal takes have been used and you can see that they actually overlap for a while. There are four 'loop' sections overlaid in suitable places and some of these crossfade in and out, or overlap, as required.

When editing is finished, you can either save your Mixfile containing the edit decision list, or you could then create a Mix Output file, which is a brand new soundfile containing the actual audio data representing your mix. The amount of time this process takes depends on the length of the original data and, when complete, the mix is played back once automatically, for you to check



Mix window screendump

it. Obviously, you need sufficient available hard disk space before you can do this, if you want to keep all your original unedited material, although you may be happy to delete all the original material once you have your new mix file.

At this point, you could open a viewfile on this output file and start the whole process all over again—perhaps to re-edit your mix at some point in the future. However, if you anticipate the need to remix, it would probably be better to keep the original soundfiles with the Mix window EDL.

Multichannel operation

Using the Mix functions, unlimited 'multitracking' can effectively be achieved internally, although only two channels can be



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recorded at once, and only two output channels are provided. The *Dyaxis 2+2* system has been developed to provide 4-channel operation. This is achieved by linking two processor racks with their associated hard disk drives to provide simultaneous playback and/or overdubbing on all four channels. The system locks together the word clocks of both processors and allows instant access to all the hard disk drives, while providing four separate inputs and outputs.

Time compression/expansion

The algorithm used here was developed especially for *Dyaxis* by Blank software and is claimed by Studer to be better than the *Alchemy* algorithm. It works fine with music up to 10% and with speech up to about 40%. I tried speeding up a file containing speech by 40%, and the results were first-rate. (As it happens, speeding up always sounds better than slowing down, because you are taking out little bits rather than adding synthesised elements.)

You may specify the amount of time compression/expansion in any of several ways, as you can see from the dialogue box, choosing whichever way is best for your purpose.

Other Mac software

Dyaxis files can be opened by one other *Macintosh* digital sound editing program—Passport's *Alchemy*—and *Alchemy* files can be transferred to Digidesign's *Sound Designer II*. *Alchemy* offers sample editing, analysis, and resynthesis, and places *Dyaxis* at the centre of a 'Distributed Audio Network' of samplers, with data conversion between *Dyaxis* and any member of the network. You can save *Alchemy* files in *Dyaxis* format, so you could also transfer *Sound Designer* files to *Dyaxis* by saving first in a format accessible by *Alchemy*, then saving this in *Dyaxis* format.

Sound Designer has additional editing and digital signal processing functions, not available in *Dyaxis*. At the time of writing these include: parametric and graphic digital EQ, FFT analysis, sample rate conversion and transfer of audio to and from most popular samplers, such as the Akai *S1000*. However, *Dyaxis* will include parametric and graphic EQ in the next upgrade, which will probably be available by the time you read this.

Dyaxis may also be used in conjunction with Digidesign's *Q-Sheet* program, which offers CMX-format edit decision lists, cue list and track sheet printing, enhanced creation, capture and editing

Time Scale		OK
Original File:	walk.take1	Cancel
Process File:	longer	Calculate
Time Scale Factor:	1.2500	
Subtract:		seconds
Add:	01.85	seconds
End Point:	00:00:07.42	00:00:09.27 seconds
Duration :	00:00:07.42	00:00:09.27 seconds
©1989 Blank Software Ltd.		

Screendump of dialogue box specifying time compression/expansion

of cue list events (MIDI and *Dyaxis* files), and so forth.

A Hypercard program called *SoundBase* is also available to provide an alternative front-end for *Dyaxis* and *MacMix*. *SoundBase* provides sophisticated sorting, cataloguing, recording and database interaction with *Dyaxis* sound files.

Conclusions

The sound quality of *Dyaxis* is first-rate and you can record from analogue sources at 48 kHz, as opposed to 44.1 kHz maximum from *SoundTools*' A/D In unit. *SoundTools*' user interface is a little simpler and easier to use than *Dyaxis*' but there is not much in this once you are used to both systems. *Dyaxis*' input/output formats are fully comprehensive and professional connectors are used for these. *SoundTools* has only SPDIF and AES/EBU digital formats and uses semi-pro connectors for analogue input/output. The A/D filters in *Dyaxis* are currently higher in quality than those in *Sound Designer*, although Digidesign are about to launch a professional audio interface with high quality A/D conversion for about £2500. (On input this pro I/O will have 1 bit delta sigma modulation with 64× oversampling, and on output it will have 18 bit D/A with 8× oversampling and Apogee 964 anti-aliasing filters, balanced I/O digital monitoring

and a BNC connector for video sync input.

A 4-channel *Dyaxis* system is available now and this capability is not present on any other *Macintosh* system as yet. The file structure of *Dyaxis* is more complex than that of *SoundTools*, and to carry out more sophisticated signal processing, or to interface with the many popular samplers currently in studio use, you may wish to use other software/hardware, such as *Alchemy* or *SoundTools*. It is a pity *Dyaxis* does not let you save soundfiles in other formats, such as *IFF*, *Sound Designer II*, or whatever, as direct compatibility is a very desirable feature in any recording system. On the other hand, *Dyaxis* allows internal multitracking, whereas *SoundTools* only offers a rudimentary mix feature with up to four files.

The *Dyaxis* system comes with hard disks optimised to work well with the system. If you buy *SoundTools*, you have to choose your own hard disk systems from third-party suppliers. Also, a professional DAT backup system may be purchased with *Dyaxis*, whereas you have to choose your own backup system for *SoundTools* from a third-party supplier.

Dyaxis is designed for fully professional use, and allows the creation of complex mixes with multiple overlapping sound cues. As a result, it is well suited to putting together sound effects tracks, dialogue, effects, and music mixes when working to picture. □

Manufacturer's specification

Analogue audio

Input/output channels: balanced XLR
Maximum input level: +24 dBm
Maximum output level: +24 dBm (into 600 Ω)
Frequency response: 20 Hz to 20 kHz
Input impedance: 50 kΩ ±5%, 20 Hz to 20 kHz
Output impedance: 50 Ω ±5%, 20 Hz to 20 kHz

Digital Audio

Sampling frequency: 32 kHz, 44.056 kHz, 44.1 kHz, 48 kHz and 100 other user-selectable frequencies
A/D conversion: 16 bit, using discrete linear-phased optimised anti-aliasing filters
Frequency response: 5 Hz to 20 kHz ±0.5 dB
Dynamic range: >90 dB noise floor to maximum output level

THD/noise: <0.02%

Intermodulation distortion: <0.02%

Phase error: within 5°

Squarewave reproduction: symmetry within 1%

Emphasis: EIAJ, 50 to 15 μs

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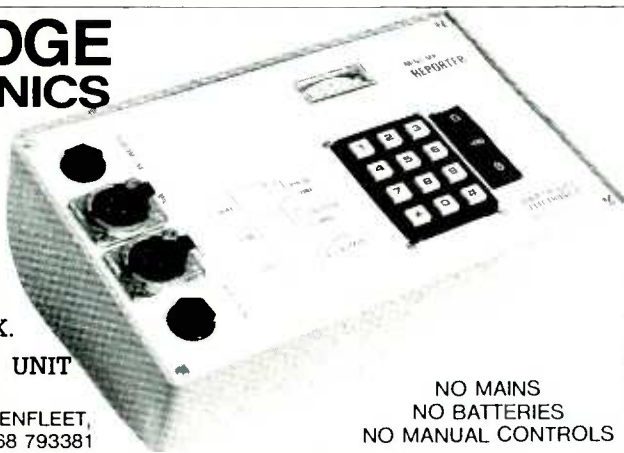
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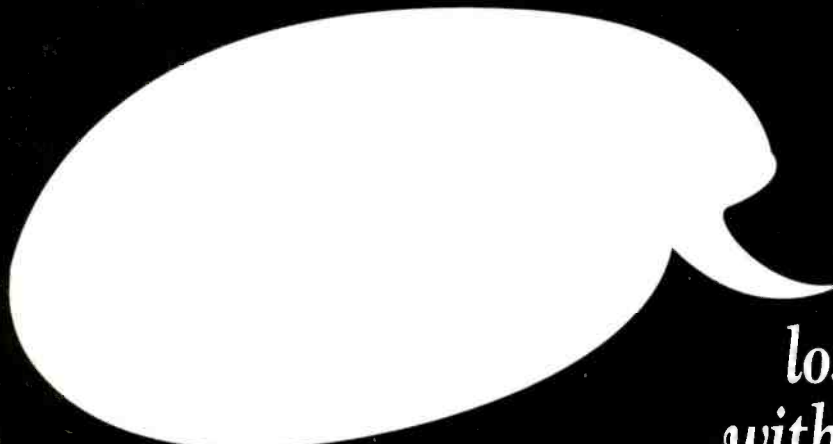
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