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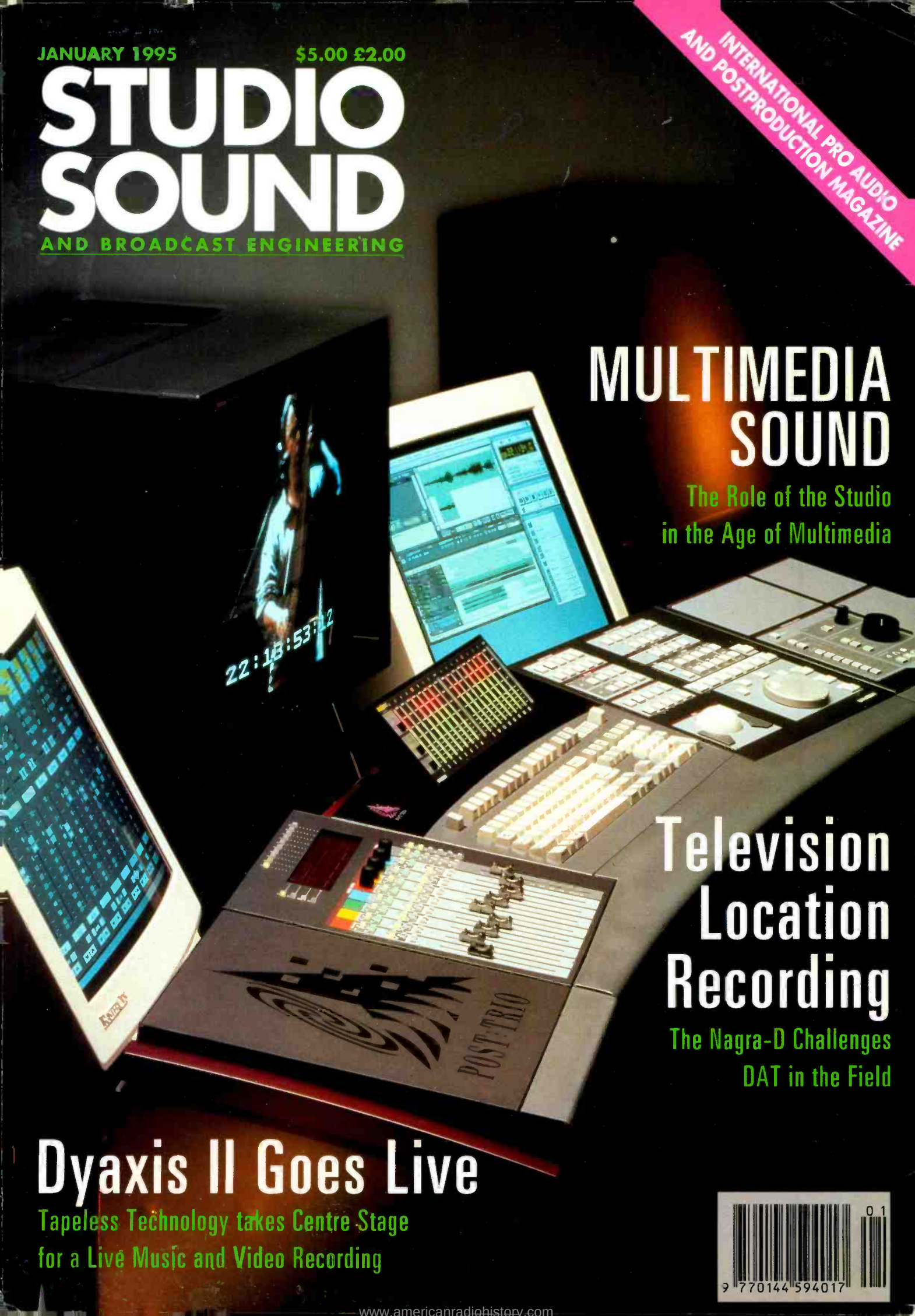
STUDIO SOUND

AND BROADCAST ENGINEERING

INTERNATIONAL PRO AUDIO AND POSTPRODUCTION MAGAZINE



MULTIMEDIA SOUND

The Role of the Studio in the Age of Multimedia

Television Location Recording

The Nagra-D Challenges DAT in the Field

Dyaxis II Goes Live

Tapeless Technology takes Centre Stage for a Live Music and Video Recording

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SCENARIA & OMNIMIX – THE FIRST CHOICE FOR AUDIO POST-PRODUCTION

NOB, HOLLAND

"We wanted to have the most technologically advanced systems at NOB to reflect the importance of the facility. Scenaria is the first system to combine the advantages of digital audio production with digital video. Scenaria is now widely accepted by top facilities throughout the world. Our clients are delighted from their first experience with the system."

Erits Paeper, Production Manager, NOB, Hilversum

NOB is the largest post-production facility in Holland. The studios provide services for a variety of episodic programmes and specials.

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"Working on five different language versions of *The Lion King* was made much easier with Scenaria OmniMix. Matching pan to voices, for instance is no longer a problem. We save all the pan data, and then all I have to do is make sure that I have the character voice on the same channel for each language. It's much quicker and OmniMix matches the pan exactly."

Brian Christiansen Engineer, Sun Studio, Copenhagen

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STUDIO SOUND
AND BROADCAST ENGINEERING

Scene and heard. See page 49

CONTENTS

A peek at Meek? See page 16

Tapeless Technology in Radio Applications - the Users Point of View

SYPHA has published the results of an extensive survey into the use of tapeless technology for cart replacement, station automation and production applications. Over 500 radio stations in the United Kingdom and United States took part and the issues examined included:

- **Awareness and opinion of systems and technology**
- **Reasons for system selection and purchase**
- **Expectations of system performance**
- **Operational and technical support**
- **Applications and features required**
- **Investment decisions and future plans**
- **Sources of information and advice**

PSN Europe and Studio Sound magazines, as well as AMS Neve, BASYS, Broadcast Electronics, Computer Concepts, Harris Allied, Korg, RCS, Sony and Studer Digitec provided the sponsorship necessary to conduct the survey. However, the method and results were managed independently by SYPHA.

SYPHA specialises in providing consultancy and research services on the use of random access technologies for audio and picture recording, editing and replay. Other publications available from SYPHA include:

- **The Nonlinear Buyers Guide** - a buyers guide to random access video systems covering nonlinear and mixed mode editors, digitising cards and software, video disks, video servers and RAM stores;
- **The Tapeless Directory** - a buyers guide to digital audio workstations covering production, post production, cart replacement and station automation systems.

A summary of the survey can be obtained by sending a stamped addressed envelope to SYPHA. The price of the full report, entitled *Tapeless Technology in Radio Applications - the Users Point of View,* is £225 or US$380 and can be ordered from:

SYPHA, 216A Gipsy Road, London SE27 9RB, UK. Telephone +44 181 761 1042, fax +44 181 244 8758.

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AND BROADCAST ENGINEERING

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Audio Recording: the New Frontier

In the heyday of the professional multitrack recording, the nature of available recording equipment did a pretty good job in to helping define what was, or was not, a 'proper' way of recording sound—music in particular.

There were no audio commandments forthcoming from Mount Sinai and however comfortable it may be to believe in a particular order in pro-audio, there is no guarantee that music, technology and entertainment formats will behave as any one of us might wish. The truth is often quite the opposite.

Even the old order was constantly under attack—cheap analogue recording formats undermined professional studios from the bottom up while sound architects like Yello's Dieter Meier and Boris Blank indiscriminately collected seemingly unlikely sounds for use in musical collages with scant regard to what the establishment thought of their sound or methods.

The development of digital processing and recording technology has been no more respectful of the old order. DAT brought high-quality digital recording within the reach of a new level of recordist just as tape-based digital multitrack has been popularised by the *ADAT* and *DA-88*.

The applications of recording have changed over the years too—lower level recordists frequently targeted library-music houses as an outlet for talent they found difficult to sell to the major record companies. More recently the burgeoning worlds of multimedia and computer games have offered new outlets for sound recordists of all persuasions.

As with early film and television, the initial efforts of the 'host' industry have been almost exclusively directed towards the more novel aspects of computer-based formats. The supporting technology and sound formats also take time in development and adoption of something resembling standards.

All of this has the unfortunate consequence of leaving sound—once again—the 'poor relation'. As such formats become consolidated, however, the requirements of their soundtracks quickly become apparent and the demands of the medium and consumer begin to make themselves felt.

But if the computer industry is still finding its feet with audio, changes closer to home are more stable.

Rising standards in the broadcast of television, for example, have made a significant impact on the considerations afforded to its sound. Concurrently, changing standards in motion-picture soundtracks are offering further challenges for the host industries and pro-audio manufacturers alike—and, of course, opportunities for sound recordists.

The format for digital-audio broadcasting, meanwhile, is now quite advanced and the adoption of digital technology in broadcast is increasingly ready to challenge us in equal measure to that presented by its adoption in the recording and postpro studio.

There are many questions and challenges implicit in these observations. But the most significant—and unanswered—question is fundamental. Is the pro-audio industry ready to meet these challenges? If the answer is 'no', then we must be prepared for the computer industry in particular to find alternative solutions to its problems. If the answer is 'yes', then we will find ourselves receiving a welcome to the first of many new tomorrows. ■

Tim Goodyer

Cover: Studer *Post Trio* system

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*Hong Kong - PL Development 08891009

January 1995

● January 5th–7th, **Showbiz Expo East**, New York Hilton and Towers, New York, USA. Tel: +1 714 513 8400. ● January 10th, **British AES Section Lecture: AT&T DISQ System**, Imperial College, London, UK. Tel: +44 1628 663725. ● January 17th–18th, **Live!**, Royal Horticultural Halls, London, UK. Tel: +44 1322 66 0070. ● January 17th–20th, **Expo Comm Mexico 95**, National Sports Palace, Mexico City, Mexico. Tel: +525 592 3257. ● January 20th–23rd, **NAMM**, Anaheim, USA. Tel: +1 619 438 8001. ● January 27th–29th, **JTS Conference: Preserving Our A-V Heritage**, NFT, London, UK. ● January 30th–February 3rd, **Midem**, Palais des Festivals, Cannes, France. Tel: +33 1 44 34 4444.

February 1995

● February 7th–9th, **ISDN User Show**, Olympia 2, London, UK. Tel: +44 1733 394304. ● February 12th–15th, **Siel 95 and Theatrical Services Exhibition**, Porte de Versailles, Paris, France. ● February 14th, **British AES Section Lecture: Digital Frontiers**, Imperial College, London, UK. Tel: +44 1628 663725. ● February 15th, **Conference: Still Protecting the Media**, Le Meriden Hotel. London, UK. Tel: +44 171 637 4383. ● February 20th–23rd, **Communications World 95**, Hong Kong Convention and Exhibition Centre, Hong Kong. ● February 20th–23rd, **Digital Hollywood: The Media Marketplace**, Beverley Hills Hilton Hotel, Beverley Hills, California, USA. Tel: +1 212 226 4141. ● February 23rd–24th, **Conference: Video on Demand**, Langham Hilton, London, UK. Tel: +44 171 637 4383. ● February 25th– 28th, **98th AES** Convention, Palais de Congrés, Paris, France. Tel: +32 2 345 7971.

March 1995

● March 8th–12th, **Frankfurt Pro Light and Sound**, Messe Frankfurt, Frankfurt, Germany. Tel: +69 75 75 6415/6907. ● March 8th–12th, **ITA Seminar: The Converging World of Entertainment, Information and Delivery Systems**, Westin Mission Hills Resort, Rancho Mirage, California, USA. ● March 9th, **Sound Sense Show**, Swallow Hotel, Gateshead, UK. Tel: +44 1491 838575. ● March 15th–17th, **The Television Show**, London, UK. ● March 25th–27th, **The Pro Audio Show**, Karachi, Pakistan. ● March 29th–April 2nd, **Audiovideo 95**, Lenexpo Exhibition Complex, St Petersburg, Russia. Tel: +7 812 119 6245.

April 1995

● April 4th–6th, **REPLItech Europe**, Austria Centre, Vienna, Austria. ● April 4th–7th, **Communications Tokyo Exhibition**, Tokyo International Trade Fairgrounds, Tokyo, Japan.Tel: +81 3 3586 7865. US Tel: +1 301 986 7800.● April 7th–12th **MIP-TV 95**, Cannes , France. Tel: +44 171 528 0086. ● April 9th–13th, **NAB 95 Symposia**, Las Vegas Convention Center, Las Vegas, USA. Tel: +1 617 965 8000. ● April 10th–13th, **NAB 95**, Las Vegas Convention Center, Las Vegas, USA. ● April 26th–29th, **Broadcast Technology Indonesia**, Jakarta, Indonesia. ● April 26th–28th, **5th Australian Regional AES Convention: Making Waves**, Sydney Exhibition Centre, Sydney, Australia. Tel: +61 3 534 5755.

May 1995

● May 9th–12th, **Pro Audio, Light & Music China 95**, Beijing Exhibition Centre, People's Republic of China. ● May 13th–21st, **MultiMediale 4**, ZKM/Center for Arts and Media Technology, Karlsruhe, Germany. ● May 15th–20th, **Expo Comm Moscow Sviaz 95**, Krasnaya Presnya Fairgrounds, Moscow, Russia. ● May 23rd–25th, **Midem Asia**, Hong Kong. Tel: +44 171 528 0086. ● May 30th–31st, **Leipziger MedienMesse Hörfunk**. Leipziger Messe, Leipzeig, Germany. Tel: +37 41 2 230.

June 1995

● June 8th–10th, **Second Annual South American Pro Audio Expo**, Centro de Extension, Santiago, Chile. Tel: +56 2 635 1994. ● June 8th–12th, **China Sound Light & Music**, Beijing Exhibition Centre, People's Republic of China. ● June 8th–13th, **International Television Symposium**. Montreux, Switzerland. Tel: +41 21 963 3220. ● June 10th–12th. **12th ShowBiz Expo**, Los Angeles, USA. Tel: +1 714 513 8400. ● June 13th–15th, **REPLItech International**. Santa Clara Convention Center, Santa Clara, USA. ● June 19th–20th, **Radio Festival Trade Exhibition**, International Convention Centre, NEC, Birmingham, UK. Tel: +44 1491 838575. ● June 21st–23th, **Audio Technology 95** formerly APRS, National Hall, Olympia, London, UK. Tel: +44 1734 756218. ● June 21st–23rd, **7th Japanese Regional AES Convention: Advanced Audio Technologies for Audio-Video and Multimedia**, Sunshine City Convention Center, Tokyo, Japan. Tel: +81 3 3403 6649.

July 1995

● July 12th–14th, **Pro Audio and Light 95**, World Trade Centre, Singapore. Tel: +852 865 2633. ● July 17th–19th, **WCA 95 Wireless Cable Association Show**, Washington Convention Center, Washington, USA. Tel: +1 202 452 7823. ● July 20th, **British Music Fair**, London, UK.

August 1995

● August 17th–20th, **Popkomm**, KölnMesse, Köln, Germany. Tel: +221 8210. ● August 25th–28th, **Beijing International Radio and TV Broadcasting Equipment Exhibition 95**, Beijing International Exhibition Centre, Beijing, People's Republic of China.

September 1995

● September 6th–9th, **1995 World Media Expo**, New Orleans Convention Center, New Orleans, USA. Tel: +1 202 429 5350. ● September 10th–13th, **PLASA**, Earls Court 2, London, UK. Tel: +44 171 370 8179. ● September 14th–18th, **IBC 95**, RAI Centre, Amsterdam, Holland. ● September 19th–24th, **Live 95**, Earls Court, London, UK. Tel: +44 171 782 6893. ● September 21st–24th, **Nordic Sound Symposium XVII**, Bolkesjø Mountain Hotel, Norway. Tel: +47 2 79 7730.

October 1995

● October 5th–8th, **99th AES Convention**. Jacob K Javits Center, New York, USA. ● October 17th–19th, **Vision 95**, Olympia, London, UK. Tel: +44 181 948 5522. ● October 19th–23rd, **9th International Audio, Video, Broadcasting and Telecommunicationas Show IBTS**, South Pavilion, Milan Fair, Milano/Lacchiarella, Italy. Tel: +39 2 481 5541. ● October 24th–26th, **REPLItech Asia**, Singapore International Convention and Exhibition Centre, Singapore. ● October 25th–28th, **Broadcast Cable and Satellite India 95**, Pragati Maidan, New Delhi, India.

November 1995

● November 2nd–4th, **Broadcast India 95** World Trade Centre, Bombay, India. Tel: +91 22 2151396. ● November 7th–9th, **Wireless World Expo 95**, Moscone Center, San Francisco, USA. Tel: +1 301 986 7800. ● November 9th, **20th Sound Broadcasting Equipment Show SBES**, Metropole Hotel, NEC, Birmingham, UK. Tel: +44 1491 838575. ● November 21st–23rd, **Visual Communications 95**, London, UK.

December 1995

● December 5th–9th, **Expo Comm China South 95**, Guangzhou Foreign Trade Exhibition Centre, Guangzhou, China.

CONFERENCE REPORT

Audio Video 94, St Petersburg

The October Audio Video 94 exhibition was housed in the Lenexpo complex on the windswept shores of the Gulf of Finland, Mainly for domestic hi-fi and professional PA equipment, companies such as Turbosound, Martin and Stage Accompany were represented by their local agents. but there were also demonstrations of video postproduction and copying equipment. Other than on the stand of DiActor, there was remarkable little indigenous Russian equipment.

Just about anything available in the West was available but for most Russians the prices were very high.

Perhaps the worst aspect of the exhibition as a whole was the battle between PA stands, who were allowed to 'demonstrate' their equipment for three minutes each in every hour during which times, serious discussions were all but impossible.

Surely Lenexpo should never again allow such an exhibition of selfish stupidity by these people, and alternative arrangements must be made for such demonstrations, which would be outlawed by health and safety regulations in most other countries. I heard rumours that some people from Celestion were in St Petersburg at the time discussing research collaboration, but that they gave the exhibition a miss because they were told that it was of no interest. If true, this is a pity, because the show developed into a good intellectual meeting of minds (most of which took place in the cafe of the domestic electrical equipment show, rather than the adjacent hall). The passes and tickets appeared to work equally well for both shows, though quite how I'll never know.

To give a measure of show quality, I met Yuri Grebeshkov, Head of the Acoustical Department of the Cinema and Photo Research Institute in Moscow, and Alexander Gorodnikov, Chairman of the Russian branch of the AES. I was also visited by Alexander Vioshvillo from the Popov Institute, who had done his PhD on crossover design many years ago and is now Consultant, and Senior Research Associate at the Institute, and is working closely with both British and US companies. Interestingly, he had wide knowledge of the work of Dr Keith Holland and myself on horn design, and was involved in research of a radical nature, continuing our philosophies down into the driver itself. At the show, I found drive systems for mid-range/high-frequency horns which are beginning to offer some quite outstanding levels of performance and reliability. We are now in the process of exchanging research notes and I left them an axisymmetric horn for their experimentation. ■ **Philip Newell**

Exploring the Scope of Sound

AUDIO TECHNOLOGY 95

The APRS Show

London is the home of the UK's most prestigious professional audio event - organised by the APRS.

For 1995, the 28-year tradition of the APRS Show has evolved into an exciting new event at an equally impressive new venue - reflecting the changing dynamics of the audio industry.

Audio Technology 95 - a unique opportunity to explore the full scope of sound, covering equipment and services for every aspect of your working environment. The new venue is The National Hall at Olympia - gathering all the exhibits onto a single level, as well as giving you even easier access from the Underground station. London is a prime centre for the professional audio industry and is also renowned as one of the most exciting locations for theatres, concerts and general entertainment.

At **Audio Technology 95** you will see the latest audio technology for every application:

- recording studios
- project studios
- post-production
- radio and television broadcasting
- sound reinforcement
- film sound
- location recording
- duplication and replication

Our free Workshop and Seminar programme will keep you up to date with key practical issues and runs throughout each day of the show.

Put the dates in your diary now for the UK's one and only professional audio event with an unmatched heritage! Wednesday 21st June to Friday 23rd June 1995 - open every day from 10.00 till 18.00. And call our Ticket Helpline to ensure your pre-registration for free entry: **+44 (0)1734 31 22 11**.

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NATIONAL HALL OLYMPIA LONDON 21 - 23 June 1995

AUDIO TECHNOLOGY 95

The APRS Show

The professional audio industry is evolving fast, operating on an increasingly global basis. London holds a well-earned place as a centre of excellence for every facet of the business, containing many of the world's most famous broadcasting facilities, recording studios and live venues. All of this is epitomised by the UK's prime annual event - organised by the APRS.

New name and new venue

In celebration of its 28th year, the APRS show continues to develop, bringing together every thread of audio excellence. The new name of the event - Audio Technology 95 - encapsulates the whole story: the longstanding APRS tradition combined with the dynamics of today's audio environment. Now the show also has a fresh setting, in The National Hall at Olympia, bringing the whole event onto one main level - a major improvement for visitors and exhibitors alike.

The APRS Heritage

An excellent track record and an international profile apply to the APRS exhibition as it enters its 28th year. The show has won a valued place in the global calendar of professional audio events. Ever since its inception, the APRS has worked closely with its exhibitors to enhance the value of the annual exhibition and extend it into new fields.

The 1995 show

Exhibition organiser Philip Vaughan explains the rationale behind the plans for 1995:

"We enjoyed a very successful show in 1994, with an enthusiastic reception of both the "Briefings" sessions and our broader exhibitor base. Building on this firm foundation, we also wanted to look for additional ways to give the event added value. It was with this in mind that we researched an improved venue for 1995. Our goal was to house the exhibition on a single floor, providing an even more dynamic atmosphere to the show and responding to our exhibitors' requests. The National Hall does exactly that, offering us an extremely prestigious location equipped with excellent exhibitor and visitor facilities.

"The scope of the APRS Show has also widened dramatically in recent years, in response to our evolving industry. The event genuinely encompasses audio technology in its widest sense, and hence we also decided to address the issue of the show's name. **Audio Technology 95,** coupled with **The APRS Show,** encapsulates the whole story - the longstanding tradition of the APRS Show is visibly aligned with the dynamics of today's audio environment, perfectly defining the event's unique aspects for the UK and the wider international marketplace."

Show Features

In 1994, a number of major innovations were introduced - all of which proved highly successful. And there is more for 1995. The programme of workshops and seminars will focus on up-to-the-minute significant issues across the full extent of the show's broad interest base. The emphasis will be on application-specific topics, providing discussion and advice on regularly encountered problems and situations. In addition, the show will include new feature areas and special displays - all designed to offer additional interest.

AUDIO TECHNOLOGY
The APRS Show

EXHIBITION OPENING HOURS

WEDNESDAY	21st JUNE 1995:	10.00 - 18.00
THURSDAY	22nd JUNE 1995:	10.00 - 18.00
FRIDAY	23rd JUNE 1995:	10.00 - 18.00

Contact Details: APRS, 2 Windsor Square, Silver Street, Reading, Berks RG1 2TH, UK
Tel: +44 (0)1734 756218 Fax: +44 (0)1734 756216

International News

In-brief

● Platinum for sale

Platinum Studios, rated as one of the top five recording studios in Australia, is being placed on the market as an operating business following the success of owner Jim Mountford's gold mining ventures. While 'Gentleman Jim' devotes more time to mining and a Japanese leisure interest the studios are to be advertised in the Asian financial press as well as Australian publications as, according to Mountford, Japanese and Asian interests are keen to invest in Australian music as shown by Perth's Planet Studios sale last year to the Japanese.

Immedia PR, Australia.
Tel: +61 2 212 6677.

● Vienna for Pragosound

A 40-channel Soundcraft *Vienna* console has been sold to Pragosound, the Czech Republic's largest sound and light company. Pragosound was set up after the Czech revolution in 1989 and already owns a 48-channel Soundcraft *Venue* Theatre and a 32-channel *Venue*, both of which are in constant use in theatres, clubs, exhibitions and concerts.

Soundcraft Electronics, UK.
Tel: +44 1707 665000.

● Apogee man for new PR

Christopher Buttner, former Marketing and Media Specialist of Apogee Sound Inc, has opened a specialised PR firm to service the professional music, film, video and audio industries. Aarvak Marketing Communications works with manufacturers of professional film, video and audio equipment and musical instruments, as well as musical artists and entertainment industry executives, and places special emphasis on helping American clients to obtain foreign media coverage and vice versa.

Aarvak Marketing Communications, US. Tel: +1 707 766 9548.

● Alesis awarded patents for *ADAT*

Two patents have been awarded to Alesis for aspects of the *ADAT* digital-audio recorder. One covers the actual *ADAT* tape format and data structure, while the other covers the *ADAT* optical digital interface. First applied for in 1992, the patents secure Alesis' rights to the key elements of the *ADAT* format for a period of 17 years. Alesis have already licensed the technology to over 60 other manufacturers.

Alesis, US. Tel: +1 310 558 4530.

● SPL distribution

Distribution of the SPL line of signal processors—including the *Optimizer* reviewed in December 1994 *Studio Sound*—has passed to beyerdynamic.

SPL, Germany. Tel: +49 21 63 8761.
beyerdynamic Ltd, UK.
Tel: +44 1273479411.

Soundtracs *Solitaires*

An Israeli stage musical is the first commercial production to emerge from the Soundtracs *Solitaire*-equipped Levitan Studios. Twenty days (and nights) of studio time went into the project, which showcased a selection of Israel's most popular artists.

Levitan Studios is located in Tel-Aviv (not California, as stated in the December '94, *Studio Sound*) and offers comprehensive 32-track digital recording—including the fully-automated 40:24:40 format *Solitaire* console—intended to serve acoustic and MIDI-based projects with equal success. Almost ten years old, the facility has established a solid reputation through its work with musical styles as varied as rock bands, choirs and local ethnic musics.

The recent BBC Royal Variety Performance on 28th November used two Soundtracs sound-reinforcement consoles, a *Sequel II* and a *Solo 8 Live*. The show, at the Dominion Theatre, Tottenham Court Road, featured a host of stars including Take That and Shirley Bassey, and used the *Sequel II* in the FOH position with the *Solo 8* providing the submix for the orchestra.

Soundtracs, UK.
Tel: +44 181 399 3392.
Levitan Studios, Israel.
Tel: +972 3 691 8967.

tc *M5000* Update

The latest software update for tc electronics' *M5000* Digital Audio Mainframe is a 4-band parametric EQ package, featuring Q adjustable from 0.1 to 20 octaves, ±12dB of cut or boost, and switchable notch and shelving high and low bands. The new package is available to all *M5000* owners free of charge, and can be controlled, like all the other algorithms, via the new *ATAC* Remote Control. The *ATAC* offers a new approach to programming a comprehensive range of parameters for up to 10 separate *M5000* units, with a 240x60 dot LCD enabling multiple parameter pages to be viewed simultaneously.

Parametric EQ for tc electronic's *M5000*

tc electronic, Denmark.
Tel: +45 8626 28 00.

Direct Hit: The Hit Factory Digital Recording Studios facility in New York have announced a further Sonic Solutions room in their mastering facility. Across town in the Broadway Hit Factory, a new studio—Room E—has just opened with a vintage Neve console complete with GML automation. Also new to both Hit Factory facilities is increased flexibility and track capacity in all machine rooms, two SSL frame expansions (in Studios 3 and D) and increased availability of vintage rackmounted Neve EQs and compressors. The above photograph of the Mastering Division lobby was taken by Dave King—as were all the photographs of The Hit Factory in November's cover feature. Hit Factory Digital, US. Tel: +1 212 664 1000

Maddox *Autoplay* purchase

United International Holdings Programming has purchased the *Autoplay I* and *II* automated transmission systems from broadcast and software systems specialists Maddox Broadcast. The systems have been installed to aid the provision of three Melita Cable English-language delivered channels to Malta.

This is a split site operation, with the production of all master tapes and scheduling carried out in London using the Windows based *Autoplay II*. This system consists of Windows workstations (which can be in any number of different locations) which are normally used to control a scheduler control 'engine'. Modules used in this instance include a tape library, an event editor and a Group Event Library, which enables the software to use a unique tree structure allowing for the preparation of event batches for later insertion into the transmission schedule.

From here, all the information is downloaded to the *Autoplay I* system in Malta, which is used to control the VTRs and a Maddox 32 x 8 matrix. Any problems can then be dealt with quickly; for example, *Autoplay I* can be configured to run a predetermined sequence of events such as activating emergency captions should a VTR fail.

The modem linking the two systems also means that Maddox are able to provide UIH Programming with remote diagnosis, training and assistance direct from their offices in Crawley.

Maddox Broadcast Ltd, UK.
Tel: +44 1293 542275.

London Radio Services refit

Audio systems design and installation specialists The Sound Company have recently completed the refurbishment of four on-air studios for London Radio Services Ltd.—London News 97.3 FM and London Newstalk 1152 AM. The contract included installing four Clyde Electronics Prima mixers and supplying the infrastructure and wiring for the replacement of the existing replay equipment with *DCS* and *DCART* hard-disk systems.

The main on-air studio for London News 97.3 FM is unique in having a dual presenter-operated console which allows the two presenters to sit

side by side, each with an identical control surface operating in parallel. The required video displays and TV monitors were mounted on novel 'goose-neck' supports, providing a rigid structure with hidden cable ducting without the intrusive effect of the usual monitor stack or the expensive alternative of a large wooden console extension.
The Sound Company, UK.
Tel: +44 1608 659025.

Oliver!

Following Mike Walker and Paul Groothuis' sound design for *Carousel* at the Shaftesbury Theatre, the ideas have been expanded for the new production of *Oliver!* at the London Palladium. The rig makes extensive use of Yamaha digital equalisers —15 *YDG2030* and five *DEQ5* units are racked beneath the FOH consoles, controlling the main proscenium and cluster system, the delay and front fill speakers, and the surround system.

The entire EQ network can be remotely controlled from anywhere in the auditorium from a *Macintosh Powerbook* using Yamaha's *QS-1* control software, and the power amp racks also contain substantial Yamaha contributions in the form of 17 *PC4002M*s and 29 *H5000*s.

Also enjoying success in the new production of *Oliver!* are Sennheiser; the show incorporates the biggest ever Sennheiser radio system ever deployed in the UK, with 34 channels in use dispersed over four TV channels. The system is based around the *EM1046* programmable receiver modules and *SK50* miniature selectable frequency body pack transmitters and features the first ever use of the latest v3.1 computer display software.
Yamaha-Kemble, UK.
Tel: +44 1908 369269.
Sennheiser.
Germany.Tel: +49 51 30 600 366.
US. Tel: +1 203 434 9190.
UK.Tel: +44 1628 850811.

Soundcraft-MBI User Group

A Soundcraft-MBI User Action Group has been set up to deal with any problems that users may experience with Soundcraft-MBI products or services. The Group has been formed solely as a consumer action group and is not connected with Soundcraft-MBI or any other associate company of Harman International. The Group invites 'individuals or companies who have bought Soundcraft-MBI products or those who are thinking of buying—to call the user-action group to discuss the products, servicing, warranty, or any other aspect of the administrative process relating to their order.' The Group will be administered by FBL Ltd, a company which has previously had a trading relationship with Soundcraft-MBI.
FBL Ltd, UK. Tel: +44 1608 651491.

Dolby 100: Dolby have produced their hundredth digital soundtrack, for released and scheduled films, with *Interview with the Vampire* starring Tom Cruise, directed by Neil Jordan produced by The Geffen Film Company. All versions—English, French, German, Italian and Spanish—will be available exclusively in Dolby Digital, which was also the main release format in the US in November, with over 650 prints in Dolby Digital.
Dolby Laboratories. US. Tel: +1 415 558 0200. UK. Tel: +44 1793 842100.

In-ear in Europe

Garwood Communications' success with the *Radio Station* in-ear monitoring system has necessitated a corporate restructuring. The company has acquired the interests of their European distributor, PRS Ltd, and will now deal directly with customers in the UK and via agents in continental Europe.

The new Managing Director of Garwood is Andrew Frengley, who has joined the company from PRS.

The news comes as Status Quo adopt the system for the latest tour after rehearsal trials, with the interesting comment that with the system 'you don't need so much volume'. Current and recent Radio Station users include Pink Floyd, The Eagles, Aerosmith, Tom Jones and The Grateful Dead, and REM are about to embark on a world tour with four systems.
Garwood Communications, UK.
Tel: +44 181 452 4635.

Contracts

● Second Focusrite to Conway, LA
Conway Recording Studios, Los Angeles, recently confirmed their intention to purchase the new Focusrite *F3* console, with Recall-Reset and GML automation, for their principal tracking room, Studio C. Conway's purchase will replace the original Focusrite console installed in 1990, which is being offered for sale complete with the GML system.
Focusrite, UK. Tel: +44 1628 819 456.

● Avid DAWS open European doors
Introduced at last year's IBC, Avid's new 16-track digital workstations, *AudioVision* and *Audi Station*, are finding homes in various European facilities. Bayerischer Rundfunk have bought three 8-track *AudioVisions*, seven 8-track *AudioStations* and a 16-track *AudioStation*. Further 16-track systems go to VTR in London, Edit Hire in Shepperton and Swedish broadcaster TV4.
Avid Technology. US.
Tel: +1 508 640 3158.
Europe. Tel: +44 1753 655999.
Japan. Tel: +81 33 505 7937.

● Augan in Germany
Two leading Berlin studios have opted for the *408 OMX* optical-disc-based recorder-editor from Netherlands company Augan. Magma Synchron recently placed an order for eight machines, and the Berliner Synchron Ateliergesellschaft have added a new 24-track *OMX* stack to the three *OMX*s they already have. A further three orders have come from the Lingua Film Company in Munich and three more from the Nord Deutsche Rundfunk to add to the seven systems they already use in the German broadcast division.
Augan Instruments, The Netherlands.
Tel: +31 85 648 966.

● VTR take Parallax view
VTR, the Soho-based postproduction company, have ordered both *Matador 2D* paint and animation software and *Advance*, the digital compositing, nonlinear editing and effects system from Parallax Software to run on a Silicon Graphics *Indigo2*. Early this year a room will be designed specifically to house the new *Parallax* suite, which has been selected to allow a greater flow of work between 2D and 3D areas.
Parallax Software, UK.
Tel: +44 171 287 3626.

● d&b audiotechnik in Symphony
As part of a major refurbishment programme, Symphony Hall in Birmingham under its Head of Sound Mick Lown has chosen d&b audiotechnik loudspeakers for the new house system. The installation comprises left and right clusters each consisting of four *402-TOP* and four *402-SUB* cabinets and a centre cluster with two *602-LS* and four *E3-LS*.
d&b audiotechnik AG, UK.
Tel: +44 1453 835884.

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In brief

● **Teac storage peripherals**
Of possible interest to workstation users is the announcement of Teac's new tape streamer, offering 750MB-1.5GB capacity using 3M *MC3000-MC3000XL* cartridges, and a transfer rate of 251.7kB/s via SCSI-2. Teac have launched the new device alongside Quad-speed IDE and Notebook CD-ROM drives with the SOHO multimedia market in mind.
Teac, UK. Tel: +44 1923 225235.
US. Tel: +1 213 726 0303.

● **Allen & Heath GS1**
Aimed at digital-quality home recording, submixing or live use, the *GS1* was debuted by Allen & Heath at the London Music Show in Wembley. Utilising Saber technology, it is claimed to be the first 8-bus console for under a thousand pounds, and features MIDI muting, MMC facilities, five aux sends, four stereo FX returns, and three-band EQ on the eight main input channels.
Harman Audio, UK.
Tel: +44 181 207 5050.

● **Sennhelser monitor headphones**
Sennheiser's long-established *HD250* closed monitor headphone has been replaced by the *HD265*. Derived from Sennheiser's new *500* series hi-fi headphones, the new model features ultra-light aluminium voice coils, *duofol* membrane, *Kevlar*-strengthened OFC cable, diffuse-field loudness equalisation and circumaural design principles, the result of computer-aided psycho acoustic modelling techniques.
Sennheiser Electronic.
Germany. Tel: +49 51 30 600 366.
UK. Tel: +44 1628 850811.
US. Tel: +1 203 434 9190.

● **ScanEM Nearfield EMI tracer**
ScanEM is a nearfield EMI tracer that detects the presence of an electromagnetic field and provides an audio and visual indication of its relative strength. Designed to pinpoint the source of emissions from equipment that can cause non-compliance EC directive on electromagnetic compatibility (which becomes mandatory by the end of 1995) It can map the field around the product under test and identify spots with high radiation levels. It is a hand-held, self-contained unit and needs no other test equipment to function.
TOR Applied Technologies, UK.
Tel: +44 1455 844114.

● **TL Audio valve preamps**
TL Audio have followed their valve equaliser, mixers and compressor with two valve preamplifiers. The ▶

Reverb on a budget—the Yamaha *REV100*

Yamaha *REV100*

Yamaha have introduced a signal processor addressed specifically at the budget market. The *REV100* offers 16-bit conversion and a 44.1kHz sampling rate for a bandwidth of 20Hz–20kHz, and 99 editable effects programs. A simplified editing arrangement allows three parameters of any program to be adjusted via three front-panel rotary controls, complete with null LEDs for matching the controls' physical position with the stored value.

The preset programs include stereo reverbs, gated reverbs, reverb plus flanger and delays, and MIDI control is restricted to selection of the presets.
Yamaha.
US. Tel: +1 714 522 9011.
UK. Tel: +44 1908 368872.

AKG UHF

As previewed briefly in *Studio Sound* September '94, AKG have added two compact receivers to their *WMS900* UHF wireless microphone system. The *PR900* is designed for ENG and EFP requirements, and can be switched to any of 12 subchannels within the chosen TV channel. A Velcro strip allows attachment to a professional camcorder, or for studio use the *R901* mainframe accommodates and powers two *PR900*s.

The *SR800* True Diversity Receiver is a single-channel unit offering most of the performance benefits of the main *WMS900* system, including two completely separate reception circuits with silent switching, dbx noise reduction, and the same selection of 12 subchannels. Other features include continuously adjustable squelch, front or rear antenna mounting, 11-segment LED meter for audio or RF levels, and transformer-balanced XLR audio outputs.

Also new from AKG is the *C680BL* Boundary Layer microphone, designed primarily for reinforcement or recording of speech and to be virtually invisible when placed on tables, lecterns, pulpits or stages.
AKG, Austria. Tel: +43 1 98 1240.
US. Tel: +1 818 909 4500.
Harman Audio, UK.
Tel: +44 181 207 5050.

Adder 882

Telecast Fiber Systems have introduced a high-performance digital audio and data-transmission system. The *Adder 882* is a bidirectional system that simultaneously transmits eight broadcast-quality audio channels and eight high-speed RS422 data-control channels both ways over a single optical fibre. Obvious applications include broadcast and telecommunications, interconnecting remote studios and high-density intercom trunking.

The system comprises a pair of 2U-high rackmount enclosures each fitted with 16 three-pin XLR audio connectors and eight 9-pin data connectors. Digital modulation and multiplexing combine all signals on to either one or two fibres for two-way transmission via standard ST-type optical connectors. An internal UPS keeps power available, and switchable preamps allow individual channels to accept microphone or line inputs. The *Adder 882* has a claimed range of 10km without repeaters or amplifiers.
Telecast Fiber Systems Inc, US.
Tel: +1 508 754 4858. ▶

Joe Meek Compressor

If you grew up in the UK in the early 1960s you will already recognise this compressor. If you have no idea who or what Joe Meek is, this probably sounds like a rather off-beat product endorsement—until you learn that this notorious British record producer-engineer Joe Meek died nearly 28 years ago. He was renowned for his (then) advanced recording techniques of which the creative use of compression was certainly the most audible, achieved with equipment that was largely home built.

Designer of the *Joe Meek Compressor*, Ted Fletcher, was once one of a group of session singers that Meek used regularly. He was also one of the few whom a secretive Meek discussed equipment design. Subsequently, Fletcher spent some time developing equipment for Meek and later went on to found Alice (Stancoil), the mixer company for which he designed mixers until 1987. In an article in the November 1983 edition of *Studio Sound* he outlined the basic circuitry Meek had used: a small power amplifier taking a feed of the input signal and powering a flashlight bulb placed inside a lightproof cover with a light-dependent resistor, which in turn attenuated the programme signal. It was crude but it worked within the limitations of the technology. The compressor was apparently quiet and exhibited low distortion but the attack and release times were determined by the time taken for the bulb to heat and cool,—both operations were rather slow.

Due to these and other 'technical deficiencies', there were some aspects of early compressors that gave characteristics now seen as worthwhile. Similar 'optical' approaches to compression were used in equipment from Fairchild and Teletronix whose products have gathered enduring reputations. Phrases such as 'warmth', 'punch' and 'nonlinearity' are mentioned as adding to these old designs appeal together with the ability to use a lot of compression without the result sounding dull.

With designers having spent the intervening years designing out the technical inadequacies, modern compressors are excellent precision work tools but you can spend hours trying to get them to misbehave artistically. The philosophy behind the *JMC* was to take the original photoelectric concept as used by Meek and develop from that a compressor capable of holding its own in modern performance terms —but without sacrificing the original sonic aims.

The result of this design process is the *Joe Meek Compressor*, a solid-state design with no VCAs. Compression is 'achieved photoelectrically with modern servo-control techniques used to maintain accuracy and speed of response of the light source' according to the leaflet and no more can I tell you as the heart of the *JMC* is sealed in a black box.

This is a stereo unit with a single set of front-panel controls and few surprises. All the knobs are of large design, in keeping with the period feel. INPUT GAIN sets the drive level into the compressor and offers 20dB of gain. To the right is SLOPE, a 4-position switch described as being similar to a ratio control but not linear in action. The possibilities vary from a maximum usable ratio of 4.5:1 at the lowest position (1) to 7:1 at the highest position (4).

Gain reduction is indicated by a standard small VU meter. I am advised that this meter will be changed in design in future models. To the right of the meter, COMPRESSION is a continuous rotary control. The *JMC* is described as having a nonspecific threshold with the ratio deviating from unity at approximately -15dBu. Compression is nonlinear and there is no limiting action.

A push button IN-OUT brings up a blue or red LED respectively. On the review unit the blue LED was very dull when viewed from any angle other than on axis.

ATTACK and RELEASE are continuous controls with the attack times quoted as from 1.5ms to 10ms.

There is no power switch, power-on being indicated by the illumination of the VU meter and the red or blue IN-OUT LED. The rear panel provides electronically balanced inputs and outputs available as XLR-type or 3-pole jack wired in parallel. The *JMC* has no quirks when run unbalanced at either input or output.

The overall physical effect of the unit is striking due to the shade of green chosen as panel colour. It quite simply 'glows' at you out of the rack. Eventually I became accustomed to it but retain a slight unease—less over the colour than the lack of contrast between the black legends and the panel. That said, this is not the kind of product where you need to adjust controls with precision.

Only very brief instructions are provided with the *JMC* but they are quite adequate. They run through the controls, a few words of advice and then suggest that you use your ears to proceed further. It should be obvious by now that the *JMC* is an effects processor rather than a calibrated tool and it is with this attitude you have to approach it. To emphasis this spirit, all the rotary knobs are calibrated 'all the way up to 11'!

The recommended starting point is to set SLOPE to 3, ATTACK to fast, RELEASE to halfway, INPUT GAIN to just over halfway and you are at unity gain point. Then just turn up the compression.

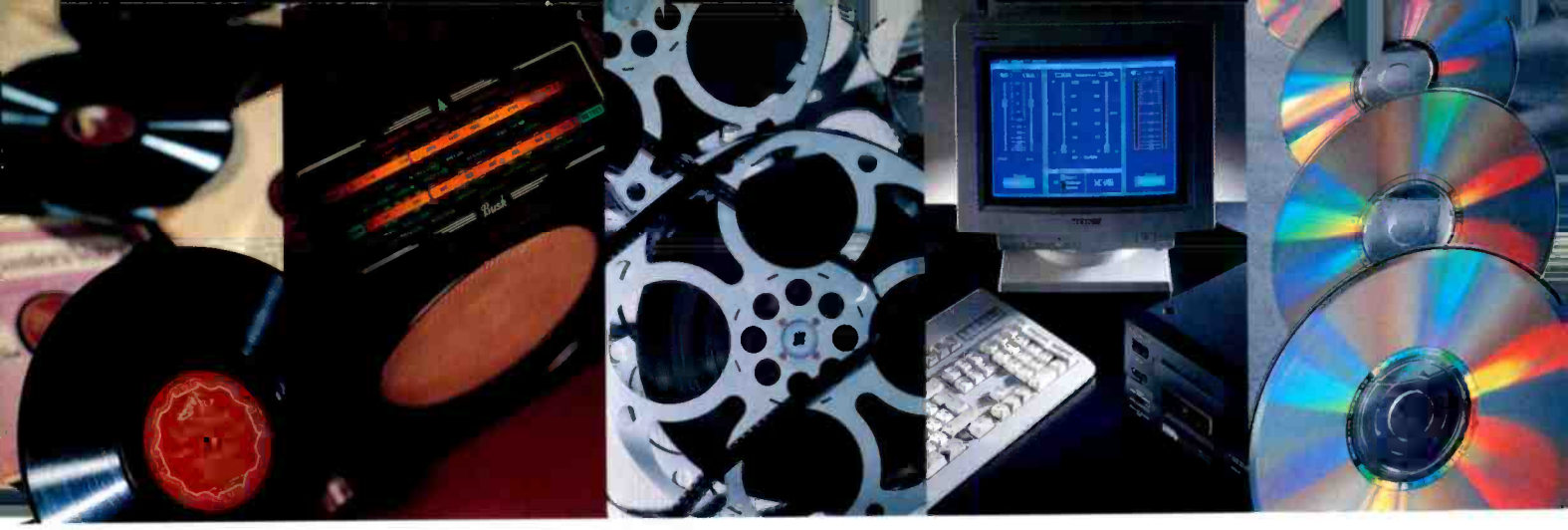
It takes a little while till the relationship between the controls becomes clear. You cannot always expect to just apply your standard compressor experience. There is a high degree of programme dependence in the results—the instructions state that the compression ratio changes with programme content and amplitude.

Initially I tried applying compression to complete mixes, across the stereo master bus, with the *JMC* switched in only when the mix was virtually complete. The first thing that you notice is that this unit can be gentle or severe. And you need to decide at what end of the possibilities you are looking. Used heavily it can, with the right material, create that thick, punchy sound that is ideal for singles and found frequently on 1960s recordings. Used more creatively you can wind in a little gentle pumping action without losing the brightness of the mix.

The second point you notice is how positive the bass response is. As part of the testing I placed a graphic equaliser before and a RTA after the *JMC* to see if this was an illusion or really there. Even when compressing hard, the low frequencies are still there in full. This is part of the reason why it is difficult to predict how certain settings will sound, with a frequency response claimed to be 'substantially flat' down to 5Hz.

I also tried over-compressing one mix with a fairly active pumping action. The result was that the balance was turned inside out, but there still remained a musical relationship within the mix. I then repeated this with a 'standard' VCA powered compressor of a recognised make and used settings that approximated to that of the *JMC*. The result was quite different—the effect was just as extreme but the musical relationship in the balance had gone. I don't know if this shows anything other than the fact the two compressors work in quite different ways. ▶

The spirit of Joe Meek's production—'rotary knobs and calibrated all the way up to 11'



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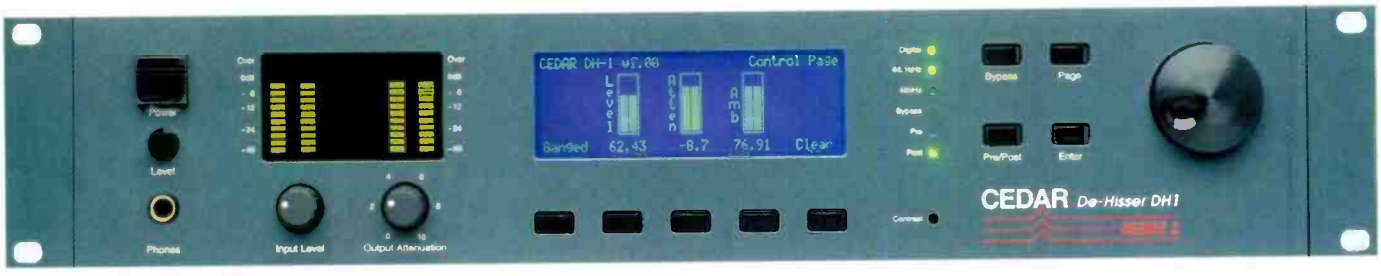

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I then tried subtlety, adding just a little compression. The instructions suggest Slopes 1 and 2 (gentler slopes) for overall mix use and if you want to apply a reasonable amount of compression these are the best settings for gentle effect. I did, however, find a setting of Slope 4, compression set to one third, attack and release minimum, where the VU meter indicated less than 1dB of gain reduction, was very effective in adding a 'fullness' to the mix.

It may be that the *JMC* can be used with subtlety but this should not be confused with inaudibility. The threshold of compression is undetectable but it's use is not. As soon as the meter starts moving the effect can be heard although compression may need to be switched in and out to identify exactly what it is. This of course is the intention of the unit—effects compression.

On single instruments, the *JMC* proved useful. I found it excellent on bass guitar where the depth of response and smoothness of operation was an excellent tool in balancing slap-and-bass tone within a bass track without making the dynamic sound completely flat. Drums and any percussion are trickier and are probably best left to the mix. I did have considerable success using the *JMC* across the stereo overheads that seemed to add a certain 'dynamic' to the track.

In an experimental mood I took a stereo string overdub and applied a hint of soft compression—Slope 2 with minimal meter movement, and the effect was a pleasant warming of the sound. This was not something I would normally dream of doing, but keeping an open mind.

In the time that I had the *JMC* the only input that I felt I had not come to terms with was the voice. This seemed to show up the interaction between the controls to a far greater degree than anything else and would require more experience before use on a live vocal. Piano is also to be approached with care. The instructions warn of this but in reality the effect is quite staggering; I could not find a halfway setting. Even small amounts of compression turn any piano into a large music box—the kind of piano sound the Rolling Stones used circa 1968.

Guitars of all sorts work well; you can probably guess the kind of results achievable particularly with a full-bodied acoustic played finger-style, the sustaining effects of a long slow release yet with no loss of HF following the attack.

While the heavy application of compression may not be high on your list of everyday techniques, it is possible to add just a touch of compression with the meter hardly kicking but adding a terrific warming (that word again) effect. I can remember being told years ago that 'everything benefits from just a little compression' which is something I've never really managed to square with my own experience. But perhaps you need a compressor with these kind of characteristics to make this statement a little more understandable. At the other extreme you can just keep winding on the dynamic range reduction to achieve the effect you want with few of the frequency response trade-offs usually experienced with heavy compression.

Unless you have permanent access to a rack of vintage compressors, a unit such as the *JMC* would be a particularly worthwhile addition to your effects resources. Even if you have a 'vintage rack', it is almost certain that the *JMC* would show some clear advantage (reliability) of modern design and components over age.

And the Joe Meek connection? Well it is a good point to start from. Meek had to battle against equipment to achieve his results. It is rather easier for us. The *JMC* opens up exciting production opportunities for experimenting with compression as an effect. ■

Keith Spencer-Allen

InterStudio Ltd, UK.
Tel: +44 1923 285266.
Fax: +44 1923 285168.

JOE MEEK

Joe Meek started his career as an engineer at London's IBC and Lansdowne Studios during the 1950s where his unconventional approach to recording won him both admirers and enemies. An erratic temperament and an ability to antagonise those who employed him made him frequently difficult to work with. He achieved a degree of chart success and this led to him arguably becoming the UK's first engineer-producer.

Increasingly unable to work within established studios structures, in 1960 he set up RGM Sound in a small flat above a North London leather goods shop. Using largely home-made equipment and a philosophy that favoured the use of ears rather than meters, he started producing recordings that were unlike anything that had been heard before. In total control of all aspects of the recording he utilised very dead acoustics, understood the importance of separation (with musicians positioned in any room in the flat) and would go to any extreme to achieve the sound he heard in his head—even destroying equipment to achieve it.

Revolutionary for it's time was the use of close miking, of different reverb qualities, and most unusual to modern ears, the use of compression as a musical instrument. Just listening to tracks from the Tornadoes or Honeycombs raises questions about precisely how they were achieved. Meek was protective about his equipment and its design, and few actually saw inside the boxes. While aspects of his work may now seem dated, his command of the creative uses of compression and a determination to use them to extremes still holds a fascination.

Stories abound of Joe Meek sessions and his handling of artists but there was no denying his success and the impact this had on British pop music in the early 1960s and beyond. In 1967, following depression and an ever increasing paranoia, he took his own life in tragic circumstances. ■

Spectrum™ Organ contains 128 presets including classic rock, jazz, gospel and pipe organ sounds. Each preset includes individual vibrato, distortion, reverb,key click and release click settings. These settings can be globally altered from the front panel, or using MIDI controller messages. In addition, each preset contains four drawbar waves which can be accessed in real time using the PC™-1600 MIDI Controller.

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- 256 Presets (64 RAM /192 ROM)
- 24 Oscillators
- 12 Voice Polyphonic
- 12 Dynamic Resonant Filters and 24 LFO's
- Poly and Legato Receive Modes
- Hard Sync and Pulse Width Modulation
- Stereo Audio Outputs

Spectrum™ Bass contains 200 presets including classic analog and digital synthesized basses, as well as electric, acoustic, fretless and slapped sounds. The Spectrum Bass includes sustained and legato versions of most presets sounds. Up to 4 presets can be layered on separate MIDI channels to create incredibly fat combination sounds. Individual presets can be edited using the PC-1600 MIDI controller

- 1 Mb 16-bit Classic Bass Sample Wavetable
- 200 Presets
- 8 Oscillators
- 8 Voice Polyphonic
- 8 Dynamic Resonant Filters and LFO's
- 4 Part Multi-timbral
- Poly and Legato Receive Modes
- Stereo Audio Outputs

Spectrum™ Analog Filter is a true programmable analog filter system which can be used to process any sound. It offers a 3-channel input mixer followed by a classic voltage controlled resonant 4-pole filter and voltage controlled amplifier. The filter circuit includes an ADSR envelope, velocity and key track amounts, and is MIDI controllable. The amplifier circuit also offers an ADSR envelope and master volume. 100 program locations allow settings to be stored in memory.

- Classic Analog 4-Pole Filter Circuit
- 100 Programmable Locations
- 3 Audio Inputs
- MIDI Note Triggering
- Audio Trigger and Envelope Follower
- Filter Frequency Velocity and Key Tracking
- MIDI Controllable
- Mono Audio Output

PC™ 1600 MIDI Controller This general purpose MIDI controller offers 16 sliders and 16 buttons that can be programmed to send system common or system exclusive MIDI messages. In addition, 2 CV pedals and the data wheel can be used as alternate controllers. The PC-1600 has many uses including programming and controlling any of the Spectrum series sound modules. The PC-1600 comes with 50 presets offering a variety of synth editors, sequence controllers, lighting system controllers, etc. All presets are fully programmable, so as other needs develop, they can be programmed by the user very easily.

- 16 Programmable 60mm Sliders
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PEAVEY

MTA *Signature Series*

Based exactly on the circuitry of the mic and EQ in the MTA *980 Series* console, Malcolm Toft's spin-off product—the *Signature Series* EQ—is likely to find a wide range of applications and users. Sporting those rather natty Neutrik connectors that can handle balanced XLR or jack connectors in one socket for separate mic and line inputs plus XLR or jack outputs, interfacing to the dual channels of the unit is simple. There are dual, high-quality, mic preamps with switchable phantom power and dual, 4-band, fully-sweepable, peaking EQ sections.

Gain is adjusted on a stepped pot giving 60dB on the switch-selectable mic and ±20dB on line inputs. EQ may be bypassed individually per channel and offers ±15dB with reciprocal curves over the ranges of 1kHz–15kHz (HF), 700Hz–10kHz (HMF), 150Hz–2kHz (LMF), and 40Hz–650Hz (LF) with a Q of around 1.5.

Toft as founder of console manufacturer Trident, has an impressive track record in desk design and central to many of his creations have been highly regarded EQ sections. The MTA *980 Series* desk continues this tradition although it has to be said that in terms of sophistication and EQ it betters some of his later creations at Trident—like the *80c*—by a considerable margin. However, simplicity and no nonsense remain strong selling points and the *Signature Series* rackmount carries over these principles well.

The mic preamp is undoubtedly very high quality and has plenty of headroom, dynamic and air in it although it would have been reassuring to have some form of metering—or even an overload LED in the path—to keep the operator informed. Similarly, the omission of a PHASE REVERSE button will disappoint some, as will the lack of the desk's 12dB/octave 50Hz high-pass filter, as it means that rumble removal will tie up the LF.

Even so, as four bands go the *Signature Series* is strong and dependable—almost deceptively so. Steep boosts or cuts are only half of the story and decent EQs are characterised by a finely-controllable lift and wane either side of zero—and this unit has plenty of that. Classy and sweet are the words that spring to mind. However, matters were confused on the review unit by the centre detents on the boost pots being just off centre —each was consistently fixed at about two minutes passed the hour.

As on the *980* desk the EQ impresses with a dependable and predictable response to the pots and an overall reluctance to want to turn harsh or nasty. The band ranges and overlaps are perhaps greater than some will be used to but this becomes almost academic in practice as it all proves to be well balanced. There's a natural logic to it.

This is a very easy and satisfying EQ to operate with the exemplary LF (unclutterd bottom-end lift) and aurally exciting HMF (the vocalist's band) worthy of special mention. It is a sweeteners' dream.

MTA *Signature Series* EQ—'easy and satisfying'

However, we have got to ask what people look for in an outboard unit like this. While the mic preamp performance and input versatility of the *Signature Series* cannot be challenged, one of the major considerations is to have an EQ that offers something different to what you already have on your console. The MTA would embarrass many consoles in this department but extended functionality would have made it even stronger.

You might, for example, expect to have some tuneable filters on a device of this description and perhaps even switchable or variable Q somewhere along the line. Most would be delighted with a desk full of this EQ but will look for other things in a piece of outboard—perhaps total variability or just something plain odd. The Amek *9098* or a Focusrite *Blue* unit satisfy the first criteria while something like the TL Audio Valve EQ does for the second but the *Signature Series* falls somewhere between the two.

It is the price of the MTA that at this point weighs strongly in its favour because in terms of affordability against performance, it is in a space all of its own. It might not challenge the power EQs for controlability but it certainly puts a couple of channels of quality equalisation and superb mic preamps well within the reach of those who have had to live without it – and there are plenty. ■

Zenon Schoepe

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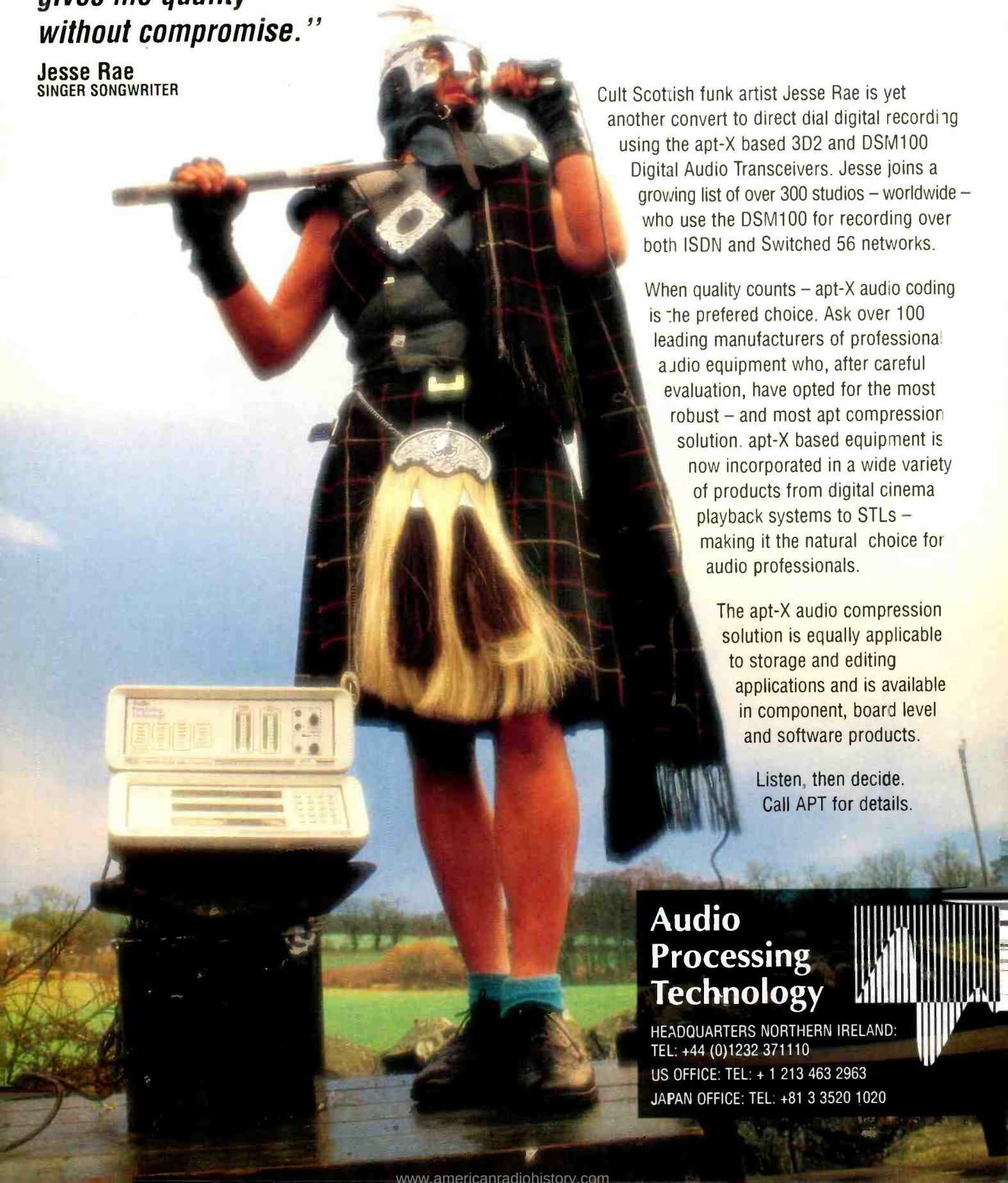

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DNA Dymand

DNA are a Dutch company that are beginning to make a name for themselves in the international pro-audio marketplace. In particular, DNA's *Dymand* compressor which was released just over a year ago, has been catching the eyes and ears of many studio professionals and is now starting to make serious inroads into studios worldwide.

Dymand is a dual channel, stereo-linkable compressor aimed at the high end market (just under £1,300 UK). This high-quality unit has been designed to be simple to use although it contains some quite sophisticated and unusual features.

The channels include prominent, illuminating bypass buttons (which turn from green to red when the Monitor check mode is employed); switchable I-O bargraph meters (10-segment); gain reduction meters (10-segment), and a Lo-cut facility that switches a high pass filter (80Hz 1st order) before the detect on circuit.

Stereo linking is via a central switch placed between the two sets of controls, and as with all other switches on the unit, includes an LED indicator. All inputs and outputs are via electronically-balanced XLRs. The only obvious facility missing from the unit is a mains ON-OFF switch.

In operational terms, the front-panel controls have been well laid-out making the unit simple to operate, and together with good, clear metering and plenty of LED indication, keeps the user in close visual contact with processing and setup. Controls are responsive and provide a good breadth of adjustment making for intuitive and fast operation.

There are two main areas where *Dymand* has something extra to offer compared to other more standard compressors. The first of these involves the feed to the detection circuit which can be switched to receive four different sources—Input, Output, Key and Side Chain. Without any selection being made the compressor works as feed-forward device attenuating program dependent on the dynamics of the unit signal in feedback mode (selected by pressing the OUT switch), the compressed signal is fed back to the detection circuit creating different effects depending on the type of program being processed and the settings of the compressor. Most notably, it can give extra edge to percussion and vocals, and add body to bass instruments. It's the kind of facility that once explored becomes quite addictive, and often (but not always) enhances the overall effect.

The other switchable detection sources, Key and Side Chain, correspond to I-Os at the rear of the unit. Key allows an external signal to drive the compressor providing effects such as ducking and tremolo; Side Chain enables an external equaliser to be inserted, thus providing frequency-conscious compression for functions such as de-essing, depopping and other problem frequency levelling. Both these facilities worked well and were conveniently being placed on switches—also being able to easily monitor each source provided a very useful facility.

The other area where the *Dymand* has something different to offer is with its Lo-cut function. As mentioned this placed a high-pass filter before the detection circuit which effectively prevents the compressor from responding to the low-frequency content of the signal. This has two main benefits: firstly low-end pumping is greatly reduced and in the majority of cases eliminated; secondly, compressed audio is very often enhanced by leaving the low end unprocessed —this producing a more natural, fuller sound without affecting the overall level to any great degree.

The simpler expander with its ON-OFF switch and THRESHOLD control, makes a very useful addition to the unit. The fixed parameters have been well chosen to make it operate both effectively and transparently, removing any extra noise that may be elevated by the compressor.

When the unit is switched to stereo operation, the rotary controls on Channel 1 will also control Channel 2. However, it is up to the user whether or not the Gain controls are linked and this can be switched via internal jumpers. One criticism is that the BYPASS switches on each channel are not linkable, making A-B comparisons in stereo a 2-button operation rather than one. All other switching remains unlinked during Stereo mode.

The unit performs well in stereo, retaining a good solid image without any stereo wandering.

In terms of overall system noise the *Dymand* is extremely quiet, and, of course, any noise introduced into the system can be reduced with the expander. This obviously makes the unit very suitable for digital work.

The quality of the processing is excellent, and the way the unit processes transients retains a good high-end response without any sacrifice to 'sparkle'. the treatment of low frequencies is also impressive, with the Lo-cut facility helping to produce a very natural bass end with plenty of warmth and power.

In conclusion, *Dymand* represents a simple to use, well featured, high quality compressor which is suitable for a wide range of applications.

Obvious R&D effort has gone into removing artefacts that have traditionally affected other dynamics processors; and the unit contains some excellent facilities designed to enhance the sound of compressed audio.

This is a very useful, well conceived unit that is definitely worth trying if you get the chance. ■

Patrick Stapley

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Yamaha *VL1m*

Heralded as the most significant step forward in synthesis technology for many years, Yamaha's *VL1*—and the keyboardless *VL1m*–rackmount Virtual Acoustic Tone Generators have made a number of high profile appearances where their ability to resynthesise sounds with a formerly unrealisable degree of control and subtlety has been illustrated.

The purpose behind Yamaha's drive must lie in the development of improved performance control over synthetic sound; the ultimate goal being to create genuinely new sounds. In the same way that early synths impressed us with rough approximations of real-world instruments, so the *VL1* must start somewhere—albeit considerably further up the evolutionary scale.

The Virtual Acoustic Tone Generator uses computer-based physical modelling rather than oscillators or samples to create sounds. Sound is created from a basic model —a nonprogrammable algorithm simulating woodwind, brass and string voices—consisting of a driver—the reed-mouthpiece, lip-mouthpiece or bow-string—and the resonant systems corresponding to the tube, air column or string of the instrument.

One of the intriguing aspects of this approach is that different drivers can be used with different types of resonant system permitting a woodwind to be bowed, for example. The aforementioned algorithms are influenced by Controllers which are variables that determine precisely how an algorithm (the instrument) plays. These Controllers include equivalents of the player's throat or bowing arm, breath or bow velocity, periodic pressure or bow velocity modulation, embouchure or bowing force, tonguing, pitch, plus damping and absorption.

What can be achieved with the above facilities can further be modified by sections which exert influence over the final timbre of a voice. An harmonic enhancer manipulates harmonic structure; a dynamic filter offers high-pass, low-pass, band-pass, band elimination and keyboard cut-off tracking; a 5-band parametric EQ does the obvious; a resonator enhances 'woody' sounds; and an impulse expander provides related enhancement of 'metallic' sounds. All of this is duplicated (in grand synthesiser tradition) for layering purposes and it becomes clear that while the *VL1m* is essentially monophonic it can stretch to duophonic if asked to.

The front panel hides the internal complexity of the instrument well and is orientated around a large LCD with 'soft' buttons below, with a cluster of Data Entry and Cursor keys beneath a data dial to the right and row of Mode and Function buttons to the right. There are also a 3½-inch disk drive and a breath controller input (giving real-time interaction by continuous controller data). Specified MIDI data received, in addition to all (mappable) continuous controllers, include note and velocity, modulation wheel, breath controller, foot controller, aftertouch and pitch wheel. All can be patched to the *VL1m*'s controllers and the way in which they interact and correspond can be edited by the user.

In hard synth terms the, *VL1m* offers 128 patches at any one time which are loaded into the unit's memory from disk and voices can be enhanced by three section effects blocks with three different types of modulation effect, three feedback delay types and eight reverb types.

I really don't know exactly what to make of the *VL1m* because it is so different from any other synthesiser available at the moment. However, it is undoubtedly as close as things get to a totally new form of synthesis, and as such presents studios of all kinds the opportunity to expand their sound palette and prospectus. Certainly it carries the drawbacks of all 'new' technology—patch editing takes place in terms of parameters that are instrument and performance related rather than in waveform, envelope and modulator terms

While the operational aspects are clearly laid out, I cannot claim to have come to understand the editing process in the short time that I have had the unit for review. It is matter of relearning—and if anyone can recall the culture shock of editing a digital synth for the first time then they can rest assured that they will encounter a similar feeling with the *VL1m*.

The sounds are very strange in places but there are some really superb sax, trumpet and bass sounds available for immediate use. The presets also include the best approximation of an overdrive electric guitar that I have heard, and what I can only describe as a selection of beautiful and eerie new sounds. But the *VL1* has to be played to be appreciated—it's a solo instrument and a very expressive one at that and you need to interact with it at a controller level to truly make it sing. It does not require that much keyboard virtuosity but MIDI wind controller players are likely to have something of a competitive edge.

It would be fair to say that the *VL1m* is a fascinating instrument that actually challenges the very nature of synthesis as we know it. Whether it represents the future of synthesis remains to be seen, this technology is not cheap at present and may be regarded as too high-brow or left field, but it is certainly capable of a wide range of timbres that are not to be found in any other box. It is the sort of thing that the synth market needs.

It is also worth commenting on Yamaha's recent production a number of extremely interesting units including the *Pro Mix 01* digital desk and now this—which proved interesting enough to occasion a UK AES section presentation.
Play one. ■

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Music News is compiled by Zenon Schoepe

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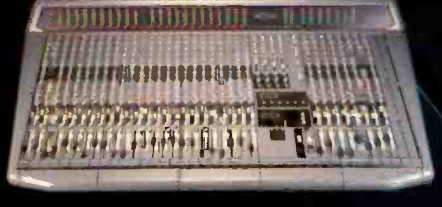

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Hi-Tech on Tour

The current Pink Floyd tour is getting (justifiably.) a lot of coverage and I was able to catch up with them in Lausanne. However, rather than go over covered ground, it seems like a good moment for reflection over the Floyd's involvement with technology from the early days and a chat with the 'man behind the scenes' who has been with them since 1973, Robbie Williams (now heading up Robbie Williams Productions).

My first involvement with the Floyd goes back to 1967 when I worked with them on behalf of WEM (Watkins Electric Music for the youngsters out there.) with the cutting edge technology of an *Audiomaster* mixing console, separate power amps, and line source columns loaded with Goodmans *Axiom 301* speakers. However, even this was quite a departure from the general practice of combined mixer-amps more suited for guitars or Vortexion *50*s with rudimentary mic. Mixers and the 'production' at this stage included Selmer stereo guitar amplifiers for all the instruments, with left and right speaker stacks for wider coverage in the audience.

In 1968 I stepped out of audio engineering for a while to become a professional musician, Syd Barrett left the guitar duties to David Gilmour and the Floyd moved on to greater things. The involvement with WEM expanded to larger PA and instrument stacks and started incorporating Vitavox cellular horns for extended HF and efficiency, together with a custom-built Allen & Heath desk. Those interested will find considerable footage of this system in the film *Pink Floyd in Pompeii*.

The 'Azimuth Coordinator' (a grandiose name for a quad pan pot) made its appearance at concerts in the early-1970s and marked the move towards both stereo and quad PA systems by the Floyd.

1973 marked the start of Robbie Williams' involvement.

'I joined as a humble trainee soundman and at this point, the sound crew consisted basically of Mick Kluczymsky and myself.

'By the time we reached 1974, we had done tours both in the UK and the States and built up a PA system that was large enough to do stadiums. When the band came off the road in '74, we found ourselves with a lot of gear that was going to spend its time sitting in a warehouse if we didn't do anything with it.

'It was really a question of a lot of things coming together: we needed storage space for the PA, the band wanted a studio of their own where they could work on new material and Roger needed somewhere to have a pool table! As it happens, the pool table didn't materialise but the studio and depot did—and that was the start of Britannia Row Leasing (Audio) Ltd.'

At this stage the system had evolved into a line-array concept with Gauss-loaded folded bass horns and direct radiator low mid cabinets, Altec *829A* dispersive horns and JBL long-throw 'Festival' horns for the mids and HF packs with either two Vitavox 4kHz slot dispersion horns or one 4kHz horn and four JBL *075* bullets. Monitor wedges were 2-way with a Gauss 12-inch and Vitavox horn and driver. Power was provided by modified Phase Linear *700B* and Quad *303* amp racks.

Consoles by this time were Midas for both FOH (including quad outputs and joysticks) and monitors.

Considering the reputation of Pink Floyd's concert sound, Britannia Row hit immediate success, with Queen being among the first clients.

One of Williams' ventures was the coordination of the design of the Midas custom console that would be used on the *Animals* tour. Still modern by today's standards, the console features six quad groups, eight stereo groups and eight routeable auxiliaries plus masters.

'The production requirements for *The Wall* necessitated a flying system so it was time to move on in terms of the installation.'

The result was an Altec horn-loaded system (no direct radiators apart from the sub-woofers) using Mantaray MF and HF horns for the main stereo system and a Court JBL system for the three quad 'stations'. The system is still a reference by which others may be judged.

After *The Wall* concerts, Williams told his fellows at Britro that he 'wasn't coming home and this was the start of my new career as Robbie Williams Productions. This gave me the opportunity to work with other people and broaden my range, so to speak.' Artists included the Steve Miller Band in the States, The Cure and Roger Waters worldwide.

Patrick Bruel in concert

After seven years of absence, Pink Floyd went back on the road with *A Momentary Lapse of Reason* with Williams as Head of Production and sound provided by Britannia Row in collaboration with MSI.

'The MSI system was very well thought out but—and I'll probably get struck down by God for this—had a tendency to be a bit 'boxy'.' I ventured that some of this might be due to the fact that combined horn and direct radiator systems tend to lose performance over long distances—the horns carrying on after the direct radiators have fallen away.

Just over four years later, the latest Floyd extravaganza is firmly in the hands of Robbie Williams and Britannia Row and features the Turbosound *Flashlight* and *Floodlight* systems.

The obvious final question is—so where do Pink Floyd go from here?

'This whole tour has been configured for stadiums and the only exception will be Earls Court, it being the only arena sufficiently large to handle the production. As such, things have gone extremely well and I am more than pleased with the way it has all turned out.

Pink Floyd have always been full of surprises but I doubt if the next production that they do will be on the scale of this one. It will probably come down to arena size but then who knows—they may even decide to come down the 2,000–4,000-seat halls and get back to an intimate atmosphere. Anything can happen.'

The other hi-tech tour out at the moment is Dispatch of France with French singing star, Patrick Bruel, where the female attendance decidedly outweighs the male!

Whereas they may not have stars of international stature, the French continue to prove from time to time that they are definitely in the front league where technology is concerned—if not way out front.

The FOH control system designed by Patrick Aufour and engineer, Yves Jaget, is almost certainly a 'first' and features a Saje *Memory* console with the latest software developments, together with two Yamaha *ProMix 01* digital consoles.

As Yves Jaget commented, 'this must be the first time that the lighting control gear takes up more room than the PA equipment'

The equipment in question consisted of the Memory with two Lexicon *LARC* remotes installed in blank panels, a *ProMix 01*, a *Mac* laptop computer and a BSS *Varicurve* remote controller.

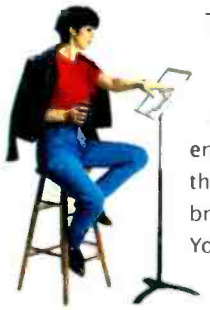
'All the audio stays up by the stage—all we have here are control signals, apart from the PFL bus. The remote audio racks are next to the effects and control racks, together with the second *01* which actually handles audio, the *01* here is simply acting as a remote controller and receives MIDI commands from the Memory for scene changes. In the same way, all the effects are preprogrammed and change via MIDI commands from the console.'

The speaker system consisted of two flown main clusters, each consisting of three Meyer *MSL-5*s with six *DS-2* low mid-bins, plus three clusters of two *MSL-2*s spaced across the central lighting truss for front fills and two more twin clusters per side for additional audience fills. Sub bass was six *USW-650*s per side.

'The *MSL-5* is very powerful in the upper-mid range and takes a bit of getting used to after *MSL-3*s. However, after the first few dates things are now going very well.' ■

Live Sound News is compiled by Terry Nelson

The Most Widely Used Studio Microphones.



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TAKING STOCK

Mike Stock (left) and Matt Aitken—redefining the role of studio booking to the record industry

Three million pounds is an enormous sum to spend on a project studio. But if your name happens to be Mike Stock—one third of the legendary Stock, Aitken & Waterman production team—and you also plan to use the premises as a base for four record labels, then perhaps the outlay may seem less extravagant.

Stock's place—Century House as it is officially called—is just about up and running after six months of intense building work which has transformed the former coffee-bean warehouse in London's Union Street into a two-studio recording complex and a large open-plan office. The building has a total floor area of 12,000ft² and virtually every inch of it has been given the once over. On the ground floor is the state-of-the-art, no-expense-spared recording complex designed by Andy Munro, of Munro Associates, while above it, on the first floor, is the office from which Stock plans to run his record production and publishing business. The building also backs on to a railway arch which provides parking for up to 40 cars.

Although Mike Stock has specified two fully-equipped recording studios—one 48-track digital studio for mixing and remix work and one 24-track digital room for recording—the complex is actually intended for his own use.

'It was never my intention to set up a recording studio that was available to outside clients,' he explains, 'because in the current climate I don't think it would be commercially viable. What we have instead is a studio complex designed specifically for myself and my associates so that we can work in comfort on our own projects and on any project that is commissioned by an outside record label. Record labels won't be able to ring up and book time for their artists unless those artists are working with us.'

The fact that Stock has taken the plunge and branched out on his own after such a long association with Pete Waterman has come as quite a surprise to many people in the music business. Despite persistent rumours that the two had a major disagreement at the end of last year, Stock denies that there is a rift between himself and Waterman. He says it was more a case of wanting to start afresh, so in September 1993, he followed Matt Aitken's lead and left.

'We'd had ten years together as a team, and a lot of success,' he says. 'But the time had come for me to strike out on my own. The SAW relationship was really like a marriage where the partners had outgrown each other.'

The situation eventually came to a head after Waterman sold his PWL label to WEA. Stock explains: 'Although Matt and I had no shareholding in PWL Records, we both felt that as a result of the sale we had lost our independent status ▶

The recording studio about to open around the corner from *Studio Sound's* UK base belongs to former Stock, Aitken & Waterman Producer Mike Stock. Sue Sillitoe visits the £3m 'project' studio

EQUIPMENT

STUDIO 1
- SSL *G Plus* console with *Total Recall* and *Ultimation* (64 frame; fitted with 56 + 2 stereo)
- Genelec *1035B* monitors
- Yamaha *NS10s*
- B&W playback monitors
- Calrec *Soundfield MkIV*

OUTBOARD
- AMS *RMX16*
- dbx *120 XP*
- Digitech *Vocaliser*
- Eventide *DSP 4000*
- Focusrite *Red 2*
- Focusrite *Red 3*
- Lexicon *480L*
- Roland *SDE330* (3)
- Sony *M7*
- Sony *R7*
- Yamaha *Rev 5*
- Yamaha *SPX990* (2)
- Assorted Aphex and dbx units

MIDI Sequencing
- Apple *Macintosh Quadra 650* fully expanded
- Apple *Macintosh Quadra 950*
- Steinberg *Cubase Audio*

STUDIO 2
- MTA *Series 980* (32 frame)
- Check for Mons etc

OUTBOARD
- Roland *SDE330*
- Sony *R7*
- Sony *M7*
- Yamaha *Rev 5*
- Yamaha *SPX990*
- Assorted Aphex units

MIDI Sequencing
- Apple *Macintosh Quadra 650* fully expanded
- Steinberg *Cubase Audio*

MACHINE ROOM
- Sony *PCM3348* DASH
- Sony *PCM3324* DASH with Apogee Electronics *D-As*
- Sony *TCK511* cassette machine
- ISDN with Dolby AC2 coding

as a production team. It became difficult to break new acts because we were having to deal with a corporate entity that was responsible for making all the decisions.

'Matt left in 1991 to pursue his racing car interests, but I stayed on hoping I could change things from within. Eventually I realised that wasn't possible and I decided to try something new. The break-up was tinged with sadness, but I am very excited about the future.'

It has not taken Mike Stock long to re-establish himself. He is already working on a number of projects, including some with Aitken who is getting back into production after a three-year break. The two currently have a chart hit—a remake of the Barbara Streisand and Donna Summer's 'No More Tears (Enough is Enough)' which features Kym Mazelle and Jocelyn Brown. Stock is also planning to launch his own label Love This Records and publishing company Love This Music which will be run from Century House along with his existing labels Bags of Fun and Ding Dong which is distributed by Bell-Arista.

Getting started

Within a month of leaving PWL Stock had located the building that now houses his new venture and started drawing up plans for the studios. The design went out to tender and the project was eventually awarded to Munro Associates because Andy Munro's ideas were the most similar to Stock's own vision for the complex. Stock says: 'I wanted plenty of natural daylight—an open and spacious working environment that didn't feel closed in or claustrophobic. The building was in fairly good condition considering it had been empty for four years, but we still had to replace the roof and knock out the mezzanine floor.'

The layout of the studio complex is quite unusual. The main control room, which has a large overdub booth, and the second, smaller control room are a long way from the recording area but visual contact is maintained by video links. Both control rooms are arranged around the central entrance hall which can also double up as a recording area. Stock intends to use this space to create the effect of an indoor piazza which will include a café where artists and visitors will be able to relax.

Equipping the two control rooms was fairly straightforward, claims Stock. As one might expect from a man who has been responsible for over 100 UK Top 40 records—including 13 Nunber Ones—money was not a problem although everything was carefully budgeted. 'Our whole philosophy was to buy the best equipment we could and for that reason I didn't want money to be a stumbling block,' Stock recalls.

He chose a 64-channel SSL *G Plus* with *Ultimation* for the main control room because of its 'industry standard' statutes and because it is a desk he has grown accustomed to over the last ten years. Mike Picking, Stock's Technical Manager, was heavily involved in the choice of equipment which had to be both familiar and also innovative.

Picking: 'Principally, Mike wanted equipment that was very similar to the gear he had used at PWL. However, over the last two years I'd come across lots of interesting pieces of equipment that I was able to introduce to Mike and Matt—for example the Apogee range.

'We sat down and drew up a shopping list for a top-end studio that included all the obvious things like the SSL, Sony *PCM3348* and *3324* digital multitracks, monitors and so on. Then we drew up a second list that included all their favourite pieces of gear. After that we took a trip to AES in Amsterdam and bullied all the manufacturers into letting us see all the latest developments they were working on so that we didn't buy something that was going to be superceded very quickly by a new model.'

For monitoring, Stock and Picking opted to install Genelec *1035Bs* in the main control room and *1037As* in the the second control room in order to give consistency. Says Stock, 'We tried a few different monitors but eventually settled on the Genelecs because Matt and I had both worked with them before and feel comfortable with them.'

The only piece of equipment that Mike Stock and Mike Picking really agonised over was the desk for the second control room—which became a matter of much debate, until Picking heard about Malcolm Toft and the desks he had just started building.

'I went to see Malcolm,' says Picking, 'because I had such fond memories of the old Trident *Series 80* desks that he had built during the 1970s. This new model turned out to be very similar—a sort of 1990s version of it, but with the advantage of first-rate electronics. Malcolm Toft lent Mike Stock and Matt Aiken an EQ strip to try out and they loved it, so we went ahead and ordered a 32-frame MTA *980* for the second studio.

'Our main criteria was to find a desk that was sonically excellent. We looked at a lot of consoles but in the end we felt this was the best value for money because it was less gimmicky and sounded so much better. If we want automation at a later stage we can bolt it on, but with the SSL in studio one it's not really essential at the moment.'

ISDN links have also been installed at the facility so that Stock can send mixes straight through to A&R departments all over the world.

'BMG have installed ISDN at their offices in London,' Picking explains, 'so it made sense for us to have it because of Mike's label deal with Bell-Arista. It also means we will have more control over which masters end up at record companies. So often mistakes are made with the wrong master being ▶

The console they agonised over: an *MTA 980* was finally installed in Studio 2

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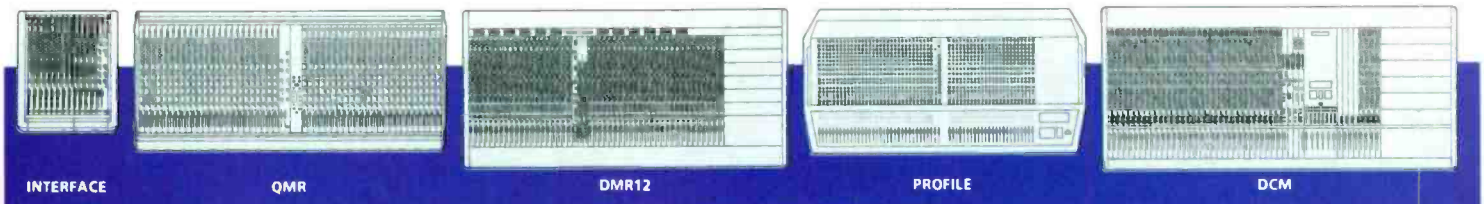
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cut, especially now that everything is on DAT tape. Our aim is to reduce the chances of this happening by using ISDN to send over rough mixes to A&R departments.'

During the building of the studio one or two practical problems had to be overcome by the design team. The first difficulty was cutting out vibration from the nearby railway and tube lines. To get around this, Munro Associates put the concrete structures for the two control rooms and the large overdub booth onto rubber pads and used plenty of baffling to cut out any noise. They also discovered that British Rail were about to install new electronic signalling which was likely to cause interference, so to solve the problem the control rooms were enveloped in Faraday cages which look very much like chicken wire. The cages have done their job—but so effectively that it isn't possible to use mobile phones or play your transistor radio inside them!

All of the cabling at the facility is Mogami OFC which means there is no oxygen anywhere in any of the cables. The studio also has its own UPS—a 15kVA power supply which is capable of running both studios and the machine room on half load for three hours should the main power supply fail.

'It's enough time for us to salvage a mix and whatever is on the computers,' says Picking. 'It comes on automatically if the power supply drops below a certain level.'

It is difficult to describe in words how bright, spacious and pleasant Mike Stock's new studio is. Needless to say he is delighted with the final result and is already working on a couple of in-house projects which will help filter out any start-up bugs.

Matt Aitken is also impressed—after three years away from the recording business he has found that technology has moved on apace, with much more now done on software-based systems like the *Macintosh* with *Cubase* that Stock has installed.

'We have both been in the studio business since 1984,' says Stock. 'But it's only when you take a break from it that you realise how quickly things change. It really is surprising how far we have all come.' ■

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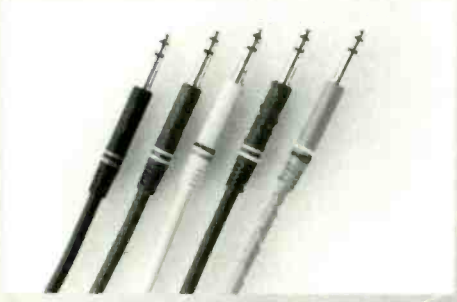

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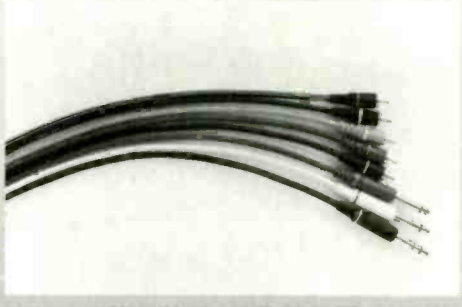

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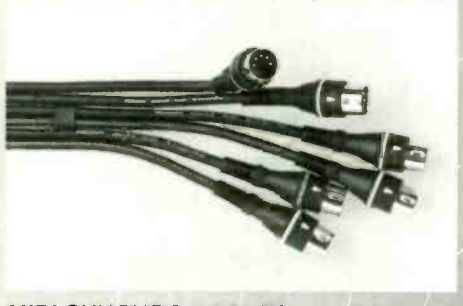

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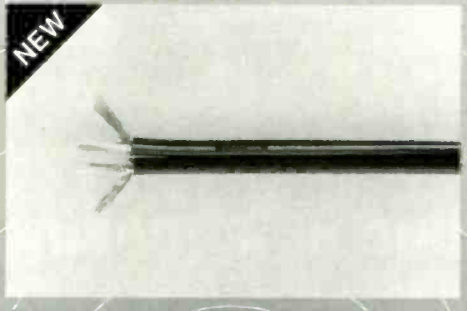

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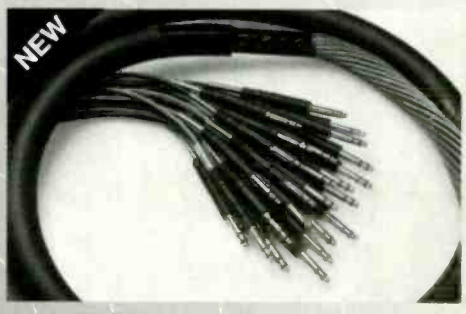

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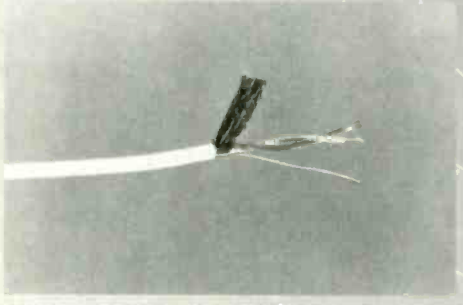

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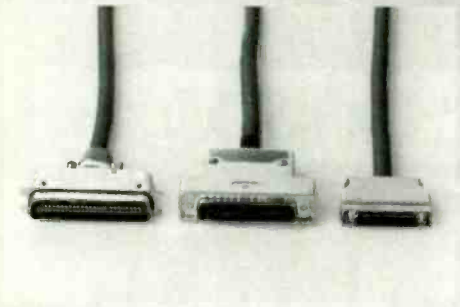

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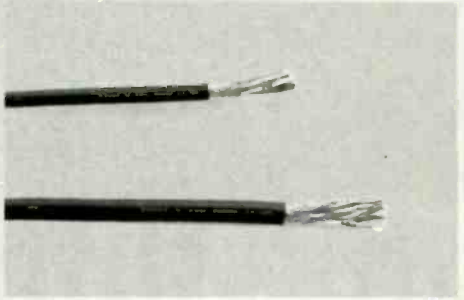

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CONCERT PARTY

The Young Person's Concert Foundation at the Central Hall, Westminster, London

The Young Person Concert Foundation (YPCF) is a unique London-based venture whose members aim to build young audiences for the future by presenting live orchestral music (played by young professionals) directly to school children. It has attracted considerable support over recent years, with major funding from the Arts Council, and a long list of Patrons including names as diverse as Dame Vera Lynn, Sir George Solti, Sir Harry Secombe, Dame Kiri Te Kanawa, John Williams, Bruce Forsyth, Lord Forte, Rolf Harris and George Martin.

In fact it is George Martin's support that has most recently helped the foundation expand its activities, by offering studio time at Air Lyndhurst to make three CDs which will raise additional funds for the YPCF.

'I think the YPCF do some excellent work,' says Martin. 'First of all, it's a wonderful get together for a lot of young people who aspire to be top class musicians, and it acts as a good springboard for emerging students who are waiting to get into orchestras. But the mainstay of the work is bringing music to young children who have never heard or seen orchestras before. It's an excellent way of getting music across to young people who wouldn't normally have an opportunity to seeing an orchestra in the flesh and teaches them something in a very enjoyable way.'

The original idea to record the foundation's orchestra came from YPCF Director Ian Dean. Apart from his involvement with the charity, Dean also runs his own production company, Creative Dialogue, which specialises in recording world music and jazz.

'Over the last few years the YPCF have had a lot of requests for different kinds of CD's,' says Dean. 'So to address this I came up with a package of three —one to show off the live aspect with all the children, another based around film music which would appeal more to adults, and a third aimed at very small children called the Teddy Bear's Concert.'

With Dean's background as both a producer and engineer, the job of organising and making the recording fell squarely on his shoulders.

'This was back in May,' he recalls. 'The first thing I did was ring Canadian classical Engineer-Producer Kevin Herring. Kevin and I had worked together in the past and he has the specific classical recording experience that I don't have. On the other hand this has had to be a commercial release in the sense of attracting a portion of the market that wouldn't normally buy this kind of music. We therefore needed to present it in a commercial way and give it a breadth of sound that a pure classical engineer may not want to go for —almost like a Disney film score with that Dolby surround feel. so I felt that between the two of us we could probably pull that off.'

Herring agreed to help, and the first recording was fixed for early December. Herring also made a bold suggestion that was to turn this into a unique recording project. ▶

Mainstream productions often form the commercial proving ground for recording equipment and practices, but special projects frequently offer unequalled opportunities for experimentation and innovation. Patrick Stapley witnessed the first use of the Studer *Dyaxis II* for live multitrack recording

'Ian had originally thought about recording in a more traditional way using 24-track Dolby *SR*.' says Herring, 'but being a *Dyaxis* owner, I said how about doing a multitrack recording onto hard disk. With storage costs coming down and capacities going up, nonlinear multitrack has become much more realistic proposition for live multitrack recording.'

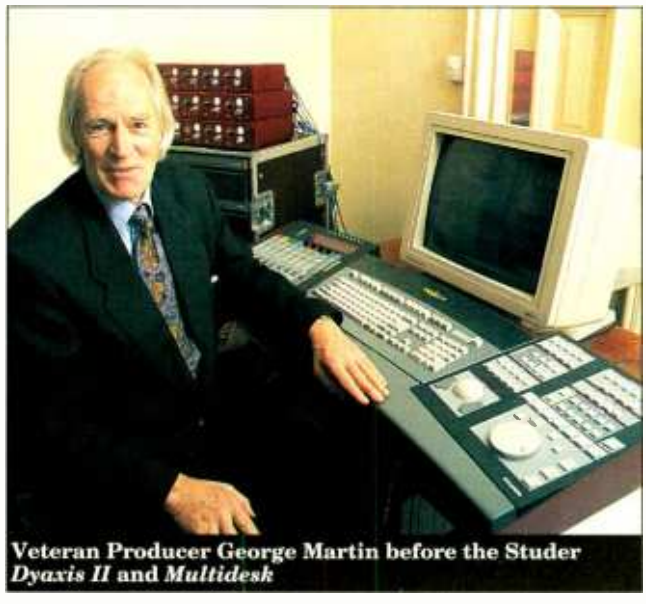
Herring approached Dave Dysart, Studer's sales rep in Canada, and with his help and the cooperation of Guy McNally from Studer Editech, Graham White from Studer Switzerland and Chris Gibbs from Studer UK, a full *Dyaxis II* system was scheduled for the YPCF, making it the first time such a system had been specified for a live multitrack recording.

Herring then came over to the UK for the APRS Show where he and Dean spent time drumming up further enthusiasm for the project.

'We went around the exhibition explaining what we were intending to do and got an amazing response. Richard Salter from Focusrite, for example, told us that as we were recording digitally we should go direct into *Dyaxis II* via good quality preamps, which of course we totally agreed with. He offered us the use of the *Red 1*s on the spot, plus he through in the *Red 5* power amp as well. Other companies that gave their support included AKG, B&W, Ampex and Delta sound, and it was also at APRS that we persuaded George Martin to get involved, and he offered us time as AIR Lyndhurst at a substantially reduced rate.

The live concert was recorded at London's Westminster Hall. This consisted of morning and afternoon performances from the 72-piece YPCF Orchestra conducted by Iain Sutherland—each concert contained an hours programme of popular classics and was performed in front of a lively audience of 2,000 school children.

At the hall a small backstage room was turned into a control room, and the assembled collection of borrowed gear crammed in. The setup consisted of three Focusrite *Red 1* mic preamps passively split into the *Dyaxis II* and a Studer *D-827* DASH 48-track machine which provided a safety backup. The internal A–D convertors were used for both machines—which in fact are identical 16-bit linear designs—and a 44.1kHz sampling rate was used to maximise tape recording time. The *D-827* then supplied monitoring to a DDA *S-Series* console which fed the *Red 5* power amp and B&W *801 Matrix II* speakers. the monitor mix was also recorded to a Studer *D-780* DAT machine.



Veteran Producer George Martin before the Studer *Dyaxis II* and *Multidesk*

The *Dyaxis* system contained three standard *Dyaxis II* processors each with four 1Gbyte hard drives providing 3¼ hours of mono recording time at 44.1kHz. As each processor controlled four tracks of audio, the system's 12 tracks had a maximum continuous recording time of 3 hours, 15 minutes—ample to record the two concerts. Also included within the system, although unnecessary for this recording, was Dolby AC-2 data compression operating at a 4:1 ratio. However, according to Herring even if extra time had been required, the compression option would not have been considered.

'We did some tests back in Canada comparing AC-2 compressed and noncompressed files, and although subtle, you can definitely hear the difference. The compression produces a more grainy sound with a slight loss of definition which isn't suitable for serious music—on the other hand if you're recording Def Leppard...'

The *Dyaxis* setup also included the optional *MultiDesk* hardware interface which contains controls for the recorder functions, an automated mixing console complete with *Uptown* moving faders, and a comprehensive nonlinear editor.

'The exciting thing about *Dyaxis* and the way the product is moving, is that it will offer you a 'studio in a box' with recording, mixing and editing all combined into one compact package,' enthuses Herring. 'The *Post Trio Dyaxis* which I'm told comes out in the early part of this year, will include a whole lot of other things like aux buses, talkback, studio and control room monitoring and a range of Lexicon DSP. They are also adding PQ encoding which means that you will be able to do the entire production process on one system.'

However, the only system available for loan at that time was a 12-track configuration *Dyaxis II*.

'Originally I had hoped to use 16 tracks to cover our areas,' states Herring, 'but it was impossible to get sufficient processing in time to allow for that, so we ended up with 12 tracks which meant adjusting our miking. Normally, when I record, I go to 8-track or direct to 2-track, but that takes into account plenty of time for getting balances and premixes together—neither of which we had time for here.'

'I also originally specified Mogami cable for the job because of its low capacitance and the long ▶

cable runs we were dealing with' continues Herring, 'but there was no one in London we could find who would supply it. We tried borrowing good quality cable from the BBC and the Abbey Road Mobile, neither of which were very happy about lending us stuff. So instead we ended up with conventional Belden cable.'

Apart from adapting to eleventh-hour changes to the recording setup, the recording team were also hampered by delays in the arrival of some of the equipment.

'We could have done with a bit more time to get things set up,' says Dean. 'The British Customs for example seemed reluctant to release our AKG *C12VR* valve mics which had been specially flown in from Vienna by AKG, and we did seriously doubt at one stage whether we'd ever see them.'

The AKG valve mics did however arrive, and were quickly arranged into a 4-microphone stereo array suspended from the centre of the hall. 'We used the Faulkner Phased Array which consists of two figure-of-eights spread 200mm apart in the centre and two omnis on the outside which help open up the sound stage and give a broader perspective,' explains Herring. 'I tend to use this array more than anyone else's, and apart from giving an excellent representation of the sound stage it's incredibly open with a lot of air.

'It was actually Tony Faulkner that suggested to us that if we were going to record digitally we should use valve mics to introduce warmth, and AKG offered us their new tube mics, they also supplied us with eight *C414B/ULS* for our spot mics. Normally for the array I would have specified Neumann *TLM170*s and B&K Omnis, but we were happy to try out the *C12*s and actually they sounded very good producing a slightly brighter sound than I'm used to, but also with that characteristic warmth.

Although impressed with the sound of AKG's revamped *C12*s, Herring did have one criticism: 'The shock mount supplied with the mic doesn't come up to the quality of the microphone itself. I was expecting the much bigger gimble-type mount that you get with *414*s, which can be configured in any way you want.'

AKG are at pains to point out, however, that the mount is intended exclusively for boom mounting and that few users choose to hang these mics. They further made Norbert Sobol available to consult on the installation directly from Vienna.

With everything finally in place the recording itself appeared to go very smoothly, and everyone was in a buoyant mood until it came to laying back at AIR.

'It transpired that the *Dyaxis* had dropped a track out of record,' reveals Dean. 'The problem was repeated for the afternoon recording but his time on a different track, which turned out to be one of the omnis in the stereo array rather than a spot mic. This meant that we would have to try and fly back the entire array from the *D-827* in order to be sure of retaining the exact relationships between array mics.'

At this point Dean and Herring weren't particularly concerned, because they felt it would be an easy procedure to replace tracks from the 48-track digital backup. However when they arrived at AIR Studio 2 the following day to start editing and mixing it didn't appear quite as straightforward as they had imagined.

'What we'd intended to do was fly in the missing tracks into the *Dyaxis* and then using the track slip facility bring them back into sync,' says Dean, 'but we just couldn't seem to get things to sync up correctly. It wasn't until a lot later in the day, and with the help of Air's excellent maintenance department, that we actually realised that during the recording the frame rate of the *Dyaxis* had been set to 29 drop frame while the *D-827* had been set to 25fps. By switching the *Dyaxis* to 25 frames we were able to resync, although we wasted the best part of the day getting to that stage.'

'However, once everything was finally sorted out, editing with *Dyaxis* was excellent and it really was an amazing experience moving that number of multitrack elements around. We were able to make edits across all 12 tracks, determine crossfades and move things around without losing crossfade information. Also it was a very simple process to offset spot mics to match the array by simply slipping tracks, and, of course, even with editing this relationship stayed intact right the way through. Kevin had measured the distances between mics and knew pretty well how many milliseconds we needed to offset things by, it was then a matter of fine tuning by ear to get the relationship perfectly set. It produced a much more focussed and natural sound.'

'We tended to edit in tandem with mixing,' continues Dean. 'Once we had set up the balance it was a case of identifying the takes we wanted to use from the morning and afternoon recordings. They were then assembled in order while grabbing bits of ambience and applause to help join everything together. We used the *Dyaxis* to set up basic output levels but all dynamic mixing and equalisation was done on the SSL, purely because that's the way Kevin and I are most used to working.'

Dean and Herring are delighted with the end result which they say has achieved exactly what they set out to do. The experienced of using the *Dyaxis II* in a live situation does not appear to have put them off the system, and both feel it has a lot to offer and helps point the way ahead for digital recording technology.

'Of course we were using the system in a way it had never been used before,' admits Dean, 'and in that respect there was obviously a high chance that we would experience some problems. My feeling is that we should remain faithful to the original idea, which after all originated from us and is still an exciting one. Studer have supported us right the way down the line so it would be totally unreasonable of us to back out at this stage and use an alternative system.'

Dean hopes to record the following two studio CD at AIR's Great Hall sometime during March which is also when he would like to release the live CD. However, this first depends on additional sponsorship to cover manufacturing costs, or finding an altruistic label that is willing to take on the project. anyone interested in helping can contact Ian Dean at Creative Dialogue on the number listed at the end of this article. ■

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bookshelf speakers—you have a better idea of what the end result will sound like in a realistic environment and you achieve the lowest common denominator. The downside of such a practice is that you lose all the advantages inherent in a higher technological approach—like bandwidth, for starters.

This methodology is perhaps better dealt with by the small in-house teams at game developers of the freelance individuals or groups of individual composers and sound designers who dominate the industry. It could be antithetical to many professional recording studios that automatically aim high, technically speaking. Nonetheless, traditional recording studios have a place in this series of events, Land agrees. However, they would need to address the fact that their transferred MIDI files would have to sound good in the compressed bandwidth environment in which games now exist. 'It's not a simple challenge,' says Land sympathetically. 'But the bottom line is that nine out of ten music options have to be rejected now because the sound cards that play them back are incapable of representing them well.'

Large conventional facilities certainly are becoming involved in game audio, however albeit tentatively. While larger rooms and more capable gear are attractive, the end products are reduced to the very common DAT format striped with SMPTE or, even better suited to the project studio, modified MIDI sequencing files. Fred Lapitino, Marketing Director for Kurzweil Technology Group, the Boston-based Kurzweil division that designs and licenses the company's chipsets, and whose *K2000* sampling keyboard he asserts to be the most popular game-audio generator, says that while the majority of game audio is now done in-house or in project recording environments, more of it is moving towards conventional facilities, if only by default.

Conventional pro studios undertake up to 20% of the current base of work, Lapitino estimates, and most of this works its way back up the chain from project studios and in-house studios requiring more sophisticated gear or services. 'But considering that you're talking about a $5bn industry, 20% of the action is more than some Seattle grunge band is going to make you,' Lapitino observes. 'So the conventional studios are definitely starting to look into game audio more intensively. I definitely see a larger role for those types of studios in the future.'

What works against that scenario, he concedes, is the cost-effectiveness of hiring resident composers and using production music libraries, an industry segment that's become so mature and crowded that it's not difficult to find the music bits that game producers want.

Rick Wilson, Audio Department Supervisor at The Post Group, a large Los Angeles film-and-video postproduction facility, has done audio work on several game packages. Wilson says the audio comes in generally as a by-product of the video editing of game projects. He agrees that demand is increasing for more sophisticated and spectacular audio, including dialogue processing, sound effects, Foley and sound design. What he has noticed is that the trend has been towards more surreal effects rather than real-life ones. 'The more realistic [the audio effects] are, the lower the rating [by consumers] they seem to get,' Wilson ponders. 'It's because they think that the sounds really are real, as opposed to the fantasy these games are supposed to create. So they've been moving towards the larger-than-life 'whoosh' types of sounds, which we're using a *Synclavier* to create. The overall effect is that it's more like scoring for animation than for a movie.

Larger professional audio facilities have an advantage in more complicated game productions, ▶

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particularly in the dialogue editing aspect, Wilson feels 'The dialogue editing is very intense, perhaps the most intense part about it, he says. 'We do more of that than music at this point. And we have to do it on our SSL *ScreenSound* system because a very powerful digital editing system is what you need to handle the many 3-second bits of audio that these projects require.'

But Wilson has experienced the ultimate frustration that all audio producers for games have once the projects are ready for layback to the media. 'After we're finished, it still goes back to a low resolution and low sampling-rate environment' he explains. 'The way the audio sounds is directly related to how complex the video will be because more complex video requires more memory on a finite disk, and that means less left for audio. So often the work winds up going out in mono.'

One studio which has moved heavily into audio for computer games and multimedia in general is The Enterprise Interactive, a Los Angeles area facility that even changed their name, adding the 'Interactive' suffix in mid-1994. The 4-studio facility had previously seen its main business as music productions, including Boyz II Men, Paul Abdul, Whitney Houston and Megadeth, making the transition that much more dramatic. While music and some film and video post will continue to be part of the client base, multimedia has become a significant focus, according to the studio's Technical Director Dan Shimiaei.

Enterprise are no strangers to new ventures; the studio have their own record label and operate a sound-reinforcement company in Las Vegas. both ventures were started virtually from scratch after substantial market research, as opposed to being entered into slowly via more natural transitions such as client requests. This is how Enterprise have approached multimedia, as well.

'We researched the market, decided that it was one that studios could venture into successfully, purchased the equipment and only then started marketing ourselves to the industry,' explains Shimiaei, outlining a sequence of events that is more familiar to the day-to-day affairs of Wall Street and The City than to the recording business. but this, adds Shimiaei, is precisely the mind-set that studios need as they face the future.

Enterprise's technology investment to accommodate audio for multimedia was relatively small compared to other types of cross-market purchases (Sonic solutions had already been bought)—around US$100,000 for new *Macintoshes*, expanded RAM, video compression, sound cards and support software. However, that figure does not include the salaries of new, multimedia—familiar staff they also hired for the transition. And the studio is now pondering the purchase of a rather expensive RISC-based SGI Indigo video system.

Shimiaei sees the future of the recording industry *vis-a-vis* game audio and multimedia as unfolding in two stages. In the current one, project studios and small in-house studios find themselves on a par with conventional facilities, thanks to the low resolution of playback systems. But later on during this period, the degrees of quality will rapidly become apparent to game clients. 'There's video compression and then there's video compression,' says Shimiaei. 'The same for audio compression. The clients are going to start seeing the differences with an eye towards the future when double-density ROM disks allow expansion of programs to 44.1kHz audio. They're going to want that for their programs. And project studios can't necessarily deliver that consistently.'

That, in turn, will open the doors for the next stage, when the capabilities of conventional studios in terms of technology and technique will give them a clear edge over smaller personal studios,' Shimiaei asserts. If the film industry, whose template the game business seems to be following, is any indication, then such a scenario does indeed favour the conventional studio since budgets will likely rise with competition and consumer expectations, eliminating the cost-effective advantage that project rooms now hold.

'The game clients will also want to know, will the studio still be there four or five years from now when I want to upgrade existing versions of games when they go to 44.1?' Shimiaei asks rhetorically. 'Will they be spending the money to eliminate noise from the chain? Noise that will be very evident at 44? The future for studios in this industry niche is going to be one of resources.' ■

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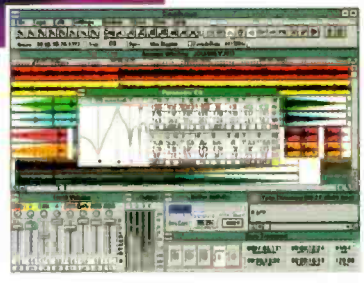

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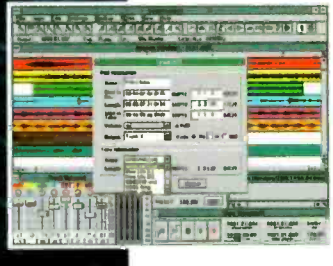

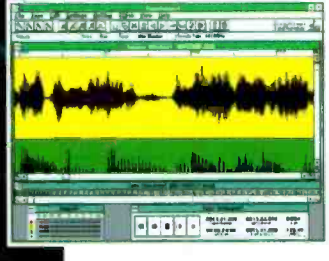

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SOUND STANDARDS IN TELEVISION DRAMA

Preferences for production sound recording are moving on from analogue—but will the digital alternative be DAT or the Nagra-*D*? Judi Headman of Crucial Fims and Gus Diaz of Soho Images pass judgement

Since its launch only a couple of years ago Nagra's 24-bit–capable 4-track location open-reel recorder has quickly established itself as the standard format for high-resolution classical recording, with companies such as EMI Classics and Deutsche Grammophon leading the way. In the world of feature–film sound recording it has also become the format of choice for prestige productions such as Bertolucci's *Little Buddha* and our Kenneth Brannagh's *Frankenstein*. Now it has made the move into the world of UK television broadcast through the two-part drama *Faith* (in the hands of Sound Recordist Robert Miles), and the second series of Lenny Henry's sitcom, *Chef*.

Chef is in every sense technically superior television comedy, a credit to Crucial Films' insistence on adopting practices for the results they achieve, rather than the savings they offer. Everything is shot on film—unusual for a programme which is filmed partly in front of a live audience—and the audio has to come up to scratch. It was for this reason that the production team broke new ground by using a Nagra-*D* for sound recording for a broadcast TV project, a change not only for the sound recordists, but also for Soho Images, who dealt with the rushes.

On location

Most of *Chef*—around 75%—was shot on location. Sound Recordist Judi Headman has worked on the programme from the outset, and when a second series was being planned, wanted to try an alternative to time-code DAT.

'When we first talked about what was required for *Chef* in terms of sound, Crucial were very anxious that we should record in stereo, and on a digital format,' Headman explains. 'That reflected the production values of the series—the first series was shot on Super 16mm, for example. They were all ready to go with time-code DAT, but I had had some unhappy experiences that made me look elsewhere. ▶

Sound and camera operations surround a recumbent Lenny Henry on location for *Chef*

Everything is shot on film for the programme and the audio has to come up to scratch

'Essentially the problems I'd come across were machines drifting out of sync without any indication of the fact, and ease of use—or lack of it. The Nagra-*D* looked straightforward, and proved to be totally reliable in its synchronisation. It locked up without any fuss, and stayed locked.'

Using unfamiliar equipment on a major project can be nerve-wracking, but the *D* presented few operational problems. 'I found it a very easy machine to get to grips with,' continues Headman. 'Once I'd set it up how I wanted, I felt very confident about using it—I never worried about reliability. I also feel more comfortable with open reel than with a DAT cassette, simply because I don't want to commit a whole day's work to one tiny cassette. It just doesn't feel right.'

Confidence aside, the 4-track Nagra-*D* format offered significant advantages. 'It meant I could use Tracks 1 and 2 for stereo dialogue, with 3 and 4 for effects [without syncing two stereo recorders]. The monitoring options are also excellent—it's very easy to give someone a mix of just dialogue, while I'm listening to the whole lot.'

The crucial test is audio quality, of course, and final results were more than satisfactory. 'The sound is very clear, with excellent headroom,' Headman attests. 'I try not to drive it too hard. What I generally do is line up the machine to the recommended level from the mixer, then back off 4dB for safety —it's no good if it clips, and the signal–to–noise ratio is so brilliant. All in all, it's a lovely machine.'

Soho Images

Using the Nagra-*D* rather than time-code DAT or analogue Nagra did, however, present a problem for Soho Images—they did not have a machine with which to lay back the sound, nor any experience of working with it. During the planning stages, as Headman recalls, 'Soho Images were reluctant to commit to using a new machine, especially as they didn't have anyone who was familiar with it. But they took the plunge, and all credit to them for doing so.'

For nearly four months, Soho Images turned around the rushes from the day's shoot. Unprocessed film and the Nagra reels were dropped off in the evening, for overnight film processing, telecine transfer, and audio layback. Rushes were ready the next morning on Beta SP (visuals and audio) along with two DAT cassettes. In the end, the only surprising thing about using the Nagra was how smoothly everything went. 'Given that we'd kind of pushed them into getting a machine,' says Headman, 'I was worried whether it would work out, so I called them up as soon as I could to find out how the first day's rushes went. They said 'it was like a dream to work with.

'That was the turning point, and everything was plain sailing from then on. There had been problems with locking up the rushes on the first series, which was recorded on DAT, but not this time—it all just went straight down.'

In the words of Soho's Head Of Operations, Gus Diaz, this time around *Chef* was 'one of the smoothest, least problematic productions. The Nagra is built like a tank, and that's very confidence inspiring. It lived up to expectations in that this was simply the most hassle-free project we've ever worked on.That was mainly down to the excellent time code and synchronisation performance. When we got the first rushes in, everything locked straight up without any problems. Normally we'd expect to have to use offsets to lock up properly, but not this time.'

Offsets are usually required in the layback process simply because the synchronisation of a film camera and recorder is rarely perfect. More complications arise when two DATs are synchronised in order to make a

Judi Headman: 'I also feel more comfortable with open reel than with a DAT cassette, simply because I don't want to commit a whole day's work to one tiny cassette'

4-track recording, which the *D*'s 4-track format sidesteps completely. 'The simple fact of having those four tracks is a significant advantage,' explains Diaz. 'It means you can use the extra tracks for duplicate, safety recordings, or perhaps record stereo dialogue on Tracks 1 and 2 with M+E on 3+4. It would make a lot of sense for more people to work like that, recording M&E at the same time rather than recording them later in postproduction. While you can make a 4-track recording with two DAT recorders locked together, it can create problems. It's much better for us to work with a 4-track format rather than try to lay off two DATs. We've done that, going down to several digital video formats—D1, D2, and D3—and the timing is really critical. The fact that you don't have to mess about with offsets, or worry about whether one of the machines may have drifted and lost sync, is fantastic. Most importantly, in the end it saves you time and money.'

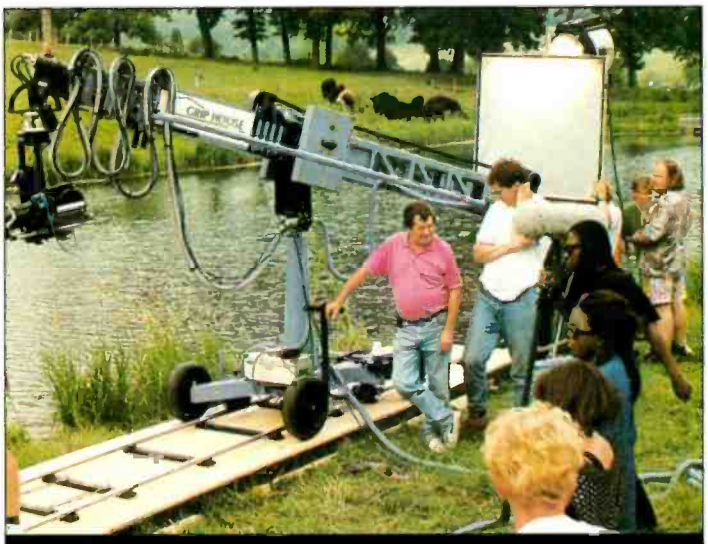
Thought the time saving to Soho in terms of the actual layback may have been marginal, the time saved down the line was incalculable. 'On most productions, you end up wasting a certain amount of time going back and forth checking whether everything is absolutely in sync or not—there are always a few things that come back to us—but not this time. That's just unheard of on a production of this scale.'

Diaz admits that 'we had to be persuaded that it was worth our while getting involved with a new format. There's always a question mark over a new format—people always prefer to go with what they know rather than risk something new'. But on balance he feels that the Nagra-*D* offers advantages over time-code DAT. Sync performance and the 4-track format aside, the take information contained in the machine's Tape Management Directory Files also proved useful.

During operation, the Nagra-*D* creates these files at the start of every reel. It automatically lays down information regarding any glitches, dropouts or clipping, along with date and time of recording, take duration, and take time code start point. The information can later be recalled either on the Nagra, or via a PC connected to the recorder.

It may sound mundane, but as Diaz explains, it is a boon. 'It's quite common to come across glitches on the soundtrack when you're half-way down the line with the postproduction—though, again, the performance of the Nagra-*D* seems excellent in this respect. We didn't have any glitches or dropouts at all. You do have to expect them, however, and normally we'd have to trace back through all the various transfer stages, perhaps even as far as the original recordings. With the Nagra-*D* we can go straight to the original paperwork generated from the files, or just call the information regarding the take up on the PC, and know straight away whether it's a problem with the original recording.'

Again, this means time and money saved. 'It could actually take a few days to track down an original DAT, and if you need to pull out a sound room just to check out a tape you're talking about £100 for a half-hour. That can add up to thousands of pounds per year. I hate to think of ▶



Judi Headman (holding the boom mic) opted to use the Nagra-*D* on *Chef* location shoots

The Nagra-*D* digital 4-track, open-reel, tape recorder

Gus Diaz, Head of Operations at Soho Images

the number of times that dropouts on DAT or Betacam have caused us real problems. The other great thing is that it means you can show a director or sound person exactly where something went wrong—it's all there in black and white.'

The directory also means peace of mind for the sound recordist, who doesn't have to wait 24 hours for rushes, worrying if they have had a problem on a day's shoot.

Postproduction took place at London's Videosonics. Here, the visuals were transferred from Beta on to *Lightworks* for cutting, and the audio from DAT on to AMS *AudioFile*. For Dubbing Mixer Tim Alban, the main advantage of *AudioFile* is a simple one. 'With auto conformed programmes like this,' he explains, 'it means you can work very quickly. You end up with lots of discrete chunks of sound, and you have to put crossfades on all of those.

Shooting on the more expensive medium of film meant fewer cameras...which in turn meant that even perfect takes would be reshot to give extra camera angles

In the studio

Ealing studios was the location for the few scenes, around three or four per episode, that were shot on a set in front of an audience. A rough cut of the location materials was also screened, in order to get that all-important laugh track. This time two Nagra-*D*s were used, by Sound Supervisor David Taylor capture audience response as well as actors. Twelve mics covered the audience, with two *U87*s on booms, plus 'a couple of fish-poles' for the cast, mixed via a 24-channel Amek *BC2*. Two Nagra tracks were used for the main mix, another two for backup, two for booms only, and the last two for just the audience mics.

Shooting on the more expensive medium of film meant fewer cameras—three as opposed to the four or five that would be the norm on a video shoot —which in turn meant that even perfect takes would be reshot to give extra camera angles. Matching the two takes in each case involved further tweaking for Tim Alban in the final post sessions, as visuals from one take would often overlap with audio from another.

Having been the first to adopt the Nagra for TV use, Crucial are set to continue leading the way with its use. The recent Lenny Henry Christmas special also featured the *Nagra-D*, and Judi Headman will also be using it for the next series of the *Lenny Henry Show*, which starts transmission on April 1st. ■

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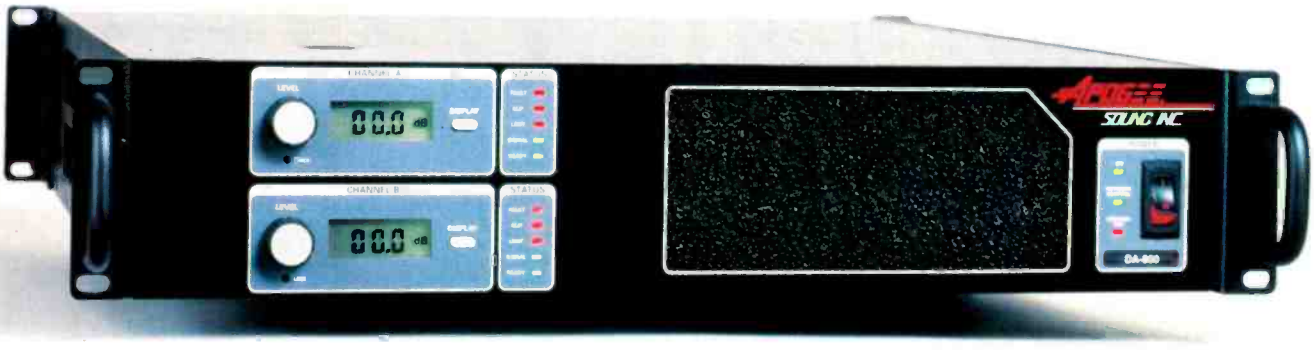

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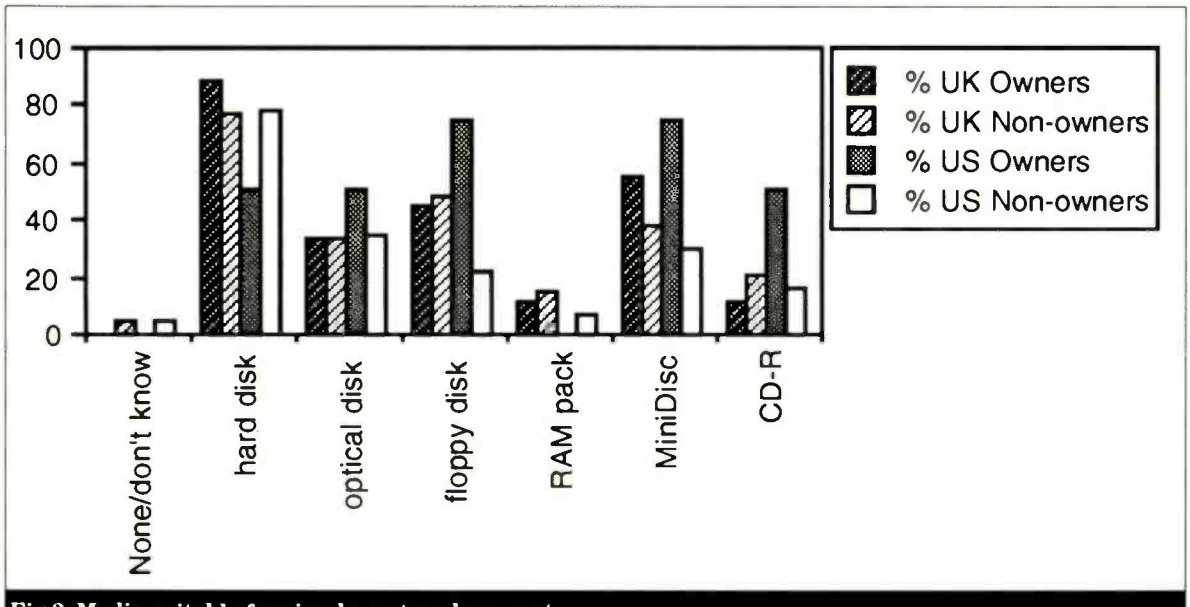

Fig.2: Media suitable for simple cart replacement

interesting to note that all of these are UK owners.

When asked to consider the range of tapeless systems now available, all except one of the owners would still purchase the same simple cart-replacement system. The one owner who would not, would prefer to invest in a hard-disk-based cart-automation system.

The main advantages non-owners gave for simple cart-replacement systems were improved quality and reliability, while the main feature given as needing improvement was the user interface. **Fig.3** illustrates the likelihood of investing in a system and how this varied between the UK and US samples—54% of the UK sample and only 25% of the US sample stated that they were likely to invest. However, it is important to note that a high proportion of US participants who were unlikely to invest already had cart automation or full automation systems.

Of those likely to invest, the majority plan to do so within the next three years, with budget and age of existing equipment primarily responsible for this time frame. The main reasons for purchasing given were improved quality, the need to replace existing equipment and reliability, while features given as essential were ease of use and reliability. As can be seen, the response of potential purchasers agrees closely with the owners. Besides already having an automation system, the main reasons given for not investing were the need for a more powerful system and cost.

Automation

There appears to be a similar level of awareness and knowledge of cart-automation or full-automation systems between the UK and US samples; excluding systems owned, 74% of the UK sample and 70% of the US sample know of at least one system. A wide range of systems was known, however, this varied considerably between UK and US samples. A high proportion of the UK sample knew of the Computer Concepts *DCS* and the Studer *Digitec Numisys*. A high proportion of the US sample knew of the Arrakis *Digilink*, the Computer Concepts *DCS*, the Broadcast Electronics *AudioVAULT* and the DHK *Audisk*. As with simple cart-replacement, owners tended to be more informed than non-owners.

Ownership of cart-automation or full-automation systems is quite high, being 32% of the UK sample and 75% of the US sample. Again, this reflects the survey method used to define the sample and is not representative of the US radio industry as a whole.

The range of automation systems owned is wide. For the UK sample, ownership is divided between *DCS* and *Audisk*, as well as the Racom Broadcast *DAMS* (which is no longer available). In the US sample, *DCS* is owned by the highest proportion with ownership then evenly distributed between *Digilink*, *Audisk*, the Broadcast Engineering *Sentry*, the ENCO *DAD486x* and the RCS *Master Control*. Over 90% of owners of automation systems have purchased multiple units or workstations, with the average being 2–3 units. Generally, the number of units is proportional to the number of broadcast and production studios.

The main reasons given for purchasing automation systems are improved quality, economics and, of course, to provide live assist or automation, while the main reasons for purchasing a particular system are cost, best available and reputation of the supplier. Of the features given ▶

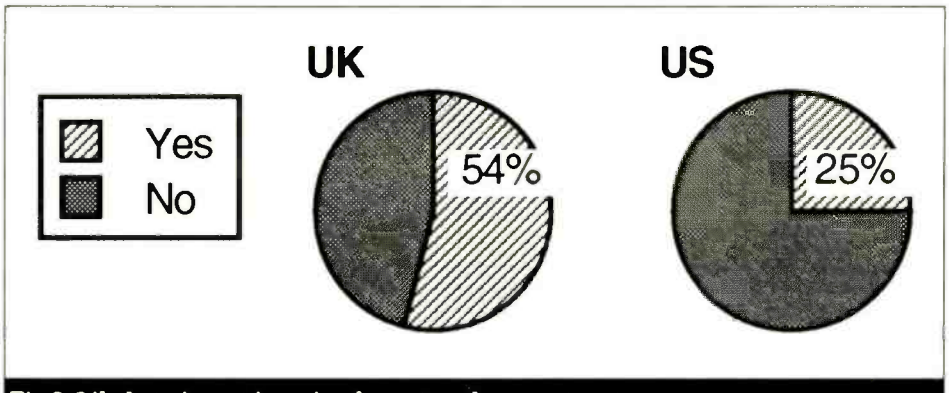

Fig.3: Likely to invest in a simple cart-replacement system

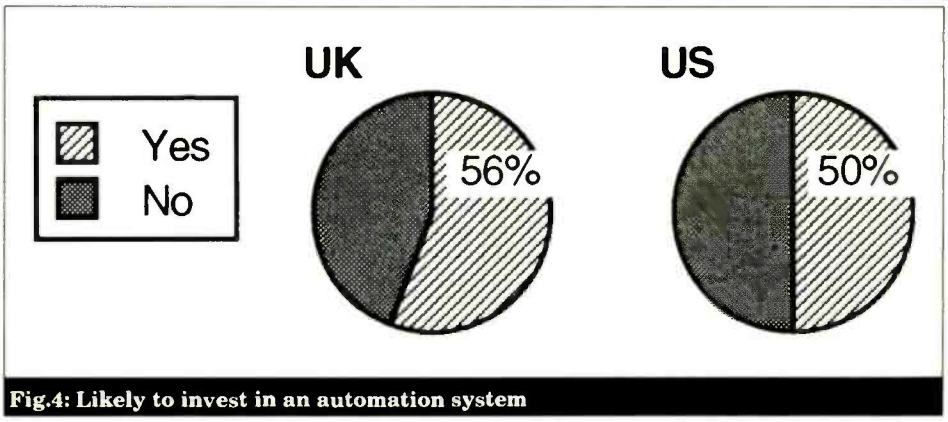

Fig.4: Likely to invest in an automation system

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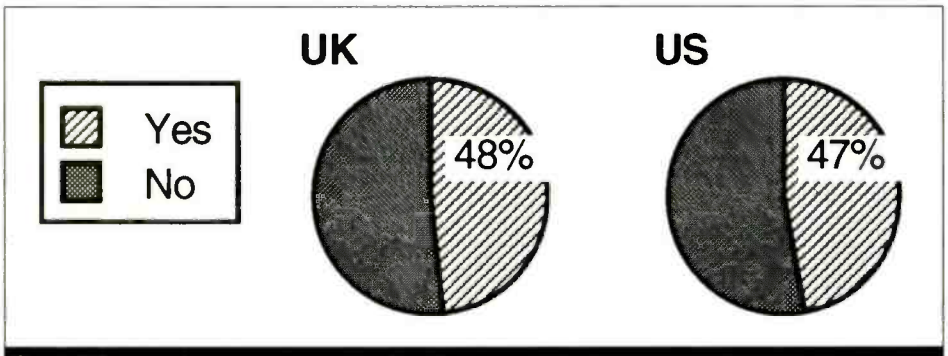

Fig.5: Likely to invest in a production system

as essential, ease of use and reliability were of greatest concern. Major differences in response between the UK and US samples include the desire of the US sample to reduce personnel and the need for systems to accommodate satellite operations. In addition, with reference to quality, the UK sample was concerned with the actual sound quality, while the US sample were more concerned with consistency.

Around 62% of owners have experienced some problems with their systems or integrating them with existing equipment. The difficulties given mainly concern system hardware or software, but also include problems with the supplier and operational issues. Some of the problems experienced are of a serious nature, such as 'instability of software forced it to be withdrawn from service' and that 'sales staff lied'. Approximately 88% of UK owners and 66% of US owners thought that technical or operational assistance provided by the supplier could be improved. When questioned about the editing, scheduling and traffic features, the UK owners are less satisfied with the functions provided.

When asked to consider the range of tapeless systems now available, only 62% of UK owners and 77% of US owners would still purchase the same automation system. Several of the owners who would not purchase the same system, stated that they would analyse the market carefully or wait for the technology to develop.

The main advantages non-owners gave for automation systems were reductions in staff, ease of operation and automated broadcasts, while the main features given as needing improvement were ease of use and reliability. **Fig.4** illustrates the likelihood of investing in a system and how this was similar for the UK and US samples; 56% of the UK sample and 50% of the US sample stated that they are likely to invest.

Of those likely to invest, again the majority plan to do so within the next three years, with budget and age of existing equipment also primarily responsible for this time frame. The main reason given for purchasing is the need to replace existing equipment, while features given as essential were ease of use, reliability, integration with other systems and flexibility. The response of potential purchasers broadly agreed with the owners. The main reasons given for not investing were cost and that automation was not suitable for the station format.

Production-only systems

The level of awareness and knowledge of production-only systems is similar for the UK and US samples; excluding systems owned, 54% of the UK sample and 55% of the US sample know of at least one system. A wide range of systems is known, however, this varies considerably between UK and US samples. A high proportion of the UK sample knew of the SA&V *SADiE* and the AMS Neve *AudioFile*. A high proportion of the US sample know the Orban *DSE 7000* and the Roland *DM-80*.

Ownership of production-only systems is quite low, with 17% of the UK sample and 25% of the US sample. **Fig.5** illustrates the likelihood of non-owners to invest in a system and how this is similar for the UK and US samples; 48% of the UK sample and 47% of the US sample stated that they were likely to invest.

Transfer and networking

Other issues covered include audio material transfer, networking, data compression and the use of digital telephone lines.

Overall, there is a clear preference for digital tapeless methods for transferring audio material around the station. While the response is split between using data compression or uncompressed audio for networking, there are concerns about the effects of compression particularly with multiple coding and decoding.

A considerably higher proportion of the UK sample are using digital telephone lines for transferring audio material to and from the station. Of the UK sample using digital lines, all were using ISDN with ISO-MPEG Layer II, aptX100 or G.722 coding. Of the US sample using digital lines, the majority are using Switched 56, although ISDN and T-1 are also being used, and coding schemes include ISO-MPEG Layer II, AC-2 and G.722.

Conclusion

With a few exceptions, radio has been one of the slower areas of the audio industry to take up tapeless technology. However, with the introduction of systems aimed at every type and size of station, this is changing, and radio now represents a major growth area for the technology. **Fig.6** shows how participants believe tapeless technology will replace conventional technology for various applications and indicates a rosy future for system manufacturers. ■

Copies of the full report *Tapeless Technology in Radio Applications: the User's Point of View*, priced at £225, are available from SYPHA, 216A Gipsy Road, London SE27 9RB, UK.
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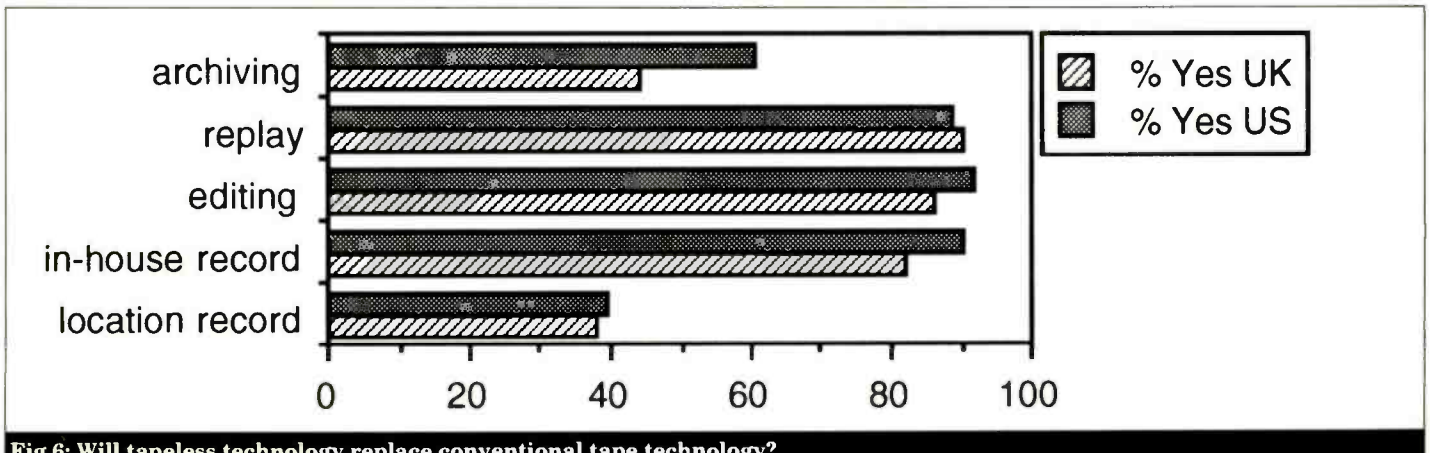

Fig.6: Will tapeless technology replace conventional tape technology?

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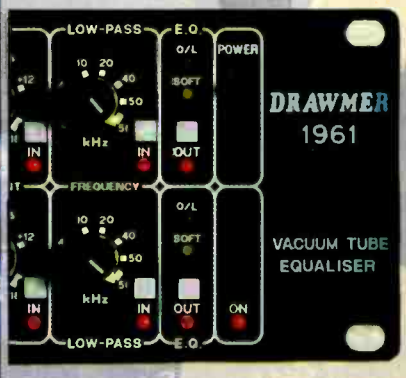

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Doubts about digital television broadcast are bringing PALplus back in contention

At the beginning of the year, several British TV industry pundits wrote off PALplus as an interim step that had come much too late; it had been developed in 1989 to eke out the last few years left in the venerable PAL colour transmission system, which was introduced to the UK and most of the rest of Europe in 1965. As implementation took longer than expected, many thought that we would go straight from analogue PAL to high-definition television; when the various format wars got in the way, it looked as though the best bet was to forget about analogue altogether and wait for digital TV.

Once again, things have lost sync. Wide-screen programming is becoming more commonplace, but digital is still at least five years away, certainly more for the terrestrial networks. Broadcasters want the ability to show 16:9 pictures with the best possible quality; the existing system is not good enough, but PALplus, which looked like becoming merely a technological footnote, could happily sustain the favoured new ratios. As it works on the same 579 active lines as PAL, it is backwards compatible, but the benefit is that additional high-definition information is buried in the carrying signal.

Channel 4 had already shown their commitment to screening films in their original aspect ratios; extending the service to other programming was only logical. A number of mainland European TV stations, notably Germany's Premiere, adopted PALplus early in 1994, with the European Commission (EC) awarding grants to build up a stock of suitable programming. C4 became a beneficiary in August, with a target of 500 hours of wide-screen programmes by the end of this year.

The grants have put pressure on broadcasters to start wide-screen production as early as possible, which is where PALplus has come in. C4 launched their new service on 22nd September at the LIVE '94 consumer electronics show in London, which, initially, was the only area of the UK to benefit, with the rest of the country catching up at Christmas. The station made its announcement on the Nokia stand. The manufacturers are providing considerable support to the project, supplementing the EC programming grant, while also committing itself to producing a range of compatible wide-screen sets for the domestic market.

Nokia's Managing Director, David Silver, says that he is not intending to push the technology to the viewer. 'What we're selling to the consumer is wide-screen—not PALplus. I think to do that is a waste of time. However, for the broadcasters, PALplus is a relatively inexpensive way of enhancing the video business'. Silver also sees this implementation as a significant coming together of the consumer electronics and broadcasting industries.

All C4 have to do is produce the goods. While its screenings of such CinemaScope classics as *South Pacific* and *Oklahoma* attracted much attention at the time (for both the right and wrong reasons), the station is now looking to move the black bands top and bottom of the picture into other areas. Its racing coverage has already gone 16:9, with hardly a murmur, although there has been more discussion over the broadening out of the soap opera *Brookside*. The weekend omnibus edition of this programme is being shown in the conciliatory 14:9 ratio to gauge public opinion.

'The general message is: we believe that this is for general applications,' says C4's Assistant Chief Engineer, Peter Marshall. 'We are expecting a certain adverse reaction from the audience and we are sensitive to the size of the black bands. If we felt that we would loose the viewing audience, we wouldn't do it, but I don't believe that will happen.' Marshall acknowledges that although the implementation of PALplus is engineering-led, the creative use of wide-screen is still down to the various commissioning editors: 'There will be no wide-screen transmission without their approval.'

Now that both digital and upgraded analogue systems can cover the broader aspect ratio, the future is looking decidedly uncertain for HDTV, which, less than six years ago, seemed to have the whole field to itself. 'We're not thinking about HD,' says Peter Marshall, 'because we believe that there are living rooms that won't benefit from it. HD is only really of purpose if you're talking about wide-screen transmissions with a big screen at home, and while we're very positive about PALplus and wide-screen, we're negative about HD.'

Marshall's point is that PALplus is good enough for at least the next 20 years, which will cover the introduction of digital systems and the necessary co-existence of the two. But he also recognises that the advent of MPEG2 compression has made digital transmissions likely within the next five years. Nokia too have acknowledged the coming of digital, and will be releasing a suitable domestic set in August, but both manufacturer and broadcaster are surprised at the stance of the BBC, who have proclaimed their faith in digits and are not bothering with a transitional period.

The Beeb made their position clear in the most public of ways, opening what they see as the UK's first completely digital wide-screen production studio at TV Centre in west London. The refurbishment of TC8 is part of both the Corporation's on-going upgrading of facilities at White City, and the commitment to follow an increasingly commercial route. Because of such initiatives as Producer Choice, not only are Television Centre Studios (as their new image call them) looking for business from outside independents, they are also looking to woo the BBC as potential customers.

The opening presentation was full of the right, commercially aware phrases. 'Investing in the right sort of resources is the key to our business,' said Michael Lumley, Controller of Production Resources. 'It was decided that for the first time in the BBC (and possibly in the UK), we should have a fully-equipped production studio for working in wide-screen. This ability will become increasingly important in the future.'

TC8 is a legendary studio within the BBC, and is best known for staging some of the classic light entertainment events of the 1970s, including countless Morecambe & Wise Christmas specials. Although the old duo would still recognise the fabric of the place, the equipment is substantially different, including Thomson *Sportscam* switchable cameras, 24-channel Thomson digital mixer, AVS *Omnibus* routeing control, and four Panasonic D3 VTRs for recording or playback, with optional Digital Betacam or Beta SP machines.

A surprise comes in the sound room, which, barring some time-coded R-DATs, two digital sub-mixers and a few digital effects, is traditionally analogue, based around AMS Neve *55* and *44 Series* consoles. This apparent incongruity highlights a growing question in television broadcasting at the moment: pictures are going wide-screen (analogue now, possibly digital in the future), but what format should the audio be in to keep up with or complement the visuals—mono, analogue stereo, digital stereo, Dolby *Pro-Logic*, or chocolate chip? The decision to stay with analogue in TC8 is perhaps understandable, given that it is often used for live broadcasts.

In many ways, this technological paradox highlights the doubts that many have over the BBC's decision to tough it out and wait for terrestrial digital transmissions. While acknowledging that digital is indeed coming, David Silver of Nokia makes the point that the benefits are much clearer to the cable-satellite viewer than to the terrestrial audience. 'If digital is about new services, why should someone buy new equipment if they're only going to receive the same programmes?'

Much the same point was made in a lecture by Dr Gary Tonge, Engineering Controller of the Independent Television Commission, who said, 'Many of the claims and counter-claims of what digital technology can do for terrestrial television have seemed divorced from the technical research taking place and seem more related to protecting established positions. Will viewers be willing to install a new aerial, as well as buying a new digital receiver, for a handful of new national terrestrial services when satellite and cable can deliver hundreds?'

C4's Peter Marshall has already sent out a challenge to the Beeb, saying, 'We think that the BBC should come on board with PALplus and we'll come on board with digital when it's ready.' Replying for the Corporation, Michael Lumley said, 'We have to have a strategic idea of what we want to do, and, usually, when the BBC do something, they want to do it on the widest possible canvas. That's where we're starting from, as opposed to going for what is technically possible now. In investing in digital wide-screen there is no risk within the life-span of the technology. We have switchable cameras and the ability to train people, which is the sensible route, the one we intend to follow.'

The final irony is that BBC Resources is renting out its wide-screen scanner to the production company responsible for Channel 4 Racing, which is in 16:9 and, er, PALplus. Who said that the commercial world didn't have a sense of humour? ■

Second Annual South American Pro Audio Expo

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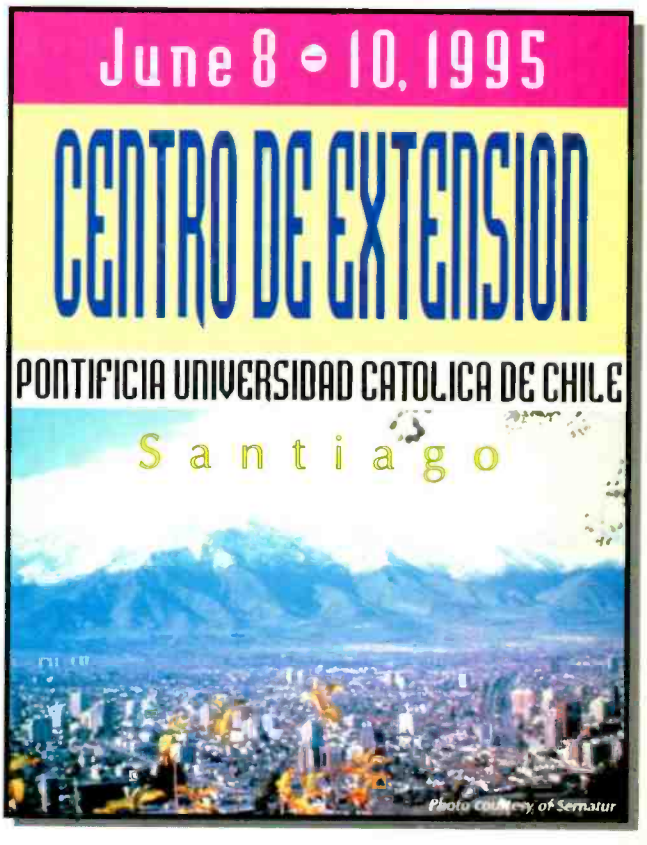

South American countries are now joining the international pro audio market. The standard was set at the First Annual South American Pro Audio Expo in June 1994 in Buenos Aires, Argentina. The next host to the South American Pro Audio Expo is appropriately, Santiago de Chile. Santiago boasts South Americas strongest and most vibrant economy. Chile is a leader in the education of sound and acoustic engineering, offering four specialized Universities. Chile, as well as other South American countries, will now continue to have a unique annual hands-on experience with the latest in sound technology. We look forward to having you and your company be a part of the growing Pro Audio Marketplace in South America.

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FIGURES OF EIGHT

Barry Hufker discusses the applications of the figure–8 microphone pattern and asks why we do not make greater use of it

Figure-of-eight, figure-8, bidirectional, pressure gradient and cosine. These are all names for the '8' pattern so often seen on multiple-pattern microphones, and yet it is seldom used. Historically, 'bidirectional' was the first directional microphone pattern created, even before 'cardioid,' and it is arguably more versatile. Yet it is a cardioid mic most engineers routinely reach for. One has only to leaf through an audio equipment catalogue to verify that the number of cardioid microphones being manufactured is vastly greater than those of any other pattern—bidirectional especially. Neumann and Beyer decided recently to capitalise on this preference by marketing a 'cardioid only' version of their multipattern mics. While the variable pattern versions are still available, this further reduces the likelihood of an engineer experimenting with figure-of-eight.

The benefits of the cosine pattern are probably well known to old hands, and it just may be that I hang around with the wrong crowd, but I suspect figure-of-eight mics are chosen so infrequently because they are poorly understood. I am not suggesting that cardioids are evil and should be done away with—not everything can be recorded with figure-of-eight. But it seems as though an important tool is going unnoticed and we might as well make the most of all the patterns on the expensive mics we own.

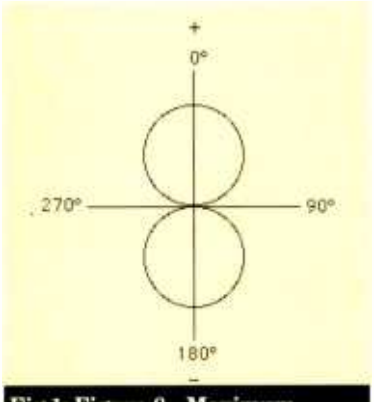

Fig.1: Figure-8—Maximum sound rejection is at 90° and 270°

Background

The natural pattern of a ribbon (velocity) microphone, the bidirectional polar response dates from the 1930s. It displays maximum sensitivity at 0° (directly in front of the mic) and at 180° (directly behind it). This is because sound pressure arriving in front or behind the mic is greater on one side of the ribbon than the other. As one moves toward the side, the pressure on either side of the ribbon gradually becomes equal, and output is reduced. Maximum sound rejection is at 90° and 270° when sound pressure on both sides of the ribbon is equal, allowing no ribbon movement (**Fig.1**). While the example here is that of a ribbon mic, the principle also applies to a single-diaphragm condenser microphone with both sides exposed.

Similar forces are at work in a variable-pattern microphone employing two diaphragms and a common backplate. As designed by Braunmuhl and Weber, when the dual diaphragm microphone is set to figure-of-eight the diaphragms on either side of the common backplate are of opposite electrical polarity. One has a positive polarity with respect to the negative polarity of the other. Again, when sound pressure is greater at one diaphragm than the other, the microphone amplifies the sound. When the pressure is equal on the two diaphragms, their equal and opposite contribution greatly reduces sound output (**Fig.2**). The figure-of-eight is a pure pressure gradient, relying on pressure differences for its output. The cardioid, supercardioid and hypercardioid are 'lopsided bidirectional' patterns comprised of both pressure and pressure gradient components.

Considering then that the bidirectional pattern is only a click or two away from a cardioid setting, why isn't it used? I suspect that just as the ribbon microphone has largely fallen out of favour over the years, so too has the pattern associated with it. I also suspect that many people just don't know what to do with that darned rear lobe.

Specification comparison

Take a moment to study the published specifications of any well-made multipattern microphone. Notice the polar plots of both the cardioid and figure-of-eight. It's the bidirectional polar pattern that is most uniform across the entire frequency range. Even if its frequency response graph is not identical to that of the cardioid, it is still very close. When they differ, there are still some very interesting attributes of the figure-of-eight's response to be explored. Given that the bidirectional pattern is truer across the frequency range and that its frequency response is similar to the cardioid, the implications are clear. The figure-of-eight promises to sound similar to the cardioid pattern while maintaining a consistent sound even when the artist (a singer for example) moves about the front of the microphone.

This is not to say the patterns are equal in character. Both the cardioid and bidirectional have their own personalities. They do share the same 'distance factor'. They each have 1.7 times more 'reach' than an omnidirectional, but there the similarity ends. The cardioid rejects sound primarily behind it (180°) and accepts less room sound in general than a figure-of-eight. The figure-of-eight is 'dead' at right angles (90° and 270°) to the front of the mic. The front and rear lobes are of opposite polarity. The rear lobe is not only 'out of phase' with respect to the forward lobe, but also allows sounds arriving at the rear to ▶

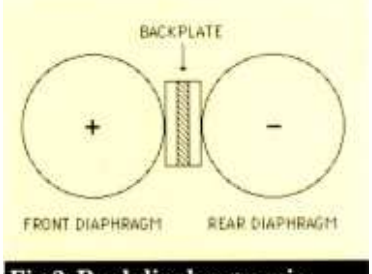

Fig.2: Dual-diaphragm mic pattern

A great advantage of M-S is its versatility. Other microphone arrays demand that the stereo image be determined at the recording site. That image depends upon the intensity of the signal at each microphone, and sometimes the time of arrival differences between them. Once placed and balance set, the stereo image is 'fixed'. Except for some minor adjustments, it can't be appreciably altered. With M-S, you don't have to make any commitments to a stereo image at the time of recording. The two components (M and S) can remain separate on two channels of a recorder until sent through the matrix to derive stereo.

Matrixing can be done at the site during taping, or more preferably, in a control room with known acoustics during postproduction. The amount of figure-of-eight mixed in with the 'M' signal determines how 'stereo' the final blend will be. The contribution made by the figure-of-eight is continuously variable by means of the appropriate channel faders. If there is little or no figure-of-eight then the mix is essentially monaural. Add more figure-of-eight for greater stereo. Monaural compatibility is maintained as the positive and negative sides of the cosine pattern cancel each other out when the left and right stereo channels are summed together. Only the mid signal remains. It is wise, however, to monitor the blend on an oscilloscope, observing the phase relationships as you make adjustments.

Because the 'M' signal is constant, M-S is sometimes employed for transmitting stereo audio across a network. With other techniques, such as a Blumlein cosine pair, if the right channel of the stereo programme drops out momentarily, not only is there a loss of level, but the stereo image shifts noticeably. M-S enables the network to keep the two parts of the stereo signal separate until just before final transmission when they are matrixed. In this manner, if the right channel ('S' information) is damaged then only the degree of stereo changes. The constant 'M' signal keeps the image centred and free from shift.

Ambisonics: ultimate M-S?

It is odd that while I don't care for M-S stereo, I have a great affection for Ambisonics and the *Soundfield* microphone. I have used the *Soundfield* microphone extensively and have greatly enjoyed the results. It is hard to image a more clever and complete use of figure-of-eight.

Actually, four subcardioid microphone capsules are mounted in a single housing. Described in *Soundfield* terminology as 'A-format', the capsules are positioned on the sides of a 'regular tetrahedron' so that one is orientated 'Left-front up,' another 'Right-back up', a third, 'Left-back down' and finally ,'Right-front down'. Matrixing is everything here. The addition and subtraction of these four elements enables the creation of any polar pattern at any angle. More specifically, it enables the creation of 'B-format'.

Three figure-of-eight patterns and their omnidirectional sum are derived from the four 'A-format' capsules. This is termed 'B-format'. It is hard to discuss B-Format without getting into the subject of Ambisonic surround sound. Maybe it is enough to say that one figure-of-eight is orientated front-back, another left-right and a third up-down. These, and their omnidirectional sum, provide all the information needed for the creation of any coincident stereo array, as well as very convincing surround sound. As with M-S, these four elements may be kept separate on tracks of a recorder and matrixed later during postproduction.

Use of M-S and the *Soundfield* microphone are complex issues deserving a better explanation than can be provided here. They do serve, however, as prime examples of figure-of-eight's versatility. An excellent discussion of them can be found in the text references at the end of this article. ▶

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Onno Scholtz, *Audio Engineer, Philips Classics Productions*

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Onno Scholtze travels all over the world to make recordings for Philips Classics Productions and is a familiar face in concert halls as far apart as Tokyo, Boston and St. Petersburg. This inevitably means that the delicate balancing work has to be done in many different, often improvised, control rooms with sketchy acoustic treatment.

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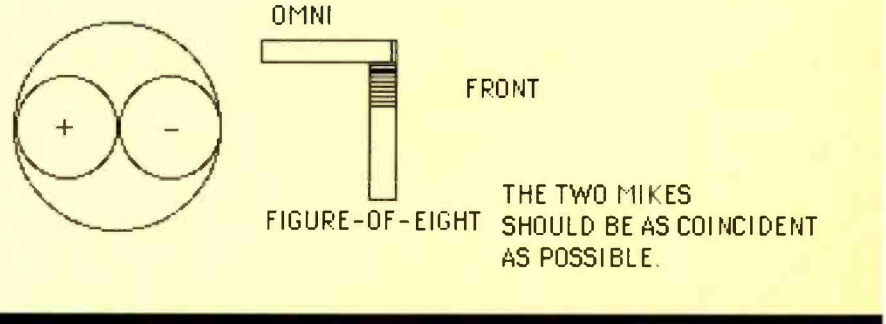

Fig.6: Creating a cardioid pattern from Figure-8s

Make your own cardioid

In this day and age when you can buy so many great microphones, why on earth would you want to 'roll your own'? The answer is simple: uniqueness. Except for extremely rare or custom gear, there is no piece of equipment you can own that others cannot also own. It is technique, how the equipment is used, that sets engineers apart. Part of your recording technique might consist of making new 'microphones' out of stock ones. That is after all how the cardioid pattern was invented. The first cardioid was a blend of both an omnidirectional pattern (pressure) and a figure-of-eight (pressure gradient).

To make your own cardioid pattern, begin by placing a figure-of-eight microphone at a convenient location. If you don't have a bidirectional mic (I suppose that is point of this article), then switch a variable pattern microphone to that setting. For this experiment to work well, the bidirectional pattern should be a good one. Next, place a second microphone with a good omnidirectional pattern as shown in **Fig.6**. If you do not own an omnidirectional mic then you really should re-examine your self-worth. Again, a multipattern mic set to omnidirectional will suffice.

Have someone speak into the front of the figure-of-eight while you adjust the gain on the console for an optimum reading. Set the input channel pan to centre and feed it directly to the board's main outputs. Now reverse the phase on the channel with the omnidirectional. Have the person continue speaking while you set this channel's pan to centre and feed it directly to the board's main outputs. Adjust the gain on this channel until the two signals cancel each other as much as possible. Now their gains are matched. Flip the phase switch on the omnidirectional's channel back to normal and test your new microphone.

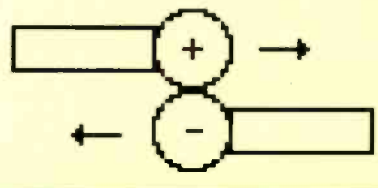

Fig.7: Creating a Figure-8 pattern from cardioids

A simple, but effective, test is to have someone speak while walking slowly around the array. For best results, the tester should speak in a uniform loudness as she walks. She should also maintain a uniform distance (six feet to one foot) from the array as she circles it. Listen for level and frequency response changes. The pattern should be cardioid. How good it is depends on how good the omnidirectional and figure-of-eight patterns are themselves. The array will become supercardioid by increasing the bidirectional element.

Experiment with other microphone makes and models. Try ribbon and moving coil together. Investigate the pairing of valve and transistor. The possibility of hitting upon a combination that conveys the best of both microphones is very exciting. This will be a microphone only you own!

Make your own figure of eight

If you don't own a bidirectional or variable-pattern microphone, you can still experiment with figure-of-eight by making your own. Place two high-quality cardioid microphones together so they both face forward. Put them as close together as possible. Have someone speak into both at once while you reverse the phase on one of them. Cancel them out as you did above. This time leave them in opposite phase. Now place them as shown in **Fig.7**. You now have a figure-of-eight mic. You can test it using the method above. Again, these mics ought to be the best you have. Ideally they should have a textbook cardioid pattern and a linear frequency response.

As always, experimentation is the key. The figure-of-eight is an important tool worth investigating. ■

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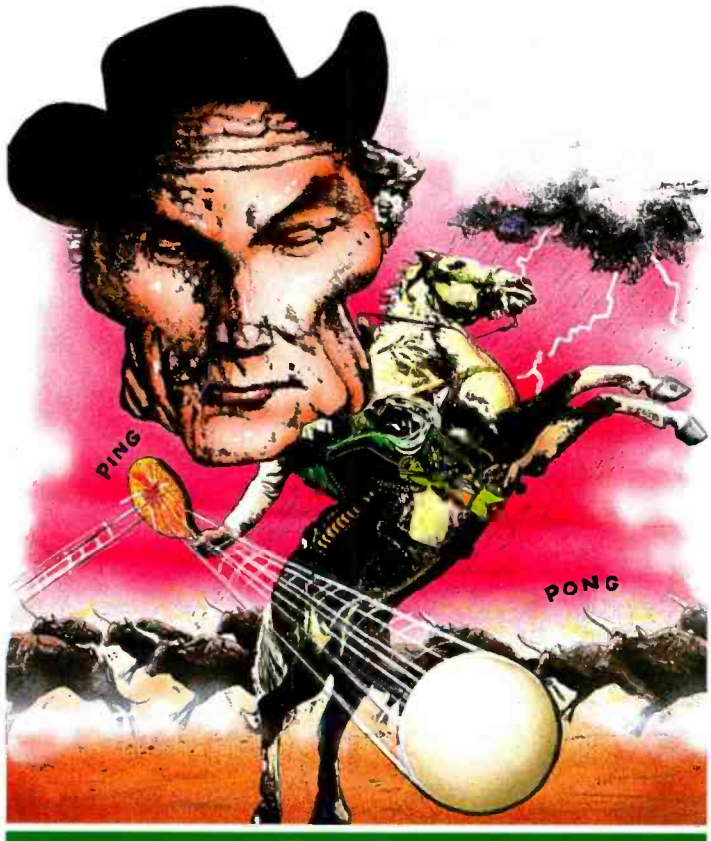

ILLUSTRATION: CARL FLINT

Barry Fox

Keeping score of cinema and computer sound and calling the BBC to account for their cuts

The film *City Slickers II* is not quite as bad as the reviews suggest, especially when Jack Palance is hamming it up as the twin brother of the character the producers foolishly killed off in *City Slickers I*. The new movie might well be fun on a plane. But on a plane you would miss half of what the producers put into it.

Watching *Slickers II* reminded of those early LPs that were made to demonstrate the wonders of quadraphonic sound. All those old recordings seemed to feature mixed doubles ping pong and tennis, trains and racing cars roaring round the room, jumbo jets flying overhead and then some specially written music which put the listener in the middle of the kitchen percussion section.

The new movie was made in Sony Dynamic Digital Sound (SDDS), which splits the surround into discrete stereo. And, by golly, do they want you to know it. Hardly a scene passes without some new torrent of rain, thunderstorm, animal stampede, round of shooting or shouting in an echoing canyon or cave.

If it will encourage the Warner management to turn down their faders a notch, I will gladly go on record as saying that the Warner West End experience proves conclusively, and without any shadow of doubt, that SDDS is able to keep all its channels separate, even when the sound is played at a volume level which is far too loud for most customers. But it also serves as a timely reminder of what the quadraphonic demonstrators and 3-D movie makers quickly learned. No amount of technical wizardry can save a 'turkey'. The Warner cinema was almost empty.

If you do see the film, be sure to stay for the credits. These must rank as the longest ever. Amongst those listed is the crew's 'masseuse'.

Gradually a clear picture is emerging on the future of video from a 5-inch CD. The latest Video CDs (James Bond movies, Sting's *Ten Tales* and a music video of Johnny Halliday) prove without a shadow of doubt that MPEG-1 at 1.5Mbit/s can deliver better than VHS tape picture quality and near *Red Book* sound.

But other discs (PMI's music video discs of Kate Bush, Tina Turner and so on) prove equally well that clumsy coding can produce results bad enough to turn the trade and public off the whole idea of Video CD.

Wisely, PMI have junked these discs and gone for recoding and re-pressing. This leaves a Rolling Stones disc likely to achieve cult status as one of the worst examples of MPEG-1. There are now four companies hard behind Video CD—Philips, Panasonic, Sony and JVC. JVC originally worked up the idea as a karaoke format. Philips were originally against it, arguing that Full Motion Video (FMV) should be used for fully-interactive titles, not linear movies. Now Philips are behind V-CD, and urgently looking for some way to control coding quality with a McDonalds-style franchise, and independent judging. Sadly there are no video industry trade bodies with the expertise to tackle the job.

It was *Studio Sound* that drove the early move to classify CDs as AAD, ADD and DDD. Does anyone have any suggestions for Video CD and MPEG classification?

Both Sony and Panasonic see V-CD as an easy way to educate the public on interactivity. Although Japan's Sega and Nintendo corporations built the video games market, it requires only very basic point, shoot and dodge interactivity, like an electronic extension of Pachinko. Video CD offers much the same interactivity as a VCR, but with much more rapid access. both Sony and Panasonic hope this may whet consumer's appetites for the much fuller interactivity offered by systems like CD-i.

Philips remain convinced that Europe and the US are ready for full interactivity.

Either way, Video CD provides a neat bridge between all the different interactive formats, such as CD-i, 3DO, the Commodore and Sega CD games, platforms and Personal Computers with CD-ROM drives. They can all play Video CDs with an MPEG adaptor, but be wary on one of these opportunities.

In Dusseldorf, at the recent fifth annual CD-i Conference (significantly renamed this year as a 'CD-i and Video CD' event), several speakers, including an IBM-er, talked enthusiastically about the 100 million PCs already in homes and small offices, of which 15 million already have CD-ROM drives.

Already scores of companies are selling plug-in circuit boards which are claimed to allow a PC with CD-ROM drive to play Video CDs. Several companies, led by Philips, are now offering similar boards which claim to let a PC-ROM system play CD-i discs.

From a pure cost point of view, this makes no sense. The Philips conversion kit costs $700 and still requires an extra Soundblaster-compatible sound card to play other ROM games. Much more to the point, the software industry is grossly underestimating the practical difficulties of modifying existing PCs to play Video CDs and CD-i discs.

It all brings back unhappy memories of the early days of satellite broadcasting in the UK. Industry pundits, who had never climbed a wet and windy ladder with drill, compass and bolts, talked loudly and stupidly about how easy it would be for the public to install their own satellite dishes. Now we have multimedia pundits, who have never been inside a PC and juggled IRQ, DMA and I-O addresses, talking similar rubbish about how easy it is to modify a PC to play Video CDs and CD-i discs.

Even if the juggling works, the bare fact is that only a very few existing ROM drives can play Video CDs and even fewer can play CD-i discs. On the vast majority, the system either produces jerky pictures and bursts of sound, or it physically ejects the disc or it refuses to read it.

This creates a clear market opportunity for a new range of PCs which come already fitted with everything needed to play Video CDs and CD-i discs. The same PC can then also be used to run business office programs. But before this happens, there will be at least a year of chaos and disappointment for everyone.

The rules of programme production are changing too. If interactive programme material is tailored to one format, it can have as short a shelf life as the hardware needed to play it—just look at the early video games.

This is why the movie studios are now shooting large qualities of extra footage for every feature film, leaving the option open for interactive reissues in the future—on any format that comes along. Any studio which has kept the out-takes from its classic movies will have some options open, too. Choose between endings for the *Magnificent Ambersons*, perhaps.

Exactly the same thing is likely to happen with original master sound recordings. It is surely only a questions of time before consumers get the chance to remix an artist's catalogue of hits. Provided, of course, that the record companies have safely archived their multitrack masters. ■

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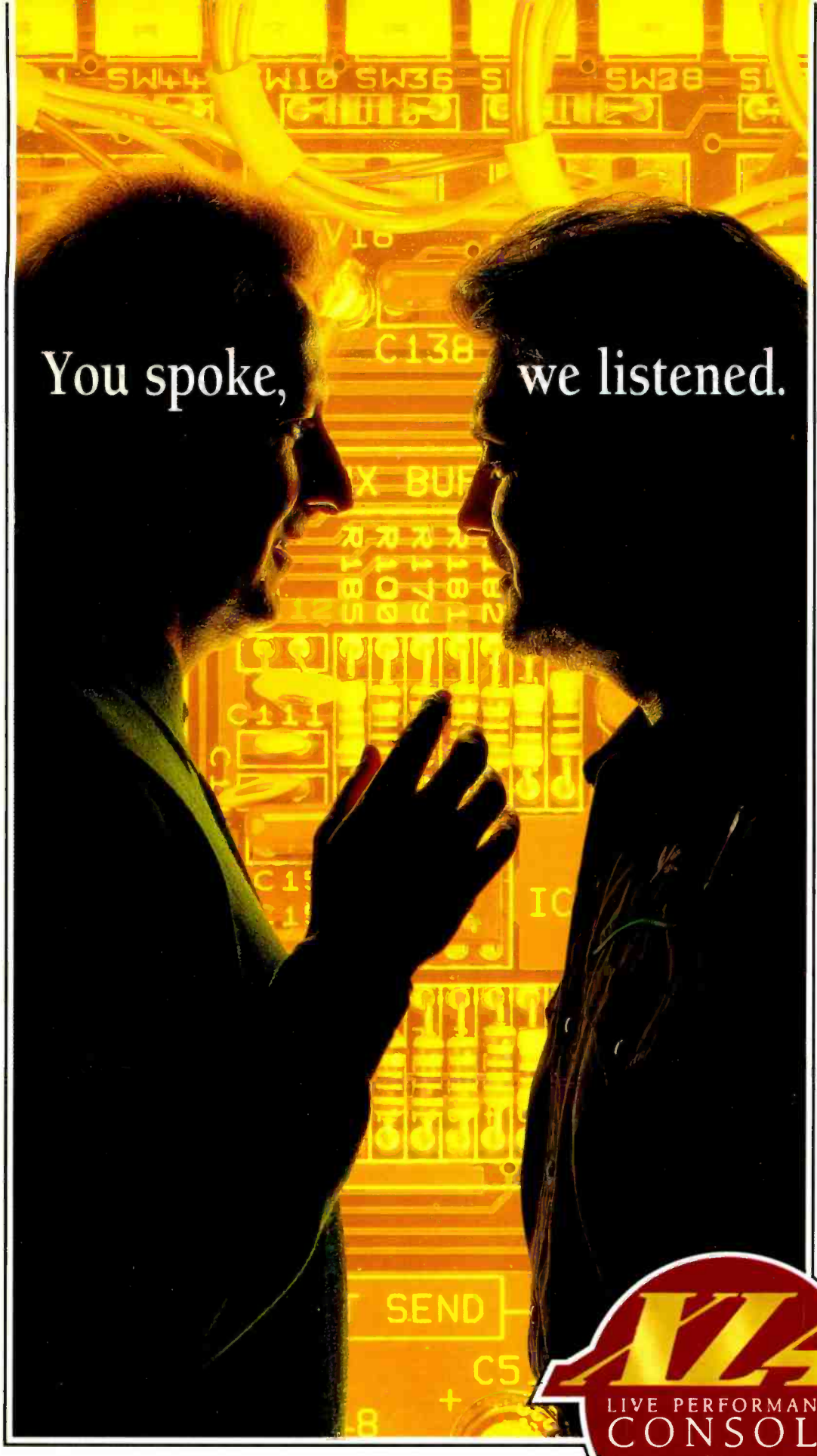

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