

APRIL 1995

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# UDIO SOUND

AND BROADCAST ENGINEERING

INTERNATIONAL PRO AUDIO  
AND POSTPRODUCTION MAGAZINE



## MICROPHONES

REVIEWED: B&K 4040; Sennheiser 504; Mikrofon MKE 13M;  
Audio Technica 4050-CM5; Electro-Voice RE2000; Oktava MK011,  
MK012 and MK219; BPM Studio Teknik TB94 and CR73

### Home of Layla

Miami's Criteria Recording Studio

### The Great Education Debate

The crisis in pro-audio personnel



# OMNIMIX & SCENARIA

## EAST SIDE AUDIO AND VIDEO, NEW YORK

"OmniMix has several great advantages, such as it's innovative combination of digital, audio and video storage. With instant access to sound and picture, there's no rewind time. This is particularly important in our business where several revisions of a project are common. When you are mixing with OmniMix, it's entirely in the digital domain - there's no comparison with conventional dubbing."

## NEW WAVE ENTERTAINMENT, BURBANK

"Scenaria lets us stay totally within the digital domain to final mix, which maintains sound quality. It's definitely a fast system to use, and the film-style user interface lets us assemble the sound elements to picture in a very intuitive way - our clients understand what we're doing and are more involved."

# THE FIRST CHOICE FOR AUDIO POST-PRODUCTION

Tom Goldblatt, Audio Mixer at East Side Audio and Video



*East Side Audio & Video, a 6-room facility specialising in audio post-production, recently took delivery of New York's first OmniMix digital surround sound audio/video system. Projects include: Commercial spots for American Express, AT&T, IBM, MCI, Miller, Pepsi, Revlon, Volvo.*

David Cantu, New Wave Entertainment



*New Wave Entertainment handles audio and video production for theatrical trailers and TV commercials for Buena Vista Marketing, the promotional arm of the Disney Group. New Wave recently opened a new facility, with two Scenaria systems and SoundNet, designed to provide full editorial and mix-to-picture capabilities. Projects include: trailers & commercials for Walt Disney, Touchstone, Hollywood, Caravan and Miramax Pictures*

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AND BROADCAST ENGINEERING



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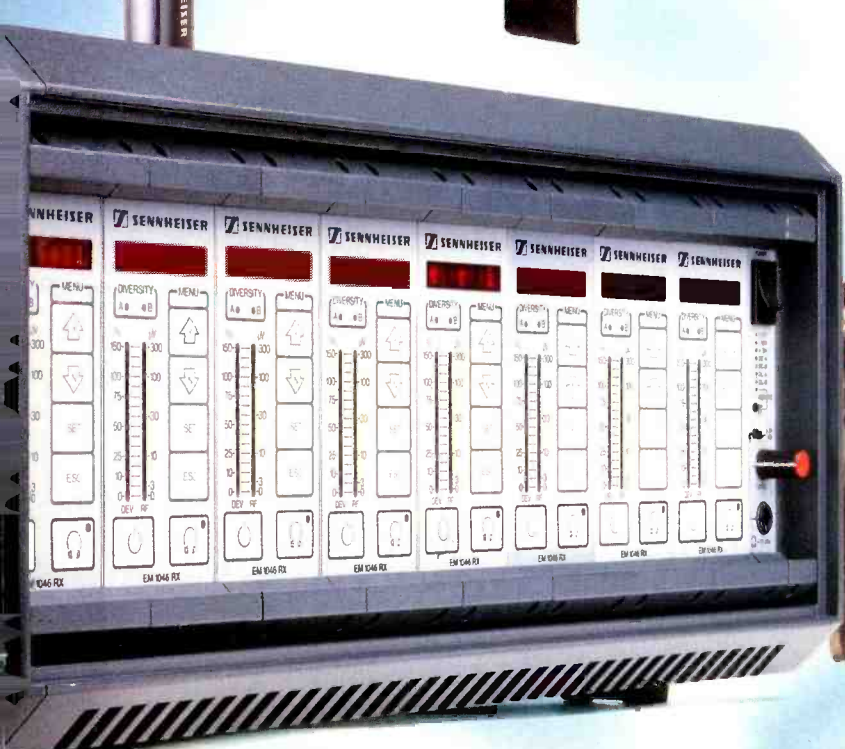
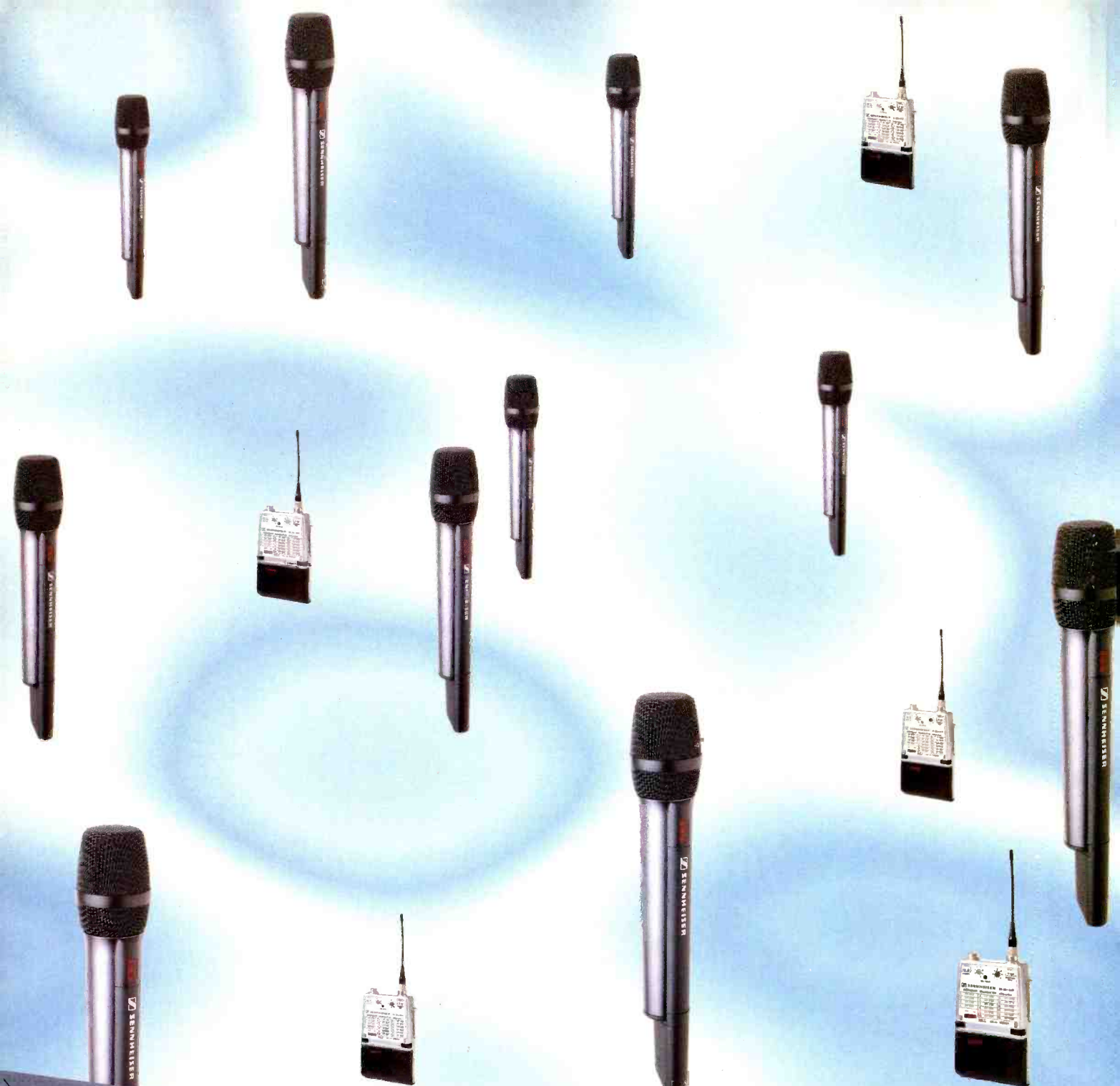
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# STUDIO SOUND

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## Riptide

Is it a coincidence that we are presently enjoying a boom in both old and new technologies? Have we, perhaps, learned to appreciate older disciplines as a consequence of new ones? Or is it that pro-audio has become divergent, one half of the fraternity attracted by older technology and the other by newer technology—in which case there is simply the appearance of simultaneous acceptance of contrasting technologies? Perhaps we ourselves have become schizophrenic—unable either to ignore or accept relentless advances in the equipment, is it possible that we are returning to old gear to help maintain an appearance of sanity when faced with the new? I suspect that the truth of the situation lies elsewhere.

Let's look at the facts. We can readily identify nonlinear (disk-based) systems as the fastest-growing area of pro-audio technology. But we cannot escape the proliferation of valve-driven preamps, compressors and so on. Most commentators will readily identify the combination of their being physically different (as opposed to chronologically distanced) as the only reason for their collective popularity—the acceptable distortion of valves conveniently counterpointing the ruthless accuracy of digital systems. No argument here except that I'd wager it is an over simplistic assessment. While valves and digits undoubtedly make sweet music, there is still the revival of interest in microphones to account for. Okay, some of them involve valves and could be part of the valve-digit love affair, but plenty do not. Okay, so some of them are coming from the former Eastern Bloc and may well be riding political tides as well as technological tides. But this fails to account for rising levels of interest in mic-related items, such as splitter boxes. No, the simplest explanations are always the most attractive, and this is all getting a little contrived for my taste.

How about this: lump all the 'old stuff' together—the valves and mics and splitters and books on mic technique and rising blood pressure in educational circles—and play it off against the havoc wreaked on recording studios by digital electronics. I would go so far as to venture that we are witnessing the turning of a tide.

When digital equipment kicked the legs from under much of the international studio business it did so at the cost of opening sound recording up to almost anyone. It was a nice idea, but it placed us all quite suddenly in a business where people have wildly inconsistent levels of knowledge and experience. For example, it has become relatively difficult to make a recording with an unacceptable signal-to-noise ratio—but recordings dogged by poor mic placement and inept use of signal processing are abundant. And good drum sounds are more readily associated with samplers than drum kits, while good drumming is too frequently obscured by inadequate recording techniques. Here is our real schizophrenia.

It is no coincidence then, that there is renewed interest in mics as well as valves. No coincidence that education is raising its profile—whether through tuition, books or merely increased awareness of engineering issues in consumer music magazines is immaterial here. And it is certainly no coincidence that this issue of *Studio Sound* carries a significant debate on pro-audio education alongside reviews of ten microphones and other related equipment and articles.

This is the new world. We are finally waking up to what the digital revolution has really cost us, and we are beginning to seek ways of addressing it—elements of the old order will survive dependent upon their ability to embrace new technologies and ideas. The nature of the majority of studios is changed forever, and there are new players in the game who must be recognised and accommodated, but the audio world has taken a significant step forward and will never look back. Certainly, there is light at the end of the tunnel for so many of those studio owners who were afraid there was none. For a long-standing pro-audio magazine, the ability to accurately analyse the real issues and trends in the biz is one of the keys to continued success. *Studio Sound* still has that instinct—as the companies and interests represented here would certainly agree. ■

Tim Goodyer

Cover: Sennheiser 504, Oktava MK, Mikrophon MKE 13M, Electro-Voice RE2000,  
B&K 4040 (S/N 000), Audio Technica 4050-CM5, cables by Klotz

# SYSTEM

## INTRODUCING

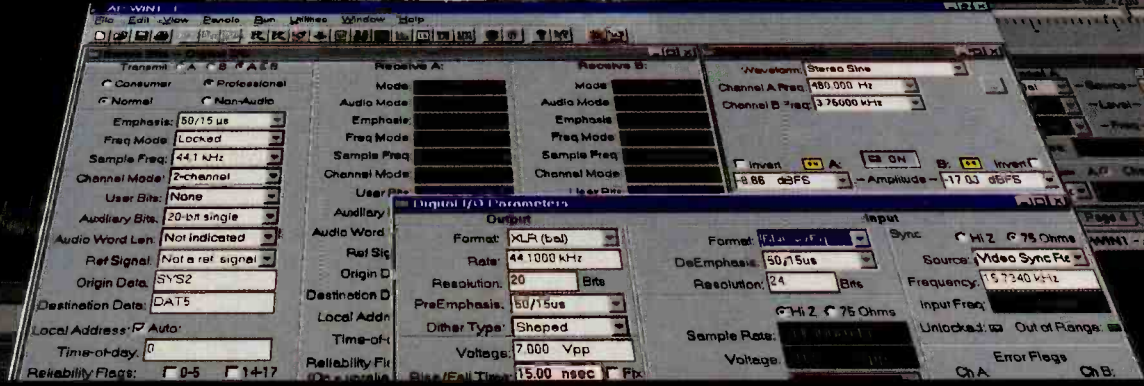
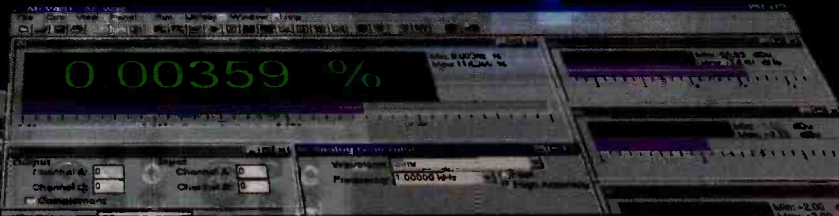
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# World Events

## April 1995

- April 3rd-5th, **Cable and Satellite 95**, Olympia, London, UK. Tel: +44 181 910 7849.
- April 4th-5th, **Television Distribution Technology 95**, Olympia, London, UK. Tel: +44 171 637 4383.
- April 4th-6th, **REPLItech Europe**, Austria Centre, Vienna, Austria. US: +1 914 328 9157.
- April 4th-7th, **Communications Tokyo Exhibition**, Tokyo International Trade Fairgrounds, Tokyo, Japan. Tel: +81 3 3586 7865; US: +1 301 986 7800.
- April 6th, **The Music Radio Conference 95**, BAFTA, London. Tel: +4 171 323 3837.
- April 7th-12th **MIP-TV 95**, Cannes, France. Tel: +44 171 528 0086.
- April 9th-13th, **NAB 95 Symposia**, Las Vegas Convention Centre, Las Vegas, USA. Tel: +1 617 965 8000.
- April 10th-13th, **NAB 95**, Las Vegas Convention Centre, Las Vegas, USA. Tel: +1 617 965 8000.
- April 11th, **AES Conference: The Value of Industrial Design**, Imperial College, London, UK. Tel: +44 1628 663725.
- April 19th-21st, **Digimedia**, International Conference Centre of Geneva, Geneva, Switzerland. Fax: +41 22 320 9075.
- April 21st-23rd, **MEMS 95**, Olympia 2, London, UK. Tel: +44 1225 442244.
- April 24th, **BKSTS Visit: BBC Postproduction**. Tel: +44 171 242 8400.
- April 26th-29th, **Broadcast Technology Indonesia**, Jakarta, Indonesia. ● April 26th-28th, **5th Australian Regional AES Convention: Making Waves**, Sydney Convention and Exhibition Centre, Sydney, Australia. Tel: +61 3 534 5755.

## May 1995

- May 1st, **IEE Audio Engineering Colloquium**, IEE Head Office, Savoy Place, London, UK. Tel: +44 171 240 1871 x2206. ● May 2nd-3rd, **AES Conference: The Future of Radio**, Kensington Town Hall, London, UK. Tel: +44 1628 663725.
- May 3rd-4th, **Apple New Media Forum**, Cannes, France. Tel: +33 93 39 74 39; US: +1 800 260 9099. ● May 3rd-5th, **Digital Media 95**, Congress Centre,

- London, UK. Tel: +44 171 226 8585.
- May 9th-12th, **Pro Audio, Light and Music China 95**, Beijing Exhibition Centre, People's Republic of China. ● May 13th-21st, **MultiMediale 4**, ZKM/Centre for Arts and Media Technology, Karlsruhe, Germany. ● May 14th, **National Vintage Communications Fair**, NEC, Birmingham, UK. Tel: +44 1398 331532.
- May 15th-20th, **Expo Comm Moscow Sviaz 95**, Krasnaya Presnya Fairgrounds, Moscow, Russia.
- May 16th-18th, **DSPx 95 Exposition and Symposium**, San Jose, California, US. Tel: +1 203 840 5652. ● May 18th-20th, **Conference: Lone Wolf MediaLink Development**, Claremont Hotel, Seattle Washington, US. Tel: +1 206 728 9600.
- May 23rd-25th, **Midem Asia**, Hong Kong. Tel: +44 171 528 0086.
- May 30th-31st, **Leipziger MedienMesse Hörfunk**, Leipziger Messe, Leipzig, Germany. Tel: +37 41 2 230.

- May 30th-June 1st, **ShowTech 95**, Messe Berlin, Berlin, Germany. Tel: +49 30 3038.

## June 1995

- June 5th, **BKSTS Visit: CRL**. Tel: +44 171 242 8400.
- June 5th-6th, **Apple New Media Forum**, Los Angeles, California, US. Tel: +33 93 39 74 39; US: +1 800 260 9099.
- June 8th-10th, **2nd Annual South American Pro Audio Expo**, Centro de Extension, Santiago, Chile. Tel: +56 2 635 1994; US: +1 914 993 0489.
- June 8th-12th, **China Sound Light and Music**, Beijing Exhibition Centre, People's Republic of China.
- June 8th-13th, **International Television Symposium-Exhibition**, Montreux, Switzerland. Tel: +41 21 963 3220.
- June 10th-12th, **12th ShowBiz Expo West**, LA Convention Centre, Los Angeles, US. Tel: +1 714 513 8400.
- June 13th-15th, **REPLItech International**, Santa Clara Convention Centre, Santa Clara, US. Tel: +1 914 328 9157.
- June 14th-15th, **Apple New Media Forum**, New York, USA. Tel: +33 93 39 74 39; US: +1 800 260 9099.
- 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 Centre, Tokyo, Japan. Tel: +81 3 3403 6649.

## July 1995

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

## August 1995

- August 17th-20th, **Popkomm**, KölnMesse, Köln, Germany. Tel: +49 221 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, US. Tel: +1 202 429 5350.
- September 10th-12th, **ECTS**, Olympia Grand Hall, London, UK. Tel: +44 181 742 2828.
- 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: +44 181 742 2828.
- September 21st-24th, **Nordic Sound Symposium XVII**, Bolkesjø Mountain Hotel, Norway. Tel: +47 2 79 7730.
- September 22nd-24th, **ShowBiz Europe**, MOC Exhibition Centre, Munich, Germany. Tel: +49 89 47 02 399.

## October 1995

- October 5th-8th, **99th AES Convention**, Jacob K Javits Centre, 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 1st-5th, **Audiovideo-95**, Lenexpo Exhibition Complex, St Petersburg, Russia. Tel: +7 812 119 6245.
- November 2nd-4th, **Broadcast India 95**, World Trade Centre, Bombay, India. Tel: +91 22 215 1396.
- November 7th-9th, **Wireless World Expo 95**, Moscone Centre, 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

- 5th-9th December, **Expo Comm China South 95**, Guangzhou Foreign Trade Exhibition Centre, Guangzhou, Peoples Republic of China. Tel: +86 1 841 5250; US: +1 301 986 7800.

## January 1996

- January 5th-7th, **Showbiz Expo East**, New York Hilton and Towers, New York, USA. Tel: +1 513 8400.

## February 1996

- February 13th-16th, **Expo Comm Mexico 96**, World Trade Center, Mexico City, Mexico. Tel: +1 301 986 7800.

## September 1996

- September 18th-23rd, **photokina**, KölnMesse, Cologne, Germany. Tel: +49 221 8210.

## November 1996

- 5th-9th November 1996, **PT/Expo Comm China**, China International Exhibition Centre, Beijing, Peoples Republic of China. Tel: +52 525 592 3257; US: +1 301 986 7800.

## February 1997

- February 22nd-25th, **Middle East Broadcast 97**, Bahrain International Exhibition Centre. Tel: +44 171 486 1951. ■

# International News

In brief

● **Sennheiser at 50**

German mic maestros Sennheiser are presently celebrating their 50th anniversary. Based in Wedemark and employing 1,100 people worldwide, Sennheiser was established in 1945 by Dr Fritz Sennheiser and is now run by his son, Dr Jörg Sennheiser. The new 'thumbnail' MD504 dynamics are reviewed elsewhere in this issue.

**Sennheiser Electronic, Germany.**  
Tel: +49 5130 600 0.

● **DAB in Paris**

French company ITIS presented what is claimed to be the first complete operational Digital Audio Broadcast chain at the Paris AES Conference.

Conforming to ETSI DAB 300.401 criteria, the chain used MUSICAM source encoding, D-MUX multiplexing and COFDM encoding serving a Philips DAB452 receiver.

**ITIS, Alain Untersee, France.**  
Tel: +33 99 23 72 20.

● **Royal Festival Hall acoustics**

Kirkegaard & Associates have been appointed as acoustics consultants for the Royal Festival Hall, charged with modifying the hall to maximise its natural resonance. Shortly after it opened, the RFH was famously equipped with an 'assisted resonance' system. Now, with the system nearing the end of its useful life, the South Bank Centre is using the opportunity to look at ways of making natural improvements,

moving away from electronic enhancement. Larry Kirkegaard, one of the world's most highly respected acousticians, has worked with his company on many of the world's most prestigious concert venues, including Boston Symphony Hall, Carnegie Hall, Liverpool Philharmonic Hall, Orchestra Hall, Chicago and the Barbican Hall in London.

**The South Bank Centre, UK.**  
Tel: +44 171 921 0631.

● **Audio-Technica award**  
**Jon Anderson**

During the NAMM show in Anaheim, Audio-Technica presented Jon Anderson with a plaque commemorating the artist's support and endorsement of A-T microphones. Anderson, the former lead vocalist and co-creator of Yes, has been employing Audio-Technica's AT4050/CM5 (reviewed in this issue), AT4033 and AT4051 capacitor microphones in his personal studio,

Opio Productions  
**Audio-Technica, US.**  
Tel: +1 616 695 5948.  
**Clive Green & Co, UK.**  
Tel: +44 1582 404202.

## Optifile link for AD Système

Under the terms of a recently signed agreement, AD Système, manufacturers of the *Optifile* VCA automation system, will now be using Audiomotion Systems' motor faders and controller cards. The two companies have also exchanged software protocols so that existing *Optifile* users will be able to read mixes from Audiomotion's new software, *Audiomate 64*, and vice versa. The decision to co-operate may seem strange for two competing companies, but Audiomotion's David Pope points out 'Our main objective has always been to increase sales of our motor faders, and *Optifile* has one of the largest user bases in the world. Since the biggest single cost in our system is the fader itself, economy of scale is the sole way we can decrease costs and pass that benefit on to studios. The move will benefit both companies and our customers, who now have a choice of two low-cost motor fader systems.'

Louis Austin at UK distributor The Home Service explains: 'We've been perfecting the *Optifile* software for over a decade, and with the arrival of our new Move status we've got as close to moving faders as a VCA system could possibly get. With the new Audiomotion fader we can finally offer real moving faders at a price our

customers can afford.'  
**Ad Systeme, France.**  
Tel: +33 1 42 53 3118.  
**Audiomotion Systems, UK.**  
Tel: +44 1207 529444.

## Apple Interactive Initiative

In March Apple Corp hosted the Apple Music Industry Day, when more than 150 music industry executives, band managers and artists converged on Apple's headquarters in Cupertino, California to look at Apple products' applications in interactive music technology. Much of the discussion focused on enhanced CDs, with a multimedia content, that can be played on conventional audio CD players and computer-based CD-ROM drives. Several attendees expressed their intentions to use Apple's QuickTime and QuickTime VR for such projects, and the forthcoming QuickTime Music Toolkit when it becomes available.

During the event Apple and Opcode Systems announced an agreement to incorporate support for Opcode's Open Music System (OMS) into QuickTime, a development planned to be complete by the end of 1995.

**Apple Computer US.**  
Tel: +1 408 996 1010.  
**Opcode Systems, US.**  
Tel: +1 415 856 3333.



Library music made easy, by Sound Stage

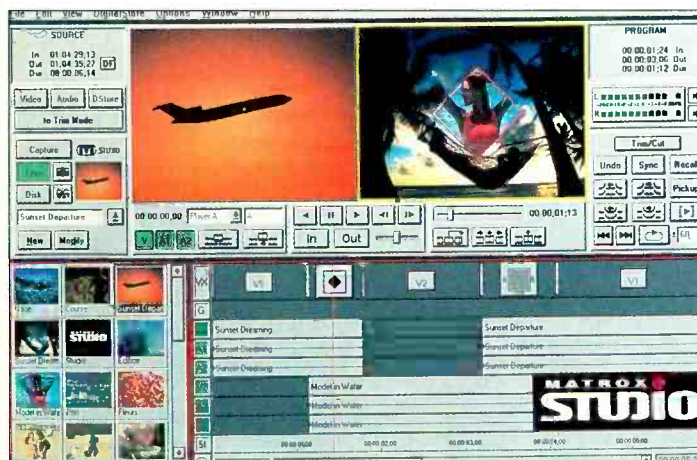
## Sound Stage Jingle Pursuit

Sound Stage have introduced a new approach to library music in the form of the *Jingle Pursuit* package. The initial set of six CDs, containing 594 tracks all either 29 or 59 seconds long, is intended to make finding the right piece of music for all manner of productions as simple as possible, and comprises colour coded discs containing as wide a variety as possible of styles and moods. The accompanying manual provides the user with the ability to search for and pinpoint the ideal track quickly and simply.

The package is available free of charge to all registered production music users, and will be followed by further additions; already in the pipeline are CDs of 'loops and strings' and 10 second tracks.  
**Sound Stage Music, UK.**  
Tel: +44 1737 832837.

## AGM record label

AGM Digital Arts, developers and manufacturers of the digital MR-1 'soundfield' microphone system (featured in *Studio Sound* April 1994) are to launch their own classical label featuring recordings made with the system. AGM founder Anthony Morris has already produced the first sessions, of the Chamber Academy Quartet playing Grieg and Sibelius string quartets, using his unique 20-bit system in conjunction with Nagra-D recorders. These recordings, and another session from Berlin of lieder by Brahms and Strauss and Ravel songs, are to be released on the Perfectum Est label, through the new AGM Digital New Media company. Apart from their obvious suitability for the 20-bit 4-channel signals produced by the microphone



**US: Matrox Systems' Matrox Studio has just seen release of v3 and Matrox have slashed the asking price of their Marvel II multimedia controller. Marvel II combines real-time MPEG audio and video decoding with graphics acceleration on a single PCI card. The unit is intended for OEM developers carving the future for multimedia and is supported by a variety of software drivers and development tools for Microsoft DVMCI, Windows and DOS. It is also compatible with numerous authoring tools including Macromedia Director and North Image Q. Matrox Electronic Systems, Canada. Tel: +1 514 685 2630.**



system, the Nagra-D machines were chosen for their Tape Management Directory software, which monitors and locates errors and overs and logs takes.

**Nagra Kudelski, Switzerland.**  
Tel: +41 21 732 0101.  
**AGM Digital, Deutschland.**  
Tel: +49 8821 947161.

## Russian to export

Euro East Transportation, having established themselves as one of the leading UK transport operators to Russia, are offering their services to manufacturers and exporters keen to explore the growing opportunities opening up in the rapidly developing Russian and Polish markets. The company was one of the first operators to open its own office in central Moscow, which is used exclusively for its customers. Its LCL service operates using the company's own drivers, vehicles and equipment on the weekly runs to and from Moscow, via Poland, out of Purfleet in Essex. Euro East accepts cargo from 50 kilos up to full loads at highly competitive rates.

Says Euro East group sales and marketing manager, Michael Pearn: 'Our office in Moscow employs English-speaking staff who prepare customs-clearance documentation in advance of shipments being received from the UK. This serves to minimise any delay in the rapid distribution of consignments to all regions of Russia as soon as they are received.' The company is also able to provide translation and interpretation help to visiting UK traders on sourcing or sales missions.

Transit times from the UK are approximately 5-6 days to St Petersburg and 7-8 days to Moscow. The company has recently introduced Renault Magnum trucks into its fleet, all equipped with satellite navigation systems so that Euro East's UK and Moscow offices can be in constant communication with the drivers and provide customers with total cargo monitoring at all points of the journey. This security aspect is also reflected in Euro East's own bonded terminal at Helsinki, guarded and operational 24 hours a day, and will become even more vital as the company carries out plans to open offices in St Petersburg, Novo Sibirsk in Siberia, Yekaterinburg in the Urals and Krasnodar in the south, making instant communication with the company's vehicles all the



**US: Apogee, Cadac Grammys.** For the seventh consecutive year, Apogee loudspeakers and processors were used to provide the sound for the nearly seven thousand attendees at the 37th Grammy Awards. Main clusters, front fills, under balcony coverage and stage monitors brought the total Apogee complement to 58 loudspeakers. Sound designer and mixer Patrick Baltzell also specified Apogee CRQ-12 parametric equalisers for the system, and Apogee president Ken DeLoria was flown in to provide Apogee's CORRECT equalisation service. Also featured at the Grammy Awards was the Cadac Concert console, pictured with engineer Patrick Baltzell. Of special use was the desk's A/B input switching feature, which meant that it was not necessary to repatch multis from board to board during the performance, and the small footprint of the console meant an extra nine seats were available compared with previous years.  
**Apogee Sound, US. Tel: +1 707 778 8887.**

more essential.  
**Euro East Transportation, UK.**  
Tel: +44 1322 386660.

## Audiomotion-Digital News

The first digital transmissions on the European Astra satellite systems have been launched by News Datacom using NTL video compression. The transmissions, on Astra 1D, are intended to test signal reception and picture quality under domestic conditions prior to direct-to-home satellite services going digital. The tests consist of a multiplex of four digital TV services using a variety of bit-rates and they are fully compliant with technical standards agreed by the European Digital Video Broadcasting (DVB) group. Signals are being received and assessed with Pace-NTL domestic digital receiver-decoders which are shortly to go into full production.

Direct-to-home digital TV services are due to be launched this year in the Asia-Pacific region from pan-

Asian Star TV based in Hong Kong. Multichannel digital services on Astra are expected to be announced in the near future, providing a huge increase in the flexibility and choice offered by satellite television. Video compression increases transmission capacity by a factor of ten or more, allowing viewers to receive potentially hundreds of new services from a single satellite. To meet this need, the VCS 4000 digital broadcasting system has been developed from a collaboration which brought together the key expertise of NTL in video compression, News Datacom in conditional access and Comstream in satellite and cable modulation products.

The lead taken by the DVB group, which now comprises around 160 European manufacturers and broadcasters, is resulting in common standards being adopted all around the world. This is creating a global market for digital TV transmission and reception equipment based on MPEG-2 video compression technology.

**NTL, UK. Tel: +44 1962 822582.**  
**News Datacom, UK.**  
Tel: +44 1628 74774. ►

### In brief

● **Midas touch in Norway**  
Midas have appointed Scandec Systemer as the official distributor for Norway. The company is based in Sofiemyr and will be distributing and providing technical support for all Midas products, including the new XL4 and XL200 Live Performance Consoles.  
**Midas, UK. Tel: +44 1562 741515.**  
**Scandec Systemer, Norway.**  
Tel: +47 (02) 6680 5960.

● **Hitachi Spatialized**  
Desper Products have licensed their Spatializer 3-D stereo technology to Hitachi. Hitachi will immediately include Spatializer, which creates 3-D surround sound from two speakers, on four new 'Nextage' wide-screen TVs including two 32-inch screen and two 28-inch screen models. The use of Spatializer technology will be featured strongly both on the products themselves and in advertising.

**Spatializer Audio Laboratories, US.**  
Tel: +1 310 268 2700.

**Hitachi, Japan. Tel: +81 45 866 7121.**

● **Vintage refit**  
As part of an ambitious upgrade and refurbishment program for Studio 2, Sunset Sound in Hollywood are to replace their current console with a vintage Neve Model 8088 fitted with Flying Faders automation. The studio's clients have been asking for a Neve-equipped tracking room, and Sunset are clearly thrilled to have discovered (in Canada) the 96-channel discrete Class A 8088 to which they will be adding the automation.

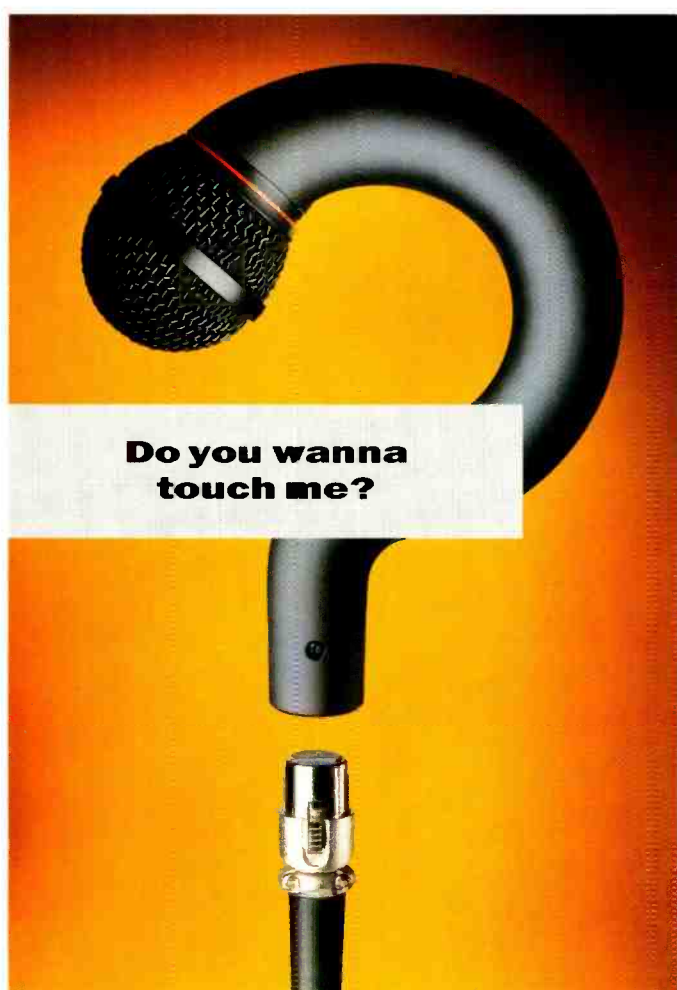
**Sunset Sound, US.**  
Tel: +1 213 469 1186.

● **NVision Enhanced**  
The new, enhanced version of NVision's Digital Audio Processing Suite is now available, including two layers of 8x8 digital audio routing. Comprising two NV1308A AES-EBU-format routers, NV 9301 X-Y router control, NV1055 4-channel digital mix-minus and routing module, NV9055 remote, NV1050 4-channel SRC and NV1060 4-channel delay compensator, the DAPS II, system has been designed for telecine and video transfer suites.  
**NVision, US. Tel: +1 916 265 1000.**

● **TL Audio distribution**  
At the Paris AES, TL Audio appointed distributors in several new territories, including Portugal, Spain, Greece, Russia, Czechoslovakia, Poland, Switzerland and Israel, and also appointed VW Marketing as sales and marketing representatives for the Asia Pacific region.  
**TL Audio, UK. Tel: +44 1462 490600.**  
**VW Marketing, UK.**  
Tel: +44 1372 728481. ►



UK: Molinare Postpro. Vying for attention alongside the other international television centre—Los Angeles—the UK capital boasts the Molinare post facility. The subject of a successful management buy-out this month (instigated by Chief Exec Barry Firmin), the Molinare Visions Group includes Molinare Postpro, the VMTV 08 unit (equipped with Calrec audio consoles), Visions Transmission Services and Molinare Spain. Molinare Visions Ltd. UK. Tel: +44 171 439 1177.



## SSL SL 8000 goes mobile

Among recent SSL console sales, other than that of the *SL9000j* and *Axiom* models, is the first *SL 8000* desk to be installed in a mobile.

The *SL8000* is also to be the first console of its kind to be installed in France, and will be included in a new facility to be known as Polyson. Owned by Slade, one of France's leading PA-sound reinforcement companies, Polyson will be operated by VCF (Video Communication France) and will be used on a wide variety of projects ranging from live broadcast to recording of sports events, live concerts and so on, to multitrack recording for the music industry.

The custom built 48-channel *SL 8000* is effectively two desks in one, allowing independent Dolby Surround mixing for live broadcast of events, with commentary in two different languages mixed with ambient sound feeds.

**Solid State Logic, UK.**

Tel: +44 1865 842 300.

**Solid State Logic, USA.**

Tel: +1 212 315 1111;

+1 213 463 4444.

**Solid State Logic, Japan.**

Tel: +81 1 3 5474 1144. ■

### Contracts

#### ● DISQ at Record Plant

The latest studio to install the powerful *DISQ Digital Mixer Core* is LA's record Plant. Currently 28 years old, the Record Plant facility features five recording and mixing rooms including the SSL II Suite, in which the *DISQ* system will interface with a 72-input *SSL 4000G Series* console. Other American *DISQ* sites include Nashville's Masterfonics, Miami's Crescent Moon, New York's Right Track and Electric Lady and LA's Conway. **AT&T, US. Tel: +1 910 279 3023.**

#### ● Capricorn sales at AES

At the Paris AES Convention, AMS Neve announced orders for four more *Capricorn* digital mixing consoles. Stockholm's Europa Studios will take delivery in May, and Nihon TV Video (Tokyo), China Beijing TV Station and Saarländischer Rundfunk confirmed orders at the Convention.

**AMS Neve, UK. Tel: +44 1282 457011.**

**Europa Studios, Sweden.**

**Tel: 46 8 799 6900.**

**Nihon TV, Japan. Tel: +813 3265 1337**

**China Beijing. Tel: +86 10 8429613.**

**Saarländischer Rundfunk, Germany.**

**Tel: +49 681 602 3449.**

#### ● Portuguese Gold

Portugal's principal broadcast organisation, Radiotevisão Portuguesa SA (RTP) has acquired a 16-channel DAR *SoundStation Gold*, bringing the total complement of Digital Audio Research units to seven. The organisation already has three *Sigmas* and three *Sabres*, and the new *Gold* will turn the analogue newsroom into a second digital studio.

**Digital Audio Research, UK.**

**Tel: +44 1372 742848**

#### ● Soundcraft make Reuters news

Reuters TV, the largest television news agency in the world, has purchased two 12-input Soundcraft *GP1* portable broadcast mixers to be used for field editing at Reuters' Agency in Bonn.

**Soundcraft Electronics, UK.**

**Tel: +44 1707 665000.**

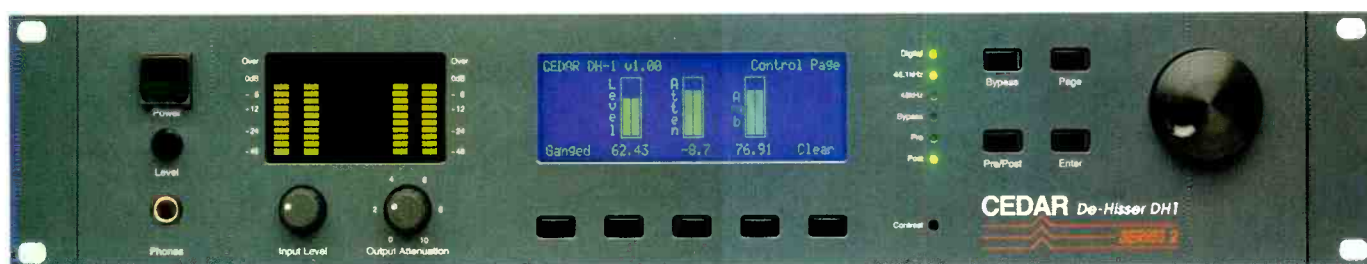
#### ● Maltese Ninety

A 40-channel Trident *Ninety*, the first to be delivered to Malta, has been commissioned in the newly-opened Temple Studios. The studio is converted from an old winery, all of whose external walls had to be taken down brick by brick to allow the internal concrete studio shell to be built. The walls were then re-built with the original brickwork to restore the facade of the historic building.

**Trident, UK. Tel: +44 1932 224665. ■**



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Independent Audio, 295 Forest Avenue, Suite 121, Portland, Maine 04101-2000, USA Tel: 207 773 2424 · Fax: 207 773 2422

## Boxer T-Series

On display for the first time at AES in Paris from Coastal Acoustics was a full series of new Boxer monitors, a new crossover unit, Boxer amplifier technology and the company's drivers.

At the heart of the Boxer system is the completely new midrange driver specially designed by Coastal Acoustics and unique to the Boxer range. This new soft-dome driver claims low distortion, high sensitivity, superb transient performance and very high power-handling levels, all with low compression.

The *T-Series* systems are supplied in four driver configurations, each system available as a standard stereo version or as a multiple-channel film variant. Supplied with the units are the new Boxer *X3MB* crossover units and the Boxer power amplifiers. All high and low-level interconnection and full on-site TEF computer acoustic analysis commissioning are included as standard.



The big fight: Boxer T-Series monitors

During the show Coastal Acoustics announced that sales of the *T-Series* range already include a *T4* system for Mutte Lange's new upstate New York facility, two *T5* systems for C&W star Reba McIntyre's new Starstruck

complex in Nashville, and a third *T5* system for Sony Music's facilities in New York.

**Coastal Acoustics, UK.**  
Tel: +44 1753 631022.

## MusicTAXI VP and MT-Reporter

The *MusicTAXI VP*, launched by Dialog4 at the Paris AES, is claimed to be the first ISO-IEC 11172-3 audio codec with MUSICAM, Layer III, G.722 and G.711 all in one machine. Software is stored in Flash EPROMs and can be downloaded from PC or from ISDN itself. Both analogue and digital (AES-EBU and SPDIF) inputs and outputs are fitted, with on-board sample-rate converters and external digital synchronisation for house clock. There is an optional SMPTE time-code interface, supporting both LTC and VITC, allowing time code to be transmitted in the Ancillary Data field alongside stereo signals.

*MusicTAXI* is available with around 20 different ISDN D-channel protocols. Dialling is via the 63 number ISDN directory, or via numeric keypad or preprogrammed buttons, and Dialog4's Master-Slave structure configures the far-end machine automatically to the parameters of the dialler's setup.

Also new is the *MT-Reporter*, combining an ISO-MPEG Layer III-G.722 codec with a 3-channel mixer with inputs for two microphones and an aux source. Designed for use by two correspondents simultaneously, the mixer incorporates an internal

### In brief

#### ● Crown, Micro-Tech and Power-Tech amps

The latest additions to Crown's range of power amplifiers are the *1400 CSL*, a cost effective model for fixed installation and applications where front panel controls are not required, the *Micro-Tech 2400* joining the existing *600* and *1200* models, and the *Power-Tech 3*, with recessed level controls and a front-panel resettable circuit breaker power switch. All the designs use direct-coupled and grounded bridge circuitry to deliver, for example, a damping factor of more than 1000 right down to 10Hz. The amplifiers, can be operated in stereo, bridged mono and parallel mono modes, delivering from 720W per channel into 4Ω in stereo (*1400 CSL*) up to more than 2000W into 4Ω in bridged mono (*Micro-Tech 2400*).

**Crown US.** Tel: +1 219 294 8000.

**Fuzion, UK.** Tel: +44 1932 882222.

#### ● 3G Mynah PLUS

On show at the Frankfurt Musikmesse were the new *Mynah PLUS* range of mixers from 3G. Following on from the previous *Mynah* range, the new mixers have new input circuitry and selectable gain structure, insert points throughout, multiple aux returns and lower noise figures. Configurations range from 8:2:1 to 16:4:2:1, with five of the eight models being rack mountable. Top of the range is the 16:4:2:1 RM + HUSH, featuring HUSH single-ended noise reduction circuitry for dealing with noisy sources. The system uses dynamic filtering and downward expansion to give a claimed 60dB of noise suppression, and the two independent circuits can be used on individual channels, subgroups or the entire mix.

**HW International, UK.**

Tel: +44 181 808 2222.

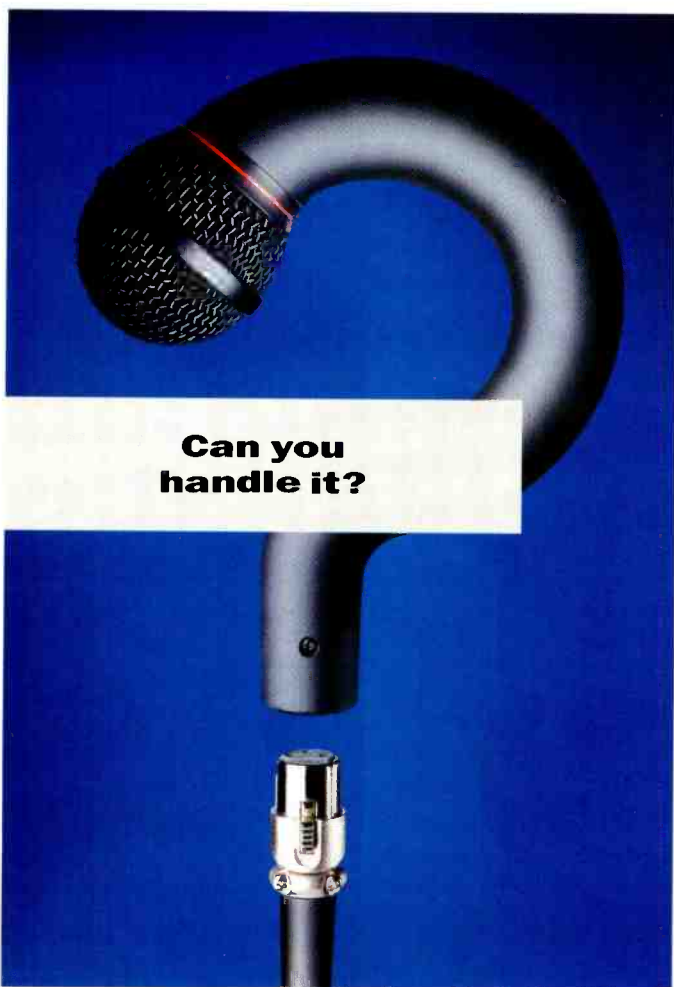
#### ● Orban Optimod software

Orban have released PC remote control software for the *Optimod-FM 8200* digital processor. The software works on a *Windows* PC with a pair of modems giving radio stations the ability to refine their FM sound from any location. All the *Optimod's* meters and processing controls are displayed on the computer screen, with archiving of presets, real-time adjustment and password protection. The software is included at no charge for new *Optimods* and a nominal charge will be made for upgrading other units.

**Orban, US.** Tel: +1 510 351 3500.

#### ● Yamaha S-Series

Intended for use in a variety of professional, commercial and personal applications, Yamaha's new *S15* and *S55* Compact Speaker Systems are



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Steve Mac  
Scratch Studios



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Soundtracs plc, Unit 21-D, Blenheim Road, Longmead Ind. Est.  
Epsom, Surrey K19 9XN England  
Tel: 0181 388 5000. Fax: 018. 388 5050

intercom system, channel mute buttons and an optional extension box allowing the two correspondents to be linked over a distance of 100m. **Dialog4, Germany.**  
Tel: +49 7141 22660.

## B&K compact cardioids

Alongside the launch of the 4040 valve microphone (reviewed elsewhere in this issue), come two new compact cardioid models from Brüel & Kjær. Using a new thick-film preamp with SMD transistors and the pre polarised condenser capsule that has met with success in the 4011 and 4012 mics, the new models are a quarter of the length of the standard microphones. Both come supplied with a small SM4000 suspension mount, and the principal difference between them is the position of the cable exit from the unit; the 4021 has its cable mounted

at 90° to its axis while the 4022 cable comes directly out of the back. This makes the 4021 suitable for instrument close miking, and specialist mounts are available for this purpose including the VH4000 for attaching behind the bridge of a violin and the CH4000 for use with a cello. The 4022 is intended for overhead and close miking of drums, and for TV use because of its compact size and near invisibility. **Danish Pro Audio, Denmark.**  
Tel: +45 4814 2828

## Graham-Patten D-ESAM 820

Graham-Patten Systems have introduced the enhanced D-ESAM 820 Digital Edit Suite Audio Mixer. Derived from the D-ESAM 800 Series, the upgraded model features a new digital input card with integral sample-rate convertor, a new master processor board, a new audio output



GP D-ESAM 820 edit suite audio mixer

module and v4.0 software. Current 800 Series users can field upgrade their systems to full 820 specifications.

The new digital input cards can handle either four or eight 20-bit AES-EBU digital sources, with continuous sample-rate conversion from below 30kHz to above 50kHz, including asynchronous sources. The new master processor board increases the number of D-MEM storage registers from 20 to more than 600, allowing multiple users to store and recall settings, and the new audio output module offers improved 20-24 bit resolution throughout the D-ESAM chassis, using Crystal high-precision D-A converters. **Graham-Patten Systems, US.**  
Tel: +1 916 273 8412.

## Amek Rembrandt

Launched at the recent Paris AES Convention was Amek's replacement for their Einstein console—the Rembrandt. Retaining the architecture of the Einstein, the new desk boasts enhanced audio and automation. Available in 40 and 56-position chassis, fully-loaded consoles will carry 80 and 112 fully EQ'd inputs (respectively), each having 4-band semi parametric EQ and access to 16 aux and 24 routing buses. VCA automation is provided with moving faders available as an option.

Other Amek news includes sales of a 40-input RN-Mozart, three BCIII broadcast consoles and a Recall by Langley to Tokyo Broadcasting System. Further Japanese placements saw a 40-input Recall by Langley installed at the Lake Tazawa Civic Hall and various private studios including that of Haroumi Hosono. The 9098 EQ has proven popular also, with over 100 Japanese sales since its launch in Japan in June 1994—Rupert Neve lectured on the 9098 late last year in Tokyo. **Amek Systems & Controls, UK.**  
Tel: +44 161 834 6747.  
**Amek, US:** Tel: +1 818 508 9788. ▶

2-way designs, combining high quality driver components and new Waveguide Horn technology to produce a frequency range claimed to extend to 40kHz with a broad and uniform wavefront dispersion. The chief differences between the two models are the LF driver, which at 6 1/2-inch in the S55 operates down to 60Hz handling up to 250W as against the S15's 5-inch driver handling 160W down to 65Hz, and the S55's magnetic shielding to allow mounting near TV sets and video monitors.

**Yamaha Corp of America.**  
Tel: +1 714 522 9011.  
**Yamaha-Kemble Music, UK.**  
Tel: +44 1908 366700.

### ● Turbosound bass bins

Launched at the Frankfurt Musikmesse, the TCS-618 is the latest introduction to the TCS range of loudspeakers, a low-frequency enclosure designed with theatre and corporate applications in mind, where accurate and powerful reproduction of LF energy at high levels is required. It features a proprietary 18-inch low-frequency driver, which uses a 3-inch voice-coil to provide a coil assembly with the optimum combination of low mass and rigidity. Capable of covering a frequency range from 35Hz–250Hz, the TCS-618 will typically be used as part of a 4-way system with the LMS-660/618 controller, crossing over to the TCS-612 at 160Hz.

**Turbosound, UK.**  
Tel: +44 1403 711447.

### ● Avid v3.0

Avid Technology are now shipping Version 3.0 for their AudioVision and AudioStation digital audio workstations. Version 3.0 supports 16 channels of digital audio using new Avid-designed audio-processing hardware, provides many new interface features and is compatible with the company's AvidNet-ATM high-speed networking solution.

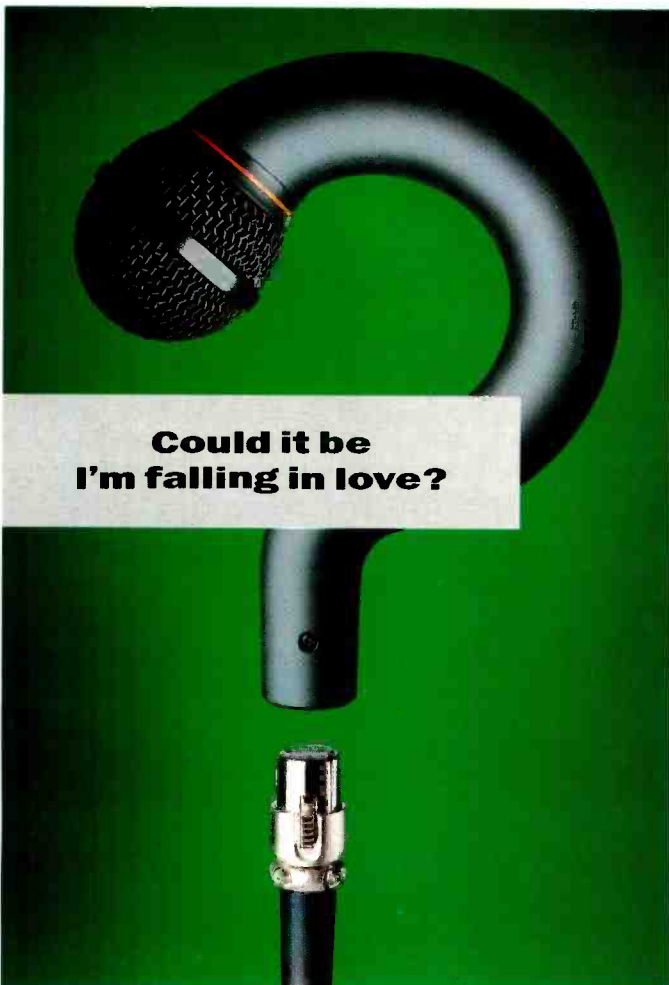
**Avid Technology, US.**  
Tel: +1 508 640 6789.  
**Avid Technology Europe.**  
Tel: +44 1753 655999.

**Avid Japan KK.**  
Tel: +81 33 505 7937.


### ● Soundcraft DC2020

The latest postpro console comes from Soundcraft in the form of the DC2020. The console comes in 24, 32 and 40-channel in-line versions with semi-parametric EQ, six aux and Soundcraft's 'floating bus' routing. Automation is C3, and handles faders, mutes, machine control, on-line mix editing and project management.

**Soundcraft, UK.**  
Tel: +44 1707 665000. ▶



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## Denon DN-790R

Denon have announced a new cassette deck with the pro-audio market in mind. The DN-790R is a 3-head, 3-motor machine using Denon's familiar closed-loop dual-capstan transport with a new cam actuation claimed to be virtually silent in operation. The head assembly has been redesigned to give improved tape-to-head contact, and the long-life amorphous heads are mounted on a die-cast alloy head block. Inputs and outputs are balanced line-level on XLRs, and 19-inch rackmounts are standard.

An interesting inclusion is Dolby S noise reduction, alongside B and C, and HX Pro is also incorporated. An automated alignment system is fitted, as is a real time tape counter and  $\pm 12\%$  varispeed. For integration into studio systems, there is access to the tape transport logic, which allows multiple units to be daisy-chained

and remote controlled.  
Denon Pro Audio, UK.  
Tel: +44 1753 888447.

## Langevin Studio Headphones

Manley Laboratories have introduced the Langevin Studio Headphone System designed to provide flexibility of foldback and communications for musicians in the studio. Each unit allows a musician to adjust his or her own foldback mix, having four mono inputs, two stereo inputs and four stereo headphone outputs. Communications features allow the producer to talk over the music or to kill the music to be heard, and to talk to musicians individually or all at once. In the reverse direction, musicians can speak to the control room via a built in microphone and control button, even in situations where they are inaudible on the

studio microphones, for example during playback or when recording close-miked guitar amps. Other controls include pan pots for the mono inputs and simple bass and treble tone controls on the overall signal.  
Manley Laboratories, US.  
Tel: +1 909 627 4256.

## Studer digital mic amps

As the first product of the new D19 Series, Studer have introduced the D19 MicAD, an 8-channel microphone and line analogue preamplifier with various formats of digital output. Eight independent channels have separate XLR inputs for mic and line, and the digital signals appear on four AES-EBU outputs. Optional output formats include SDIF, TDIF and multichannel ADAT interfaces, and the A-D converters feature 20-bit resolution and switchable dithering with noise shaping. Functions can be controlled locally from the front panel or remotely via RS422 or MIDI, with a rackmount master controller for up to 16 MicAD units on its way.

Studer Professional Audio, Switzerland. Tel: +41 1 870 75 11

## CS2000 new versions

Euphonix showed two new versions of their CS2000 digitally-controlled console at the recent NAB Show. The first is the CS2000B broadcast console, with new features including fault-tolerant power systems, audio router interfaces, mix-minus bussing and multiple-studio communications systems. Euphonix' SnapShot Recall allows an audio room to be reconfigured several times a day or even on air, and the desk comes in a range of configurations from 16-104 inputs with a side variety of signal processing and bussing options.

The CS2000P is aimed at high-end postproduction, and includes eight stereo busses for every mono-stereo fader and a sophisticated machine control package. There is an option for Multi-Surround panning and bussing, and SnapShot Automation allows the recall of an entirely new mix as fast as every video frame if required.

Euphonix, US.  
Tel: +1 818 766 1666. ■



● Milab EMBLA mic

New from Sweden's Milab is the EMBLA, a studio condenser microphone using the same rectangular capsule as the VIP50 at a price designed to give semi pro users and project studios access to a professional, variable-pattern microphone. Five polar patterns are offered, adding Wide Cardioid and Hypercardioid to the usual three, and a frequency response from 30Hz-20kHz is quoted along with a maximum SPL handling of 112dB.

Milab Microphones AB, Sweden.

Tel: +46 42 11 50 78.

● Ghielmetti Digital Patch Panels

Ghielmetti have introduced their latest modular patch panel in the series ASF, CSF, USF and 'High Performance'. Flexible and compact, it allows the building of optimised switch-rooms, distribution substations and cable systems. The new modular connecting levels of the Patch Panels and Matrix Systems allow both planner and operator flexibility and security concerning changes, extension and reconstructions.

Ghielmetti Communications Techniques, Switzerland.

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# The Gas Cooker

The relentless march of the valve continues. It seems there is nothing that cannot be sold to us as benefiting from the presence of the ubiquitous valve—the valve PC cannot be far away (Would it get its sums right if it had a pentode processor?). Among the many types of valve equipment to hit the market in recent years it has not always been easy to distinguish between genuine attempts to provide a quality alternative and 'me-too' boxes, offering glowing innards but no discernible audio advantage.

One such red herring was a valve DI box which came my way a few years ago, and sounded no different from my solid-state boxes despite the inconvenience of powering it, warming it up and treating it with kid gloves. At the time it was a bit of a curiosity, but recently valve DIs have been catching the eye of the discerning and selling rather well. A new contender in the market is a 2-channel DI box from Ridge Farm Industries, known (for reasons which cease to be obscure as soon as you see it) as *The Gas Cooker*.

The two channels of the unit are completely independent, and each offers all the usual inputs, outputs and controls. Instrument input and the

loop through to the amp are on front-panel jacks next to the balanced XLR output, and a further output appears on the rear. As you would expect, phantom powering is not possible; *The Gas Cooker* requires mains, supplied via a rear-panel IEC. Contrary to normal practice, the loop through socket is not a hard-wired parallel to the input, as it is affected by the PAD switch, which can be tiresome. The attenuation of the pad is uncalibrated but appropriate (about 20dB perhaps), and the only other switch is the earth lift. Earthing arrangements are more involved when the DI box itself is connected to mains earth as this is. I unwittingly caught the unit out once with two amplifiers in different parts of the studio connected to the two DI channels—no combination of earth lift settings would get rid of a very loud hum. At the time there was too much of a rush on to investigate, and it probably says more about my studio's mains wiring than anything else, but mains powering of a DI box is another potential (no pun intended) complication in an already obscure area.

The other control—and the one which gives the box its name—is a big old-fashioned black plastic knob for level. The two of these, at the extreme ends of the panel, would certainly look more appropriate on a 1950s kitchen appliance, and although big accessible controls are never unwelcome the suspicion remains that these have been fitted for effect rather than practical reasons. Unlike the pad, the

LEVEL control does not affect the instrument's through signal to the amp, but controls the gain of the valve stage itself to the mixer output. It is, of course, not unknown for DIs to have straightforward gain controls, which to my mind are often of limited value and introduce unnecessary variables, but in the case of *The Gas Cooker* the control is there for a reason and offers interesting possibilities. In normal use it will be set to its nominal standard 'x1' position, but cranking it up brings in a distinctive characteristic as the effects of the valve become audible. This was particularly noticeable on a session where I was lucky enough to have a real Fender *Rhodes* in. Once we had fixed the piano (a vital damper had fallen off), we put it through *The Gas Cooker* and were immediately made painfully aware of the shortcomings of the intervening years' synthesiser imitations. Winding up the DI box's gain added a fullness, edge and depth which would have been hard to achieve any other way short of using an amp with all the noise problems that might have brought.

It had the same effect on a *CS80* string pad, where the combination of the analogue synthesiser warmth and the valve stage won everybody over. It seems to be stating the obvious to mention that the results on bass were superb, but indeed they were—clean, rich and smooth. This is a box that will win you friends among visiting bass players, particularly as the various inputs, outputs and gain controls allow it to be patched into

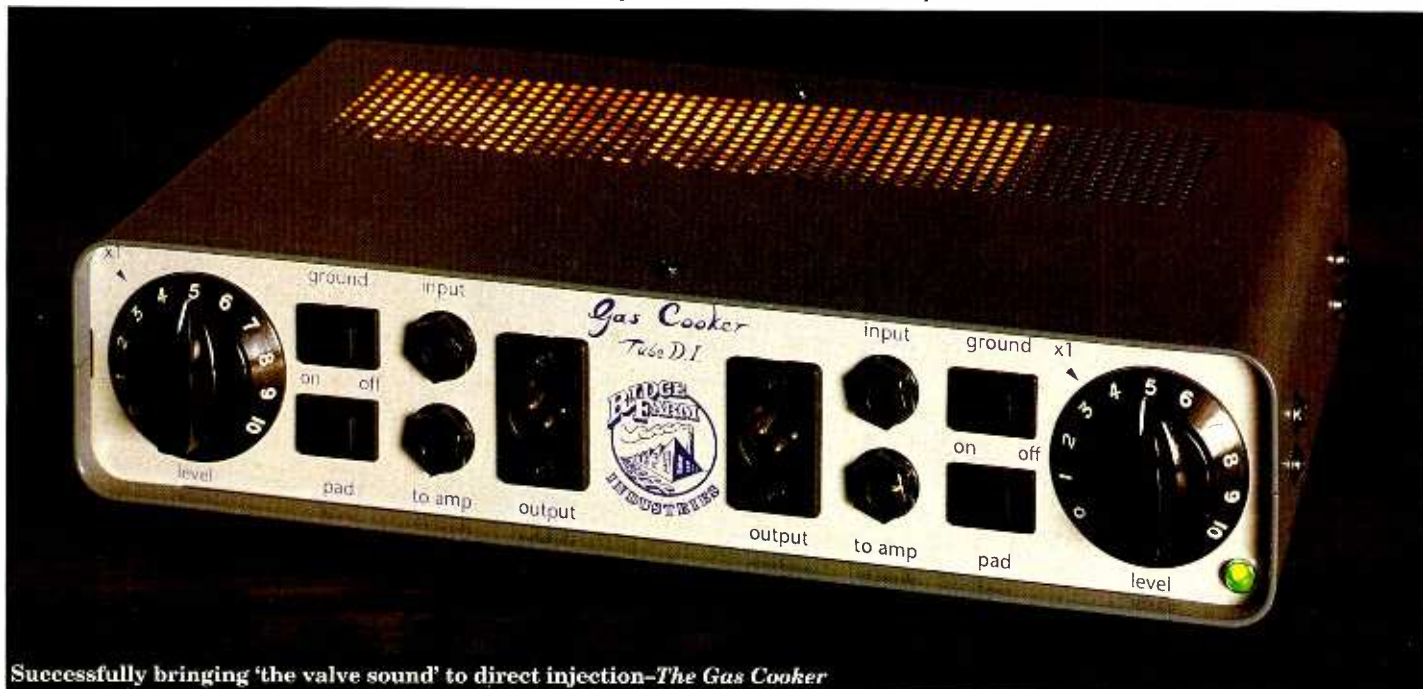
console inserts to add its contribution on the mix, a facility I used to good advantage when faced with a notably characterless bass track.

Even if the wheat can be sorted out from the chaff, the fact remains that the worthwhile valve products tend to line up in two camps. One type sets out to be as accurate as possible, adding an indefinable something in the process; microphone preamps generally fall into this category. The other approach is to use the valve to create a distinctive sound (although defining what that means remains difficult) and that appears to be *The Gas Cooker's* aim in life. The bonus is that without its GAIN turned up it still behaves like a well-specified straightforward DI—you have the option of using the valve or not as you choose.

Apparently we can expect more products in the same vein from Ridge Farm, and if they have the same flavour as *The Gas Cooker*, I await them with interest. In the meantime, *The Gas Cooker* deserves a listen as a good representation of the various faces of the valve market and a very useful piece of kit in its own right, offering a subtle valve sound when wanted, straight clean feeds when necessary and anything in between according to taste. ■

Dave Foister

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# Symetrix 528E

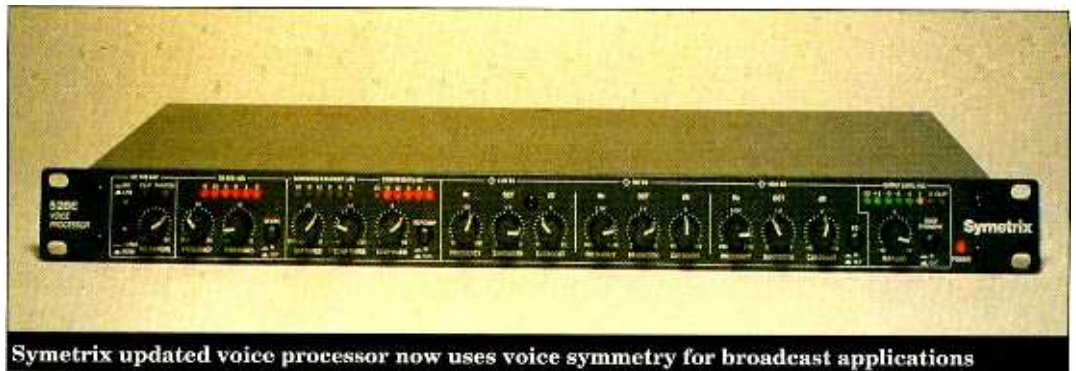
The Symetrix 528E Voice Processor supersedes the 528 Voice Processor, bringing with it new features and improvements. Like its predecessor, the 528E is a mono mic preamp-processing unit that has been designed ostensibly for voice applications. The unit offers a mic preamp, de-esser, expander, compressor, 3-band parametric equaliser and voice symmetry function (a new function added for broadcast applications) all housed in a 1U-high 19-inch case.

Although this mid-priced unit has been designed for speech processing and is particularly suited to voice-over and broadcast studios, it has wider applications and will be of interest to smaller studios looking for a general-purpose, high-quality stand-alone preamp. In fact, prior sales of the 528 in Europe have demonstrated the broad appeal of the unit in broadcast, recording and live applications—interestingly, in its native America the 528 has been adopted more by broadcasters as a DJ's mic processor.

With the 528E, Symetrix have managed to pack a lot into a small space without over cluttering the front panel or over miniaturising controls. Having said this, the control aspect has been kept quite simple with certain parameters—such as attack and release times—being fixed within the unit. Bearing in mind its size, the 528E is not short of displays, and a useful selection of indicators have also been neatly incorporated: 6-segment LED strips individually showing gain reduction for de-essing, expansion and compression; there is an 8-segment LED display for output level; and there are single LEDs to indicate input clip, phantom power and mains power.

Front panel controls are divided into five main sections arranged from left to right following signal flow—Input section, de-esser, dynamics processing, equalisation, and output section.

Unlike the previous unit, the 528E includes a MIC-LINE switch—however there is no control for line level, and this will have to be optimally adjusted from the source. The mic path has 60dBs of gain and includes a 15dB pad; it also offers phantom power, but the switch for this has



Symetrix updated voice processor now uses voice symmetry for broadcast applications

been positioned at the back which will make operation awkward when the unit is rackmounted. A nice touch though, is that when phantom power is switched on or off, an output dim is automatically activated to avoid power thumps.

The mic preamp has been upgraded with improvements being made to low level distortion. Performance wise it produces a clean, uncoloured signal with low noise, which should easily match the performance of high-end consoles.

The de-esser comprises a continuous frequency selector (800Hz–8kHz), a threshold control (-30dBu–0dBu) and a BYPASS switch. The frequency selector operates as a shelf filter rather than a peak filter, so that everything from the 'sensed' frequency and above will be attenuated. The problem with this arrangement is that the processing removes high-end frequencies in a broad sense, rather than allowing sibilance to be pinpointed and dealt with in a defined band. The net result is that to successfully de-ess a signal, one can often end up with a general high-end roll off making the signal appear dull. Compared with peak sensing de-essers, the system is harder to use to inconspicuously control sibilance. However, it does have other uses and generally proved effective as a broad-band, high-end limiter.

The expander and compressor share the same VCA and are combined into one section with an overall BYPASS switch. The expander has just one adjustable parameter, Threshold (Bypass to 0dBu), and the compressor has adjustable Threshold (-40dBu to +20dBu) and Ratio (1:1 to 10:1).

The expander worked well on a variety of programme material producing smooth, clean attenuation of noise, and convincing dynamic stretching. Although the expander ratio is fixed, it does vary with threshold and at high threshold settings will increase slightly. Attack and decay remain permanently fixed.

The compressor on the other hand, although perfectly adequate for straightforward speech processing, is less versatile when used on other programme material. The absence of adjustable attack and release controls is at times frustrating—attack time automatically adjusts with transients, while release remains fixed. That said, one does have to make allowances for the price of the unit and remember that not every faculty can be included.

Equalisation is from three, generously overlapping bands that collectively provide an impressive frequency range from 16Hz–22kHz. Each parametric band has a very wide range Q control giving 0.3–4-octave bandwidths, and centre detented gain control  $\pm 15$ dB. The gain range was originally -30dB/+15dB but it was felt that attenuation at this resolution was difficult to use. The equaliser has a 'leap frog' topology which basically means that separate boost-cut amplifiers are used for each band—some cheaper EQ units share one amplifier which can cause inter-band interference. The equaliser offers plenty of control, and using a broad Q setting is capable of boosting frequencies up at 28kHz. The sound of the EQ does have a tendency though towards brittleness and harshness, lacking overall warmth—Symetrix put this down to the fact that their filters are extremely accurate and do not attempt to colour the sound in anyway.

The output section includes a gain trim ( $\pm 15$ dB) and the VOICE SYMMETRY IN-OUT switch. Voice symmetry has been designed to compensate for asymmetrical waveforms present in speech. This mainly has applications for broadcasting to avoid negative overmodulation. In normal studio use it has very little audible effect, although Symetrix claim that it can help give slightly higher overall levels by improving speech symmetry which,

in turn, may allow less compression.

Although the various processing sections each have a bypass switch, there is no overall system bypass facility which would make a useful addition. The unit is not supplied with a power switch, but this can be optionally fitted to the rear panel.

Also on the back panel are a series of insert in-out jack points (these replace the original terminal strip on the 528), which allow the signal flow to be interrupted and rearranged. So, for example, if I prefer to equalise before dynamics processing, this can easily be achieved by inserting a couple of patch cords to reroute the signal.

These jack points may also be used to insert external processing into the signal chain. Additionally, the dynamics section contains a side-chain input allowing either an external equaliser or the internal equaliser to be patched into the control circuit for frequency conscious operation. Main balanced inputs and outputs are via XLR, although an additional unbalanced line output is provided on a jack socket. The balanced line output can alternatively be converted to mic level through internal switching.

The 528E Voice Processor offers a lot of functions in a small package. Contrary to the implication of its name, the unit can be used on a wide range of material. However, certain control aspects have been simplified or omitted in line with the cost of the unit, and it is worth checking carefully that the level of processing meets specific requirements, in particular operation of the de-esser, compressor and the sound of the EQ. ■

Patrick Stapley

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# Panel beating

Think of eye-catching front panels and you are likely to think of Focusrite, and particularly their *Red* range. The assumption that the distinctive red panels are there for cosmetic purposes or as pure self-indulgence misses most of the point, however.

Focusrite's Richard Salter explains: 'When we began work on the *Red* range we knew that we had to design suitable mechanics to support all the transformers in our circuits, to provide substantial protection for these valuable products and, of course, to satisfy the key design target that all our products should outlive us. In addition we have always been concerned about the overall safety of racking systems, whose rigidity and structural integrity has often been less than acceptable. Therefore we determined that should *Red* range modules cause a rack to deform under their weight, the rack would still be a true 19-inch frame, even if slightly shorter than intended. Extensive research in our smallest laboratories led us to the conclusion that a curved profile was essential—remember how strong empty cardboard rolls are. Further investigation suggested that aluminium extrusion would fulfil this strength to weight requirement and could be coloured a beautiful deep red.'

'As is noted in the *Focusrite User Handbook*, Focusrite is concerned about the safety aspects of racks not completely filled with *Red* or *Blue* modules—apart from the obvious sonic problem, the empty spaces can cause injury in so many ways. So the *Red 0* blank panel was born as the optimum way of filling those empty spaces safely, elegantly and with the usual Focusrite transparent audio performance. Following unprecedented demand the *Red 0* is now available in a range of 'U' sizes, and Focusrite is proud to say that there has never been an instance when a *Red 0* has failed to keep our customers safely out of empty rack spaces.'

EMO's approach to the mechanics of the front panel is not dissimilar to that of Focusrite, as is their commitment to audio quality. This has led them to explore the effect a product's front panel can have on its sonic performance.

'Not perceived quality,' comments EMO's Mike Reay, 'although we always try to make our panels look the part, but a real concrete difference that can be heard by anyone listening through a good quality monitoring system.'

'Traditionally we have constructed our panels from aluminium, but for two years we have experimented with different materials. We have used rare metal compounds with some success but unfortunately the cost is unacceptably high. However, recent experiments with oxygen-free alloys have been very encouraging. Our listening panel of respected audio engineers has noted a marked effect on audio quality, especially at high frequencies, apparently extending well beyond the accepted range of human hearing. These alloys, while not cheap, do not carry the price penalties of their rare companions and may be the way forward.'

One further avenue EMO are exploring is the forming of front panels from thousands of thin wires treated under high pressure to form a solid mass. The result is a stable, rigid panel of great strength but with a skin effect more akin to a piece of multistrand audio cable than to a block of solid metal.

Drawmer's Ivor Drawmer is keen to emphasise another role: 'One of the functions of a front panel is to inform,' he says. 'Let's face it, people don't really read manuals—they trust their knowledge and experience to guide them round a new piece of equipment. If you don't make it clear on the front panel what your device is doing and how to get results out of it, you can hardly blame the users if they misunderstand something or even miss some features altogether, and then think less of your equipment as a result. Even making it legible can be a problem under some of the lighting conditions equipment is likely to encounter, which is why we use black on white. For a simple processor all this is reasonably straightforward, but as the device gets more complex so does the task of helping the user. Where do you put the information? Some have tried printing it on the top panel, but who can read it there? Little multimenu screens and softkeys are only half the answer; people like the reassurance of dedicated labelled controls, and we think we achieved a good balance with the *M500* in this respect. The next step is perhaps even larger displays which themselves act as the

control surface, with touch response, on-line help and even the complete manual available on screen. You could have "tips of the day", multilingual instructions, calculator and notepad functions, and even sell advertising space. Structurally this gets awkward as you eat away more and more of the metal until the front becomes one big screen, but this can be got round with stronger side members and base trays.'

The focus for the front-panel design during CEDAR's recent development of their new range of processors was electromagnetic interference. Mindful of the imminent EU regulations tackling this problem, CEDAR built their casework to form a Faraday cage surrounding the circuitry within, and in the process discovered an unsuspected spin-off.

'It is well known that there are many people who can't wear watches,' explains CEDAR's Gordon Reid, 'and I think we all know at least one person who seems to have a detrimental effect on electronic devices—perfectly healthy equipment can inexplicably fail or misbehave simply because that person has walked into the room. What we didn't realise until we started investigating the new EMC requirements was that research is under way into this phenomenon, and factors are emerging to explain the Remote Influence of Personnel Syndrome (RIPS) and the resulting Personnel Induced Problems (PIPs). Details are still hazy, but it seems certain that some form of electromagnetic fields from such people are responsible for the effects. The good news is that the thorough shielding we incorporate in CEDAR equipment, which exceeds the new EMC requirements, also appears to protect the circuitry from RIPS and PIPs. Controlled experiments are hard to carry out, but preliminary results suggest that our Faraday cage, known in-house as D-CEDAR, of which the front panel is an integral part, can reduce PIPs by a factor of ten.'

Technology, then, reaches the front panel, which these days is clearly far more than a bit of metal with holes for the knobs to poke through. ■

Len Frapton

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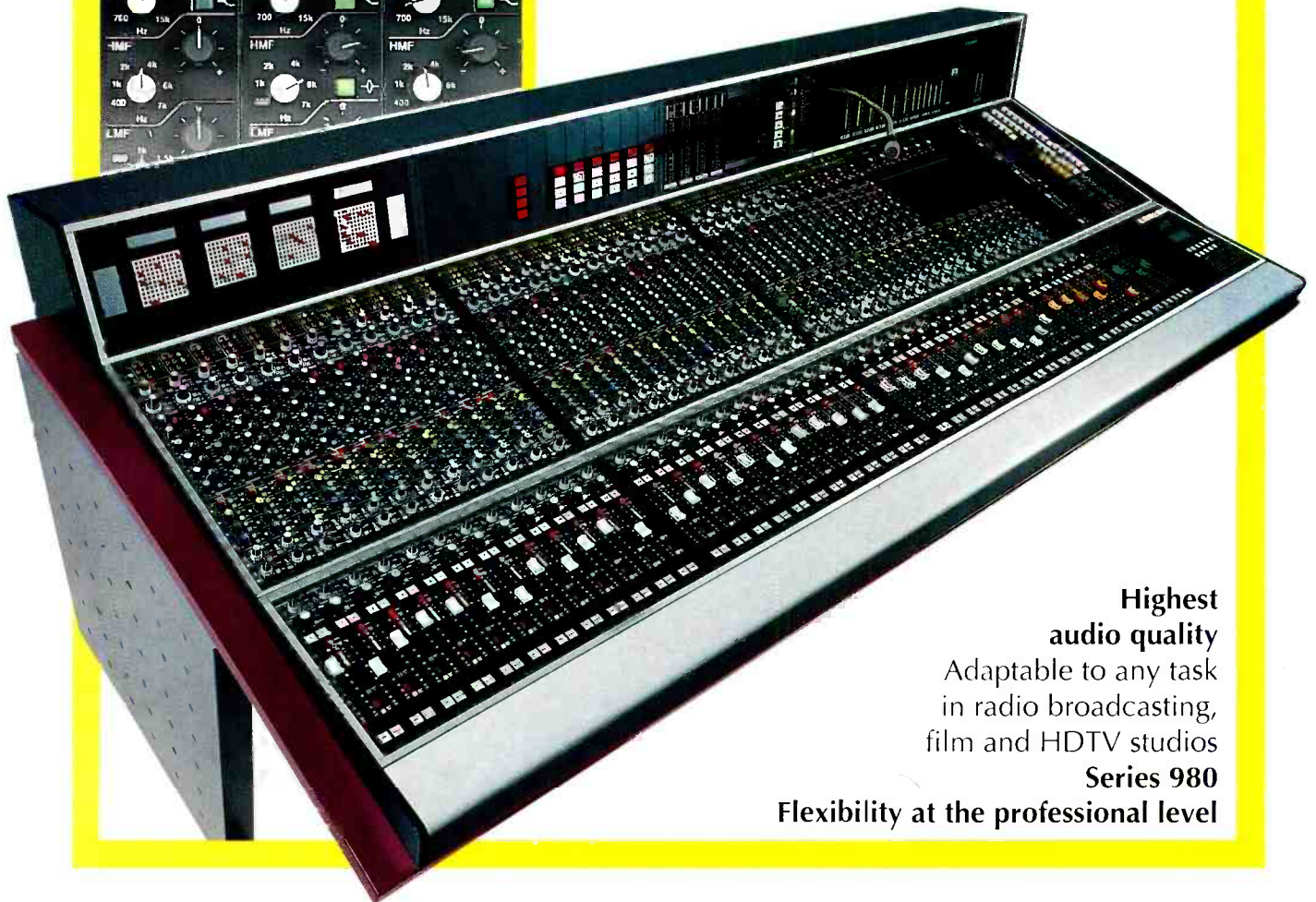
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A glimpse of the multimedia future—computer-based audio from Yamaha

## Yamaha MU80

Furthering from their original drive into computer music-orientated tone modules, Yamaha's *MU80* goes a little bit further than most. It offers 729 voices in a half-width 1U-high box, along with the now commonplace *Mac* or *PC* computer interface and two separate MIDI inputs to realise the box's 32-part multitimbrality and 64-note polyphony. There is also an external input for instrument sources which can be mixed in with the voices in the box and full GM compatibility with enhanced control courtesy of Yamaha's XG (extended GM) implementation.

The *MU80* is based around a large LCD peppered with graphics. One great thing about the display is that it presents bar graphs for things like MIDI channel allocation in blocks of 16 across the 32 parts. You also get a collection of initially fairly difficult to decipher icons representing the type of instrument a particular sound is based on and other icons tied to legending below the LCD indicating the amount of level, expression control, pan, sends to the reverb, chorus, and variation (an effects module that includes dynamics in addition to reverbs, chorus and pitch change among others) and transposition going on in a part. Any icon that is selected gets its values thrown up as bar graphs for a group of 16 parts.

It is welcome and useful because it gives at a glance status although the *MU80* sorely needs a dial for data

entry as UP-DOWN button presses (in increments of ten or one) just do not cut it if you are altering loads of values sequentially especially when you have the fineness of control available for such things as pan position.

Buttons are provided for entering play, edit, utilities, effects (the *MU80* has a built-in multi-effects processor with five effects modules), multi mode setup and EQ. Thus there is a switch for entering every important operating mode. Thereafter, travel to pages and across and along icons is controlled by select and PARAMETER UP-DOWN switches and two further buttons for addressing voices or parts.

Parts can be muted and soloed on a key and actions are confirmed or ignored on ENTER and EXIT buttons. A single, stereo, audio output leaves on individual back-panel jacks, overall level is controlled on a front-panel pot, there is a headphones output and the aforementioned external stereo or dual mono input with its own level control into the A-D converter circuit.

General operation is simple and you really have to be inattentive to get lost, however, the sheer quantity of adjustment possible will startle some users. The *MU80* could probably have done with some supplementary paired and assignable audio outs to unlock its potential but then it would probably become a completely different box and held a heavier price tag altogether.

The effects are useful in that you can apply them to individual sounds and to the whole resultant mix simultaneously. The presence of an external input on the front panel conjures up visions of karaoke but it is better than that because in addition to being able to plug in a mic or two you are in fact getting the

makings of not-so-bad guitar preamp with access to the effects in the same way as all the internal sounds plus a selection of distortion types and some EQ. Is there no end to the ingenuity behind this little box?

To my mind the *MU80* illustrates just how far things have gone in the synth stakes in the last couple of years in that such a diminutive unit can supply an *AWM2* tone module with phenomenal polyphony, a computer interface, guitar-mic preamp and multi-effects in one combo. This is a unit that is positively crammed with good sounds and brimming over with features that make it staggeringly varied in nature.

There are in reality almost too many features available because while the interface is good for so well stacked a box, the *MU80* never succeeds in hiding the depth of its capabilities from the user. That is simply because there is just so much in it. This is not a criticism, it is an observation.

Sound-wise it is predictably able and in line with the sort of tones that have characterised the majority of synths on the market at the moment—varied but very contemporary. The GM tones are good but the XG extension certainly gives a wider palette of similar but different sounds along with some original sounds of its own. It is an excellent all-rounder.

You could argue that the *MU80* attempts to do too much—if you take the tone editing possibilities with the effects and the general performance commands and multiply them by 32 parts and add a couple of analogue inputs you'll get the picture. The temptation to underuse the device's full potential is strong. However, this cannot detract from what is quite a ground-breaking product—powerful

### XG

Described as an extension of the GM standard and 'to meet the requirements of the coming multimedia age', Yamaha's XG provides a higher level of control while maintaining GM compatibility. Significantly, XG is designed for future enhancement and expansion as sound module technology develops.

XG expands the number of available voices beyond the 128 of GM by using voice bank commands alluding to different specific musical characteristics. It also provides standard methods of darkening or lightening a voice, a means of altering such things as voice attack, for example, and other voice modification parameters above those offered in GM. (Harmonic Content modifies the resonance of a sound while brightness modifies the cut-off frequency of its filter.)

Effects are also integrated into the spec by such things as the control of effect type, parameter selection and adjustment and includes equalisers. Finally external audio inputs (optional) can be controlled digitally from within an XG equipped unit alongside its own internal data.

XG devices have at least 32-voice polyphony and can receive on at least 16 MIDI channels. Program changes on the rhythm channel instigate drum kit changes.

Bank select overcomes the limitation of GM's 128 voices by making 16,384 different banks available. Control change enhancements include the alteration to the rate of pitch change in portamento plus the addition of sostenuto and soft pedal controllers. ■

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# CRITERIA RECORDING

Dan Daley explores a studio facility in Miami, Florida, whose renaissance parallels that of the city

The cab driver has a gnarled and highly tactile visage. At least, the half-moon of it that can be seen from the rear seat—a Mercator projection of age too long in traffic. He accepts the fare with a nod and a flip of the taxi's meter and sets off down a crowded Collins Avenue, the sinuous, narrow spinal column of the tidal island that is Miami Beach.



Joel Levy, owner of Criteria Recording Studios

Within moments he begins speaking in that quasi-New York accent that is characteristic of Miami, the southernmost non-Southern city in the US. It turns out he's from Philadelphia, been here since 1959 and he is poised to launch into the kind of soliloquy that is common to cab drivers from Karachi to Chicago and which threatens to lurch randomly anywhere from the weather to O J Simpson. Fearing the latter topic—the weather is unremarkably fine for February—one sits back and steels the ears as the traffic gets thicker. However what follows is a highly personal historical retro- and introspective that puts Miami into a new light.

'See dat vacant lot over dere?' the cabbie asks in nasal South Philly tonality. 'Used to be da Singapore Hotel. Meyer, he used to live dere, walked his two little dogs on a beach alla time. Never alone, though.' Meyer was the diminutive but powerful Meyer Lansky, the financial genius behind 'Lucky' Luciano's, uh, family, enterprise that ruled the glitzy hedonism of Miami Beach and Havana, 100 miles to the south, in the 1950s and early 1960s, until Fidel Castro came along and screwed up everything. 'Every night, a car would come outa da Singapore, no lights on,' he continues. 'Then another car, no lights on. That would be Meyer. He was heading towards Wolfie's—as good a delicatessen as you get south of Brooklyn—'But Wolfie would never have him. So he'd go to Junior's instead. He'd be there with a whole bunch of his people and he'd have two cups of tea and two bagels and he'd leave \$125 tip. Dat was good money in those days.'

Depending upon what you're about, it's not bad today, either. But the driver's *ad hoc* discourse illustrates vividly the grandeur that was once Miami Beach, a place where early television star Jackie (*The Honeymooners*) Gleason used to do his show from and which he would punctuate with the line, 'Miami Beach audiences are the greatest audiences in the world! Good night, everyone!' It was Las Vegas without the legalised gambling. Showgirls and classy pimps. Tony Bennett at the Americana Hotel with good champagne and Havana cigars.

But Tony Bennett's back in the charts and cigars are back in style. And so is Miami. After a precipitous decline in the 1980s in which the city's perception changed thanks to drugs, illegal immigration and a few highly

publicised tragedies involving German tourists, Miami has rebounded in a big way, as has its position as a musical capital. And while the city has seen the arrival of several major recording facilities in the last five years, one has been there through it all and is watching as its fortunes undergo the same rejuvenation as the city itself.

Criteria Recording Studios were born in 1957, the progeny of jazz musician Mack Emerman, who saw his part-time fascination with recording grow into a fully-fledged business. Starting out as a single-room facility with an Ampex console, the facility was expanded and structurally modified several times over the next two decades, growing into a 5-room complex in a low-slung building (which also grew in size with structural additions) in an area that also housed many of Miami's broadcast and postproduction sites. During that time, Criteria became synonymous with an entire generation of rock and pop music. The facility's original main studio, now a storage room, is where Derek and the Dominoes recorded *Layla*; the Baldwin piano upon which Bobby Whitlock spontaneously created the famous coda to that track is in regular use in another of the studio's rooms. But with the exception of more gold and platinum album awards than the studio's capacious walls can seemingly hold, there is no museum quality to Criteria. This place is all business. The Allman Brothers, Beach Boys, Count Basie, David Bowie, Blood, Sweat and Tears, Crosby, Stills, Nash & Young, the Rolling Stones, Jimmy Buffet, Fleetwood Mac, Dan Fogelberg and scores of other artists who defined the era were regular or occasional clients. The studio's first ever gold record was for James Brown's 1961 soul rave-up *I Feel Good* and the mounted award bears the somewhat stilted but touching inscription '...Criteria's splendid workmanship and recording... is greatly appreciated.' The Bee Gees would book the place out for months at a time just to write the songs for their records, then spend a year or so recording them there.

Those kinds of budgetary excesses drove the US music industry into a tailspin in the early 1980s, and Criteria's, like other major studios', fortunes fell with it for a time. What set Criteria's course apart from many others, though, was a diverse client base that has now grown to include 40%



**Studio B—with the largest US East coast SSL 4096G+ desk and custom monitoring—recently redesigned by George Augspurger**

Latin artists as the area increased its Hispanic presence in the 1980s, a reputation for excellence that survived the lean years, and a staff—more like a family, really—that wouldn't quit, such as Margie Curry, who started as the studio's receptionist the same month Clapton and company commenced the recording of *Layla* in 1969 and who is still there as the studio's general manager. And her son, Trevor Fletcher, who says he grew up in the studio, is the facility's studio manager.

That also includes the current studio owner, Joel Levy, who began as an accountant at Criteria in 1985 and who bought the business from Emerman in 1989. 'We have kept plugging away, doing things at our own pace and in a way that we felt was best for the studio, not following trends,' observes Levy, a native Miamian with tousled brown hair and as much of a tan as one could expect from a studio owner, from behind his modest desk on a sunny afternoon. 'When Miami increased its Latin market share, we learned what that clientele wanted and developed it for them.' Silently supporting that statement, two doors down, Julio Iglesias' name is on the door to a private lounge, a practice the studio has developed for high-profile clients during their working stints there. REM, who just finished their most recent recording at Criteria, had a fuzzi-ball (pronounced foos-ball, a sort of mechanical table soccer game) lounge built for them and dubbed the Mike

Mills Memorial Fuzzi-ball suite. (It should be noted that the labyrinthian Criteria has more lounges than one can readily count tucked away in corners.) When Jimmy Page and David Coverdale came in in 1992 to make their collaborative record, Page wanted Studio C to become a bit more live sounding. 'I got a call in the middle of the night from Trevor saying Jimmy wanted to take up the carpeting in the studio,' recalls Levy. 'I said, "So, take up the carpeting." It was later replaced with a tile floor.

The result has been a steady stream of well-heeled clients throughout even the lean years of the 1980s, including Extreme, the Scorpions, Chris Walker, Screaming Blue Messiahs, Cinderella, Soul Connection and producers like Phil Ramone. What Criteria has been is a constant star on the horizon of Miami and American music recording, pushed and pulled by the ebb and flow of economic and aesthetic tides, but always afloat thanks to a combination of diligence, foresight, devotion to music and some luck. But the future poses even more challenges.

## Studio technology

Technologically, the recent addition of a 80-input, 96-frame SSL *G+ Series* console with *Ultimation* (the largest on the east coast) has created a nonpareil

mixing suite at Criteria, a move that Levy says has kept more clients completing projects in the facility. Of Criteria's five operational studios, three are SSL-equipped: the aforementioned *4096 G+* in Studio B, a 48-input SSL *6048 E-Series* in Studio D and a 48-frame *6048* in Studio E. A vintage 40-input Neve *8078* resides in Studio A and the one remaining MCI *JH532C* with 32 inputs is in Studio C, the room where the Eagles' *Hotel California* was recorded. At one time, Criteria was an all-MCI facility, desks and tape machines. In the latter department, the studio has two Otari *MTR-90 MkII* 24-track machines and a pair of Studer *A820* machines (with internal Dolby *SR* cage), a Mitsubishi *X-800* 32-track digital deck with Apogee converters and a Sony 48-track digital machine.

'I have to credit the SSL *G+* with being a big part of the studio's future,' says Levy of the studio's most recent large-scale acquisition. 'It was a big investment and a scary one, too. But it's getting and keeping clients here mixing. The Scorpions just mixed here and they were real happy with it.'

Physically, the studios themselves have changed relatively little over the years. The mix room, Studio B, was completely redesigned and renovated by George Augspurger in consultation with Levy. Its soffited monitoring is a Criteria-designed speaker system devised by Emerman in 1980 with TAD drivers and an Ed Long-designed ►

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## US RECORDING FACILITY

crossover system, which are also mounted in several other of Criteria's rooms. The two largest recording rooms are George Augspurger-designed Studio A—at 46-foot x 52-foot x 22-foot large enough to seat a symphony and which is used as a dubbing and sound stage and which features a hard cyclorama wall—and Studio E (designed by John Storyk and Emerman)—50-foot x 50-foot with a 27-foot ceiling and featuring motorised 'Acousta-Wing' units that can be remotely adjusted to various geometries.

The original rooms, Studios A, C and D, were designed in-house by Emerman (in the case of Studio A, with George Augspurger) based on designs Emerman had seen in Los Angeles and New York in the 1960s and 1970s. Their wood and glass (stained glass in the case of Studio D) interiors elicit a sense of older designs but sonically they are completely valid. The range of room sizes and technologies allow Levy considerable latitude in accommodating various budgets, another thing that's kept Criteria going so long. In fact, he says, the studio has no rate card for the rooms themselves; just a set of guidelines that allow maximum flexibility. The studio also maintains a digital editing suite with a Sonic Solutions system and Studio A has 35mm and 16mm film synch capabilities with Audio Kinetics *Q-Lock*, Adams Smith *Zeta Three* and *Lynx-Timeline Microlynx* synchronisers for scoring and ADR sessions.

Other technologies include Bryston and MacIntosh monitor amplifiers; Westlake, Altec, JBL, Fostex and Yamaha monitoring in addition to the in-house and Ed Long designs; a Meridian CD-R unit; three live echo chambers and five echo plates; a Symetrix telephone interface; a pair of dbx Subharmonic Enhancers; Panasonic *SV-3700* DAT decks; and Sony, Studer, Mitsubishi and Ampex 2-track and 4-track decks. The microphone cabinet is one of Criteria's particular sources of pride, and considering that they have been in business over the course of four decades, they've had time to amass a seriously vintage collection. It includes AKG *C12s* (tube and FET), ten AKG *414s*, E-V *RE-20* and *RE-15*, Neumann *U47* (FET and tube), ten *U-87s* and one *U67* tube. The studio's endurance over the course of many technology eras also finds a Wurlitzer and Fender Rhodes electric pianos—which Levy says are making serious comebacks in a kind of synthesiser backlash—and the no-longer-so-ubiquitous Hammond *B3* with accompanying *Leslie* speaker.

The studio has also offered a broader range of services based on experience catering to the more pampered rock stars of the 1960s and 1970s. You need tickets to a major league basketball, football or baseball game in Miami? Criteria will rustle them up for you, if it can be done. The same goes for deep sea fishing, sailing, restaurant reservations (Joe's Stone Crab House may take a day or two) and other concierge-like functions.

## Connecting with content

But while the technologies and amenities have kept pace, the studio business itself has changed, in Miami as elsewhere. Like most American studios

today, staff engineers are generally limited to assistants and freelancers are the norm. However, Levy says he's building a coterie of in-house talent that may change that arrangement in the near future. And the impact of personal recording technology is being felt here, as well—Criteria acquired an Alesis *ADAT* and sees more clients coming to dump tracks for overdubs and mixes.

In a response to much of these changes that Levy sees as pivotal to the facility's future, he has entered into a joint venture with Rich Ulloa, a Miami-based artist manager and independent record company owner. Ulloa runs Y&T Records and helped manage Miami natives The Mavericks into a platinum major label debut in 1994 on MCA-Nashville Records. The newly fortified Y&T label with Levy and Criteria aboard will expand the label's artist roster and begin using the studio to develop artists, following a trend in the industry for studios to operate less as solely service providers and more as content developers. (Platinum Island Studios in New York and both Ardent and Kiva Studios in Memphis have all created similar scenarios in the last year by starting their own record labels.) Initial signings to the production company include multicultural pop artist Nil Lara, who has already been signed to Capitol Records in the US and whose first recording is being done at Criteria.

'We have five rooms here; that's 120 hours a day I have to use the studios,' says Levy. 'The traditional hourly or daily rate client is still the priority for Criteria. But that will still leave a lot of time to develop artists and now to do so in a way that's more highly focused and organised, as opposed to simply doing spec deals. It's actually very exciting. Rich has demonstrated success in management and record company operations and the name Criteria lends a lot of credibility to the venture.' (It's also keeping Levy out prowling the many clubs of Miami looking for talent, a process compounded by the birth of his and wife Joan's first child. 'Hey, it can all be balanced out,' he laughs.)

The record company venture coincides with what Levy says is a nascent but growing commitment on the part of major national record labels to invest in Miami by establishing satellite offices there; Sony-CBS Records has one there to supervise its Latin artists, and others are reportedly considering following suit. Local and national organisations are also bolstering the local music environment; regional music paper *XS* cosponsored a well-attended music festival in Fort Lauderdale last December that drew 4000 attendees, evidence that more highly organised local networking is paying off; and PRO ASCAP held its own showcase there to foster local talent to national labels.

'Between that and the development of the Latin music scene here, Miami is a good place to have a studio like this, as long as we maintain an awareness that the nature of the music business itself is changing and that the studio business has to change with it,' concludes Levy. ■

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# BRÜEL & KJÆR 4040

Finished in brass and glass, the B&K 4040 would be special even if more than 100 were to be made. Dave Foister explores the edges of exclusivity

**S**urely no-one could approach the B&K 4040 with complete objectivity. Any microphone with such a remarkable combination of appearance, design, pedigree and price is bound to produce, initially at least, an emotional rather than a rational response. This could take two forms: there will be those who swoon at the very sight of it, certain that with its background it cannot fail to be worth every penny of its undeniably high price; and there will also be those who feel that there is perhaps an element of the grand gesture in the design, feeling (as many do about esoteric hi-fi) that the function of real return against expenditure must plateau out at some point and that the 4040 may well sit on the line past that point. Neither presumption has any validity without some knowledge of what the microphone can do, but the point is that some form of irrational preconception is surely unavoidable.

Many companies like to think their products are the standard by which others are measured but in Brüel & Kjær's case this is literally true, as they are still a strong presence in the test and measurement business which they have dominated for decades. Even other people's measurement equipment often uses B&K reference microphones, and their studio microphones are among the most highly respected in the business. It will be remembered that when they first ventured into the recording market, B&K refused to make anything other than an omni microphone as they were not prepared to accept the sonic compromises of cardioid operation.

With such a background, any new mic from B&K is bound to be greeted with some considerable interest, and when that new model is as striking, conceptually and aesthetically, as the 4040, then that interest is multiplied.

For those who have missed the announcements of its launch, the 4040 is a limited edition microphone—only 100 will be made—which houses both solid state and valve preamplifiers inside a substantial hand-made gold body. The outputs from both sets of electronics are delivered independently, allowing outboard mixing of the ir respective two sonic characteristics.

Brüel & Kjær microphones have tended to be fairly visually anonymous, clearly descended from their laboratory counterparts, but the 4040 is anything but, as befits its generally attention-demanding image. The body is all gold, including the typical B&K grille, and is sleeved in glass under which lies an engraved panel proclaiming the 4040 to be hand crafted. It is substantially bigger than familiar B&K models, with a larger (one-inch) diaphragm, and space in the body for what one assumes are all the additional electronics. With trembling hands I opened the body up for a look inside, to find a sparse but immaculately laid out and finished (and obviously hand-assembled) board. This has a cut-out near the centre carrying a valve very different from those often employed in microphones—a National 5899, no more than a centimetre in diameter and terminated in wire lead-outs hard wired to the board. This is, in fact, a specially selected SQ (special quality) version of a valve B&K have used for 30 years or more in their test gear and elsewhere; they still have a 1968 preamp based on this valve which continues to work perfectly. Four transistors make up the solid-state active electronics, and the passive components within the microphone itself do not number many more. In fact the double-sided board has more empty space than components on it, and leaves one wondering why the microphone needs to be quite so big; then again, component layout in a condenser microphone is of vital importance given the very high impedances involved, so we must credit B&K with making the microphone the size and shape it is for practical reasons rather than in the interests of catching the eye.

## Connections

The 4040 attaches to a stand with a simple and surprisingly slender clip, cradling the body at two points but with no attempt at elastic suspension. If I

had paid the asking price for this microphone I would be inclined to wrap it in cotton wool and hire a security guard to stop it getting knocked over; this stand attachment seems wilfully basic, especially when compared with some of the elaborate spider's-web affairs with which some manufacturers support more mundane microphones.

Similarly delicate, in a way, is the choice of connector for the cable to the microphone's separate power supply. The cable itself is an extremely flexible Mogami multicore and clearly of a very high quality, and the multipin plugs on the ends are sturdy gold-plated locking 8-pin Lemos, but small nonetheless compared with XLRs or the big military multis often used in this kind of application. I get the impression that while this kit is designed to stand up to professional use it is assumed that it will be treated with the care it deserves rather than (perish the thought) chucked about with all the other gear. Having said that, the review sample was the prototype, and its many journeys around the world before reaching me had left it relatively unscathed if not quite in mint condition.

The power supply, on the other hand, looks like a piece of military hardware, even down to the colour. Its corner-protected box carries the input connector for the microphone cable (identical to that on the microphone itself—no worries about trailing the cable out the wrong way round), the mains connector and fuse, a pad switch providing 10dB or 20dB of attenuation, no fiddly little slide switch this but a big rotary one, and, of course, not one but two XLR output sockets marked simply 'tube' and 'transistor'. There are unfortunately no tell-tale signs on the panel to let you know that these outputs are at line level; I had no documentation with the kit, and my monitors rather wished I had when I first pushed the faders up. Note that there is no polar pattern selector—this microphone, despite its complexity in other areas, is cardioid only. Since the supplied multicore cable is only 5m long the power supply must be sited close to the microphone, but as it then delivers line level signals to run however far is needed back to a console or recorder this is, perhaps, no bad thing.

The entire kit is beautifully made and presented, supplied in a slim, rigid briefcase with plenty of space for the



The 4040's glass barrel rotates to show either the serial number (review model: 000) or the internal circuitry

components and a channel around the edge for kink-free storage of the cable. The review outfit did not include the necessary IEC lead; this may have been an oversight (or it might have been lost by a previous recipient) but as there was no obvious place for it in the case I suspect it may not be supplied with the microphone.

The 4040 is effectively two microphones in one, for all that they share a common capsule assembly, and the two available signals must be assessed individually to begin with. At this point, actually listening to the microphone, one is tempted to reach for the thesaurus as the superlatives start to run out. The sound delivered by the transistor electronics is nothing short of breathtaking—as clean a sound as you will ever hear. The very slight lift around 8kHz serves only to make it sound ‘cleaner than clean’ and is not sufficiently pronounced to make the microphone coloured by any normal standards. The extended high frequency response is evident in the extraordinary openness and clarity, and just as remarkable is the absence of noise. The specs quote an equivalent noise level of 9dBA, and indeed any noise the microphone was producing was below the ambient noise level of my studio. I used it, as one inevitably must, on vocals, and it delivered a completely unstrained, relaxed yet full and vital sound. This is certainly not a strictly vocal microphone in the sense of having a characteristic which flatters the voice but its nothing-added, nothing-taken-away accuracy is to my mind at least as useful and probably more flexible.

In fact it seems strange, almost an insult, for B&K to describe it, as they have, as a vocal microphone. What defines its sound is not a personality or a tailoring to a specific task but a complete, refreshing neutrality. This is a microphone which could record anything and give any other model, however specialised, a run for its money.

Turning to the valve output reveals, as one would hope (otherwise there would be no point having it), more of a character, but such a subtle one that by comparison with most microphones it still sounds ultra clean. For once the word warm does not immediately spring to mind, as the flavour of the valve is not that strong; it makes its presence felt more in a roundness and richness. Where the transistors deliver clinical, almost brutal, precision, the valve provides gentle flattery. Its noise level, amazingly, is no higher than the solid-state electronics, and there is still no trace of strain as the SPL rises—the available dynamic range is simply huge.

Part of the idea of the separate outputs is the possibility of mixing the two characteristics to achieve the required blend. With this in mind, it is vital that the two outputs should be exactly in phase right across the spectrum, and listening and a vectorscope confirmed this to be the case. The two outputs add in just the way they should, and the possibility of delicate balancing of the pair is well worth experiment. We are in subtle realms here; the difference between the two sounds is nowhere near as marked as might be expected, and small variations in the balance between them need

concentration and good monitoring conditions to be heard. They are undoubtedly there nevertheless, and the facility to do this adds greatly to the microphone's appeal.

I feel I should own up to the fact that my personal, initial, attitude to the 4040—based on what I had heard about it and the sight of it when I opened the case—was the first of the two outlined at the beginning of the review; I expected it to be something special. This could have had two contrasting influences: it could have predisposed me to hear excellence even if it was not there; or it could have left me feeling let down if the microphone did not deliver the hoped-for magic. As it turned out, I am happy that I was able to give it a fair hearing and set such presuppositions aside, and I remain bowled over by its performance. The indisputably high quality microphone I used as a reference sounded like an SM58 by comparison (no offence intended to Shure, who I doubt would ever expect their stage dynamics to stand comparison with studio condenser microphones). The 4040 is a very special microphone, and anybody whose budget matches their aspirations to the very highest quality should be rushing to try it before all 100 are sold—be warned, the word is that someone has already bought two to place in a bank vault as an investment. ■

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# MIKROPHON MKE 13M

## *MKE 13M*—undiscovered Russian treasure? Dave Foister reports

**H**ere is a Russian microphone with a difference. The novelty of good, previously unknown microphones appearing from the old Eastern European countries has worn off as it has almost seemed as though more 'new' models have come from there than from the more familiar sources. Most, however, have been microphones long established in their own territories even though new to the

west; by contrast, the Mikrophon *MKE 13M* (pictured in Philip Newell's article 'Raising the Curtain', *Studio Sound*, February 1995, on St Petersburg recently) is genuinely a new model.

Mikrophon are a new company formed by two engineers from the Popov Institute of St Petersburg, where the Biocellulosis used by Sony in their headphones was developed. The microphone's packaging suggests that these are still early days; the case is nothing more or less than a cassette carrying case lined with foam and decorated with an apparently hand-drawn badge, although having carried it home in a torrential downpour I can vouch for the fact that it is weatherproof.

The microphone itself is a simple 2-part condenser affair, looking for all the world like a black Neumann *KM84*. It is almost identical in size and shape, and has a similar grille arrangement below a similar detachable capsule. It would be interesting to know whether further elements of what looks like a modular system are available or planned. The supplied capsule is cardioid, and the quality of the assembly and constructional details are good but nothing special. The same could be said of the whole body, which is well enough finished but not very neatly engraved. The output XLR is a good quality connector, however, with gold plated pins, and suggests that the price of the microphone goes towards the worthwhile practical considerations rather than mere cosmetics.

The stand mount is a plastic-lined metal clamp affair with screw tightening in the manner of the better AKG mounts to hold the microphone securely. After the usual spot of attention with a screwdriver the swivel supported the light weight of the microphone easily and offered a good range of adjustment. No wind shield is provided, although its 'standard' diameter of 21mm allows most small socks to be used; strangely, perhaps, a female XLR is supplied in case you need to make up an extra cable for it. The microphone requires phantom power at anything from 12V to 52V.

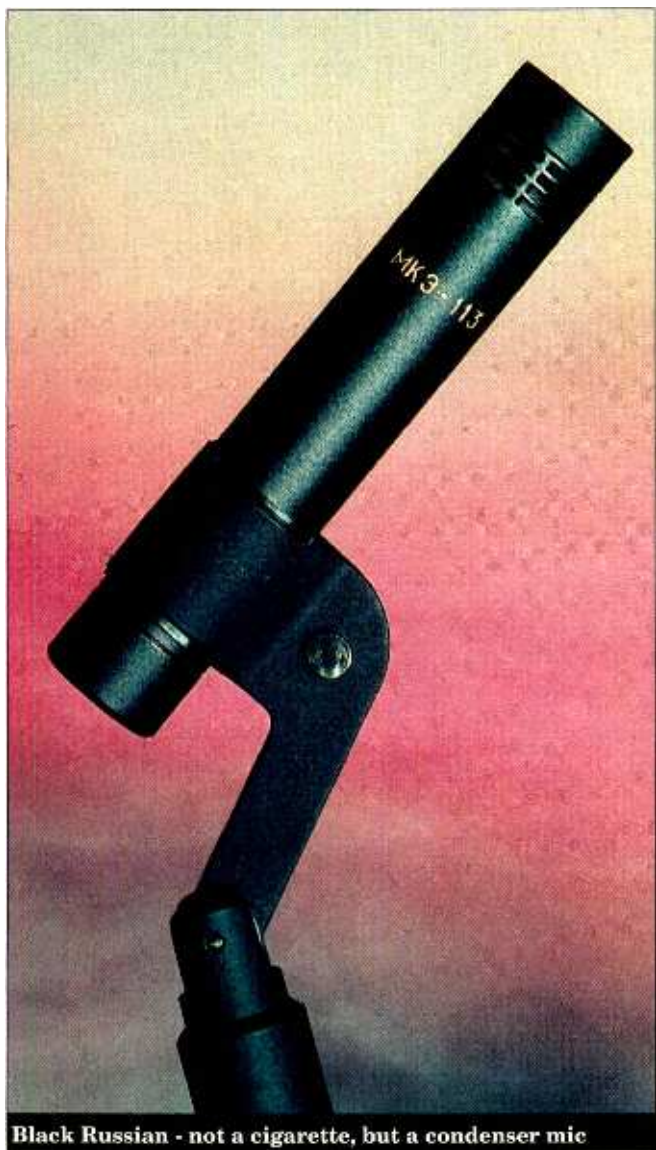
There is a certain type of sound one

hopes to hear from a small-diaphragm condenser microphone such as this. Rich deep warm bass is not generally to be expected, but clean extended highs should be present with as little trace of unnatural brightness as possible. The *MKE 13M*'s specifications suggest that this is what the microphone will produce, and actual use confirms that it is pretty much the microphone one would hope it would be. The frequency response is quoted as 31.5Hz–20kHz which seems fair, as does the sensitivity, which is a touch higher than average. Despite this, and despite having no pad fitted, the microphone appears to have acquired a reputation for being able to withstand high SPLs better than some of the competition, and my experience (putting it on a snare drum for instance) bears this out as well.

A single session provided the opportunity to use the *MKE 13M* on a wide variety of instruments, and in all cases it gave interesting and useable results. First impressions were very favourable, with the microphone's open clean sound immediately apparent. On acoustic guitar an A-B test showed it to be more present, perhaps slightly brighter, than the microphone I had chosen to begin with, and this was just what was needed for the track. Tenor saxophone gave a strong biting sound with all the depth intact, while soprano sax was detailed and singing. A potentially difficult instrument was a harmonica—one of the new plastic ones—which, even when played very close to the microphone (always a danger area with these), produced a rich yet attacking sound.

This is not a perfectly flat microphone, but its brightness is only slight and is often a help when an instrument needs to cut through. A whole track recorded with these might sound slightly thin, but in the context of other microphones it has something distinctive to offer. My understanding at the moment is that the *MKE 13M* is available very cheaply, in which case the wise will snap them up before word gets out and the marketing, packaging and price start to reflect the microphone's true worth. Another bonus from the peace dividend. ■

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**Black Russian - not a cigarette, but a condenser mic**





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# AT 4050-CM5

## AT 4050—impartial, accurate and overlooked? Dave Foister reports

About three years ago, I had the pleasure of reviewing a new microphone from Audio Technica—their first foray into the serious professional market. The mic was the AT4033 and it was a revelation, standing head and shoulders above the other models I had been sent to evaluate at the time and holding its head up with some pride in familiar top-end company. My only reservation about it was the fact that it only had one polar pattern—cardioid—and I commented that a multipattern microphone from Audio Technica would be an interesting prospect.

Audio Technica took me at my word, because not long afterwards they launched the AT4050-CM5, enthusiastically endorsed by Alan Parsons in their ads ever since. As expected, the microphone has been very well received among those who have

encountered it, but still awaits the big-time recognition the 4033 suggested it should deserve.

Physically the microphones are very similar. The 4050 retains the long, slim, rounded shape of the 4033, with a long side-firing grille through which can be seen the capsule assembly. At about 20mm in diameter, the diaphragms are an unusual size, being large enough to warrant this type of physical design as opposed to the tubular variety but clearly not as big as those used in the more familiar large diaphragm microphones. The capsule incorporates two 2-micron thick vapour-deposited gold diaphragms, specially contoured and aged through five different steps in an attempt to

ensure that the performance will remain constant for years.

The 4050 has a transformerless output design and consequently is claimed to exhibit very low noise and the ability to handle very high SPLs—149dB is quoted, without the pad, for distortion within 1%. Specifications for the polar patterns are also very impressive, being remarkably uniform with frequency; the supplied plots suggest that the off-axis response will be relatively flat and uncoloured whichever polar pattern is in use, which many will regard as vital. A surprising number of otherwise excellent microphones have an uneven off-axis response, giving a coloration to spill and ambient information which has a significant effect on the overall sound.

The 4050 sports three switches, controlling the 10dB pad, a high-pass filter rolling off 12dB per octave below 80Hz, and the polar-pattern selection. Three patterns are provided, with the expected omni and figure-of-eight characteristics augmenting the original cardioid. The only commonly-seen pattern not offered is hypercardioid, but I doubt if many people will miss that greatly, under-used as it generally is.

The normal method of attaching the 4050 to a stand is an elastic suspension mount, unusually supplied as standard, although a more basic stand clamp is also available as an optional extra. This would be required if two 4050s were to be used as a coincident stereo pair, as the suspension would make it very difficult to arrange them properly. The supplied cat's cradle is a splendid mount, the only difficulty being deciding which way up the microphone fits in it. There is one picture in the accompanying leaflet, but it seems certain that in the photograph it is mounted upside down, as not only is it awkward to get it in that way but once fitted, the mount obscures the switches. The trouble is that even the right way up, it is not easy to slip the microphone in and out, and I suspect that many people will end up leaving it in the mount permanently. The swivel for adjusting the microphone's angle locks off manually with a large winged handle—one up to Audio Technica. No

windshield is supplied, but a cylindrical foam sock is available as an accessory.

Actual use bears out the specifications in a most convincing way. The impression is that of a truly transparent microphone, combining the best aspects of large and small capsule designs. The extensions of the frequency response go as far as one could wish at both extremes, while remaining apparently flat and uncoloured. Neutral is not a word everyone would regard as a compliment, but for a microphone I hope it would be taken as such; I trust I am in the majority in expecting the best microphones to give me a neutral, accurate rendition of the sound they are receiving, and the AT4050 appears to be doing just that.

Obviously it cries out to be used on vocals, and this is an area where I believe the 4050 is already establishing a following. Certainly it gives great control over a voice, giving a complete rendition of the singer's characteristics without superimposing a characteristic of its own. This open accuracy is the key to any microphone's versatility, and it makes the 4050 capable of dealing with anything it gets thrown at it. Its ability to handle high SPLs makes this doubly true; despite its slender, delicate appearance, it does not need handling with kid gloves and tweezers and can happily be stuck in places where many condensers would complain. I put it on a snare drum, often the exposé of a condenser's Achilles' heel as it struggles to cope with the SPL and produces a strangled, squashed sound, but the 4050 was as unflustered as a good dynamic while still producing a much more extended accurate sound.

With its impartial accuracy, its exemplary technical performance and its uncomplaining versatility, this is the kind of microphone you could do anything with, dispensing with all the others if you wanted. Of course, nobody is going to relinquish their 414s, TLM170s, Schoeps and B&Ks, but it is this company in which the AT4050 unquestionably belongs. ■

Dave Foister

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AT4050-CM5 – it is intended that the performance will 'remain constant for years'



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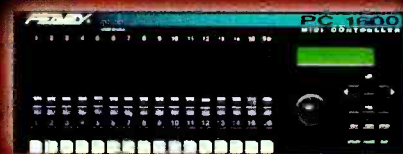


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# THE POSITIONER

## The Positioner—hands-off mic placement. Dave Foister reports

Every recording engineer knows, or should know, that the first step in successful recording is careful microphone placement. Time and again we are reminded that all the EQ and processing in the world cannot compensate for a poor original sound, and that getting the microphone in the right place to start with can often give you the sound you want right from the word go without any further messing about. The trouble is that no matter how much experience the years have brought there is always an element of chance about microphone placement. That no two grand pianos are alike in terms of what sound comes out, and where it goes, goes without saying, but the same can be said of most acoustic instruments—especially larger ones such as double basses but also including difficult instruments like soprano sax. Making changes to the aim of a microphone generally involves running backwards and forwards between studio and control room (making it very difficult to assess the effects of any changes), or using a particularly trustworthy gofer. In location recording the problems are often compounded by the inaccessibility of the microphones, especially if they are slung from the ceiling.

This last problem has already been addressed by one company who produce a motorised slinging arrangement,

complete with infrared remote control, but this is very specialised and has no obvious day-to-day application in the studio. For conventionally-mounted microphones on stands there has been no alternative to manual readjustment—until the introduction of *The Positioner* from American company Studio Techniques.

*The Positioner* looks very much like a small oxygen cylinder, which can give rise to a few wisecracks from respiratorily-challenged brass players, and contains motors and gearing for rotating and tilting a microphone attached to its top while its bottom is screwed to a stand. The clever bit is that power and control come from a cigarette-packet-sized remote connected via a single XLR tie-line—the fitted connectors are the right gender for use with a microphone line, which any studio ought to be able to provide.

Two rocker switches on the remote carry out all the movement control, and allow almost 360° of rotation and about 90° of forward or backward tilt. Power comes from a single 9V battery (PP3 type) in the remote itself. The motors inevitably make an acoustic noise, which sounds worse than it is in the control room having been transmitted mechanically into the microphone, so use during a take would not be possible. The switching of DC on to the control line also carries a risk of putting spikes into adjacent microphone lines in a cheaply-fitted studio. It could be said that any extraneous noises could get in the way of the subtle positional comparisons that the device sets out to help you make, but compared with the distraction of running to the studio and back while trying to remember what it sounded like before, I would have thought this aspect would pale into insignificance.

The ability to aim a microphone remotely, particularly a stereo pair, can be extremely valuable, as anyone familiar with the *Soundfield* microphone will be very much aware. The *Soundfield* has the advantage that since nothing moves, nobody knows you are doing anything and so nobody gets distracted; by contrast, the first time I moved a microphone with *The Positioner* the

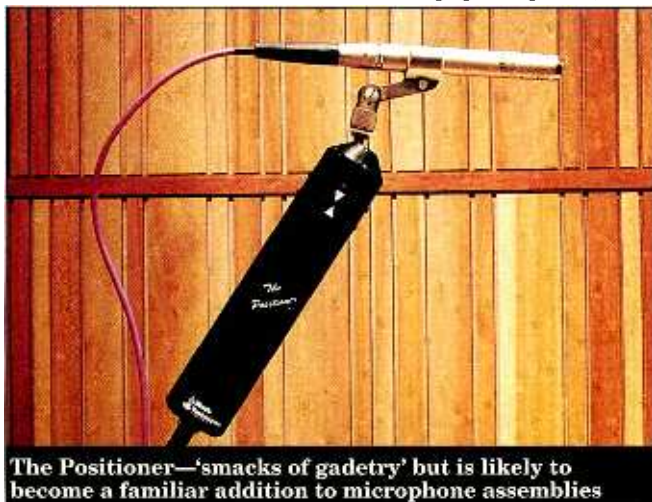
session came to a standstill as everybody fell about laughing. It must be admitted that a microphone moving around apparently of its own volition is a sight few musicians are prepared for, and smacks of gadgetry, technophilia and sheer showing off. This aside, its usefulness will be obvious to most, and it would be even more useful for slung microphones—it is less elaborate than the existing competition but also less expensive. With that in mind, it would be good to see some kind of lashing arrangement either fitted as standard or provided as an accessory to make suspension easier. Knowing how difficult it can be to make suspended microphones stay where you want them even once you have got them there, *The Positioner* offers an additional advantage in its size and weight, which would stabilise the centre of gravity of the whole array and stop things flopping about.

One small beef is the exclusive use of American standard 5/16-inch threads. For the few extra cents it would have cost, it would have been enormously useful to have been provided with the necessary adaptors to fit the unit on to a wider variety of stands. This is a peculiarly American problem; AKG, Neumann and Sennheiser all supply thread adaptors with their microphones as standard, but Shure, for instance, do not. On the plus side, there is a locking ring on the end the microphone attaches to, which makes it easier to align the microphone with the plane of movement of the tilt mechanism.

*The Positioner* cannot be the complete answer to the problems of microphone placement; it should be obvious that a lot of the more critical adjustments are going to need the microphone moved nearer to or further from the sound source, or from side to side, that is to say physically moved in space. *The Positioner* clearly cannot do this, so is only really useful for the final subtle adjustments. Having said that, anyone who does not know the difference a few degrees of tilt or rotation makes to the sound of a cardioid close to a piano should rush out and try it at once, and maybe they'll decide they could really do with one of these contraptions, whatever the musicians think. ■

Dave Foister

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The Positioner—'smacks of gadgetry' but is likely to become a familiar addition to microphone assemblies

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**Alan Parsons and  
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# ELECTRO-VOICE RE2000

## RE2000—a studio standard in the making? Dave Foister reports

**E**lectro-Voice have long been associated with dynamic microphones. They were the company who first brought neodymium magnets to the fore; they produced one of the most respected dynamics, the *RE220* of bass drum and *Midnight Caller* fame, with a sound not too far from that of a condenser; they were the ones whose sales rep used to call at one place I worked and accidentally on purpose drop all his samples on the floor just to prove they would still work. They always did, although the joke wore thin after the second visit.

All this makes E-V's latest offering something of a surprise. The *RE2000*, launched at the Paris AES Convention, is a big, brash studio condenser microphone with high aspirations and a few ideas of its own. There is no danger whatsoever of this getting muddled up with other people's microphones, as its appearance bucks the trend of discreet, slimline, rounded designs in a big way. More reminiscent of an old AXBT than anything else, its large, rectangular body hangs assertively in its cat's cradle suspension mounting—which appears to be an integral part of the construction rather than a separate accessory into which the microphone must be fitted before use. Being assembled in this way, the entire affair is nicely balanced, with enough stiffness in the elastic to avoid bouncing and wobbling but sufficiently careful mounting to deal effectively with stand-borne shocks.

The *RE2000*'s body has an interesting front-back asymmetry, making the bronzed front grille an unnecessary distinction from the black back, and the mounting hardware attaches at the back of the microphone rather than its base. The stand attachment is a bit of a

disappointment, being plastic in contrast to the largely metal construction of the microphone, and its swivel relies on friction which—surprise surprise—was not sufficient as supplied to support the review microphone's weight and needed tightening with a screwdriver. This is such a basic requirement, why are so few manufacturers apparently capable of dealing with it?

Electro-voice's main departure from convention with the *RE2000* is the fact that it does not operate from phantom power but uses a dedicated 'computer grade' power supply. This requires mains powering, which in some circumstances could be a problem as its connection to the microphone itself is via a captive cable terminated in a 5-pin XLR. No doubt this could be extended, but if one happens not to have a 5-pin extension about one the power supply must be sited fairly close to the microphone. Its output appears on a flying lead with a conventional (although gold-plated) 3-pin connector. The special power supply is evidently connected with E-V's Constant Environment System, designed to combat adverse effects of the operating environment by heating the transducer assembly. It is probably safe to assume that a chunky power supply is going to have the additional benefit of maintaining the required supply when the mike is driven hard, unlike phantom power which can drop when transients draw larger currents through its series resistors.

The microphone itself is almost as straightforward as it is possible for a microphone to be. Its polar pattern is fixed at cardioid, and its only controls are the usual pad and bass-cut switches, providing the expected 10dB attenuation and 12dB per octave roll off below 130Hz.

The other accessory supplied is, as might be expected, a windshield, but this is not the usual foam sock; the *RE2000* is the first microphone I have seen to be supplied as standard with a clip-on mesh screen, which slots neatly into special mounting brackets on the front of the capsule area, screening the whole front grille at a usefully close distance.

The size of the microphone, together with the power supply and the wind screen, makes the *RE2000* kit rather too much for a conventional storage box,

and consequently the whole setup comes supplied in a sturdy lockable foam-lined, plastic, carrying case not much smaller than a briefcase and twice as deep. Even so, there did not seem to be quite enough room in the various cut-out holes for all the components, and the lining was already damaged by the time it reached me (honest it was).

Since Electro-Voice have succeeded, perhaps better than anyone else, in making the sound quality of a dynamic microphone approach that of a condenser, it is reasonable to expect their first high-profile condenser to sound like a particularly good condenser, and in use this certainly turns out to be the case. It has a large body containing a diaphragm to match, and the sound is as big as its appearance would suggest. There is an impressive openness about it, with the expected large-diaphragm bottom-end warmth complemented by a top-end extension which lends an unexpected clarity and sparkle. There is, perhaps, a trace of personality, expressing itself in a slight forwardness—not a presence in the sense of unnatural mid frequency lift, but a feeling that the subject is slightly larger than life. This shows to good effect on the voice, of course, for which the *RE2000* should become part of the familiar armoury. A classical singer I was recording tested it to the full, with an enormous dynamic range including powerful sustained high notes; the microphone handled it all with ease, never showing any trace of stridency and providing a larger, clearer window on the voice than many microphones would have managed. The same was true of all the other instruments I tried it on, with soprano sax showing it to good advantage with its clear top end and essential warmth coming across intact.

The *RE2000*, with its elaborate construction and deliberately different styling, could look a bit silly if it did not deliver the goods, but it does deliver, very effectively, and deserves to become as familiar as its dynamic stablemates. ■

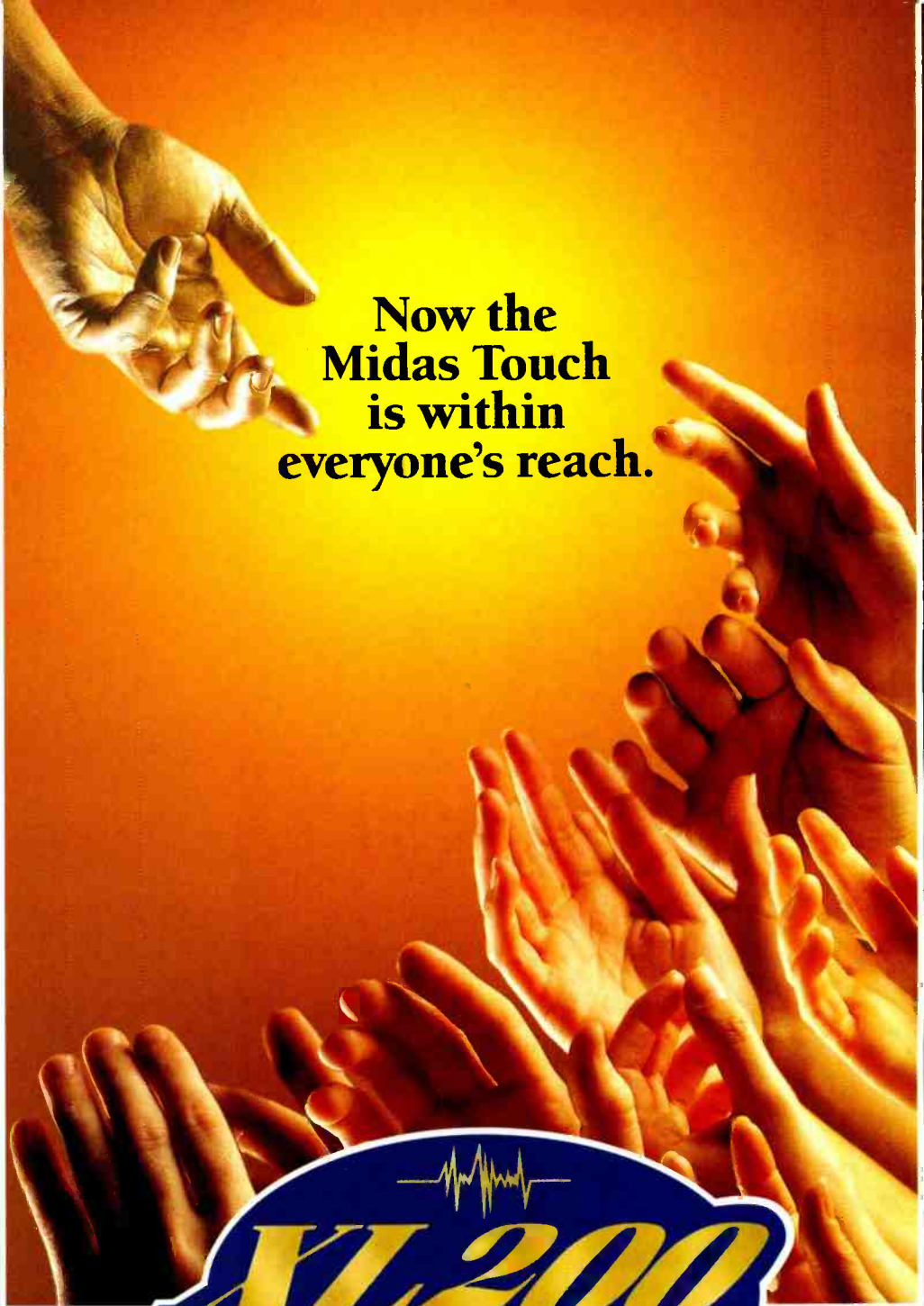
Dave Foister



RE2000 - Large body, large diaphragm, 'large' sound

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# SENNHEISER MD504

## MD504—too small to miss? Dave Foister reports

Look at any miked-up drum kit, on stage or in the studio, and the chances are there will be at least one Sennheiser microphone in the rig somewhere—the MD421 is a particularly familiar sight, for instance. It may be that in the future we will have to look a little harder to spot them, but they will undoubtedly still be in there in the form of the new MD504 microphones, dubbed 'thumbnail' mics by Sennheiser. These are positively diminutive dynamic microphones, described unhelpfully in the instruction leaflet as being designed for recording instruments, but clearly having as their main priorities the ability to reach inaccessible places where conventional microphones will not fit and the ability to hide.

So small and dinky are they, in fact, that they are liable to raise at least a smile from the musicians playing into

them. Without the connector attached, they look like the headlights off a bubble car only not so elegant; they look as though they could have been supplied with a Fisher-Price *My First Stereo* kit. They are made of lightweight yet reassuringly tough-looking plastic, and in the interests of keeping the whole thing small and easy to deal with the stand attachment is an integral part of the construction, joined to the microphone body by a swivel. To my astonishment, even these were not assembled tightly enough to stop the almost weightless microphone flopping about on the end of the stand—just like almost every microphone I have ever reviewed, they required the application of a screwdriver before I could use them. At least they were supplied with thread adaptors.

It is harder to say whether the microphones look more or less odd with the XLR connected. The protruding part of the connector is almost as big as the microphone body, and the receptacle in the microphone takes up so much of the space that it is difficult to see where there can be room for the guts. The advantages are immediately apparent when miking up a drum kit, as they can be poked in through the smallest gaps and still swivelled and rotated without their back ends crashing into adjacent drums or sticking up into the path of the drummer's flying sticks. It is fair to suggest, I think, that such considerations place constraints on the way a kit gets miked, as all too often the ideal place for a microphone from the sound point of view is just such a place as will get it bashed during a take. Given this, a microphone as small as the 504 offers a bit more freedom and flexibility right from the word go.

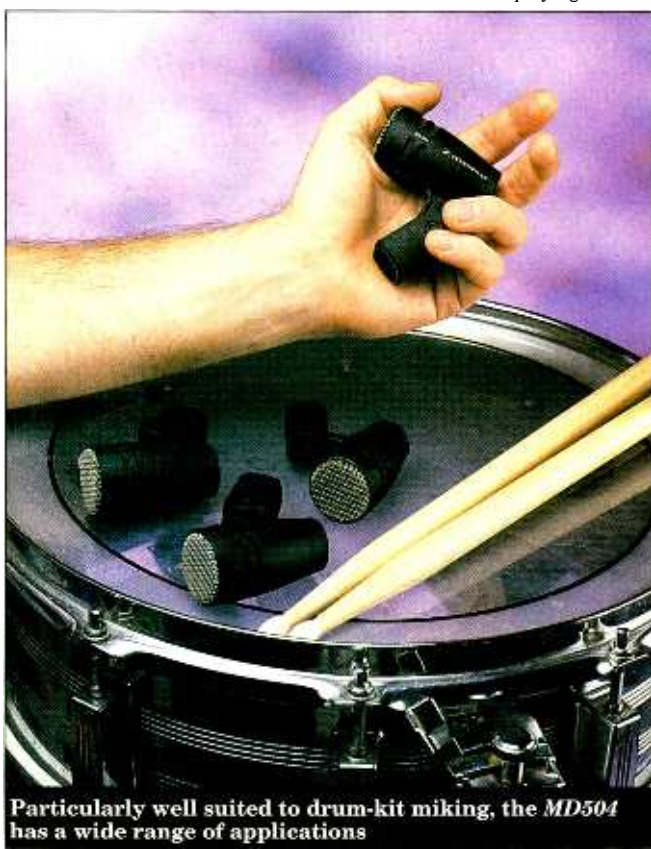
None of this would have any point of course if the microphone was not up to the job of close miking drums, and happily this is not a problem—far from it. The second main selling feature of the MD504 is a claimed fondness for high SPLs, and this too turns out to be very much the case. Placed inches from snares and toms these microphones never flinch, producing a sound which retains all the live bite of the drum with a clarity and up-front punch few microphones can

manage. This is never at the expense of the fullness and resonance, either—the sound is remarkably big and complete, belying at every turn the size and price of the things.

Although their special characteristics lend themselves particularly to recording drums, Sennheiser themselves do not focus on this application, suggesting, as has been noted, only that they are suitable for instruments. As it turns out, the generality of the instruction leaflet's description is not so wide of the mark after all. Determined to take Sennheiser at their word, I pointed the things at anything that moved, and they never let me down. In other situations where the dynamic is still often the microphone of preference, they excel; a guitar amp is a good example, again because the combination of punch and tolerance of high levels is exactly what the application needs. It does a helpful job on horns, as well, with both brass and reeds instantly acquiring that cutting character often needed in the mix without any tendency to lose clarity on the extremes of volume.

It will perhaps be no surprise that I did not try the MD504 on vocals; quite apart from it being the only area specifically excluded by Sennheiser's guidelines (as if that counted for anything) its personality would, I suggest, only be useful on the voice for deliberate effect. It simply isn't quite smooth enough for this kind of work, but then one would hardly expect it to be competition for the big familiar condenser mics. Elsewhere, however, it has plenty going for it both in the studio and outside—discreet, easy to rig, virtually disposable at the price, and producing an astonishingly clean, full and attractive sound in some very demanding applications. Expect to see them becoming a very familiar sight—assuming, of course, you can spot them. ■

Dave Foister



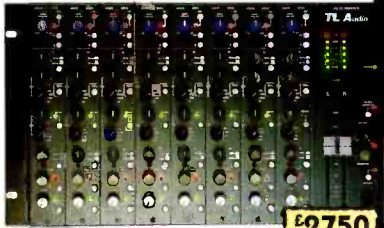
Particularly well suited to drum-kit miking, the MD504 has a wide range of applications



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# BPM TB94 & CR73

With or without valve circuitry, these German mics sound special. Zenon Schoepe lends an ear

Prompted by affordable large-diaphragm condenser mics from East Germany's Microtech Gefell and most recently Russia's Oktava, mic-meisters are currently having a serious attack of the 'you've never had it so goods'. Neumann's *TLM193* and AKG's *C3000* have joined the plunge downmarket with stripped down derivatives of more famous originals, and US manufacturer Lagevin have joined the party with the *CR3A*.

What these moves tell us is that once a low price expectation is established, manufacturers either join in or lose out. While it remains unfair to judge these affordable mics against the top-end models on the grounds of sophistication and flexibility, the cumulative effect is nevertheless to undermine them. In cost-conscious times, the arrival of such a wide choice of affordable product does not mean that mic cupboards will be emptied of exotica and classics but it does mean that when buying time comes around again, users are going to look a little further, listen a little harder and spend their cash

**BPM Studio  
Technik TB94**



a little more carefully.

BPM Studio Technik from Germany are the latest manufacturer to enter the mic arena with their *CR73* and *TB94*. Both are large-diaphragm mics and are 'affordable', however, the latter has the distinction of being an affordable large-diaphragm valve mic. Company owner Udo Bekemeir started making mics three years ago in the company's West Berlin factory.

The capsules are cut on an in-house laser and the electronics are made on site. The only twist is the fact that the mic bodies are made in China although assembly and testing is done by BPM in Germany.

Both mics have identical features but the inclusion of an ECC83 in the *TB94* separates the two sonically. Both have switchable cardioid and omni patterns and a combined switch arrangement for a -10dB pad and bass roll-off filter which does not allow you to use the two simultaneously should you want to. Central to affairs is a 35mm gold-plated capsule running through traditional electronics powered by 48V phantom in the case of the *CR73* and an external remote PSU via a multipin cable in that of the *TB94*.

Each mic comes as a nicely presented package of a foam-cut flight case, the relevant leads and a simple but effective elastic shock mount suspension which must be worth a few marks on their own.

I had already concluded that the build quality was reassuringly Teutonic before I discovered that the metal work was of Chinese origin. The finish is smooth and well machined with no irregularities in the grill and no jagged edges plus positive clicks to the switches. Internally, the circuit boards are clearly hand-made and the mics are robust, well damped and very solid in feel at a cool half a kilogramme a piece. These look like expensive mics.

Plug them in and the first thing you appreciate is the shockmount as it overcomes one of the fundamental problems of wiring up a *U87*-style shaped mic—how to grip it reliably while isolating it from the rest of the world, particularly when it has a tendency towards extended lower end performance. Both mics sport a usable frequency response of some 20Hz–18kHz and can handle a maximum SPL of around 134dB with 0.5% distortion at 1kHz. However, as with all large-capsule mics such figures cannot prepare you for the peculiarities of the mic and how they interact that conspire to make them special—and the *CR73* and *TB94* are special.

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**BPM Studio  
Technik CR73**



marks it immediately as a decent vocalist's microphone. The character is not dissimilar to the archetypal large Neumann sound that all the

affordable competition aims to achieve. It is pleasantly sensitive and has the benefit of an excellent omni pattern that retains the gentle mid lift for opening up detail. It is actually quite modern and finished sounding on the cardioid.

The valved *TB94* takes these fundamental characteristics and embellishes them with a precedent-setting smooth and full bass response which evolves into the most mellow remainder of the frequency range. The depth of low end is really quite exciting. This is the sort of mic that a good vocalist can work to wonderful effect—it is a performance tool. Additionally there is a complete lack of any of those quaint things that you do tend to take for granted with an old valve mic, like inexplicable thuds and splutters. The *TB94* is a tube mic that you can set and forget, it is extremely well behaved.

The omni patterns on both mics are genuinely useful and usable. Still, the tube boasts the better, or rather the more pronounced, bottom end and it is an interesting alternative on vocals again that you can try if you have a nice space to record in.

They are good for room pick up and acoustic sources although I have to say that I consider the *CR73* to be the better all rounder simply because it lacks the fullness of bass that the *TB94* has and consequently is less fussy and more immediate to set up.

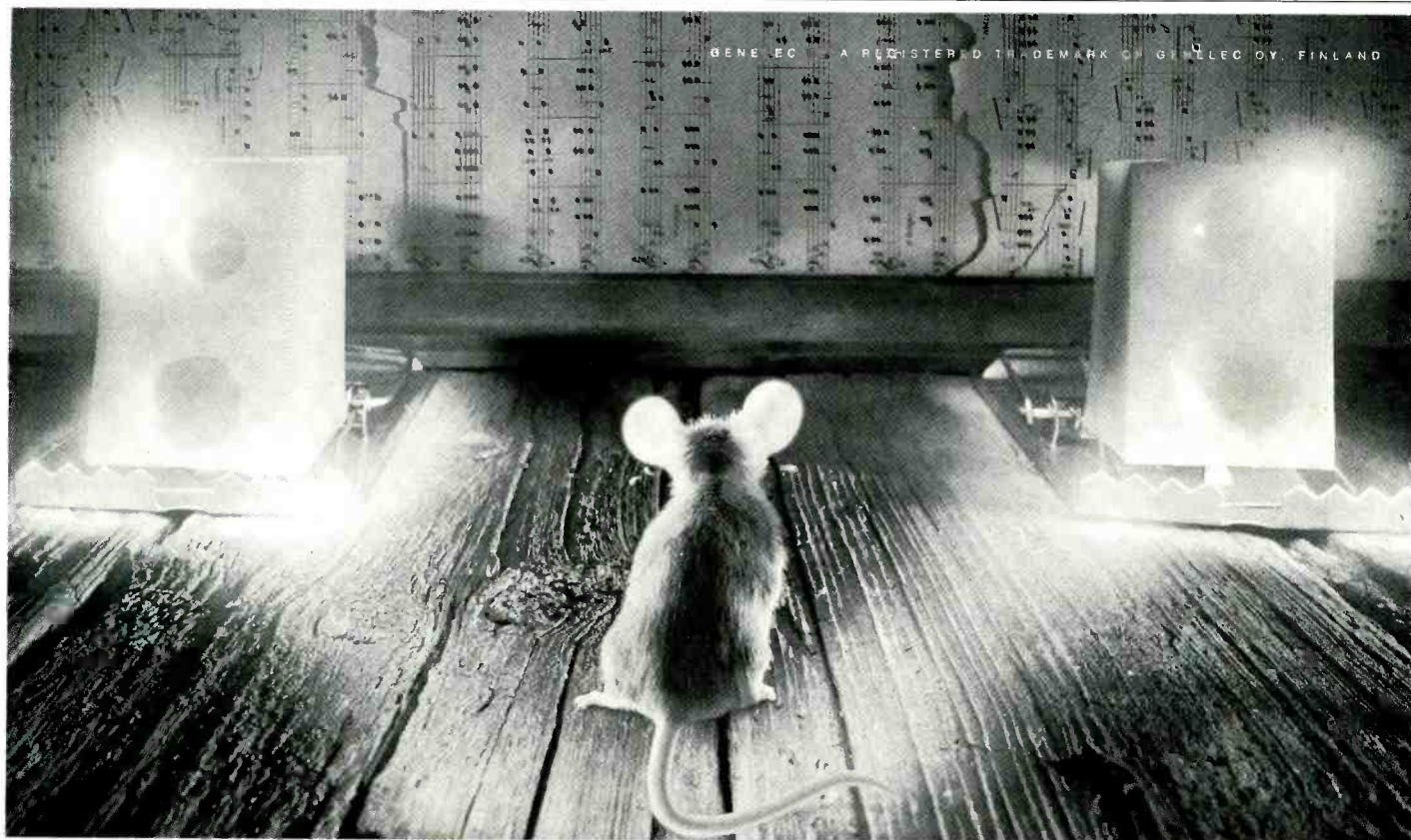
I could not bring myself to dabble with the roll off on the *TB94* because the mic's bass contour is so complete—instant Jim Reeves. However, even with it in it still outshines a flat *CR73* in this department and provides something of an in-between setting between the two models. Both are admirably pop resistant and quiet.

The strength of either mic package is impressive with the *CR73* being slightly less than half the cost of the valved *TB94* and well within spitting distance of the sort of money other 'affordable' large-capsule mics are commanding. For your cash you are getting two usable patterns as opposed to the usual fixed cardioid, while in the *TB94* you are getting a ridiculously good value for money valve mic that is traditional in approach and performance and does not really have much competition at all.

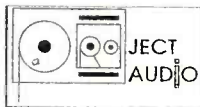
With the news that BPM will soon be releasing a stereo valve mic preamp along with other valve bits and pieces, they are obviously a manufacturer to watch. If you are in the market for a *U87*-type mic then you owe it to yourself to investigate either one of these. They are very special. ■

**Zenon Schoepe**

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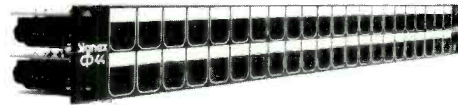
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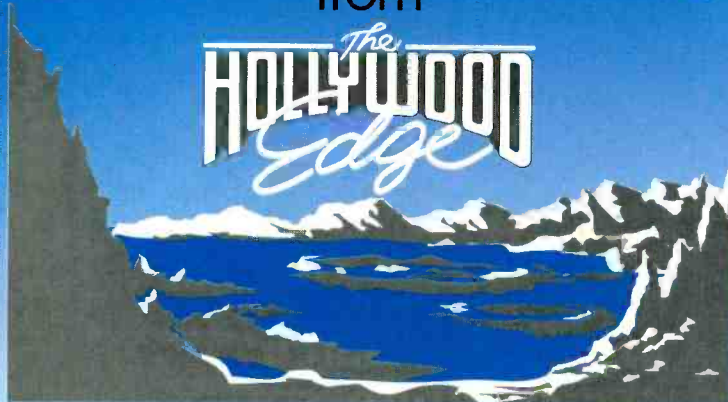


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# RED OKTAVA

The low cost, high performance microphones trickling out of Russia are causing a stir in the West. Zenon Schoepe visits the Oktava factory and looks at three of the line

**T**he Russians do not really have much of a reputation for the technical sharp end. They may have had a man—and indeed a dog—in space sooner than anyone else, they may have a space programme that has continued to flourish and an arsenal of advanced weapons but they have never really managed to cut it on the high-tech PR profile. Stories of MIG fighters loaded with valves, raw man power rather than computer power in manufacture and the briefest of glimpses under the bonnet of a *Zild* all reinforce the popularly held belief that while the wheels certainly turned in the former Soviet Union it was achieved without a great deal of grace or elegance.

But ingenious they most certainly are, particularly as they have so far achieved everything under a regime as unbearable as it was proved to be unreasonable and unworkable.

Things are changing slowly following the dissolution of the Eastern Bloc and the re-creation of the old Russia. More Russians travelled abroad last year than ever before and some glean employment from the country's new service industries and buy clothes in Moscow's new boutiques. A middle class has emerged with money to spend, due in part to the stabilisation of the country's economy with monthly inflation brought down to 5% from 26% in 1993. Incomes are rising and consumption is up—but not for everyone, as the suburbs of Moscow continue to portray a picture of hardship, greyness and bottom-of-the-heap humanity that is spectacular on the European continent.

The commercial birth has transformed the centre of Moscow into a huge building site as



Microphone Xanadu: the main gate

projects get under way to renovate old buildings and construct new ones. Moscow's largest exhibition centre is block-booked with trade fairs into the middle of 1995 and the overwhelming observation is that trade rather than aid is what Russia needs. The Government seems to have decided that its destiny and the country's hopes now rest on those moving to the free market with the result that Russia is a consumer market in the ascent and we should all prepare

ourselves for Russian product in the West.

In pro-audio terms, the country has been developing in a parallel universe albeit at its own speed. Dominated and restrained by the State, activity has always been centred around the national broadcasters and an industry grew to support this aimed at creating self-sufficiency in equipment terms. There are Russian mixing consoles, compressors, and amplifiers; most people have heard of Oktava microphones; Oktava being essentially the first Russian pro-audio company to come in from the cold.

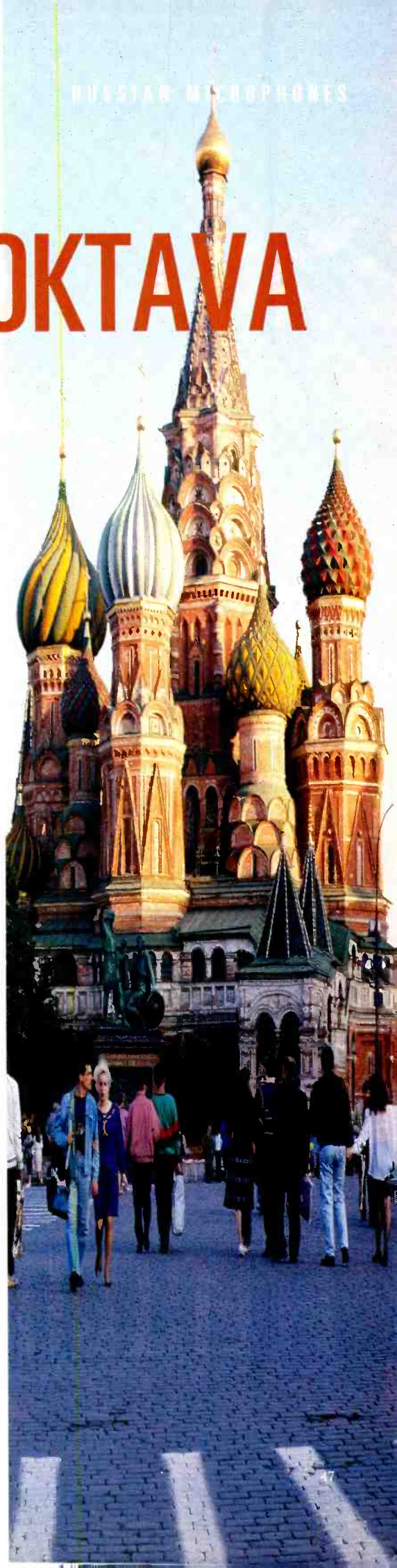
A far cry from the svelte and modern operation of companies like Sennheiser, Oktava's massive plant is based in Tula about 100km south of Moscow. Tula, home of the armaments industry founded 350 years ago by Peter the First and the Kalashnikov, was deemed strategically important enough in Soviet times to warrant closed-city status meaning that nobody got in or out without a ream of paperwork.

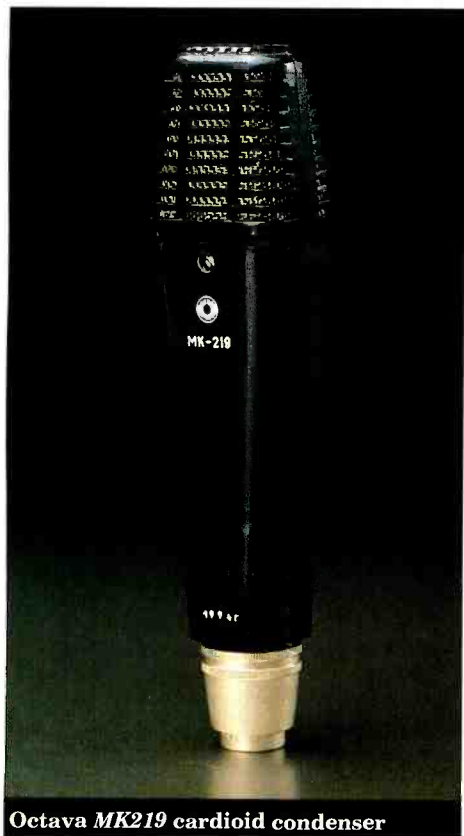
A large assembly room for workers' meetings in the old days dominates the Oktava main building. A massive map of the world above the door, unusually for Western eyes with the former Soviet Union at the centre, has lamps positioned at Oktava export territories. Not surprisingly, there is not much activity west of the former Iron Curtain apart from a pocket just off the East coast of America called Cuba.

There are also fly-blown exhibits, including a pastel pink Bakelite radio set made for Stalin, which follow Oktava's progression from lightning conductors, to radios, speakers and horns for stadium use, telephone transducers and the first mics in 1947.

There are photographs of workers growing tomatoes in the factory greenhouse and Oktava also has its own water purification plant. Such self-sufficiency extends to its engineering department's ability to build to order machines that the company needs, something that was essential in the old days because they could not be bought.

The plant employs around 3,000 people with 300 dedicated to microphones but mic production has dropped from the time when Oktava supplied ►





Oktava MK219 cardioid condenser

mics across the board from cheap dynamics packaged with every consumer tape machine right up to those intended for broadcast use.

Oktava's heritage is impressive and it is still active in transducer technology and electronics for telephones, hearing aids, headphones and studio mics. It supplies its technology to the military and the space programme. Accounting for 17% of its output, it is Russia's biggest mic manufacturer and in Soviet times peaked at around 5 million units of all types per year. Manufacture is almost entirely by hand, by rows of white-coated women supplying completed components to test stations. While the techniques employed seem rather inefficient due to the geographical distances between different mic component production lines and assembly points, there can be no questioning of Oktava's quality control as each mic is tested in anechoic and various environmental conditions. If one unit deviates from the parameter constraints, production is halted until the cause is found.

It is perhaps unfortunate that until recently the QC never extended to the metal work and finish as Soviet mentality cared more about whether a mic worked than what it looked like. A leap in finish quality for the MK219 was achieved by simply cleaning out the mould. Mics coming off the production line at the time of the visit could not be compared in finish quality to the units used here for review, a direct response by Oktava to requests from international distributors A S McKay to improve the presentation of its products.

It is also worth pointing out that but for distributor A S McKay, Oktava would no longer be manufacturing a pro mic range as dissolution of

the Soviet bloc had reduced demand for the products to the point where it was no longer worthwhile. By placing advance orders for export to the West, AS McKay essentially kick started Oktava mic production again.

Gennady Ulianov, general manager at Oktava, says that the company had been following mic developments in the West with some interest. 'Our scientific designers believe we are not very much behind the main players. Maybe even in some areas we are probably even a bit ahead,' he says. Valves and ribbon mics in particular were the mainstay of the product range for many years and while now discontinued, remanufacture in response to demand would be simple as the tooling for the metal work, the circuit designs and the know-how are all preserved. Among the ideas being considered is a valve driven MK219 variant.

Unlike many Western mic manufacturers, Ulianov states that Oktava shares no heritage with other brands and has always tried to be unique in its designs. Consequently he believes that they have much to offer. 'The quality of our mics is no worse than western mics and they're also much cheaper. The price for this sort of quality product is much higher in the west,' he says adding that it is the classic nature of the mics that appeals as well.

'I think we can go even further back in time if there's a requirement for it,' he continues. 'But it's also important to keep looking ahead as well and keeping up with modern standards at the same time and we have a research and development department dedicated to just this.'

Ulianov admits times are 'difficult but interesting' and believes Oktava will soon be taking its rightful place alongside historically important mic manufacturers from the west.

## MK219

Described variously as possibly the ugliest microphone in the world and the best value mic on the market bar none, Oktava's MK219 cardioid condenser is unforgettable.

Presentation, or rather the lack of it, for this 1960s design has become one of the charming aspects of the MK219. Contained in the flaccid plastic foam-lined case is an unrefined looking windshield seemingly made from the same material as the lining—it offers less in the way of reducing wind and pop noise and more in the ►



Prototypes and current models

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## RUSSIAN MICROPHONES

protection of the mic from physical damage. It also robs so much of the top end that it is fairly limited in potential applications.

You will also find a side-mount type stand adaptor which is screwed tight by the XLR base connector collar and allows the mic to be mounted

for its side-on use. This clip looks insubstantial but actually supports the mic quite firmly, provided the stand is not shaken—this can cause the elbow joint to work loose and I would imagine that after a time the joint will give up altogether. An elastic suspension would probably be the best solution

anyway as the *MK219* although fairly insensitive to handling noise does interpret the occasional strike to the casing or stand with almost congo-drum-like resonance.

A female Neutrik XLR will not click locked into the base of the mic no matter how hard you try as you are expected to employ a Russian XLR supplied in the packaging which will lock.

What is offered is a large gold-plated diaphragm feeding a discrete pre-amp with magnetic reed switches for a 10dB pad and a 50Hz high-pass filter.

Build quality on the review unit is better than I have seen on *MK219*s in the past but nowhere near the finished look of the models seen coming off the production line at the factory now. The seam between the two halves of the mic body do not butt terribly well, there is evidence of insensitive file work to smooth bits out, and the satin black finish is not even. Opening the mic up and beholding the large comfortable circuit board leaves no doubt that this thing is hand-built.

Any gripes about the appearance and finish quality pale in to insignificance when you plug this mic in as it is so optimised for vocals and speech that it is uncanny. There's immediate fatness, a splash of presence and that special something that happens when sound rattles around a largish cavity on its way to a side-on capsule. There is also a little noise—the sort of low-level hiss that you expect ▶



Assembling the mics

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## RUSSIAN MICROPHONES



Oktava MK012 variable-pattern condenser

from this sort of arrangement—and an impressive built-in resistance to pops which negates the need for a shield in a very controlled environment. A pop shield is advisable at all other times.

I was surprised by the flexibility of the 219; it is good on acoustic instruments, and the 10dB pad and the attractive price means you are more inclined to try this large capsule mic in a potentially high impact location, such as drums, than you would with a more costly equivalent.

However, its real strength lies in being a superb and flattering vocal. It isn't particularly honest but then that's not particularly what you want.

Direct comparisons to large capsule Neumanns are inevitable, but involve an element of wishful thinking. Such comparisons are unfair because the Oktava is not quite there—the sound is somehow less expansive, its noise profile is different, the response is less smooth and less rounded, and the build quality is lower—but it will be close enough for many who are prepared to live with the difference.

The MK219 is a legitimate and wonderful vocal mic that stands up on its own merits and currently occupies the slot of mic bargain of the decade. If you have not yet heard it, you need to. It is stunning.

## MK012

Building on the popular modular mic principles established most successfully by AKG with the 451 and 460 ranges, the Oktava MK012 offers interchangeable capsules with a preamp similar in dimension to the Neumann KM84. The kit contains cardioid, hypercardioid and omnidirectional capsules plus a 10dB pad collar which fits between capsule and preamp.

The finish is satin silver, but the manufacturing process has failed on the review models to match preamp body, preamp connector collar, capsule bodies, capsule collars and pad body to the same colour tone making assembled mic combinations look very shoddy. It is a shame because this is an excellent quality mic package that suffers credibility loss simply because it does not look as if it ought to be very good.

All parts are screwed together via a wide but firm thread and the kit is completed by a pincer

type mic holder (again in a different shade of satin silver) and the whole lot is packed neatly into a rather attractive hinged wooden box.

Sonically the MK012 compares extremely well with a 451. Its cardioid capsule is close to the CK1 but is hotter, has a more pronounced mid range with better bottom end control and a less strident top end. The hypercardioid is not so tight as to be unusable on anything but spot miking and has quite a natural roll off in response off-axis which means that it does not sound immediately like a hypercardioid. I cannot make my mind up about the omni capsule because while it sounds the flattest of the three options it does not feel particularly wide, even so it's undoubtedly the quality capsule in the pack.

Some sort of wind shield is essential if the mics are to be used with confidence in a variety of applications as their tendency to blast at the slightest provocation is quite alarming. They are also incredibly intolerant to any sort of movement.

However, the results are good and the MK012 applies itself well to just about anything you care to throw at it, apart from real up-front vocals. ▶



Testing the microphones

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Oktava MK011 cardioid condenser

The mic is clean, quiet and, like all the Oktavas, remarkable value for money. The MK012 Set amounts to a veritable sonic Swiss Army knife.

## MK011

Just when you thought all Oktava mics were destined to be flawed in their finish, along comes the MK011 cardioid condenser which displays the high standards of finish that the Russian factory has within its reach.

However, it is not a particularly pretty mic and seems to fall between the look of a rather dated reporter's hand-held and the sort of mic a compere would favour on a glitzy game show.

Aimed predominantly at studio and live vocal use the MK011 is beautifully light and delicately balanced although it suffers from handling noise and despite its bulbous head, which gives the impression of heavy baffle pop proofing, its resilience to popping is low and when it blows it really blows.

Despite this the performance of this mic is quite special. The cardioid pattern is well defined with marvellous off-axis rejection and the proximity effect is very controllable and predictable. The sound is warm at all working distances and it's remarkably quiet.

It amounts to a far more adaptable mic than the

MK011's vocalist slant would have us believe. It's not a flat mic, the presence peak feels quite broad, but it has outstanding control and definition in the low end. While I would hesitate to call it bass light, I would say that the MK011 does not easily suffer from the sort of undesirable over-bottom heaviness that often has to be fought against to get some sort of workable starting point. It is a satisfying mic to EQ creatively.

It is an excellent studio vocal mic (with at least two-layers of Russian-grade denier stretched across the front I hasten to add) which can be worked to great effect by an experienced singer. By the same token it would be very applicable to radio and voice-over work and serves as an able acoustic instrument mic, which with a bit of care can be used closer than you would normally dare. It has the makings of a first class overhead or ambience mic because it is detailed in the mid range without being overly bright. The sound is warm, classy and expensive.

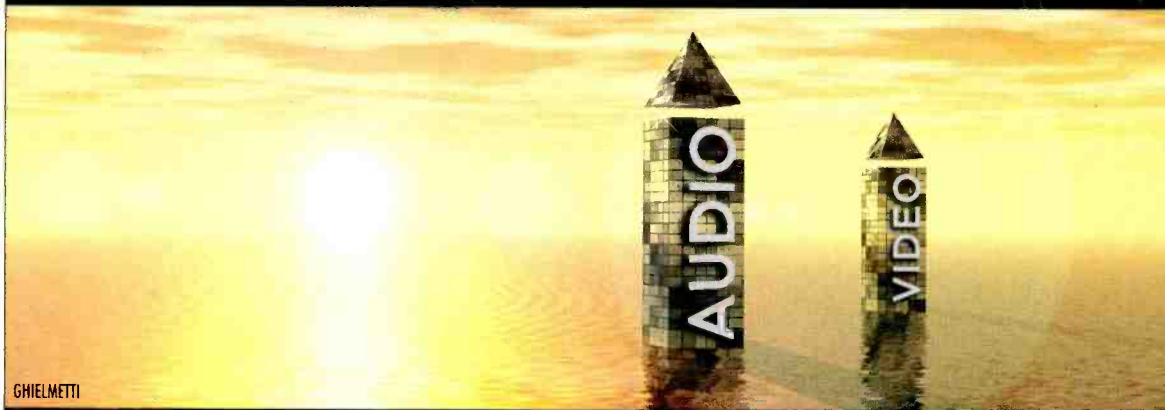
As the newest model in the Oktava range discussed here, the MK011 is a good indication of the sort of quality that the Tula plant can come up with. Again it is ridiculously cheap and again it is a real contender. ■

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# SOUNDTRACS SOLITAIRE

**T**he *Solitaire* was first shown over a year ago and has been commercially available for the last seven months. In this time the console has been well received selling internationally into a number of markets: music recording; TV production; education and even a mobile OB. However, the *Solitaire's* main market is the small music studio including both commercial facilities, like Dynamo Sound in Italy, and private facilities, such as Nik Kershaw's studio in the UK.

The console has evolved directly from Soundtracs' top-of-the-range recording console, the *Jade*, and shares many of the same features as well as very

similar performance figures. In order to keep costs down, the desk is smaller than the *Jade* with less auxiliaries, a simplified equaliser, and integrated channel faders. However, the desk also features some facilities not incorporated in the *Jade* such as a proprietary moving-fader automation system.

The *Solitaire* comes in three different frame sizes: 24, 32 and 40-channel, and each may be supplied with or without a patchbay. It has three automation options being available with moving faders on the channels and VCAs on the monitors, VCAs on both channels and monitors, or with just mute automation. Soundtracs' Assignable Dynamics Processor, which also appears on the *Jade*, is a standard feature although the desk can be supplied without if requested.

A fully-specified 40-channel console with moving fader automation is priced at under £30k in the UK.

## Channel strip

The in-line channel strip has been colour-coded into Channel (light grey) and Monitor (dark grey) sections—the channel fader is the large fader (100mm).

Input is sourced by the MIC-LINE

switch with the channel gain control providing up to 70dB of padless mic gain and -10dB to +20dB of line trim respectively. Also included is a 48V phantom power switch, and phase reversal for the selected path (the switch is positioned at the base of the module just above channel pan).

The channel equaliser is 4-band swept featuring Soundtracs' FDB (Frequency Dependent Boost) design on the high and low bands—on the *Jade* this was included on all bands. FDB compensates for the ear's natural roll-off at extreme high and low frequencies (A-weighted) by progressively boosting frequencies from +15dB to +20dB as they reach the extremes of their range.

The four wide range bands (HF: 1.8kHz–18kHz; MF 1: 700kHz–14kHz; MF 2: 50Hz–1kHz; and LF: 50Hz–500Hz) all have a fixed Q of 1.5; also included in the section is a high-pass filter operating at 63Hz (12dB/octave). Directly below the channel EQ is a separate monitor EQ section providing two shelving bands (HF: ±15dB at 10kHz; LF: ±15dB at 100Hz). This also includes a MIDS button that switches the two mid-frequency bands from the channel EQ into the monitor path. Effectively, the I-O strip

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Already popular with early users, the *Solitaire* recording console has only just become available for review. Patrick Stapley weighs up *Jade's* little brother

---



provides six bands of EQ with four selectable on either path.

The performance of the EQ is excellent, producing good-sounding results across its range with precision. It is capable of being both subtle and fierce where necessary, and the FDB design successfully bolsters top and low-end response.

The eight Auxiliaries have been divided into two stereo and four mono sends. Stereo Aux 1-2 are fixed in the monitor path while Stereo 3-4 are in the channel path—each pair is pre-post selectable. The two stereo sends can be combined in the centre of the desk to feed the same phones output enabling stereo foldback to be easily sent from both paths. The mono sends are switchable in pairs between channel and monitor and remain fixed in 'post'. They can, however, be collectively switched to 'pre' via an internal jumper.

In addition, Aux 7-8 can access the routing matrix providing another 24 possible sends during mixdown. This facility can also be used in broadcast situations where separately controllable multitrack feeds and a live mix are required.

The routing buttons are arranged in a column beside the channel fader. Each of the seven keys assigns the output to pairs of buses—L-R Mix, Groups 1-2, 3-4 and so on. At the bottom of these selector keys is a routing shift button that switches group routing from 1-12 to 13-24. Normally the channel path feeds the 24-track routing but this may be replaced with the monitor path via local switching. This feature enables track bounces to be performed very simply without having to rebalance or recreate EQs, and also allows the small fader to act as an additional aux send during mixdown. Where both the monitor and Aux 7-8 have been selected to the matrix, priority is given to Aux 7-8.

The small monitor fader has its own L-R MIX routing button and associated TAPE and GROUP buttons. TAPE sources between tape return and group output, and GROUP allows the monitor fader to act as a group trim directly affecting the level to tape—in addition the monitor EQ, solo and mute functions will also affect the group signal. This arrangement is used in the *Jade* where it has proven very versatile.

There are two other buttons situated between the small and large faders—MIX and MTR. MIX flips the module from Record to Mix mode: the channel sources the tape input, and the monitor sources the mic-line input. MTR switches the channel's associated 10-segment bar-graph meter to display either the group-tape level or the channel-input level.

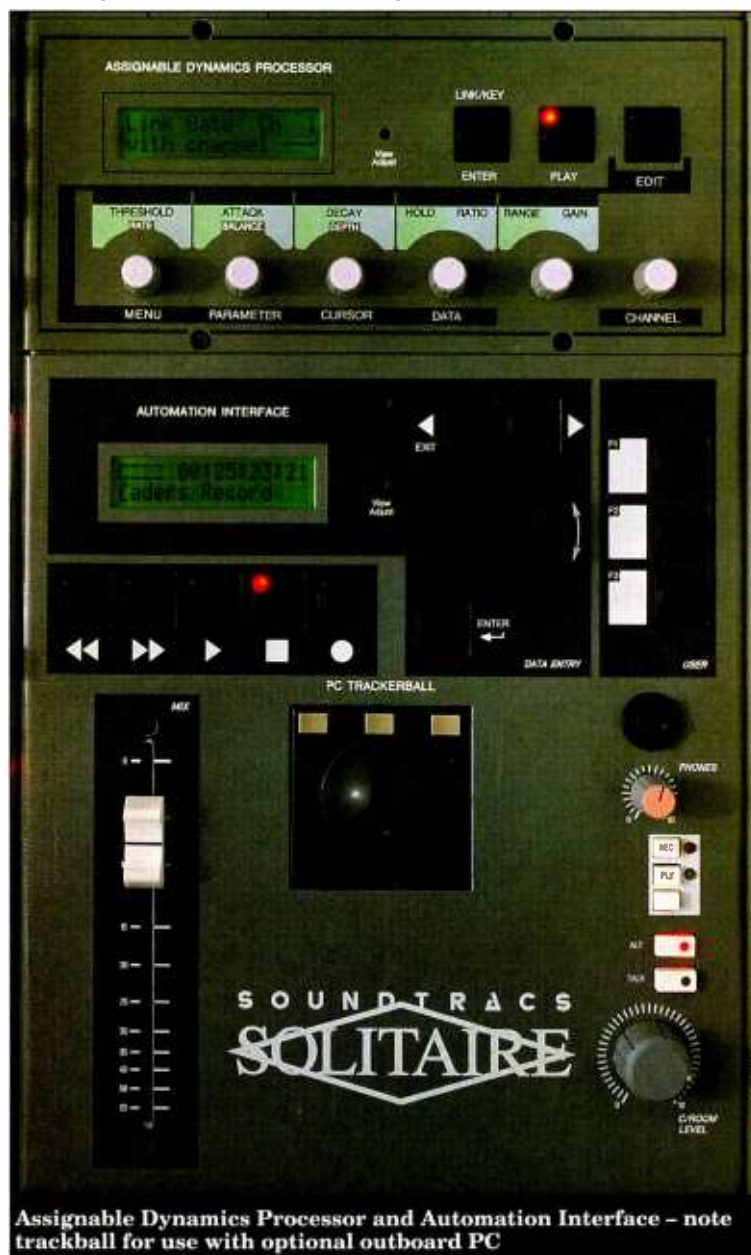
Solos on both paths can be globally changed from PFL to destructive SIP from central switching. Solo and mute switches have LEDs built into the buttons, and mutes are automated. The remaining switches are VCA bypasses for each fader (obviously not applicable for moving faders) and automation controls which will be covered later.

Optionally available is a stereo input channel (non in-line) which replaces a standard I-O module. It has a simplified 4-band equaliser with fixed HF and LF, full stereo auxiliary capability and can be used with the assignable dynamics. There is no restriction on the number that can be fitted other than 24 I-O modules must be available to allow 24-track operation.

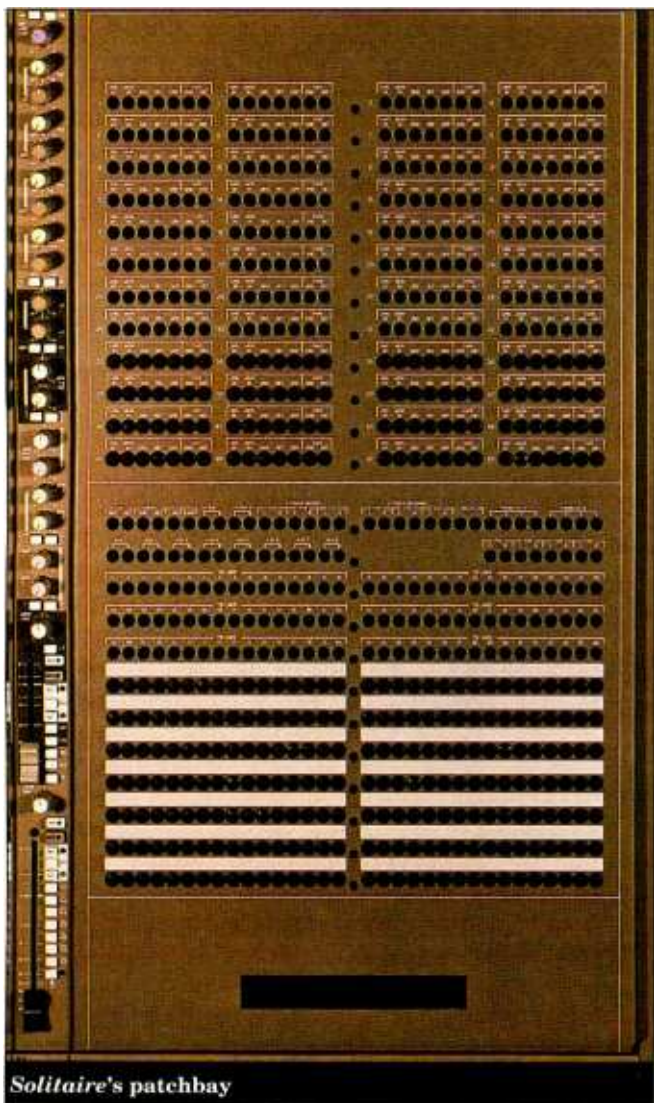
## Master section

The master module houses the auxiliary masters, stereo-effects returns, solo master-control, monitoring controls, communications, oscillator, and master fader.

The eight auxiliary masters each contain a level control, AFL, and soft mute switch for automating effects sends. An automated mute is also incorporated into the four stereo effects-returns, which feature 60mm stereo faders (nonautomated), the same 2-band shelving EQ as the monitor, access to either Aux 1-2 or 3-4, solo, and a balance control. The returns may also be individually switched to cater for professional (+4dBu) or ►



Assignable Dynamics Processor and Automation Interface – note trackball for use with optional outboard PC



Solitaire's patchbay

semiprofessional (+10dBV) devices. With the use of effects returns a 40-input console can provide a total of 88 inputs.

As mentioned, the console offers two Solo modes —PFL or SIP—and these are globally selectable from the master section. When SIP is selected all channel and monitor paths will mute apart from those that are solo selected—the effects returns are isolated from SIP muting to allow SIP with effect.

There are two control-room loudspeaker circuits toggled from an ALT button. The main output is controlled from a prominent rotary control placed at the base of the section in easy reach of the engineer. This will also affect the level of the alternate speakers, although a secondary trim control has sensibly been provided to allow level matching between main and nearfield speakers. In addition, a stereo headphone socket is provided with separate level control.

Monitor source is selectable from Mix, three 2-track external inputs, and the two stereo auxiliaries. These selections may be made additively and can be monitored in stereo or mono. Also additive are the source selectors for the studio foldback circuit, which allow any combination of Aux 1-2, Aux 3-4 and the control room selection to be sent to the studio.

Communications and oscillator (100Hz, 1kHz and 10kHz) share the

same group of destination keys providing access to the groups, auxiliaries and studio foldback. The nonlatching TALKBACK button is again conveniently placed near to the engineer.

The 100mm master, stereo fader is VCA automated, but is not available as a moving fader purely because of the extra cost.

## Assignable dynamics

The *Solitaire* is the third Soundtracs console to include the company's Assignable Dynamics Processor—the others were the *Jade* and the live *Sequel 2*. The digitally-controlled system utilises a separate VCA in each channel path which is placed post-EQ/pre-Aux. This arrangement means that processed signals can be sent to effects units and so on.

Controlled from an assignable central panel, the system allows two dynamic processes to be set up for each channel path in the console. One of these must be a compressor-limiter, the other can be a gate, expander or modulator (vibrato and autopan effects)—its not possible to have a gate and a modulator selected on the same channel.

From the control panel, the channel is accessed and the type of processing selected and switched on. Five rotary controls then allow adjustment of parameters with a display window showing the value for the currently selected parameter. A big advantage of this arrangement, rather than integrating hard controls into each channel, is that apart from keeping console size and cost down, it allows a far greater number of parameters to be made available—this includes sophisticated functions such as a range of compressor knee settings and adjustable hysteresis for the gate.

The effects of dynamics processing are displayed in two ways. Firstly the integrated display in the control panel will show various bar graphs for each type of processing active in the selected channel. Secondly, a red LED below each channel meter will glow according to dynamic activity, while a second green LED will confirm that processing has been switched on for that channel. There is also a third way of viewing dynamic activity setup, and this is by connecting a standard PC. This provides a graphic display of curves, gain reduction and parameter values on a channel by channel basis, and also allows parameters to be adjusted directly from the screen.

From the central control panel,

settings can be copied between channels or to all other channels for quick setups. The system also allows dynamic settings to be stored in 128 memory locations for future recall. The first 12 of these contain factory presets designed to offer useful starting points from which users can make modifications.

Channel linking is also controlled centrally with no restrictions on the number or position of channels. Processing may also be linked separately so, for example, Channels 1 and 10 may have compressors linked while Channels 1, 5 and 23 have their gates linked. The user can decide whether to control link or parameter link the side chain—if parameter linked, any parameter adjustment on a linked channel will equally effect all the others; with parameter linking switched off, just the gain control aspect will apply allowing channels to have different release characteristics and so on. The system also accommodates key inputs for gates to be fed from the post EQ point of any channel without having to reach for a patchcord.

## Automation

The automation system is supplied in three forms. The most basic is Mute Automation which provides MIDI-based control for all console mutes, resetting mute scenes from a 100 memories. The console can also operate with a MIDI sequencer for recording and playing back mute data.

The stage on from this is VCA and Mute Automation which adds Analog Devices VCAs to both the monitor and channel faders. And the top option is Moving Fader and Mute Automation which adds Panasonic touch-sensitive moving faders to the channel, and VCAs to the monitor. Both fader-automation systems use MIDI Time Code (MTC) and will automatically adjust to rates as well as generating MTC to slave sequencers and so on. If working with SMPTE a time-code convertor will be necessary.

The automation system is fully self-contained and does not require a PC to run it. However, a PC can be added to the system to provide extra facilities such as a graphic interface, off-line editing, and mix archiving, and its addition is definitely worthwhile.

Automation controls are sited locally (adjacent to faders), and centrally in a menu-based control panel which also includes a set of transport controls for machines using MIDI Machine Control (MMC). If the system is being used in conjunction with a PC, the built-in tracker ball can provide cursor control. Although the system can be screen

controlled and incorporates a degree of menu operation, the emphasis is very much on local hard controls, which make it far more intuitive and faster to use.

Each fader (channel, monitor and main) includes two automation buttons, RECORD and PLAY, with associated red and green LEDs. These buttons are used to locally select between four statuses: Record; Play; Trim (VCAs only); and Isolate, with the LEDs indicating status. Play status functions differently for VCAs and moving faders: with a VCA the status is permanently a replay status, but with the moving fader it behaves as an update status switching to Record as the fader is touched. There is, however, an additional Safe mode which puts the fader into safe playback, guarding against inadvertent moves. All fader status can additionally be globally set from the central controller.

Mute status is set globally between Record, Play, Update or Isolate. Update, rather like moving fader Play, is a record ready mode which drops the mute into Record once it is pressed. To return to Play the mix has to be stopped. Mutes can also be individually set to Safe and this can be used both to protect groups of mutes and to selectively set write status.

After a pass, a message will appear in the control-panel window asking whether to Keep or Abort the pass. If Keep is selected, the new data will overwrite the previous mix and the status of the faders will be reset to Play and the mutes to Update; if Abort is selected, pass data will be ignored and status retained.

Nulling can be achieved either manually or automatically. Manual nulling makes use of the red and green status LEDs as direction indicators—a flashing red LED indicates the fader must be moved up to null, with the opposite for a flashing green LED. Once the fader moves through the null point it will adopt the desired Record (not applicable for moving faders) or Play status. With automatic nulling a glide rate can be set (1 frame to 1 minute) allowing the fader to either level jump or crossfade gradually as status is changed. Moving faders have a top to bottom travel speed of 80ms.

Only one mix is held in internal memory at a time, so to save mixes the system must be interfaced with an external device such as a PC or sequencer. The internal nonvolatile memory increases with the size of the console (512kB or 768kB), and Soundtracs claim there is ample space to deal with complex mixes. A fuel-gauge-type display shows how much memory remains, and more specific information can be viewed from the Mix Statistics page.

The PC option requires a system

capable of running *Windows 3.1* such as a 386, which communicates to the console via a serial link. A high quality, 17-inch monitor is recommended both for good resolution and sufficient viewing space. Software is included with the *Solitaire* and offers the following features:

- 1) Display of console fader positions and mute status.
- 2) Display of level and mute information against time.
- 3) Off-line editing of fader and mute data.
- 4) Saving of named mix files to the computer's hard disk or diskettes.

There are three display windows that graphically represent the Channels, Monitors, and Master Section—and each may be positioned and sized to suit the user. Additionally the number of channels-monitors displayed within a window can be expanded or compressed to show the total number fitted.

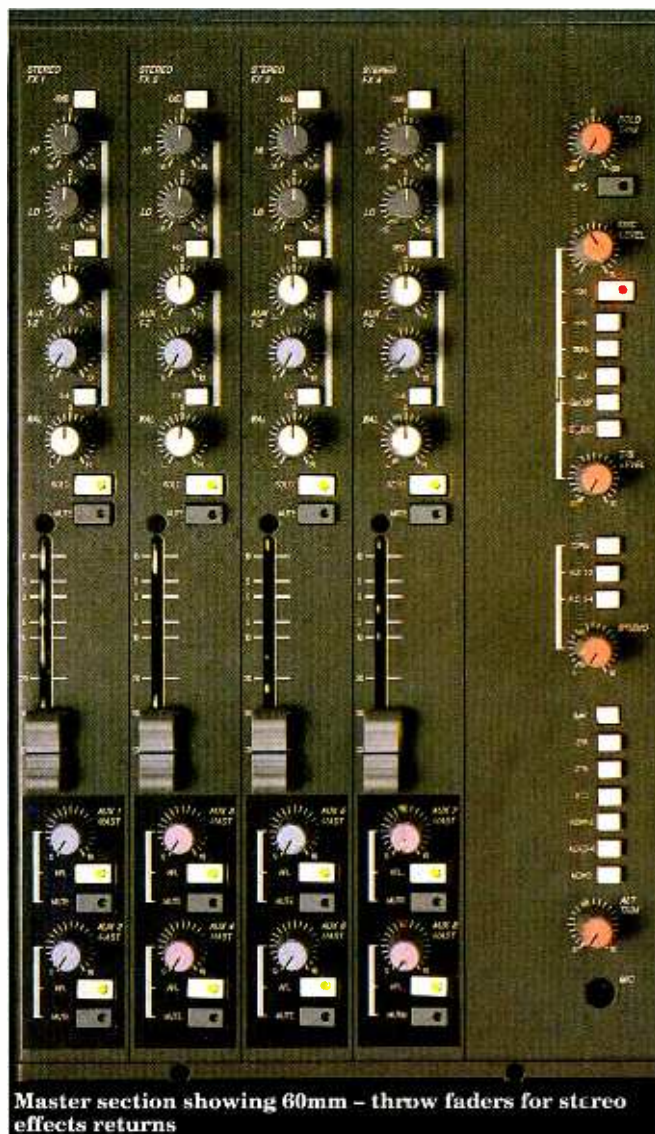
Apart from providing a clear representation of automation setup and fader and mute movement, the displays also allow parameters to be directly accessed from the screen: so, for example, fader status can be changed locally or globally, and mutes can be switched on or off.

The display also includes a time-code-transport window which emulates the time-code display and transport buttons found in the automation control panel.

The Mix window shows fader and mute activity throughout the mix for each channel, monitor and master function. It has a horizontally laid out display with a scrolling Time Line passing across channels rather like a hard disk editor. The display is highly intuitive giving clear, precise indication of the timing of events and their interrelationships—it also provides a very useful visual cue of approaching events. It can be zoomed-in/out both in relation to time and the number of channels that are displayed.

Off-line functions are performed via the Mix window, and these include insertion and removal of mutes, shifting mute positions, copying mutes between channels, cutting and pasting level within or between channels, smoothing over level jumps, and autofades for one or multiple channels. Again the system has been simply laid out and is quick and easy to use with functions accessed from an icons tool bar. A particularly useful feature, which is again reminiscent of hard disk editors, is the ability to position the Time Line precisely and 'snap' events to it.

Also under icons are the Save and Load Mix functions, a naming function for channels which effectively also provides a track list, and a note page



Master section showing 60mm - throw faders for stereo effects returns

which is saved along with the mix.

The automation system is continuing to expand rapidly and future additions may include groups, snapshots and additional statuses.

## Conclusion

The *Solitaire* represents excellent value for money. In a relatively small package, the system manages to offer the kind of functionality and flexibility that one would expect from a far larger, more expensive console. The addition of Soundtracs' Assignable Dynamics Processor, and a surprisingly sophisticated moving fader automation package as standard, make the console particularly attractive. The desk also scores points for general audio quality with quiet signal paths and good sounding, responsive EQ.

Since its release last year, the *Solitaire* has been selling very well and I can see no reason why this trend should not continue. The *Solitaire* is definitely worth investigating. ■

**Soundtracs plc, Unit 21-D, Blenheim Road, Longmead Industrial Estate, Epsom, Surrey KT19 9XN, UK.  
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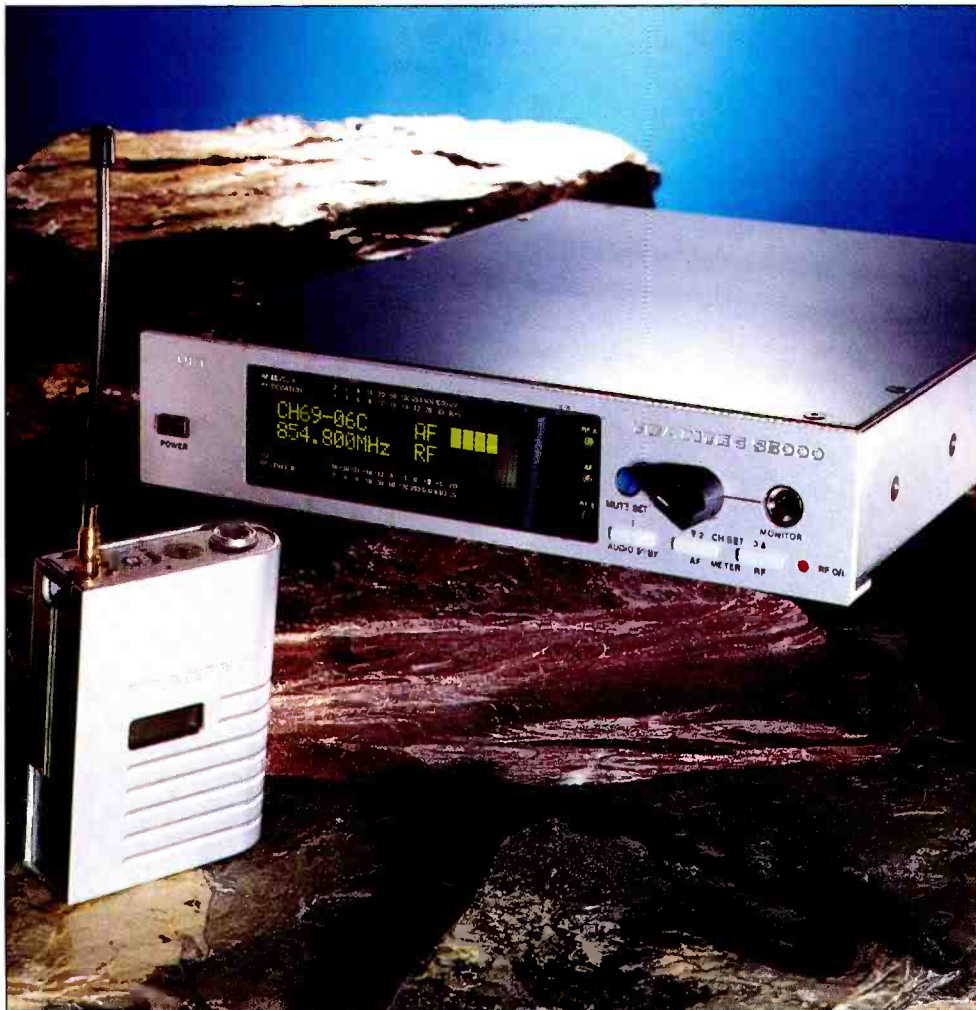
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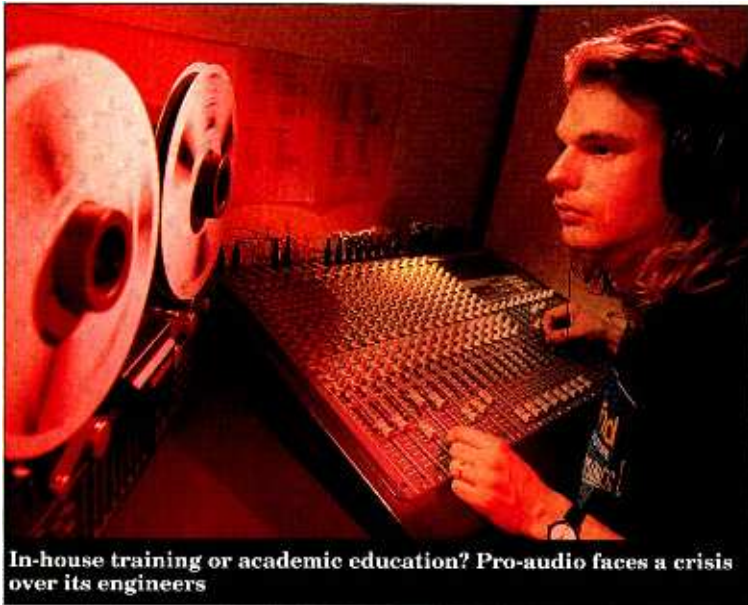
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# THE GREAT DEBATE



In-house training or academic education? Pro-audio faces a crisis over its engineers

The subject of education for, and within, the pro-audio community has been a vexed one for a considerable time. In 1995, however, the issue is becoming of renewed importance due to a variety of factors—not the least of which are the decline of the ‘traditional’ recording studio apprenticeship and the considerable demands made by advances in digital audio equipment.

In late December 1994 a small panel, representing a cross-section of the diverse interests which make up today’s audio industry, met to air the considerations and concerns which will shape the next phase of the recording industry and beyond. The discussion that ensued was varied, thought provoking and periodically confrontational. And although a lot of issues are presented here, there remains much—not least of which concerns the international nature of pro-audio—which it was not practical to address in this debate. The objective of this feature, therefore, is to raise awareness of the issue of education and the key forces at work. Hopefully it represents a move toward resolving some of the problems and heralds a return of interest to an area which is of vital importance to us all.

It is worth noting that almost four hours of discussion had to be condensed to provide the transcription that follows. It is not, therefore, a full account of the debate which took place and certain contributions are not fully reflected in

their presence here.

Although none of the relevant industry bodies were formally represented, the AES, APRS and SPARS all were subsequently invited to make statements clarifying their policies regarding the issue of education: all of these are included here.

With the scene set, the debate opens with Gerry Bron—an outspoken critic of audio schools—stating his case.

**Gerry Bron:** I’ve been getting increasing numbers of letters saying ‘I’ve got a diploma from the so-and-so school of audio engineering, I am looking for a job’. I used to write back, saying ‘sorry, there are no jobs’, but then I started saying to these people ‘you’re wasting your time because what you’re being taught is of no use to us at all’. The reason I’ve stopped writing back is that they don’t like to be told they’ve been wasting their time and their money.

The conclusion I’ve come to is that recording studios are better equipped, and maybe the only people equipped, to train upcoming recording engineers. I’ve been in the business 45 years, 33 of which have been spent running in and out of recording studios. In the last eight years we’ve grown eight guys who have joined Roundhouse as tape ops with some or no experience and have become engineers. So we’re producing one engineer a year; I wonder if the schools of audio engineering produce as many as that.

My proposition is that the industry

should be creating a climate where studios are encouraged to take people on an apprenticeship and let them grow, and to say to the schools of audio engineering ‘you’re not doing the right things and you’re not producing the results that recording studios are looking for’.

**Guy Nicholson:** The alternative is to set up an industry body who will specify a course which will be acceptable to most people within the industry so that anyone who meets certain criteria can give a course that has an acceptable standard. To bring some industry standardisation into something that has a lot of backyard operators.

**Bron:** But we’re a talent industry. You can’t say to somebody ‘you’re going to be an engineer in x years’.

**Nicholson:** It’s a personality and creative industry like painting or singing, that’s why there are specific people who succeed—because they’re the ones with the talent. You can educate as many people as you like but not every one is going to succeed—not every songwriter in the world is going to succeed either.

**Bron:** How many groups are signed up by record companies, promised all sorts of things and never make it? How many groups sign up with a record company, make it and never get paid any royalties? We are in a business where there is vast exploitation. I think tape ops are probably are given a very good deal because most of them at the age of 25 are earning far more than their contemporaries. They have that opportunity.

**Nicholson:** You’re exploiting peoples’ desire to do something.

**Steve Flood:** I would level that same criticism at some of the schools who are taking anything up to ten grand a year off someone who is not going to get a job.

**Nicholson:** I agree that some of ►

## THE PANEL

### Andy Beer

Freelance Engineer

### Gerry Bron

Roundhouse Studios

### Gus Dudgeon

Record Producer

### Steve Flood

Master Rock Studios

### Dave Foister

Guildhall School of

Music and Drama

### Tim Goodyer

Editor, Studio Sound

### Mike Hatch

Independent Producer,

Floating Earth Productions

### Howard Matthews

BBC Wood Norton

Training Centre

### Guy Nicholson

The School of

Audio Engineering

### Hugh Robjohns

BBC Wood Norton

Training Centre

### George Shilling

Freelance Producer-Engineer

The pro-audio industry is a technically advanced business with advanced educational needs. *Studio Sound’s* education debate explores its varied points of view, and identifies those who hold them



**BBC Wood Norton's Hugh Robjohns holds court. Left to right: Howard Matthews; Hugh Robjohns; Mike Hatch; Gus Dudgeon; Gerry Bron (with back to camera); Dave Foister and George Shilling**

the schools do that but how many schools have you visited to see what they're like?

**Bron:** None.

**Nicholson:** So therefore you have nothing to judge them by. Before you can properly assess what schools do, you should go and visit them. You can dismiss ones that are no good. Some are very good—I visit a lot of different schools. But if you're going to make a concise opinion, you should be aware of the facts—whether it's a university course, whether it's a private school or whether it's a studio that's trying to make use of its downtime to run courses.

**Bron:** Do recording schools actually want to produce candidates who will work in professional

recording studios?

**Nicholson:** I want them to end up working somewhere they will be happy to work. There is such a wide variety of audio-related fields that we try to give them an education that will allow them to move from one area to another. When they come out of a course they don't know everything but an employer can then exploit what they've learnt in a year, two years, four years, depending on the course, and therefore they'll be a more stable employee than someone who is a friend of a friend.

I can speak only for us but we try to give people rounded education that gives them a good overview of how things work. They can understand how a

mixing console works rather than just being the operator of a Neve or SSL.

**Howard Matthews:** At the BBC we're in a different position in that we're purely vocational trainers, at the moment we don't take students and pass them on in the hope of getting a job. But if we're producing people who are useless, then we stop doing the courses. We have a very close relationship with those who send people on our courses and they are not backward in telling us that something is wrong or needs changing, or that there's a new piece of equipment that requires a course.

On the exploitation front, to take someone who is prepared to throw themselves at you for ►

### AES STATEMENT

The AES is principally a learned society, dedicated to the furthering of knowledge in the field of audio science and engineering, as well as related arts and sciences. In this respect all of its activities are related to education in one way or another. It is not, however, a body capable of offering any form of formal accreditation to audio training or educational establishments, mainly owing to legal issues concerning its byelaws and the status of the society. Further, many of the private training schools with courses likely to require validation or accreditation are concerned primarily with audio operations, not science and engineering, putting them outside the main area of the work of the AES.

The AES has an active education committee, chaired by Roy Pritts of the University of Colorado at Denver, made up entirely of voluntary members, one of the main tasks of which is to coordinate the publication of a worldwide Directory of Educational Programmes, available to anyone at nominal cost from the AES. For the 1996 edition of this directory it is intended to show, where the

information is available, whether the included programmes carry any form of accreditation, and if so, what the granting agency is.

The issue, of course, is accreditation for those courses not based in the further and higher education sector is a difficult one. Many European countries and US states have government agencies of franchises which perform a validating service, although the audio industry has not been quick to press for such validation. Within Europe, the Swiss have done well in obtaining government recognition of an audio engineering qualification, leading to the possibility for government funding of training places which lead to that qualification. This activity was largely driven by those training organisations which needed students to be able to obtain grants to study in their establishments, but it had support from industry representatives. The AES Education Committee has only very rarely received requests for information about validation, or for validation itself. It is probable that unless employers consider course validation an important issue, educational institutions and

validating bodies will not feel any particular urgency either.

Many may remember TIPS, the Training Initiative for Professional Sound, which was formed a number of years ago to tackle this issue, as part of the UK government drive to establish National Vocational Qualifications (NVQs). The AES was represented on the TIPS working groups. Unfortunately the plug was pulled on TIPS, and the closest thing that exists today is Skillset. Skillset, though, is mainly concerned with the visual entertainment industry (TV and film), and its involvement with audio is mainly in sound for pictures. It is also concerned with many other issues such as makeup, costumes and so forth. Some of the work carried out by TIPS has been passed on to Skillset through common membership, but there is currently no organisation specifically concerned with NVQs purely for audio. ■

**Francis Rumsey, AES Education Committee, and AES Governor**

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Studio Sound Magazine, U.K. (Nov 94)

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24 hours a day does not necessarily mean you're getting the best person. What we're finding is that more people in broadcast want recruits with a good grounding—they don't want a person to peer over someone's shoulder and learn one skill on one piece of equipment. A lot of companies want someone they can pull out of the studio and put on VT for a week—and they have the basic understanding to do that. It does sound as if the recording studios and the schools should get together.

**Dave Foister:** When I graduated 14 or 15 years ago, Surrey University did not regard itself as a school of audio engineering by any means. It was not a vocational course, it was an academic course.

I spent my industrial year as a sound operator at the National Theatre not in a recording studio; other people went to loudspeaker manufacturers and testing laboratories. It caused difficulties on the course at the time because there was a lack of understanding of this academic aspect and people who went in expecting to come out as a recording engineer could be disappointed and miss out on some of the things Surrey was offering. I know now that a lot of what some people were dismissing as irrelevant at the time is actually relevant and I value what I learnt there a lot. But the distinction between what Surrey was trying to do then and what the audio schools are trying to do now is a

very important one.

A part of your criticism is that people come out of schools not knowing what the business is like but that applies to a lot of other professions too. People are not told, while they are doing 3 or 4-year university courses, the difficulties they are going to face, so they come out with an unrealistic expectation of what the qualification is going to do for them. Part of the problem is leading people to believe that this is all they need to know rather than explaining to them that a course giving a grounding in some of the technical aspects of what they're going to do is part of the ongoing learning experience. It should be part of actually doing the job. Nobody should come out of university or college and expect that the world owes them a living.

**Bron:** That's terrific; more people should have that background. I wish more of our tape ops had a knowledge of music.

**Mike Hatch:** You [Bron] seem to be asking for very specific skills that would fit into your environment here yet you're dismissing the fact that it might be an advantage to have somebody who has a very broad experience.

But by dismissing the sorts of skills the schools are trying to put in, I think you might be shutting the door on areas you could be exploiting. The whole industry now seem to be far more cross fertilised and the sort of skills you should be looking for are far more broadly based.

**Nicholson:** The biggest boom in the studio market is not in studios like yours. There are songwriters and musicians who want to learn something more about their own talent. There are digital 8-tracks studios that these people cannot learn about in a studio like yours so they go to an audio school and then they set up their own studio.

**Bron:** Most people I know with their own equipment at home have never been to a school, they just turned it on, read the manual and then turned up at my doorstep saying 'I want to mix this'.

**Nicholson:** But the technology has changed so much in the last five or ten years that it's getting to a stage where a lot of people can't read the manual—they don't understand the basics and they need somewhere to learn about them. You can't pick up any device these days and instantly access it, you have to learn how to get the best out of it.

But studios are a minuscule part of the industry.

**Matthews:** It's the glamorous part. In the BBC, everyone wants to be on the studio floor but there are half a dozen people on the studio floor and there are thousands behind doing different things that are just as related. There's a bit of glamour sitting in there with a rock band you've seen on the telly in here. That attracts people—and you may say they're the wrong people because they've come for the wrong reasons but they're the ones who will keep hammering on the door. Which brings us back to the question: Are you really getting the right people if you rely on the ones who throw themselves at you all the time?

**Bron:** But it's essential to have people who are prepared to work to succeed. The only people I've worked with who have been successful are the ones with a burning desire to succeed and will keep going until they make it.

**Nicholson:** And that's why the smart studio ►

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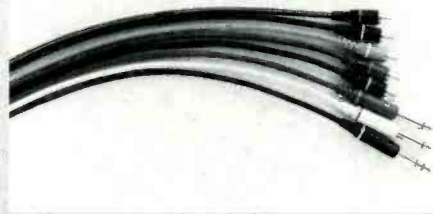
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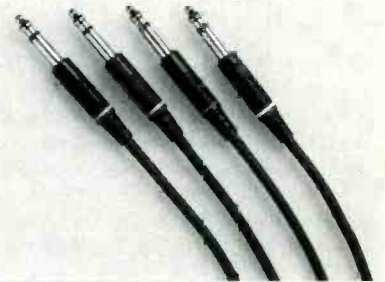
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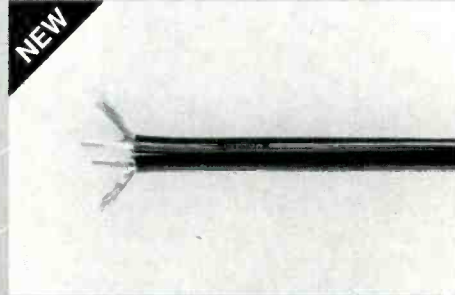
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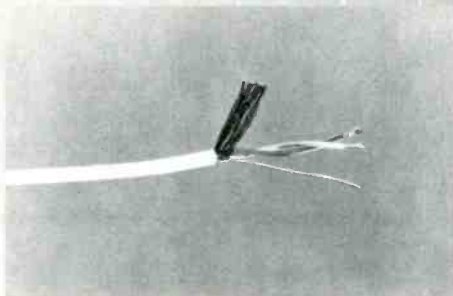
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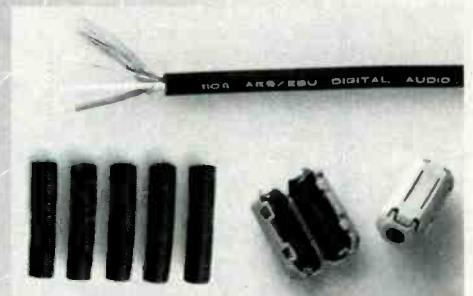
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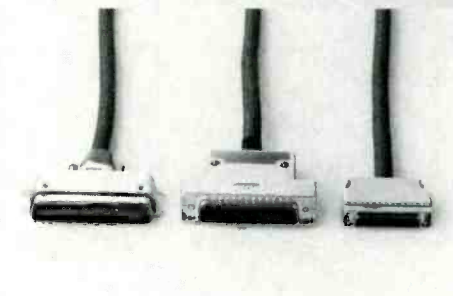
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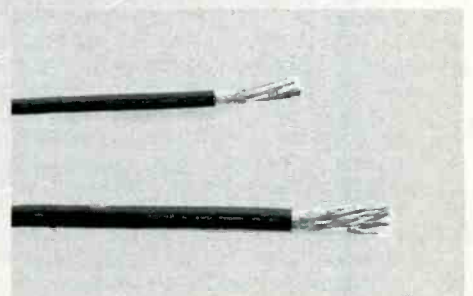
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operators ring up audio schools and find out who the best graduates are.

**Matthews:** It must be more economical to you to have the right personality with a good grounding than to have the right personality with no grounding at all.

**Foister:** It seems to me to be very hard with a 'traditional' apprenticeship to pick up a proper technical understanding of microphones, wiring, signal paths... What is wrong with learning these things properly? I get tapes to edit from people who have learned the traditional way and I can't make head nor tail of them. What's wrong with teaching people these things rather than expecting them just to pick them up?

**Bron:** Instead of studios getting together to put up prices—which is what has been the recent thrust—we should be getting together to put up our standards.

**Nicholson:** I agree. The studios should get together and set up a board that would look at courses and approve certain things to be taught but no-one wants to do it.

I've talked to the AES Education Committee

about it, I've also talked to Philip Vaughan [APRS] about it at length and it's a political hot potato.

They can't even work out their new form of inspecting audio schools. It's been through two meetings and still hasn't been ratified how they can even inspect an audio school. If they can't do that, how are they going to accredit a course?

**Bron:** Then we have to change our industry representative body because it's not doing the job. Or set up another one.

Part of the problem has come about because the proliferation of freelance engineers has stopped that apprenticeship. In the early days, you had recording studios that employed engineers and the tape ops learned from those engineers. Gradually, those engineers became producers. Once freelance engineers came in, there wasn't that lineage. A tape op could work with a different engineer every day and each one of those engineers could have could have a different standard so you didn't have the Abbey Road mentality where everything was done a certain way.

**Tim Goodyer:** The implication is that in-house engineers can be trained to the house standard but

freelance engineers need to be trained some other way—through the schools?

**Nicholson:** But there's always another way of doing something. I've spent a lot of time talking to the APRS and to the AES Education Committee in the US about standardising courses and having some sort of industry accreditation board and none of them are interested because it's too political. The problem is that because no-one is interested and no-one regulates, it leads to all the backyard operators who will exploit people. Until the industry itself wants some sort of training you're hitting your head against the wall.

**George Shilling:** Generally the recording industry doesn't—they'd rather do it themselves.

**Hatch:** I don't think there's anything that can prepare you for the real life situation of having to do it for a living. I did a lot of recording when I was at Surrey and I thought it was hard work but there's nothing that prepares you for sitting in front of a real orchestra with three hours to get a record out. That sort of thing can only come with experience.

**Flood:** We're talking about audio ability. There are three basic things involved—the knobs and ►

## APRS STATEMENT

Speaking as the collective voice of the recording industry, the APRS clearly sees value in training both at entry level and later. Comment about the Association having no interest in training is quite inaccurate: for example, up to 1990, the Association ran its own one-week training course for studio engineers, and there have been 'educational members' for many years.

Until recently this denoted a category of membership open only to organisations in the public sector (universities and, previously, polytechnics). The commercial training schools were not provided for—chiefly because at that time they were seeking the endorsement of the APRS for their courses, and despite considerable pressure the Association took the line that it had neither the skills nor the resources to give such

endorsement in a meaningful way.

Meanwhile, the training industry was evolving: the boundaries between the public and the commercial sectors were blurring and the application of training in audio techniques at many levels was becoming broader. In March 1994 came a major change: the APRS announced that the educational member category would be opened up to all providers of training, including those run purely as a commercial enterprise, providing they met carefully set criteria of competence and professionalism.

Would-be members under the new system complete a detailed application form, their premises and the competence of teaching staff are checked, claims to offer future employment are not allowed and if a training studio is operated its

actual availability to students is monitored. As with other kinds of membership, the Association does not 'rubber-stamp' applicants.

It is envisaged that when the number of educational members justifies it, and if they are so minded, these members might form their own group within the APRS (as, for example, the PAD—pressers and duplicators—group have done) to run their own meetings and address matters of common concern.

The Association's board, through its training committee, are currently investigating further significant initiatives in the field of training in the audio industry, which it is hoped to announce shortly. ■

**Philip Vaughan, APRS Chief Executive**



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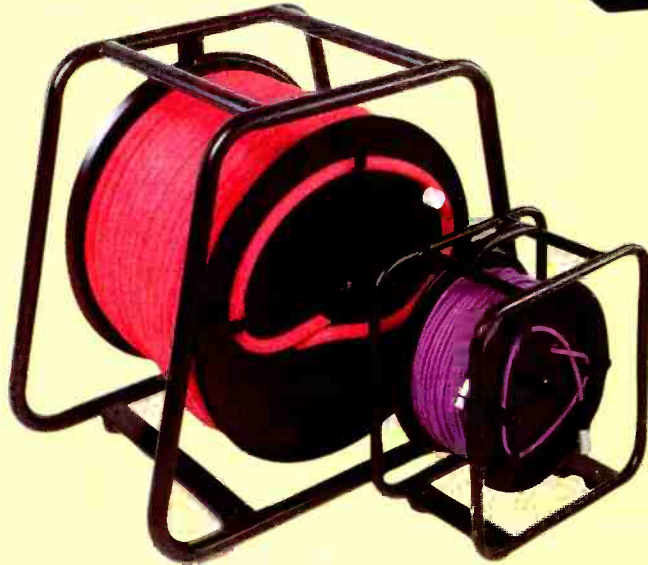


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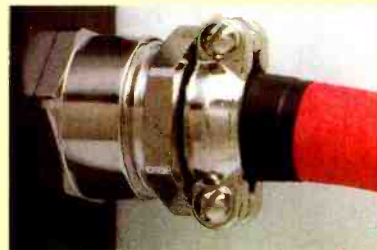
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buttons, the ears, and the communication skills. You're looking for all three. These are the three stages you go through in terms of training—in some areas studios can do it really well and in others the schools can do it really well. What I'm looking at is so divided that it's untrue. It's bloody obvious that the studios don't talk to the schools and the schools don't talk to the studios. For the schools to think that they're training people for studios... They're not because there is no communication. For the first time, two weeks ago I actually had a letter from a school saying 'We are planning a new course, we would like your input on what the course structure will be, what we need to do and how we are going to put it together'. That is the first time in eight years. That's horrifying.

**Nicholson:** So how many studios would reply to a letter asking them about what they really needed in training? Have you got the time to reply to that letter?

**Flood:** Probably about 25%.

**Nicholson:** We have done something similar. I think you'd be lucky if you got 5%.

**Bron:** I'm amazed at that.

**Nicholson:** Audio schools are normally run by people who have worked in the industry and been professional engineers themselves and done some teaching. It's not like you become a school operator or a teacher with no training. Most people who work for us or are associated with us have been working in studios for many years. And we have guest lecturers and experts who come in are still working in the industry.

A lot of the people who work for us do still work commercially because it's the love of their life. What puts the icing on the cake is the guest lecturers that are currently working in the industry and who are helping others to achieve a certain level of education. But it depends on the school itself. Anyone who applies to us we tell to go and look at each of the schools, work out what they teach and then pick the one that suits them. We don't try to sign them up just because they came to us first.

**Gus Dudgeon:** Do any of these schools do

sessions *per se*?

**Nicholson:** Yes. We try to operate them as if they are commercial sessions. We have a book full of bands—we place ads every so often 'the School of Audio Engineering is looking for bands to do free sessions'—and the student picks a band that suits them and rings them up. They arrange for them to come in, they usually go and have a look at a rehearsal session, they book the session in the studio, do a session plan, and they produce a product themselves. It's rather like being a freelance engineer and that's work that they're assessed on. They're also assessed on session procedure in a 2-hour exam at the end of the course.

**Dudgeon:** When I got in at Decca, the system was that Decca had regular auditions so any act that had been seen by any producer came in and a tape jockey was put on the session. The idea was that you'd made the tea, sat in on a number of sessions got a few tips and then you did an audition session. Then, assuming the band got signed and the producer did not object, then you got the gig. You still didn't know any more than when you did the session but now the clock mattered and you started to understand the pressures.

Now, I completely fucked up because I did Tom Jones' audition and then completely screwed up the first record. Everyone thinks that was 'It's Not Unusual', but I engineered the first record and, believe me, it was extremely unusual—it was distorted to buggery, it was one of the worst records ever. So I fucked up, but by fucking up I learned not to fuck up next time. Luckily The Zombies came along and I was in. But it was a great system because you put in your effort and the pay back was that you got to do something else and it expanded from there.

**Flood:** It would be brilliant from a studio point of view to have a catchment group of people to which in some way the filtering process had been applied. You'd know that it was something they wanted to do, that they had some basic knowledge, that they knew how to line up a tape machine ▶




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—so that you'd got some way down the line. My standard question to all people who come from audio engineering schools or whatever is 'can you line up a tape machine?' To me, a tape op who cannot line up a tape machine is a tea boy. You can easily say 'welcome to the digital age' but you also have to line up a Sony 3348 and an Alesis ADAT because it's part of the discipline that is supposed to be taught. The second year students of one university course that is fighting very hard for accredited status, who the head of the school, I believe, is on the Education Committee of an industry organisation still haven't been taught to line up a tape machine. This is ridiculous. It is one of the most basic things—whether you're going to use a Fostex 8-track, and ADAT, a DAT machine—and two years in: nothing.

The one thing I'm keen to push is a training circuit. I've been trying to get people from one particular college into us, get them out of us and into another studio, and out of there into another studio because the skill base

is much broader.

I started trying to push some other studios into it and got nowhere, frankly. With one person we did get him a job somewhere else and from there he moved on to other studios. Now we've just taken him back on and he's got his skill base. It is very wrong of studios to say 'this is the way you do it' because that's very limiting. The average kid is going to spend three months changing light bulbs; someone who is exceptionally good will spend a day doing that. The progression route is up to the individual. It's not a question of exploiting cheap labour—we are employers and if we can use someone properly in revenue earning areas we will.

If you take a kid off the street, after eight months they're sitting in the control room feeling very frustrated because they want to get their hands on. But you may have a client there paying God knows how much money a day, and you don't feel like taking the commercial risk. The thing to do is to move them on—into a demo studio or a publishing studio

—where they're ready to get their hands on. If they move on from there to somewhere else eventually they'll come back properly rounded.

**Goodyer:** Whose responsibility is that? We keep running into this need for communication and then bouncing off it. We're getting individual solutions and perspectives; does anyone have any proposals?

**Shilling:** I'm still sceptical about any kind of qualification. It's very difficult to quantify what a good engineer is because there are a lot of different ways of doing things—even setting up a level on a DAT machine is a grey area.

**Goodyer:** But pointing the finger and saying that a course is not perfect is not a good reason for having the course.

**Shilling:** The way I've learned is by observing how not to do things as much as how to do things. In my years at Livingston, I tape op'd for good people and a lot of arseholes and I probably learned more from them. I was able to say 'it might be a good idea if we...' and I learned tact there. I learned how not to do things because I could see people making a pig's ear of things...

**Matthews:** That doesn't fit in with this industry body you want because you can't have standards and have everybody learning their own way.

**Flood:** We won't get an industry body. Training has been one of the hot potatoes for years. The APRS' view was that they didn't want to ally itself with any one school—which is reasonable enough.

**Matthews:** You don't have to.

**Nicholson:** But it doesn't even want to ally itself with a standard. We have to work out a standard and then schools can apply for endorsement. But it is very political.

**Flood:** I don't think you're going to get that.

**Nicholson:** SPARS are trying to do that in America at the moment. They are probably the only people in the world who are interested in trying to standardise some form of education—because America is so large.

**Dudgeon:** What you're looking for in an ideal world is some place where people can experience everything from an actual a session that matters to lining up tape machines that is so bloody good that every studio is falling over itself to get people from this place. How do get there? You want somewhere where everyone is so bloody good that when you're short of staff—even if it's just for two weeks, temporarily—you ring these guys up

because they're that good.

**Nicholson:** That's a further step. When anyone comes out of a school they know the basics of a range of areas, and that has to be built on. What you're talking about is like an agency with a pool of people.

**Dudgeon:** But for it to work for everybody, you need to bring it under one roof so that it's worthwhile you making the call and it's worthwhile people being in it. I just don't think someone walking in with a piece of paper saying they've been to school means diddly.

**Matthews:** The training we provide involves taking people with a piece of paper and then starting again. We had Maida Vale and Telecenter and Broadcasting House and we could send them to each one for six months and they'd build up their experience and their knowledge. But we are massive employers, we can afford to do that.

**Flood:** It doesn't need to cost money. If you consider the different levels of studio in London, what you need to do is circulate people through those levels. No single studio knows how to do it all.

**Shilling:** There is no right and wrong with a lot of recording practice; it is a very experimental thing and I think by having a standardised course you're going to lose out on a lot of the sorts of thing that I've learned.

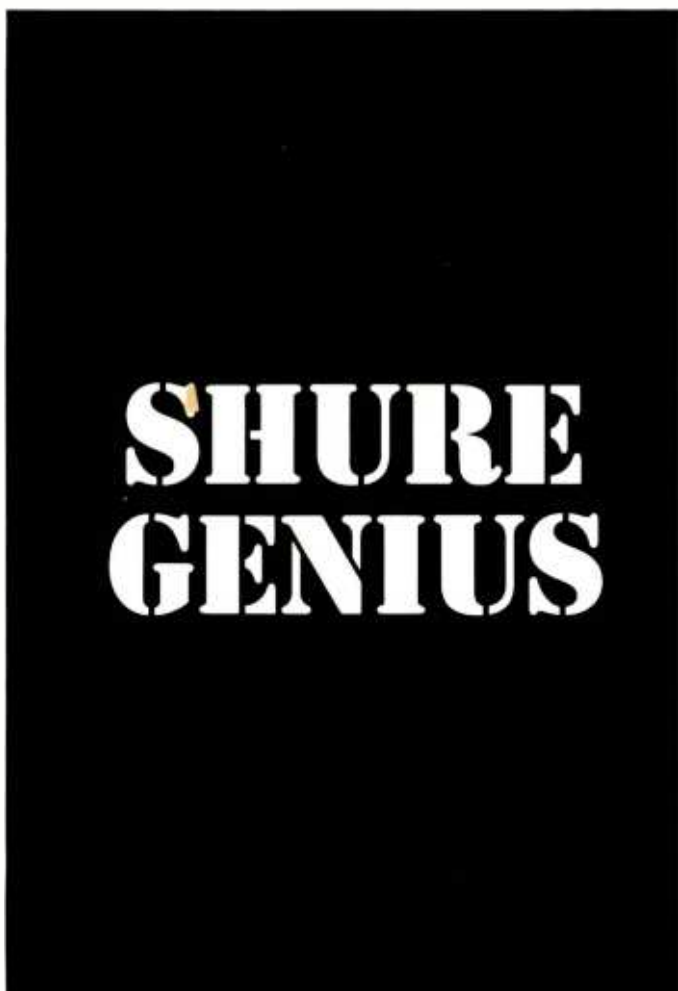
**Nicholson:** You provide a base that people can build on, then they can learn their quirky things and do whatever they like.

**Shilling:** Then you get a business like you have in Denmark where the government fund bands and rehearsal rooms and there's no excitement in what people do because they don't have to work hard or go out to get sticks of celery at four in the morning.

**Bron:** You're almost saying you shouldn't have formal musical training because there are a lot of rules you learn that you then break.

**Matthews:** But a music studio training scheme would not be a course, it would be going off to a classical studio to learn about classical, then to a rock studio to learn about rock bands, it means doing a bit of classroom work on principles. But then again, how do you pick people from the ground level? Why not pick people who have gone to an audio school or Guildford as the base level? That's what the BBC would do; we'd want to see some evidence of commitment.

**Dudgeon:** It's a question of why somebody would choose to join one of



the courses as opposed to applying for a job at a studio. Maybe they have applied and been turned down and then gone on a course. Those people would be more interesting to me because they've tried one route and it didn't work so they've tried another route. They're the people who are going to push through.

**Andy Beer:** The trouble is that even if the APRS gets involved, it's only when the studios themselves specify what they want that anything will get done. So if it's going to get done at all, the chances are that it'll get done better if the APRS aren't involved. It means that there must be more people like Steve Flood who mustn't be doing more important things' when a person from a technical college comes to see them.

**Bron:** I think Steve Flood and I should be on the phone establishing a more direct interchange between studios to raise the standards rather than getting somebody else to do it for us. The best training schools are

studios—all the great engineers have come out of studios not out of schools of audio engineering.

**Nicholson:** I think they'd disagree with you in America about that.

**Flood:** There has been this attitude of 'the schools versus the studios' here, but I believe that if it was done correctly, we could have courses that suit us properly. Only a couple of the courses do anything that is related to maintenance engineering within studios—Salford does it so well that I can't get anyone from there back into London because they all go to work for BBC Manchester or Amek. There is a whole area of training within our area that the schools simply do not address.

**Dudgeon:** The best engineers have fought against much greater odds than just paying the money to take a course. Maybe that's the difference—being bull-headed enough to beat the odds against you making it. There are no odds against getting on a course if you can pay the fee.

**Nicholson:** The odds are against you whether you've come up the hard way or come from a course. In the end, whether or not they succeed is up to them. That's what people have to be judged on.

**Hatch:** The question is whether the odds are improved by going on a course or not.

**Foister:** There's a market for integrating some basic education into peoples' work experience. There's not a market, it seems clear, for people who have just done a course and expect to be on the fast track as a result.

**Hugh Robjohns:** We've thrashed through people going on a training course and then trying to get a job in a studio, but what about the opposite opportunity for training schools. You've got good people and you want to keep them but you want to give them a new skill—you want to get into audio for video and they need to know about video machines and *AudioFiles*?

**Goodyer:** In that situation you can no longer train people in the traditional way of leaning over

somebody else's shoulder and picking it up.

**Flood:** At this stage of the game this is taken care of by manufacturers' courses. The question for a commercial studio is whether it can afford to invest money to broaden the skill base. It's easy for schools to say, 'But you should'. You try writing a cheque some days—we're in a tight industry.

**Flood:** The studio market diminished by 50% every five years. But if you consider the numbers of media channels into the home, we've gone from the Light Programme, Home Service, BBC1 and ITV to how many million channels today? It all has to be made somewhere. It's still the same basic skills involved but it's not just about recording studios. I'm interested in people who have that broad base of skills because I can then expand my business. ■

**Thanks are due to Gerry Bron for hosting this debate at the new Roundhouse facility, and to all who participated and assisted in organisation.**

SPARS STATEMENT

The issue of educational standards is one which is timely and important. SPARS (the Society of Professional Audio Recording Services) has always made education a priority, and many of our members are actively involved with education, either directly as in the case of schools, or indirectly, as in studio or manufacturing members who allow interns to be placed at their facilities or who speak to classes as a regular part of educating the 'newer' members of the American recording industry.

In 1992, SPARS' Educational Committee, including representatives from various audio educational institutions, compiled guidelines to be made available to educators in curricula planning and for use by studio managers. In the Guidelines, SPARS describes three career 'tracks' individuals might choose within the audio industry: production (direct providers of audio production services), management (facility administration and client services), and technical services (technical and maintenance personnel providing support for the facility and not directly to the client). The Guidelines make recommendations for education, work experience and skills that candidates for these positions would be expected to have. This is the same

type of information that a potential candidate would disclose in a resume prepared for an employer.

Although the SPARS Guidelines do not 'set standards' for education for the various positions they describe, they take into account appropriate educational paths to prepare for a particular career in the audio recording industry and makes suggestions for the intangible personality traits that are usually found in persons holding certain types of positions, thus an extroverted young person could find that a position that would require him or her to work alone most of the time might not hold the same appeal as one that dealt with the client. Coupled with the section for each type of position describing experience that would be useful in preparing for such a job, the Guidelines help educators and studio managers to place people in positions that use their talents most wisely.

As the industry changes, SPARS Guidelines are revised (in 1993 and are now undergoing revisions for 1995). This allows them to address new types of equipment that are being introduced and the resultant new jobs available for entrants into the audio recording services industry and specific educational backgrounds appropriate for such jobs. ■

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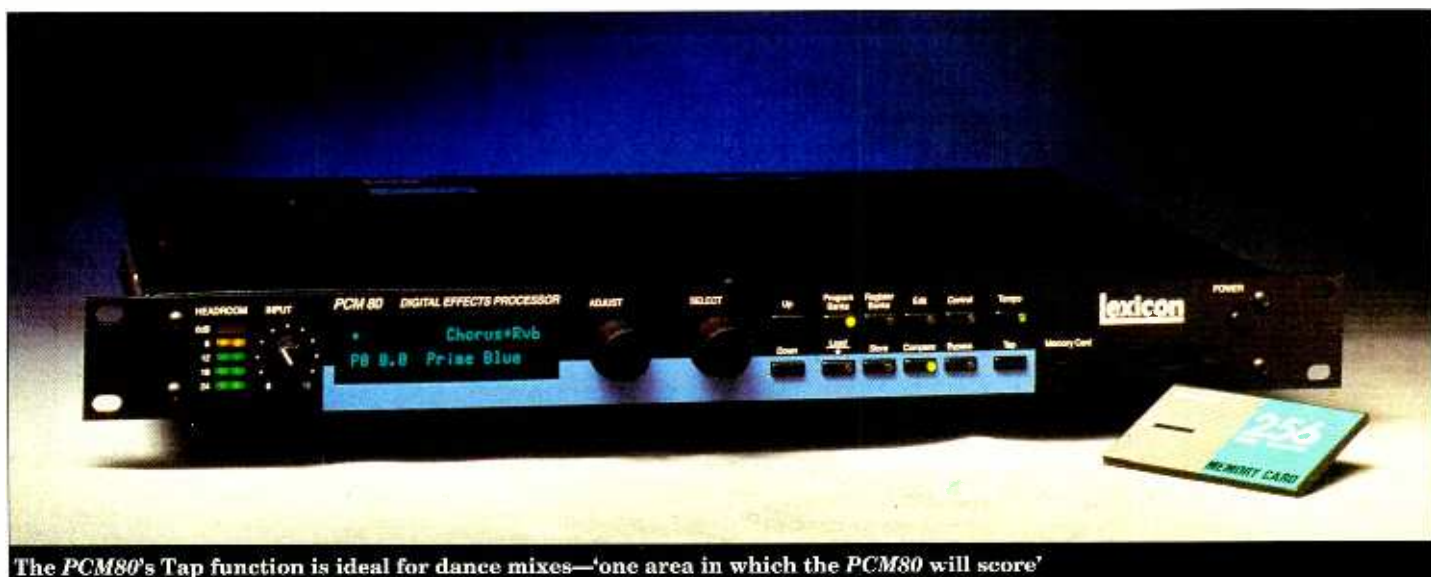
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# LEXICON PCM80



The PCM80's Tap function is ideal for dance mixes—'one area in which the PCM80 will score'

Most recording sessions involve some degree of clock watching. So while it is nice to experiment with outboard effects units, sometimes you just have to get on with the job. With this in mind, I always liked the idea of the Lexicon PCM60—it has about eight push buttons, no hidden functions, nudge buttons or unnecessary guff, just very good sounding American reverb. I also liked the Lexicon 224X—the *de facto* top of the range reverb unit. Then came the PCM70 which did just about everything the 224X does and more, but at about a quarter of its price and size. Nearly every commercial studio bought one. Certainly, economies had been made with the unit, and these were mainly in the area of control—there is one knob for parameter adjustment, a set of awful buttons, and a mode of operation that takes a bit of getting used to. In short, it is the DX7 of effects units. I often found that the musicians couldn't wait for me to navigate my way around it, so I patched in the AMS RMX16 instead.

Superficially, the PCM80 looks very much like the PCM70. The first difference to note is that there are now two soft knobs—ADJUST and SELECT—and a slot for memory cards. Turn the unit round and plug in the IEC mains lead (socket upside down, US style) and you will notice that the signal connections are balanced despite being on 1/4-inch jacks. How many studios have balanced jack connectors in their

leads cupboards? Still, the PCM80 offers true stereo inputs, SPDIF phono in and out, and MIDI sockets in the somewhat unconventional order of In, Thru and Out. Also, there are sockets for footswitch and foot controller for triggering and controlling certain programs.

## In use

Turn the PCM80 on and—wait. And wait. It takes the machine 25 seconds to settle down and run all its internal tests so put the kettle on, read the manual and grow a beard. Two things will strike the PCM70 fan; firstly the 80 has a 2-row, 19-character blue LED display, and secondly, the TEMPO button is flashing. This is for accessing one of the most significant new features on this device (more later).

I was halfway through a mix when the PCM80 arrived and in need a good Lex-type reverb. I plugged it in, whizzed through the programs, tried a few with likely looking names, but could only find 50 programs of *chorusey*, *flangey*, *delayed rotary speakers*. I gave up and plugged in the 480L.

Back home, I read the manual and found that I had been looking through just one of four Program Banks (confusingly numbered P0 to P3). All those favourites (like Rich Plate and Locker Room) are there and sounding as good as ever—possibly even smoother and less *clangy* than some of the PCM70 equivalents—but they are hidden away

on Bank P3. It appears that Lexicon want you to hear how clever they are in preference to offering you what might be most useful up front.

Programs are numbered 0.0 to 4.9 being on a kind of grid matrix—the UP and DOWN buttons take you through rows 0–4 and the SELECT knob takes you left to right, 0–9. This is little improvement over the numbered buttons on the PCM70, and personally I would prefer the programs to be numbered more straightforwardly from 1–50. Programs are based on one of 10 algorithms, each of which offers reverberation plus a 4 or 6-voice stereo effects 'tool box' for creating specific effects treatments. This allows for several multiple effects. In practice, however, the effects are well integrated within programs and not always clearly separable into delay, reverb and other discrete processes. Rather, they tend to create a single, well-rounded effect. ►

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SS001

## EFFECTS PROCESSOR

Once you have loaded a program, the ADJUST knob takes on the parameter that Lexicon have deemed most useful for that program. On some programs this adjusts reverb decay, for example, while on others it changes several parameters at once.

EDIT takes you to the edit matrix—much like the program matrix, each row of parameters covers a different related set of adjustments. When you first power up the unit, however, it is in what Lexicon call Go mode, here the manufacturers have thoughtfully selected around ten of the most useful adjustments, and these are all that are available to you. This doesn't really help that much in practice, as I do not think they have always chosen the most useful things. Every parameter can be accessed through the alternative Pro mode matrix, however.

After loading a program, the COMPARE button lights up; pressing this toggles between the preset and the edited version. Confusingly though, the light does not go out if a setting is edited and then returned to its preset position, so you might find yourself comparing two identical programs and not realise it. Storing the edited program is as straightforward as pressing STORE, where the *PCM80* finds next available location (there are 50 in all). Recalling a program is the same as loading any other program except you press REGISTER BANKS to access your creations. The standard PCMCIA S-RAM memory card slot is, as already noted, a new feature, but I have yet to meet anyone who carries disks or cards with personalised reverb presets. I presume that future software updates will appear on such cards, but surely 3½-inch diskette would have been better and cheaper. FX Width is variable from -360 to +360, where these two settings and +0 give you a mono output and +45 gives you stereo, with plenty of possibilities in between for surround sound effects.

The Tempo feature is a superb addition to the capabilities of the unit. The *PCM70* was the first unit (to my knowledge) to include BPM settings for delay times—this was great if the track was programmed and you knew what the tempo was, but not that much help otherwise. Now the *PCM80* offers a TAP button to allow manually entered delays to be in time. This function is active regardless of the unit's operation mode, the exception being when you hook up a MIDI lead and send it MIDI clock pulses, when the delay times sync to this. The function is ideal for dance mixes and this seems to be one area in which the *PCM80* will score—many of the programs are perfect for livening up sounds from machines and modules. Especially wacky are the Thunder FX (self-explanatory) and Super Ball! (samples and loops a section decreasing its length until zero) both of which are great fun but of limited use. Amusing and much more useful are Cheap TV Room (like that found in many studios) and Backstage which, if you remove the dry signal, is just like the dressing room during a gig.

There are also programs based on the Resonant Chords program that first appeared on the *224X* (that familiar elastic band sound), a couple of which have acquired MIDI note control, and some great *Leslie* effects.

The manual proudly states that you can have SIMM chips installed to increase the *PCM80*'s delay times to 42 seconds, but surely the 2.6 seconds you get as standard are adequate 98% of the time.

## Conclusion

The *PCM80*'s algorithms allow for a wide selection of effects, the only missing elements I would have added being distortion or speaker simulation (the rotary speaker programs are a bit too clean) and, perhaps, more use could be made of the two separate inputs with vocoder and ring modulation programs.

I found the fact that some programs will not work without MIDI or footswitch input mildly irritating—many studios who buy one of these won't ever hook up a footswitch I'm sure.

The effects, however, are superb—as well as fabulous reverbs, there are plenty of new and different and usable programs. The sound quality is up to (or even beyond) Lexicon's usual standard of excellence. The outputs are subjectively noisier than, say, the *480L* (depending on the program selected) but still well within useable pro limits. I found it quite difficult to get past the first program *Prime Blue* which combines three effects and is adequately controllable by tapping in the appropriate tempo and using ADJUST which, in this case, varies the mix of 6-voice chorus, panning delay and reverb. It sounded great on vocals, guitars and keyboards. For drums, the Drum Plate program was excellent. Using these programs for monitoring and mixing purposes elicited an encouraging response from the musicians involved in sessions at London's new Roundhouse Studios—Morrissey's band and a heavy rock band Call of the Wild. On dance projects I found the MIDI Clock Tempo mode to be immense fun, and for my money, the addition of the Tempo mode has to be the *PCM80*'s biggest selling point.

Some of the unit's hidden functions tend to confuse operation, however; I was frustrated on several occasions and only after much manual reading—or by chance—discovered that what I wanted it to do was possible. The default settings were not set up the way one would expect in several areas. For example, the machine kept changing my tempo setting when I loaded a new program until I stumbled on the System Tempo Mode Global-Pgm setting in the Control menu.

Where the Eventide *H3000* had a much more welcoming feel about it, the *PCM80* incorporates many 'unnecessary' features (who wants a setting to turn off the flashing Tempo LED?) and a discouraging learning curve. The manual too could be improved, being well written but 'waffly', repetitive and poorly cross-referenced.

Certain aspects of its functionality aside, I love all the *PCM80* can do to a signal and—most tellingly of all—I still want one. ■

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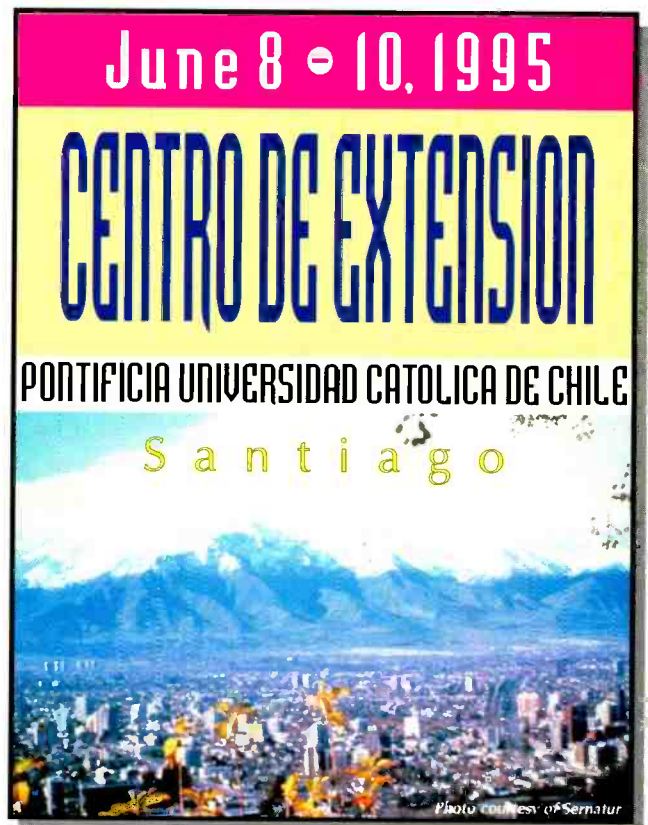
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Once upon a time, long, long ago and far, far away—there was only one audio show and that was the annual meeting of the AES. Then, there was a European AES show and that made two. Today, the audio market has fragmented in the directions of various audio market niches and has professional meetings serving the new faces of the industry. If you want to know more about motion-picture sound, try the World Media Expo (the merged Society of Motion Picture and Television Engineers' show that is part of the NAB Radio Show with the SBE and others). If your movie-sound energy is not dissipated, you may then attend either Show East or Show West and then take in the Show Biz Expo. For audio-visual try InfoCom or the InterAV show. Sound reinforcement takes you to the National Sound Contractors Association show known as the NSCA meeting. Broadcast audio, TV production and postproduction is the province of the gargantuan NAB spring meeting in Las Vegas. Musicianship, touring and-or live concerts will take you to the NAMM show in Anaheim. Computer audio is the province of MacWorld and Comdex. And there is even a specific show for background music providers.

There is an Audio Technology show in England, European AES shows around Europe, the IBC in Amsterdam, 'local' audio shows and conferences in Beijing, Birmingham, Bombay, Boston, Cannes, Frankfurt, Guangzhou, Hong Kong, Jakarta, Karachi, Karlsruhe, Köln, Leipzig, London, Los Angeles, Mexico City, Montreux, Moscow, New Delhi, New York, Paris, San Francisco, Santiago, Singapore, St Petersburg, Sydney, Tokyo and Vienna. This is just the beginning.

One element that has been gradually altering the balance between the various shows is the emergence of the NAMM show as challenger to the US AES Conference. It has been clear to NAMM attendees in the past that audio was a big part of the mix of products being displayed.

The 1995 NAMM show, however, crossed the line from being a musical instrument show with a lot of audio exhibitors of interest to being an audio show with a lot of musical instruments (MI). The transition of NAMM to the audio mainstream simply acknowledges the following developments. Electronic musicianship has never been of a higher calibre. Musicians have become the mainstream buyers of professional and project audio equipment. MI and MIDI technology has advanced to the point where the professional audio performance suite is modular and has direct connection to MI and MIDI. In addition, the presence of an attendee base measured in multiples of tens of thousands coupled with the sponsorship of a commercial organisation (NAMM) justifies the 'selling' status of the show to exhibitors. Larger booths at NAMM accommodate both 'hands-on' equipment evaluation and ample seating for equipment demonstrations by well-known musicians.

The magic of NAMM is that the show is about and alive with music. Everything there is focused by that relationship between audio and music. Exhibitors at NAMM are showing hard disk workstations for editing, hard disk

Martin Polon

## The professional audio trade show —trick or treat?

recording, every option for live performances and touring, recording studio equipment and so on. In most booths, the audio technology is showcased as to its relationship with music and with performing musicians.

NAMM aside, the commonly heard complaint of attendees to any of the large audio shows is that the event overwhelms the showgoer. Here are some suggestions that will ease the process of audio show attendance for those attempting to keep up with the latest and greatest.

Many of those who attend audio shows are paying out of their own pocket. Other attendees travel for business on tight budgets. In both cases, the result is an appetite for inexpensive air fares. But bargain air fares frequently yield convention goers who complain of arriving a day or days late or of having to endure 14-hour flights with three changes of planes. This is especially unacceptable for anyone doing exhibitors booth duty and-or carrying display material. The same can be said for convention attendees with an ambitious schedule. Bottom line: purchase only those air fares that offer a reasonable guarantee of arrival within three hours of the scheduled arrival time.

In the past—especially at AES Conventions—there was a 'pecking order' to hotel occupancy that conveyed a certain social order. The 'show hotel' housed the meetings, the exhibits and the social programme. Other hotels were less desirable since the closer to the activities that one was, the more that could be accomplished. Then the AES

It is not unusual for AES officers, SMPTE officers or the officers of just about any learned professional 'society' to spend their entire four days at the convention in meetings

and all of the other similar shows expanded. The 'show hotel' no longer housed any of the vital elements of the meeting and where one was housed became a matter of function over form. Bottom line: the amount of time one spends in a hotel room at an audio megameeting is minimal if you are 'doing' the show properly. Try to avoid being at a distance from the festivities so you avoid travel time.

Do not get diverted from your 'main course.' These audio shows are so big that one must really concentrate one's energy on those products which are potential 'buys.'

Consider that you may not be able to spend time in every booth at the show and attend every wild rock 'n' roll party thrown during the effort. It is helpful to focus on what you have to do at the show and accomplish it. Wear comfortable shoes. Get plenty of sleep. Now this probably sounds like advice for elderly sound engineers but consider this—there are going to be attractions at these shows that you cannot find anywhere else. You can always party back home.

Cruise all of the booths with a pad and paper. Make a note of all of the booths you need to see. Bottom line: get the lay of the land.

As part of scoping out the show you are attending, gather up the trades and see what is new and what interests you.

With your equipment shopping list, your first fast scan of the show and whatever intelligence you have gleaned from the trades, plan the number of days that you have available to cover the show. Try and keep the last day open to allow for meetings and to see things that you have previously missed.

Rather than suffer various degradations of your musculature, try to gather printed matter and publications you really can't live without and get them back to your room. You will find that carrying 40lb of literature in two shopping bags really does cramp your style!

If you know that you will want to talk with sales or marketing personnel at a specific booth—call ahead of the show and make an appointment. When you show up they will at least have some knowledge of you.

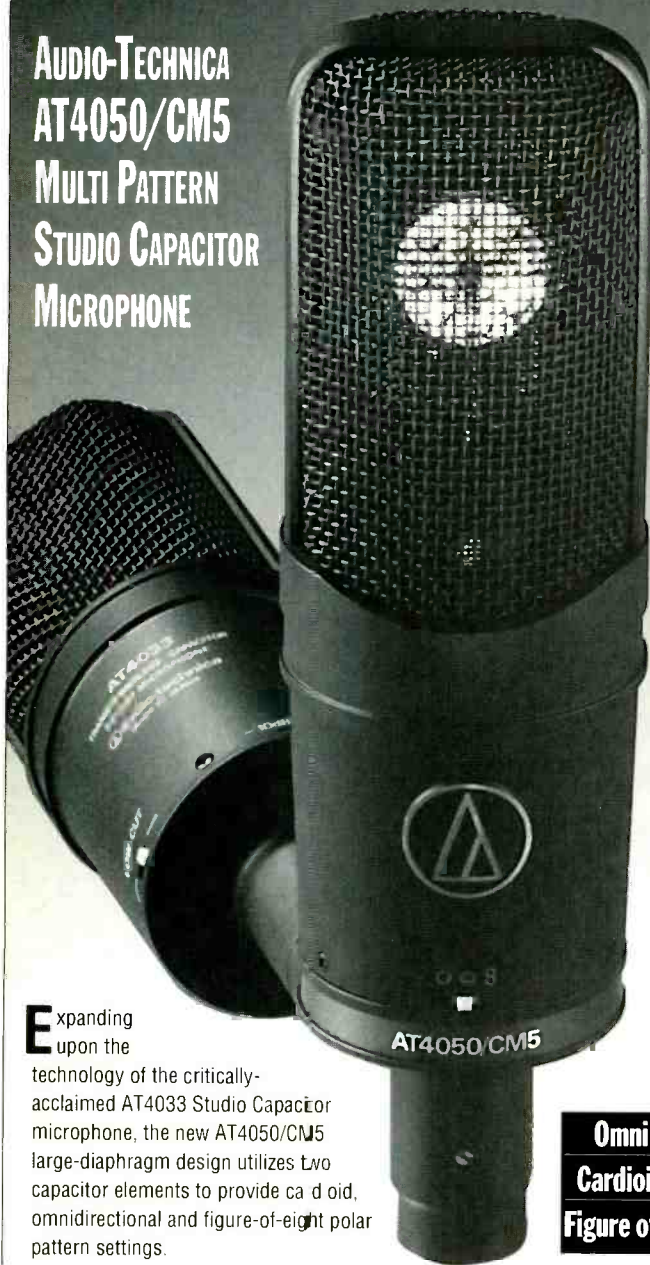
Avoid utilising show time for meetings. Think of the way that many people go to AES or NAMM or NAB and then complain when you see them back home that 'they hardly saw the show!' They're really not kidding. They spent the whole show in meetings thinking 'Wow, I'm really important.' Which may or may not be true, but their knowledge of the audio industry diminished by more than a notch or two with what they missed on the floor.

If you really want to run a big audio or audio-video show, then by all means do so—but consider carefully other officer assignments. of the Executive Committee, Future Directions Committee, Education Committee, Finance Committee, Publications Committee, Sections and Regions Committee, Board of Governors. Not to mention the odd Standards Committee working group or three. Trust me on this, you will see at best perhaps half of one day of the convention and only then if you manage to avoid the Awards Banquet!

For a comprehensive listing of audio-related shows please refer to *Studio Sound's* World Events listing. ■

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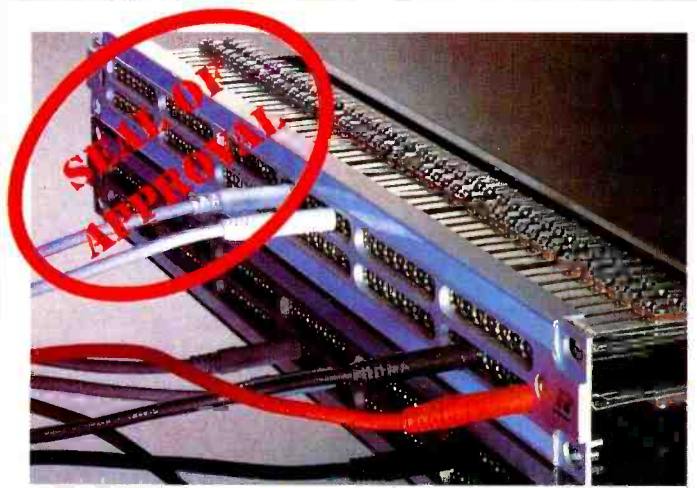
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Remember a time when hard disk-based digital audio workstations were a new thing and everybody got terribly excited over them? You do? My, you've worn well. Back in the heady days of the mid-1980s, when the sky was purple and *Perrier* came out of the taps, the cry was that tape was dead and all anyone needed was a computer and a powerful enough disk drive. In this way, quarter-inch spools of oxide-coated material would be pushed out of the studio—whether it be broadcast, postproduction or recording—and into the technological history books.

It has taken a while, but it is all happening now of course. As with many new things, people started shouting too early and didn't take a few vital factors into consideration. One was end-user resistance; the other was the initial unreliability of the early systems. To update an engineer's gag of the time, 'What's the difference between a digital audio workstation and Baring's Bank? Baring's only crashes once'. Today, just about everyone produces a digital audio workstation of some shape or form; they are cheaper, more powerful and, here's the clincher, operators are starting to trust them.

In video postproduction, digital audio workstations have largely been used for segments, preparing the audio and then dubbing onto another format. If the tapeless dream is to be achieved, then entire sequences and programmes will have to be prepared on disk, a proposition that calls for a high level of sophistication and, perhaps more importantly, a not inconsiderable degree of courage on the part of the producers and operators. While TV and video continues to look rather warily at this, radio, the senior but poor relation in broadcasting, has been taking some serious risks where digital disk-disc technology is concerned.

The most obvious example of this is the CD, the use of which has extended beyond just a couple of players either side of the disc jockey (a phrase that now takes on totally different connotations), as in the old days of turntables and vinyl. Radio station machine rooms now contain large multiplayers, or juke-boxes, which store hundreds of CDs, all of which can be accessed by the studio's selection computer.

These make life a lot easier, but presenters have found some glitches. One is operational, when sometimes the computer won't co-operate and the whole programme shudders to a halt. The other is artistic: the DJ plays what is presented on a VDU; gone are the days of rushing on air with a pile of randomly chosen albums, many of which came as a complete surprise, not only to the listeners, but to the person playing them.

Many DJs used to make a big thing about how they dealt with jingles and the cart machines that played them. One presenter I knew used to walk in with two boxes full of NAB carts—the start of his show was two minutes (at least) of samples, catch phrases and idents, all expertly cued in considering their short durations.

All gone now. The tape-based cart, which suffered badly from wow and flutter, and spurious cues that put them into fast-forward, have been superseded by MiniDisc and diskette-based

Kevin Hilton

## Digital audio workstations in radio broadcast—overkill or cart killer?

players. This has been underlined by the announcement that Sonifex, one of the big names in the old-style cart machines, have ceased their production to concentrate on the new technology.

Both MD and diskettes have been adopted by radio stations, with the MD perhaps having the edge because of its larger capacity and the ability to construct edit and content lists. MD is also being seen as a partial replacement for quarter-inch analogue tape; it can be used to record interviews both in the studio and on location and, as Sony's Andy Tait observes, 'It's possible to get 10 to 20 cuts onto one disc for jingle and advertising use, while reporters can edit on machines and get a good enough end result to go straight to air with.'

But the big threat to tape is the digital audio workstation, even in radio where some engineers and producers still hang onto the days of steam wireless, with its tangible recording medium, razor blades, EMI blocks and splicing adhesive. One, of many, digital prophets is Francis Wachemann of French manufacturers Audio Follow, which produce two systems, the DDO Broadcast and the Contact, which both work with M-O discs.

'It will happen step-by-step, but hard disk, M-O discs, will come into more general usage—tapes will disappear,' Wachemann says emphatically. 'Disc is convenient and is not susceptible to worn heads, mechanical problems and tape deterioration. It also gives immediate access and the ability to network, making for a larger sound bank. In the future, all radio will work in this way—it's just a question of investment.'

The money is evidently coming: BBC Radio have been spending large amounts on digital audio workstations following its Digital Project to assess the performance of various units. Commercial stations of all sizes are also gearing up with disk-based technology, especially as automation starts to become more widespread. The point now is to prove that these units are more than just clever little boxes that do tricks. 'Oh wow,' we say, but there's got to be more to it than that.

A good, but tough, testing ground is the outside broadcast and the BBC have used digital audio workstations on some high profile events. The acts at last year's Monsters of Rock Festival were recorded onto Augan units, where the obligatory heavy metal profanities were excised; the finished packages were then transferred to tape for later broadcast. More faith was put in hard disk for the presentation of the Brit Awards, an occasion that is synonymous with disaster after the legendary infamous 1989 event.

To guard against such monumental ineptitudes ever happening again, professional presenters are

used and television plays safe by prerecording the entire proceedings. Radio, thankfully, still has the room to be spontaneous: a 2-hour show was broadcast by BBC Radio 1 FM from Alexandra Palace in North London on the night of the Brits, with DJ Mark Goodier fronting a mix of interviews (some recorded earlier, some live), music from CD and stage performances.

Goodier is a self-confessed techno-buff and last year founded an independent production company, Wise Buddah, with his long-standing associate, Musician-Technician-Producer Bill Padley. Wise Buddah have produced a variety of programmes and sequences for R1 and was contracted to provide the Brits coverage. The intention was to make it a totally digital disc-disc experience, with prerecorded music on CD, interviews and performances laid onto Digidesign *Pro Tools* and then backed-up on MD.

Plans had to be changed at the last moment due to a loose screw in the MD record machines, which meant that the *Pro Tools* systems were used for playback as well as recording and editing. Padley admitted that this was a little hairy but pointed out that the broadcast worked, proving that digital audio workstations have the immediacy quarter-inch analogue does not. This was illustrated when, at the shortest possible notice, Madonna declared that she was prepared to be interviewed.

'Mark rushed out to interview her and Richard [Earle, BBC Senior Sound Supervisor] had to play CDs to cover,' said Padley. 'The interview came direct onto *Pro Tools*, I chopped it down from five minutes to two and it went on-air straight afterwards. There's no way we could have done that on tape.' Wise Buddah had subcontracted the facilities side back to the BBC, who are now beginning to put more faith in a wide variety of digital audio workstations (including *SADiE*, *D-CART* and *Sonic Solutions*). Even so, the Brits went further than most transmissions: 'It's probably the first time we've put so much faith in such a system,' said Richard Earle. Bill Padley added, 'People are now confident that it won't be a catastrophe.'

It is this confidence, mixed with the Beeb's now famous desire to be seen as a step ahead of the game, that may have led Radio OBs to be the first recipient of SSL's *Axiom* and *DiskTrack*, the console and hard-disk storage system which take the technology into 'go-faster stripes' territory. It also knocks another spool off the studio shelf as far as analogue tape's longevity is concerned.

But should this worry us? A highly placed radio sound person observed to me that digital audio workstations meant technical operations and editing could be easily passed up the ladder to producers. This may sound like a call for demarcation, but the point seems to be that producers may not necessarily want to cut programmes, whereas there are plenty of qualified, trained people around who do want to do it.

The coming of new technologies gives freedom, both operationally and creatively; it shouldn't be used as an excuse for the suits to trim another couple of ECUs off the budget. ■

## Legal eagles

Much of the thrust of the letters in reply to Ben Duncan's EMC article (*Studio Sound*, November 1994) had revolved around the enforcement of European Union legislation, and reference was made to possible loopholes via the southernmost countries. This is possible true, as I am sure that in Portugal, I could buy whatever approval anybody wanted for just about anything (as I could no doubt also do in a number of other countries) but it must be fully understood that the southern cultures are very different from the Anglo-Saxon/Scandinavian cultures of the North. There is a great deal of humanity in the south, which can sometimes be sadly lacking in the north, and family values down here are strong and healthy. Human beings are not expected to be 'perfect' animals, and hand-in-hand with greater humanity, goes a greater tolerance of many human foibles, which is an aspect of life

which is often absent in the more disciplined northern life.

Within this context, I was consulting at a public exhibition site, and asked about European rulings on emergency announcements, maximum permissible SPLs, speech intelligibility requirements and so forth, and drew a total blank.

Basically, nobody is interested in the latest European safety rulings in these countries, where they sometimes refer to me as a 'woman', because I fuss about the toxicity of solvent fumes, bare wires on electric tools, or people working high up without guard rails at sites on which I may have been the designer. The criticisms don't worry me, because I can give as good as I get.

All of this leaves me between a rock and a hard place in terms of trying to do my job. Not complying with EU legislation can leave me perhaps criminally liable if I specify anything which fails to meet the latest rulings, but with no work if I try to enforce them. Spanish Junta's build things for their

people, often to help re-election prospects, but nonetheless because they believe in their local communities, and wish to provide facilities with whatever financing they have. Brusselocratic rulings will not stop them if the cost of compliance would put the project beyond their means.

The sound contractors for whom I work from time to time, take no interest in EU laws. A typical situation, even for a local government authority, will perhaps have a budget of \$30,000 for a job that would need \$60,000 to meet the regulations. If they wish to save further money, they (the official bodies) will string along the contractors until the last minute, and if those contractors refuse to take what is offered, a last minute substitute would be found for even less money, to do a 'botch' job, and if anybody complains, the official line would be 'Well, you know, it was the cheating contractors, who tried to force more money out of us, then refused to do the work at the last minute. At the end, we only had three days to make the best installation that we could.'

Whatever their high and mighty stand, there is nothing that the men in suits in Brussels can do about this. If they try, I would really like to be there to watch the outcome. One local mayor who overstepped his authority recently was taken from his house and paraded stark-naked through the streets of his town until he agreed to resign. A new Mayor was elected, the people got their way, and except for the ex-Mayor's possibly over-inflated pride, nobody was hurt. I suspect that 'interferers' from Brussels would receive a similar fate. These people will not be told by Brussels that they must do without something in their own lands, simply because they do not have the resources of Germany, Sweden, or Britain, to comply with the latest northern-inspired safety rulings. In a central government funded project in Madrid or Barcelona, perhaps the rules will be applied more rigidly, but in the provinces, life will go on in its own way. Fact.

As I wrote in *Pro Sound News* last year, in one discotheque in Portugal for which I did the acoustic design, the owners worked to the letter of the latest EU law, only to provoke the fury of the local inspectors, who could find no way to extract their customary bribe. There followed interminable bureaucratic delays in receiving the necessary certificates. The discotheque owners then swore to me that if they every built another one, they would ignore the fire safety rules, and just pay the bribes, which would be less 'dangerous' for their business.

In the light of all this, I cannot help but give a bit of a wry smile, when I read the letters of Allen Mornington-West (for whom I have great respect) Ben Duncan, (who is very knowledgeable) and the other well informed persons, who attach a gravity to all of that which seems to be very much diminished in its seriousness from some other, fully fledged parts of the European Union. Do the British sometimes get too wrapped up in the niceties of some of these details?

I should add that the 'bribes' for fire or electricity installation inspection inspectors are largely not born of criminality—these people are often poorly paid by north European standards and their main priority is to feed their families. Their jobs are of secondary importance. A small bribe ensures food for the inspectors' families and an affordable installation cost to businesses which can be secure in the knowledge that 'glaring' safety problems will have been pointed out. The motto seems to be 'if Brussels wants it, Brussels can pay for it'.

Philip Newell, Lisbon, Portugal ■

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# MIC SPLITTERS



Mic signal splitting is an essential part of both live and studio recording schemes

one mixer needs to be connected across each microphone. As soon as a monitoring console is added across the FOH mixer, microphone loading drops to 600Ω (Fig.1). When additional mixers are added for recording and/or broadcasting, the loading falls further, down to 300Ω when four mixers' inputs are connected. The load impedance seen by microphones is often even lower at high frequencies—above 5kHz—due to the capacitance of many metres of multicore cable, and also the RF filtering capacitors inside each console.

In everyday use, dynamic microphones are broadly assumed to have an impedance around 250Ω. In reality, however, the impedance of many widely used microphones fluctuates widely at resonant points across their frequency range. It can vary from up to 2500Ω, over ten times higher than this nominal

250Ω, to as little as 50Ω in the cases of certain AKG, E-V, Shure and Sennheiser mics, or one fifth of the nominal. These impedance fluctuations are not a problem when microphones are plugged into a single mixing console, presenting a load that is close to the 1200Ω specified for most microphones.

The trouble starts when more than

## Excess loading

The extra loading of multiple mixers has two effects: firstly, it reduces the microphone's output level by between 3dB and 6dB. This is not much of a problem by itself, but if any of the mixers is for some reason unplugged or switched from the optimised microphone

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## Colin Park and Ben Duncan discuss the use of active electronics to enhance stage microphone performance with reference to the ARX MSX 4

(1200Ω) input impedance to line (10kΩ) bridging impedance, the resultant sudden change in microphone level can trigger a burst of feedback in the PA system, requiring some frenzied activity to restore the status quo.

Secondly, and more importantly perhaps, the microphone's frequency response is changed. At the microphone's resonant points, the response (with loads below the rated 1200Ω) may dip or peak by several extra dB, causing a substantial change in the way the microphone sounds. This upsets the engineer's judgment as to which microphone to use, and requires extra equalisation effort in an attempt to recover the intended sonic characteristics.

Because the response changes can involve change in quite sharp dips and peaks, not many console EQ sections will be capable of fully or satisfactorily compensating the results of the microphone's excess loading. Again, if the microphone-line settings of any of the two, three or four mixers across the microphone are subsequently changed, the frequency response will be upset, possibly causing howlround, and certainly causing the microphone's sound to change again, requiring further equalisation. Even

without mic-line switching, level and tonal changes can occur when pad switches are operated, as in consoles their setting significantly alters the input load impedance.

Overall, as the PA crew have little control over what broadcasting and recording engineers do with the consoles in their trucks, this explains why broadcast and recording link-ups are regarded with some trepidation.

### Splitter transformers

Microphone 'splitter' transformers are commonly employed when microphones are connected to more than one or two mixers. They usually have 1:1 ratios—1:1:1:1 for a 3-way split. It is a common belief that such splitters alleviate the mixers' loading effects. This, however, is an incorrect assumption unless the transformer is combined with active electronics.

Usually for reasons of cost, splitter transformers are stand-alone, passive devices. If so, they can only apportion the microphone's impedance equally between the mixers, exactly as would happen without the transformer. Splitter ▶

#### Stage Microphone Connections

Fig.1 Conventional Scheme

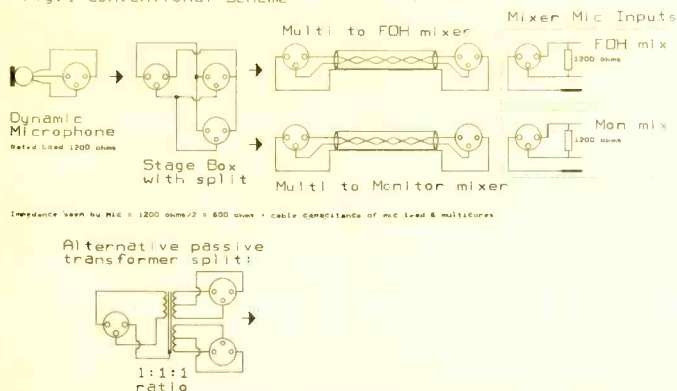


Fig.1: Conventional signal splitting scheme

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DYNAMIC MICROPHONE OPERATION

Stage Microphone Connections

Fig.2 - Using an Active Splitter

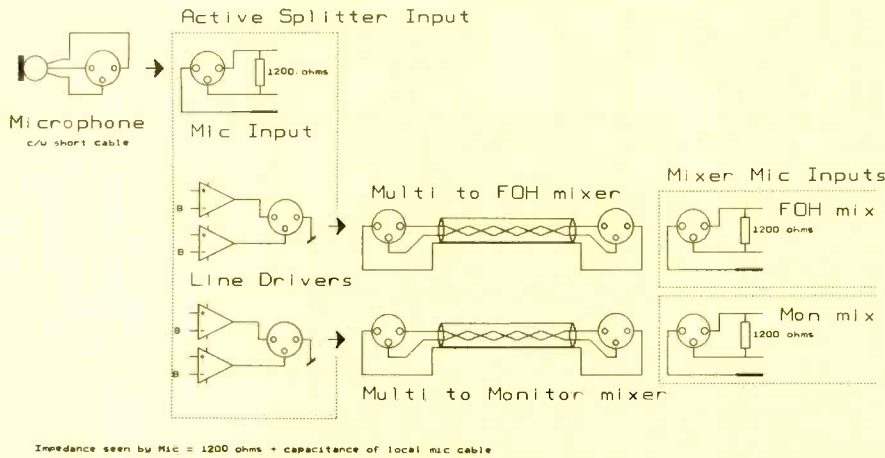


Fig.2: Using an active splitter

transformers are still useful, as they galvanically isolate the grounds breaking potential loops, and also restricting the potential for damage and death if any circuits are accidentally connected to the mains power. However, ground isolation can be achieved more cheaply by breaking shield connections with switches, or using low value resistors for a 'soft float'.

Since good transformers are highly expensive, and more affordable transformers will always add significant frequency response, phase and distortion aberrations of their own, it is best to avoid them unless galvanic isolation is essential for safety, for example, in outdoor events where wet weather is possible, or where insurance requires it.

Active splitting

Because an active microphone splitter makes each feed immune to changes caused by the loading presented by additional mixer connections, one of its psychological high notes is that harassed live sound engineers can quit worrying about the mobile truck.

Use of an active microphone splitter close to the microphones also improves sound quality on at least three counts. Firstly, each microphone's signal level is brought up to line level before it has travelled away from the stage, so the signal level rides 10dB-29dB higher above hum, RF hash and signal breakthrough that gets picked up along the main body of multicore cabling. Meanwhile, the noise level (S-N ratio) of the microphone splitter is as good as the best console microphone inputs.

Secondly, pickup in the multicore is typically reduced, particularly at RF, as the active microphone splitter's output impedance is much lower (at 50Ω) at all audio frequencies and up to 1MHz and above, and is more consistent than any dynamic microphone.

Thirdly, by avoiding the complex loading effects

of multiple consoles, each microphone's frequency response and sonics are improved—returned to what the manufacturer intended—and as a result, less equalisation will be required.

Finally, passing microphone signals through transformers (with their well known transient, phase, amplitude and distortion aberrations) can be avoided in most cases.

The use of active splitting does not offer a complete 'win-win' situation, though, and a possible downside as compared to passive splitting, is the higher risk of unreliability, since a mains power supply and also more parts are required. But, by using two power supplies in tandem, we have effectively a second, 'redundant' power supply which will cut-in instantaneously if the first supply goes down. This successfully overcomes the first objection. Meanwhile, the extra parts are all low power, small-signal, high quality electronics, certainly no less reliable than the microphone amplification in premium mixing consoles.

Looking at the ARX MSX 4 microphone splitter, we find a carefully considered signal path intended to provide dynamic mics with a constant, ideal 1200Ω load, irrespective of whether the pad switch is in or out. And, unlike the arrangements in many consoles, the switchable phantom power is applied in a way that prevents speaker and nerve destroying bangs and clicks.

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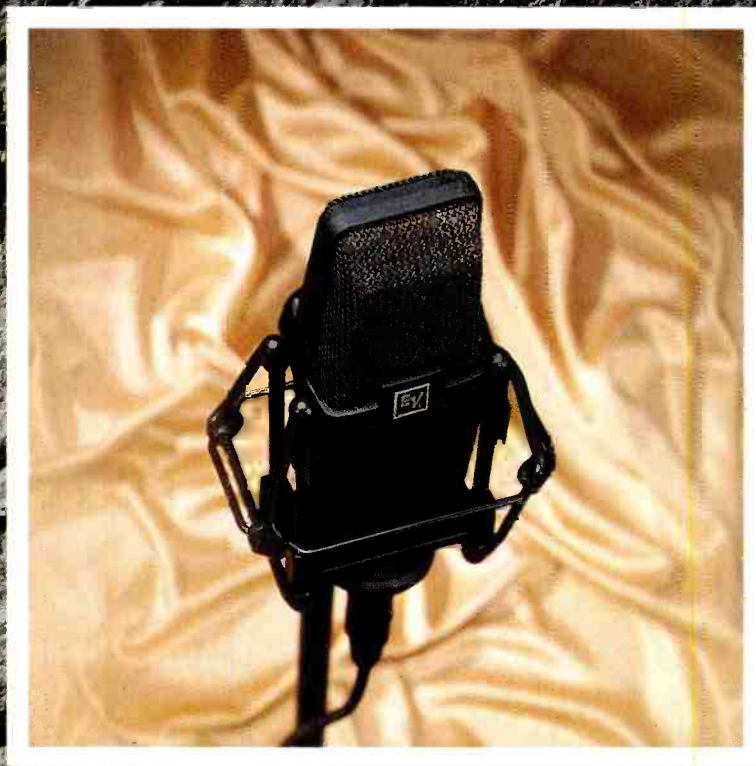
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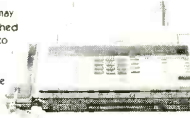
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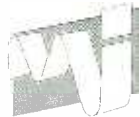
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I recently tried the Philips *DCC-170* portable digital cassette recorder. It is neat, it is small, it works like a dream and, finally, delivers what DCC always promised.

For £250 (UK) you can make 18-bit recordings, and play back either digital or analogue tapes. On the face of things, it should be the ideal portable for broadcasters. But there are two downsides.

The first, as Sony continually remind us with MiniDisc, is that the future of tape is disc. Many radio stations now use hard disk editing systems and as a consequence, tape access times seem ever more painfully slow. Secondly, like all consumer portables, the *DCC-170* uses 3.5mm mini jacks to connect headphones, microphone and analogue line out. And 3.5mm mini jacks and sockets are notoriously flimsy. It is all too easy to break the plug, or loosen the leaf connectors inside the socket. then plug contact becomes horribly erratic.

What broadcasters need is a *DCC-170 Pro*, with XLR connectors and a bigger battery.

Marantz—now a subsidiary of Philips—make the *DCC-170* in its Japanese factory. Marantz have long experience of the pro and semipro analogue tape market. Many radio reporters still use Marantz warhorses. So Marantz are in the ideal position to produce a DCC portable that reporters can kick around, and rely on in crowds without fear of skipping. But the original point of DCC was that it would be a low-cost consumer digital recorder to undercut DAT. Marantz have admitted making no profit on the *DCC-170*. Portable DAT recorders have now come down to prices that pro DCC would have difficulty undercutting. Sadly I doubt that we'll see an XLR version. DCC was a nice idea that missed its time slot.

Nagra's 'solid state solution for radio reporting', shown at the AES Convention in Paris, certainly looks like the ultimate jog-proof system. Reduced audio is stored on a PCMCIA memory card, the credit-card size plug-in module that is now a standard for adding extra money or a modem to portable computers. With no moving parts, the *Ares-C* will not skip, even if someone who does not want to be interviewed, karate-kicks the reporter.

The *Ares-C* plugs into an ISDN line to send 7kHz mono to a radio station. As Nagra rightly point out, 'Almost all UK ILR stations and BBC Regions



Barry Fox

## Pro DCC—too late at the gate?

make regular use of ISDN.' More and more reporters are using the ISDN lines now laid into sports grounds, offices and new flash points. But how carefully have Swiss Nagra researched the UK market opportunity?

The *Ares-C* uses the G722 telecoms standard for compression and will later also use MUSICAM MPEG Layer 2. The BBC use G722 and Musicam, but independent local radio stations have opted for the quite different apt-X system. 'Other versions are possible, depending on customer demands', say Nagra.

The likely price of the *Ares-C* is between £6,000 and £7,000 (depending on the state of the pound). How many local radio stations can afford this? Certainly not any of the BBC's local radio stations which are now horribly starved of budget.

Nagra quote recording capacity as up to two hours on a 64Mb card but, when asked, will admit that cards of this capacity are not yet available. Nagra hopes that 20Mb cards should be available for around 600–700 Swiss francs, but does not want to be held to that price prediction. and I can see why.

Techomatic, a London computer supplier with keen prices, charges £779 (plus VAT) for a 20Mb PCMCIA card. 1Mb cost £125, 2Mb £195 and 10Mb £475. At the *Ares-C* data rate of around 0.5Mb per minute, that puts the cost of recording at between £20 and £50 a minute. And the current limit is 40 minutes, which is less than one side of an analogue audio cassette costing a quid. The

quid cassette, on a *Pro Walkman*, will deliver better than 7kHz quality. And it will probably record faster a karate kick, too.

Of course, prices will fall and card capacities will grow. But not as fast as solid state enthusiasts would like. In Japan, Toshiba have just announced samples of 40Mb cards at ¥150,000 (around \$1,500, US). NEC recently announced their own plans for solid state recording with a device called 'Silicon Audio'. This uses MPEG audio compression to put 44 minutes of mono, or 22 minutes of stereo, on a 32Mb card. but NEC say Silicon Audio will not go on sale before 1988 or 1999. In the US, Bell Labs (the research wing of AT&T) have developed a solid state recorder but do not expect product before the turn of the century.

Although a 64kbit/s ISDN call usually costs the same as an ordinary telephone call, the installation and rental of ISDN lines is many times higher than for ordinary lines. Additionally ordinary lines are easier for reporters to find than ISDN lines. So what are the chances of sending 64k quality down an ordinary line? This is where things get interesting.

There is widespread confusion over what data rates ordinary telephone lines can carry, neatly typified by Nagra's own explanation of what ISDN offers: 'Whereas phone lines can carry data at a rate of 3kbps' write Nagra, 'ISDN lines will run at up to 64kbps'.

Wrong. The bandwidth of a telephone line is 3.4kHz (or rather

more these days), which is quite different from 3kbps. How does Nagra think a fax machine works at 9.6kbps?

The telephone system was designed to carry analogue waves, with the 3.5kHz bandwidth needed for intelligible speech. To send digits down the line, square wave pulses must be converted into analogue waves. This is what a modem does, by rapidly switching analogue tone signals. The switched tones sound like a warble which is the noise you hear from an electronic mail modem or fax machine.

Early modems switched 300 times a second (300 baud) to carry 300 digital bits per second. Now modulation tricks have made speeds of 14.4kbps easy to achieve.

ISDN—Integrated Services Digital Network—offers a faster alternative to conventional phone lines as a means of sending data from A to B.

Telecommunications companies across Europe and North America provide ISDN services, and you can have an ISDN line installed just like a phone line. Just as modems are used to send data down lines, ISDN requires a codec at each end, and a Terminal Adaptor. (Both of these are provided on the NAGRA *Ares-C*'s ISDN option board.)

Whereas phone lines can carry data at a rate of up to 3kbps, ISDN lines will run at up to 64kbps—better, but still not enough to carry CD-quality audio in real time. As a result, compression is generally used when sending audio data with ISDN. The 7kHz bandwidth G722 standard is widely used by broadcasters. Other compression standards allow higher audio quality, at the expense of slower transmission, or use of multiple ISDN lines. MUSICAM, for example, allows a full bandwidth stereo signal to be sent in real time, using two ISDN lines. Recording studios and film post facilities have already taken to using ISDN to allow performers to work together on projects even when they are separated by hundreds of miles—a singer in LA, perhaps, and the band in New York.

In the broadcast sector, almost all UK ILR stations and BBC Regions make regular use of ISDN. Applications include live news reporting and sports broadcasts, transferring jingle and advertisements from studios to stations, and even live FM stereo music broadcasts, using several lines with MUSICAM compression. ■



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—D&R ORION REVIEW, MIX MAGAZINE

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and every audio stage in every module in every console we craft. The result? Virtually no audible phase shift.

Is all our trouble worth it? Yes. You see, if we settled for "industry standard" phase specs, your music and audio could suffer up to 300% more phase shift. So thanks to our trouble your D&R will deliver sonic ecstasy. Not sonic smear.

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