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May 1999 $10.00 £4.00

Studio Sound

THE INTERNATIONAL PROFESSIONAL AUDIO MAGAZINE
FOR RECORDING, POST-PRODUCTION AND BROADCAST

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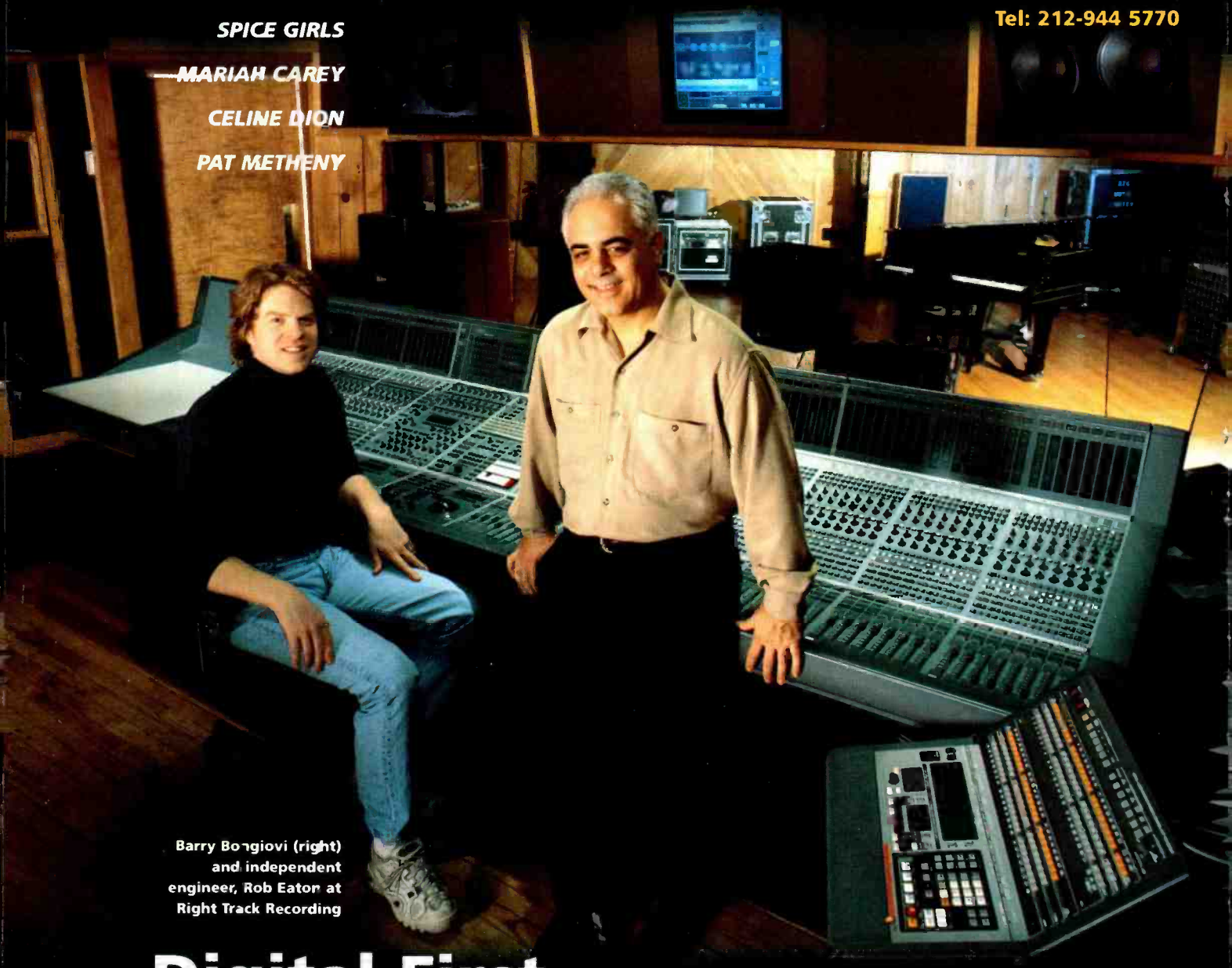

Barry Bongiovi (right) and independent engineer, Rob Eator at Right Track Recording

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Nature's way

THE REDUCTION and stripping down of the technological prowess of the world's largest broadcasters has been much talked about and pondered over. It has been precipitated by a complicated concoction of market forces, governmental policy, technological progress and several bouts of national recession. This caused those in positions to make decisions to take action that has made previously sprawling and all-powerful one-stop technological programming factories into still sprawling but less autonomous and less well equipped production centres. In territories where this has occurred this has created mass and well-equipped supporting private postproduction facility industries. These started off supplementing the work previously carried out by the broadcasters, now they account for the majority of it. This is clearly nature's way. When a large broadcaster's facilities, founded and based originally upon the requirements of a few well defined routes of output, begin to be stretched and challenged by many more channels, they seem unable to react in sensitive and economically-efficient ways particularly when there is public money funding the whole operation.

What is interesting is the increasing number of smaller national broadcasters serving smaller markets that are gearing up technologically in order to keep, or in many cases take back in-house, work from their supporting post industries. These have some technological catching up to do but investment empowers them to get involved where it matters—at the production stage.

I can see an analogy to what happened with record companies. When the world was a simpler place the large ones all had their own facilities, today their role is predominantly distribution, admin and control. Today smaller labels are frequently tied in to their own facilities and if they're smart they can make a difference and a good living.

Will we see this polarisation happen in broadcasting? I believe it has already begun but you've got to wonder which set of consumers will get the better quality deal.

Zenon Schoepe, executive editor

The party's over

THE ENTHUSIASM with which the major record companies have embraced CD as a music format can be readily measured in terms of their subsequent back-catalogue profits. It's only what you'd expect of a business, of course, but perhaps a more prudent business would have sought to invest some of its unexpected wealth in tomorrow's back catalogue. As it stands, contemplating repeating the whole profitable process with DVD and SACD seems to be a far more interesting proposition.

It's certainly more appealing than contemplating the ramifications of online distribution. Until now the majors' primary concern appears to have centred on the problem of piracy rather than the potential for profit. But the arrival of widespread distribution of music via the Internet is little less than a formality. Bandwidth will increase, compression algorithms (if they remain necessary) will improve and record shops will either largely disappear or be forced to reinvent themselves. The control of copyright material under such circumstances has numerous hard and software developers in overdrive and the majors counting on their ingenuity.

And then there's the duplication-replication industry to consider...

The record majors' preoccupations seem to have allowed something important to slip by them—control of Internet access. And so it is that we find telecomms company Energis (already behind Dixons' Freeserve) lending its weight to the ambitions of DJ-entrepreneur Chris Evans' Ginger Media Group (present owner of Virgin Radio) to establish the M for Music ISP (Internet Service Provider). If this arrives in July as anticipated by *The Observer* newspaper, M for Music can be expected to distribute its software through CD releases to the tune of securing the support of some 70% of the British population. Surely, the majors would rather have found themselves driving this proposal rather than talking to Ginger about it.

Surely, the irony of the situation is that if the majors had been less greedy over the pricing of CDs, they would now have a more buoyant music market and far less of a piracy problem to distract them from the real issues.

Tim Goodyer, editor

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Incorporating Broadcast Engineering

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Toronto +1 (1)416 431 9131
Singapore +65 (0)438 2272

■ **French** film dubbing studios, Les Auditoriums de Joinville, has ordered an AMS Neve DFC digital film console to be installed in a new post complex in Paris. The 120-fader DFC will be used for mixing soundtracks in a new Andy Munro-designed THX-licensed theatre that will sit alongside a further sound mixing stage, two Foley studios, and 80-seat theatre and 40 editing suites.
Les Auditoriums de Joinville, France. Tel: +33 1 48 85 2323.
AMS Neve, UK.
Tel: +44 1282 457011.

■ **Canadian** post house Sharpe Sound Studios has ordered a 56+ 16-input Soundtracs DPC II digital console for its Stage B. The Vancouver facility provides audio post for TV and film through its 15 digital edit suites and three dubbing stages.
Sharpe Sound, US.
Tel: +1 604 988 3477.
Soundtracs, UK.
Tel: +44 181 388 5000.

■ **London** commercial radio station Classic FM has purchased seven Tascam CDR-W5000 CD recorders for production applications in its new digital broadcast studios. The 7-studio suite will address the DAB requirements of the GWR group of which Classic FM is a part—along with Virgin Radio and Talk FM.
Classic FM, UK.
Tel: +44 171 343 9000.
Tascam, UK.
Tel: +44 1923 819630.

■ **American** mastering houses are taking up Crookwood's Mastering Console with Baltimore's South Design taking a stereo console prewired for 5.1 surround and complete with metering and 96kHz digital facilities, record and dub paths. Nashville's Mayfield Mastering console is also pre-wired for 5.1 working.
Crookwood, UK.
Tel: +44 1628 528026.

■ **Tennessee's** Sound Kitchen (established in 1994 by Kansas' Dino and John Elefante) has completed its expansion programme and now offers four new recording rooms. Two of these are based around 64-input SSL SL4000G+ consoles with Total Recall and Ultimation and two are equipped with Neve consoles—a 48-input 8108 and a 60-input V3. Each of the new rooms uses three Hafler Transnova Diamond power amps to drive its monitoring. Sound Kitchen has hosted a variety of recording artists including Trisha Yearwood.
Sound Kitchen, US.
Tel: +1 615 370 5773.
Hafler, US. Tel: +1 602 967 3565.

■ **Honolulu's** new TK Disc Studios will open with an SSL SL9000j analogue console, Sony 3348HR digital multitracks, custom 5.1 monitoring and acoustic design by Studio bau:ton later this year.
Studio bau:ton, US.
Tel: +1 213 251 9791.

■ **London's** prestigious Barbican Centre has taken a 10-channel Sennheiser UHF radio mic system as part of its ongoing refurbishment. Ten SKM5000 handheld and SK50 belt transmitters and five EM3032 dual-channel receivers have replaced a 6-channel Sennheiser VHF system in the concert hall that is home to the LSO and regularly hosts varied concerts, recordings and broadcasts.
Barbican, UK.
Tel: +44 171 638 4141.
Sennheiser, UK.
Tel: +44 1494 551531.

■ **Mobile** developments include the South African Broadcasting Corporation's installation of two A&H GL4000 analogue consoles (one 40-channel and 24-channel linked with A&H Sis-Link) in its OB truck. America's Remote Recorders, meanwhile, has added a 1970s Urei 565 Filter Set Equaliser to its outboard list
SABC, South Africa.
Tel: +27 011 714 2826.
Remote Recorders, US.
Tel: +1 416 975 0905.
A&H, UK. Tel: +44 1326 372070.

■ **Portuguese** broadcaster SIC TV is to install a 16-track AMS Neve AudioFile and 8-fader Logic 3 at its Carnaxide site near Lisbon. The largest private Portugese TV company, SIC will use the new system primarily for posting documentary and drama productions, and is to upgrade its existing AudioFile to 24-bit operation for station promos.
SIC TV, Portugal.
Tel: +351 1 417 9559.

■ **Dutch** facility 013 has added three Midas consoles and a DDA Forum monitor console to the facilities of its two concert halls, The Choice and De Kleine Zaal. Located near Tilburg, 013 caters for a wide variety of musical styles and intends to entertain, inform and educate the people of The Netherlands, Belgium and Germany before moving on the remainder of Europe.
013, The Netherlands.
Tel: +31 13 460 9500.
KT, UK. Tel: +44 1562 741515.

■ **German** postproduction house company b has chosen an SSL Axiom to add up to 8-channel surround mixing to its DVD production operation. The Axiom accompanies a 32-channel Pro Tools 24 and Audio Cube restoration system with which the facility hopes to become central to the audio requirements of the new Babelsberg fx Center in Potsdam where it is based.
Company b, Germany.
Tel: +49 331 721 6000.

■ **British** Afro-Celt Sound System has moved on from its Tascam DA-88s with the installation of a Digidesign Pro Tools 24. The new system will complement its SADiE system and Akai MPC60/3000. James McNally, currently working on TV and film projects holds down the roles of engineer, producer and Pogues member and has a forthcoming album under the Afro-Celt name on Real World-Virgin.
Digidesign, UK.
Tel: +44 1753 653322.

▲ Germany: In the cinema centre that is Babelsberg, Germany's University for Television & Film, Konrad Wols, has installed an 8-Fader Fairlight FAME for its new Television Postproduction Department. Students can now undertake training on the Fairlight MFX platform at one of Germany's longest established institutions.

Men about Townes

US: When Jeanene Van Zandt played Eric Paul a collection of old DAT tapes of her dead husband's incomplete and unreleased songs, the stage was set for the release of *A Far Cry From Dead*.

As Willie Nelson's ex-chief engineer, Paul was well placed to recognise the value of the tapes Jeanene had been minding for over seven years—even though she herself had been unable to play them. The tapes had been entrusted to Jeanene with the words, 'Hang on to these babe, I think there's some good stuff on here'.

Once discovered, the vocal and guitar parts recorded in a neighbour's home studio during the late-eighties and early-nineties were transferred to a Studer A-800 analogue 24-track machine running Quantegy GP9 Grand Master tape. From there Paul completed the 13 songs that make up *A Far Cry From Dead* at Nashville's Imagine Recording on a vintage API console.

The album was subsequently mixed across town at Battery Studio The Music Mill to a Studer half-inch machine also running GP9. A key element in retaining the feel of Townes Van Zandt's earlier 'rockin'' work was the use of Battery's echo chambers, designed by Dan Flickenger during the seventies. The more sedate tracks were given the benefit of the Mill's Focusrite console.

Townes Van Zandt died of a heart attack on New Year's Day 1997 at his home near Nashville.

▲ UK-US: The No.1 crossover classical placing of James Horner's *Back to Titanic* soundtrack recorded on Sony 3348 with BASF 931 digital tape has secured BASF Master Awards for the team responsible for its recording—Jake Jackson, John Bailey, Simon Rhodes and AIR Studios (pictured with AIR's Malcolm Atkin). Across the pond, Marilyn Manson's album *Mechanical Animals* has won Master Awards for producers Michael Beinhorn and Marilyn Manson, engineers Barry Goldberg and Sean Bevan having debuted on *Billboard*'s Hot 200 chart last autumn. Recorded on SM900 Maxima high-output tape, the album was recorded at LA's Conway Studios earning the facility a further Master Award.

Cyber billing

UK: Two UK-based broadcast facilities have become the first to streamline their billing system through CETA Software's CETA accounts link. JCA TV Facilities and Metro Broadcast reckon the system significantly reduces the time taken to generate invoices from their booking, scheduling and administration management systems. The accounts link will relate booking details, tape stock, taxis and food.
CETA, UK. Tel: +44 181-675 6114.

▶ **US: Producer-engineer Chuck Ainlay has pooled resources with Warren Rhodes, general manager of Nashville's Sound Stage Studio and head of Power Gear Rentals in the acquisition of ATR's One/Two 1-inch, 2-track analogue mastering recorder. Based on the Ampex ATR-102, the One/Two is designed and built by ATR's Mike Spitz (pictured). Ainlay intends to fly this one to the UK for use on Mark Knopfler's autumn album. ATR, US. Tel: +1 650 574 1165**

◀ **US: After 18 years of service, Future Disc Systems has remodelled its Studio One. The original design by founder Steve Hall that mastered projects from the likes of Patti Labelle, Madonna and Earth Wind & Fire has remodelled acoustics and now offers a custom Solem console along with outboard including analogue equipment from Sontec, Focusrite and Manley, and digital equipment including a Weiss bw102, Pacific Microsonics HDCD system, Apogee UV22 and a variety of convertors. The monitoring system consists of Tannoy dual-15s biamped with Hafler Transnova and Audire Otez amplifiers. Future Disc Systems: futuredisc@aol.com**

DVD Conference confirmed

UK: Miller Freeman and IRMA have confirmed the programme for the DVD Production Europe 99 conference staged in London at the end of May.

The event follows last year's successful US DVD Production conference, emphasising the opportunities and difficulties facing the emerging European market. As well as concentrating the programme on the issues surrounding DVD-Video it will focus on audio for DVD, with specific presentations on multichannel audio for DVD by SSL, high bit rate and sampling rate audio presented by Studio Audio & Video and a comprehensive overview by Dolby Labs of audio on DVD.

The two-day programme will cover the essentials of European DVD production and will be topped by a party at Abbey Road Studios, where the first DVD Production Europe Craft Awards (DVD Pecas) will be presented. These awards uniquely celebrate the development of DVD titles for the European market with five international awards for DVD-Video, PC-enhanced DVD-Video, Best Menus, Best corporate DVD and overall Best DVD.

The programme includes: Market Analysis—Understanding & Solutions, The DVD Production Chain, Choosing Content For DVD Release, Asset Protection, Making DVDs, Testing Times, Improving Authoring, Making the Most of PC Accessibility, Project: DVD-ROM, Project: DVD-Video, Sound on DVD, Packaging For Europe, Selling DVD, Panel: Music Video—A New Dawn With DVD, Copyright & Distribution, Quick Fix Production Versus Quality, Audio for DVD, High Bit Rates, Panel: European Non-Union: Distribution, Coding & Censorship, EU, DVD Committee.
Tel: +44 1306 500 960.
Net: www.prostudio.com/dvd

▼ **UK: Bringing the CBSO's rehearsal facilities in line with its regular venue has seen the installation of adjustable banners from Triple E. American acoustician Russel Johnson, who was responsible for the design of Symphony Hall itself, specified the rehearsal studio acoustic which was then pursued by the CBSO's Richard York and consultants Techplan's Roger Fox resulting in a contract for 18 custom banners falling to London-based Triple E. Triple E, UK. Tel: +44 171 237 6354.**

May

8–11
106th AES Convention
MOC Centre, Munich, Germany.
Contact: Martin Woehr, Bayerischer Rundfunk Studioproduktion.
Tel: +49 89 59002434.
Email: 106th-chairman@aes.org
Net: www.aes.org

8–11
DISMA Music Show
Rimini Trade Fair Centre, Rimini, Italy.
Contact: Ente Autonomo Fiera di Rimini.
Tel: +39 541 711 711.
Net: wwwfierariminiit

13–16
Calm Expo 99
Beijing Exhibiton Centre, Beijing, China.
Contact: Alan Suen.
Tel: +852 2861 3331.
Email: alan@iir.com.hk

15–16
Conference: Smart Business—Smart Technologies
Midland Hotel, Chicago, USA.
Contact: SPARS.
Tel: +1 561 641 6648.
Email: spars@spars.com

17–19
Cable & Satellite Mediacast 99
Earls Court 2, London, UK.
Contact: Reed Exhibitions.
Tel: +44 181 910 7767.
Net: www.cabsat.co.uk

19–22
CEDIA UK
Novatel, Hammersmith, London, UK.
Contact: CEDIA UK.
Tel: +44 1462 627377.
Email: cedia_uk@compuserve.com

24–25
DVD Production Europe 99
The Conference Forum, London, UK.
Contact: CCW.
UK Freephone: +0800 917 3596.
Tel: +44 1306 501 530.

25–30
Expo Light & Sound 99
Romexpo Exhibitions Centre, Bucharest, Romania.
Contact: Romexpo.
Tel: +40 1 222 43 56.
Email: romexpo@ccir.ro
Net: www.ccir.ro/romexpo

29–30
Sound Control Live 99
SECC, Glasgow, Scotland.
Contact: Mammoth Events.
Tel: +44 1353 665577.
Fax: +44 1353 662489.
Email: events@clara.net

June

1–3
Showtech 99
Berlin, Germany.
Contact: OTSA, UK.
Tel: +44 171 886 3106.
Fax: +44 171 886 3101.

6–11
Sound,Vision and Home Appliances 99
Jeddah International Exhibition Centre, Jeddah, Saudi Arabia.
Contact: Al-Harithy
Tel: +44 171 223 3431.
Fax: +44 171 228 4229.
Email: ACExpo@aol.com
Net: www.members.aol.com/ACExpos

7–8
AES UK Conference: Audio—the second century
Church House, Westminster, London, UK.
Contact: AES.
Tel: +44 1628 663725.
Fax: +44 1628 667002.
Email: uk@aes.org

10–15
Montreux International Television Symposium and Exhibition
Montreux, Switzerland.
Contact: WHD PR.
Tel: +44 171 799 3100.
Email: news@whdpr.com
Net: www.montreux.ch/symposia

22-25
CommunicAsia 99
Singapore Expo, Singapore.
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Net: www.montnet

July

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11th PALA 99
Singapore International Convention and Exhibition Centre (SICEC).
Contact: Ann Tan, IIR Exhibitions.
Tel: +65 227 0688.
Email: ann@iirx.com.sg

26–28
Conference: Advanced A–D and D–A Conversion Techniques and their Applications
University of Strathclyde, Glasgow, UK.
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Reading habits

YOUR LEADER in the March edition of Studio Sound raised a smile with me. I too have got into the habit of reading equipment manuals but instead of being labelled 'sad' I have been hailed an expert. 'Is there a minimum selection length to enable looping in Pro Tools, Robin?'. 'Why can't I get anything out of my DEQ5, Robin?'. It seems that because I've read the manuals, my ability to answer niggling questions instantly marks me out above the crowd.

The manuals themselves vary enormously in their approach to the reader. Some are merely there to outline safety criteria, being full of isolation certificates and warnings about plug wiring and then leaving the user to himself after pointing out the power switch. Others are informative and a great laugh to boot—well done to Intelligent Devices who's plug-in manuals make you actually want to read further.

It seems to me that manuals should be hierarchical, giving bullet-point guides to the most pertinent information, each of which has reference to the pages further on where more detailed information on that particular subject may be found. A further list of Web, mail and email contacts should follow with manual addenda being available on-line to download. I usually print out electronic manuals, four pages to a sheet of A4, because paper is the only way to systematically learn the functions of a particular piece of kit.

If equipment manufacturers were to spend a little more effort on their manuals and make them humorous as well, more people would join the likes of Tim Goodyer and myself and become 'experts' in the use of their capable pieces of equipment.

Robin How, UK

Tim Goodyer replies: Hold on, who claimed to be an 'expert'? I'm sure that Dave Foister and George Shilling come closer to the definition than myself. I'm talking about manuals as well as the kit they describe. But does this make them—or any of the rest of us this side of the publishing divide—suitable equipment reviewers? It seems fairly clear that the great unwashed would rather be driving kit that needs no support from a manual (entertaining or otherwise) than kit that requires a week's preparatory study before the power switch may be safely addressed. In which case the danger of becoming a manual expert may be that you cease to be a peoples' champion. But then the same unwashed seem to like to know what to expect of a manual as well as whatever else is in the delivery box.

Building for the future

I READ with interest the article by Peter Levesley (*Studio Sound*, March 1999), on his series 'Designing a Studio Mixer', starting July 1971.

I actually I used the original series as the basis for a control desk I built for York Hospital Radio. The desk has been on-air almost daily since move of premises. A second desk was built a few years later and is also in daily use. The first desk was built from scratch, hand etching the PCBs etc, although for the second this work was sent out.

Paul Wilmott, York Hospital Radio, UK

Seeing red

I WAS APPALLED by Neil Hillman's so-called review of the Canford Audio ZERO. It is clear to me, as it would be to any discerning reader, that Mr Hillman is either a total novice in the field of performance broadcast cycles, or that he never took the time to slip into the saddle!

Please don't quote me.

David 'The Captain' Kirk, A&H, UK

Tim Goodyer replies: I'm afraid you're much mistaken—Herr Hillman is an old hand where bikes are concerned and his intimate experience of the ZERO's saddle is not to be sniffed at. You've dropped a double clanger...

Not seeing red

CONGRATULATIONS to Dirk Brauner and Steve Revell for not mentioning their respective products in your 'congrats' page (Ruby Red Letters, *Studio Sound*, February 1999). What a depressing place this world sometimes seems...

John Willsteed, Scope Post, Brisbane, Australia

marantz

Professional

RUBY REWARDS

STUDIO SOUND'S 40th ANNIVERSARY party is set to continue with a competition of millennial proportions. As you can see from the accompanying listing of equipment, many of pro-audio's top manufacturers have conspired to make the event a winner by building a one-off custom model.

As a unique *Studio Sound* Ruby issue, every unit is destined to become a collector's item, not to mention being a talking point in your studio for years to come. So in each issue of the magazine until the end of the year you will have the chance to win a selection from the *Studio Sound* Ruby series. In this first instalment, Joemeek's VC1 Studio Channel is the star of the show. Sporting its new coat, the Ruby VC1 contains a mic preamp, 'Joemeek' photo-electric compressor and enhancer, topped off with a large vu meter. (A complete review can be found in *Studio Sound*, February 1997.)

As an additional coup, we have secured ten pairs of tickets to the spectacular Royal Air Tattoo. These are included in the opening phase of the competition.

Studio sound

ALL YOU HAVE to do to secure the Ruby VC1 or one of the pairs of tickets is to correctly answer the questions below and perform your chosen ritual to invoke luck. Tickets for the Air Tattoo will be assigned to the winning entries and nine 'runners up'.

THE QUESTIONS

Q1 What was the first piece of equipment issued bearing the 'Joemeek' name?

Q2 Given that it owes its heritage to the 1970 vintage Morris Ital, what is the usual colour of Joemeek outboard?

Q3 For which console manufacturer did Joemeek mentor Ted Fletcher once work?

CLOSING DATE FRIDAY 2 JULY 1999

TO ENTER, you can email your answers to ruby.competition@unmf.com, fax them (to +44 171 407 7102) or send them on a postcard to Ruby Competition, *Studio Sound*, Miller Freeman Entertainment, 8 Montague Close, London SE1 9UR, UK. Include your name and address.

As long as you are a registered *Studio Sound* reader, you may enter any number of instalments of the competition as long as you do so separately (multiple entries, as ever, will be treated with the disdain they deserve), and **include your Unique Reader Identification Number. The Unique Reader Identification Number is the nine-digit number that is located in the middle of the top row of your *Studio Sound* address label.**

REWARDING RUBY PRIZES

AKG 535 stage condenser, C1000S, and C3000 microphones

A&H 32-channel GS3000 console

CEDAR Series-X DHX dehisser

Drawmer DS201 dual gate

EMO E520 Single DI box; E445 cable tester; E325 3-way mic splitter

Genelec 1029 monitors

Joemeek VC1 compressor

KT DN-360 graphic

Marantz CDR640 CD recorder

TL Audio C1 Classic compressor

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Enormous thanks are due to all those who have so readily contributed equipment, time and advice in the preparation of this competition.

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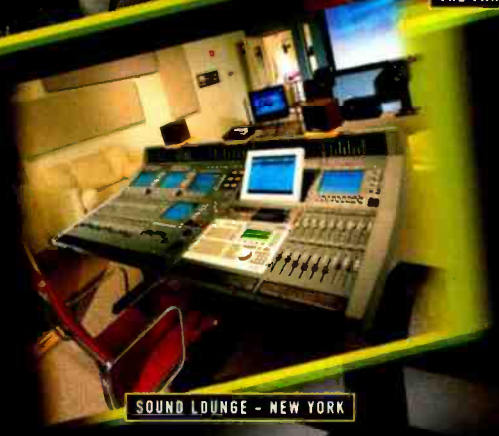

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Summit audio MPE-200 element 78

Adding the expertise of Rupert Neve to that already residing in Summit's R&D rooms and you have to bet on impressive results. **Terry Nelson** bets on the new preamp-EQ

I MIGHT AS WELL come clean—I have been a fan of Summit Audio ever since it hit the UK and European shores, and I make no apologies for the fact. It was, therefore, with an element of trepidation that I accepted the long-announced MPE-200 for review. Before I hear howls of 'biased' (an audio term if ever there was one), being a fan involves employing a 'disappointment index' and my expectations were high.

The MPE-200 Element 78—to give it its full title—is twin-channel microphone preamplifier and equaliser designed in collaboration with Rupert Neve where analogue circuitry is concerned. Lifting the MPE-200 out of its carton and substantial protective packing, reveals a unit that oozes class, class, class. The hefty 28lb 2U-high rack chassis demands either rack rails or another piece of equipment to sit on. This said, the chassis construction is massive enough to take the weight, but with this kind of investment, why take risks? For those familiar with Summit valve equipment, the Element 78 is quite a departure from what we are used to, featuring class-A discrete circuitry, digital control and MIDI to boot.

The front panel is sober and features large, stepped knobs and illuminated push-buttons that are, in fact, miniature display screens. The panel is divided into six modules—microphone preamplifier featuring a single knob and an illuminated push-button, four identical modules with two knobs and a push-button for the equaliser section and a master module for presets, channel selection and output level. The rear panel carries input and output XLRs for both the microphone preamplifier and equaliser sections, MIDI DIN connectors and IEC mains plug with fuse and rocker mains switch.

Before getting into practical matters, the MPE-200 is a 2-channel or stereo microphone preamplifier with 4-band parametric EQ. The mic pre also offers stepped high-pass and low-pass filters with 12dB/octave characteristics, and 48V phantom power. Gain is controlled in 17 coarse steps of 4dB combined with ±4dB in 1dB steps around the 0 point of the coarse gain setting. The frequency response is specified as 10Hz–100kHz within 0.5dB. The filter section again features 17 stepped frequencies for both the HP and LP bands and covers 20Hz –320Hz and 4Hz—30kHz respectively.

The high and low frequency bands of the EQ section have selectable peak and shelf characteristics and ±16dB of gain in 17 steps of 2dB. A Fine Zoom function expands the steps to 0.5dB for critical applications such as mastering. The low and high-mid frequency bands are fully parametric and also have a variable Q function with a range of 0.6-2. All frequency bands overlap by a wide margin for heavy filtering.

The icing on the cake is the facility to store up to 25 user presets. This is expanded with a basic MIDI implementation to save and recall presets. By using a SysEx librarian, presets can be named, stored and transferred to another MPE-200.

Opening up the Element 78 reveals 4 massive chrome transformers for the floating inputs and outputs, and neat board construction and assembly for the digital and analogue circuitry. The large torroidal mains transformer and PSU section are fully screened away from the rest of the unit.

> As far as the human interface is concerned, we are definitely talking digital control with an analogue feel, and using the unit becomes almost intuitive—you have been here before

Time to put the cover back on and turn on the box to see if it delivers what it promises... As far as the human interface is concerned, we are definitely talking digital control with an analogue feel, and using the unit becomes almost intuitive—you have been here before. The basic operations are 'push and turn'. The knobs themselves are rotary encoders and a small LED acts as a position marker against the clearly legended 17 steps for frequency and gain settings.

As mentioned earlier, each 'module' has a display screen in the form of a large illuminated push-button. In spite of the fact that this means the screen is small, the characters are very easy to see in both strong and subdued lighting conditions. The various screens are called up by pressing the corresponding display, and toggling between on-screen functions is by pushing the rotary encoder. Adjustments are then made by turning the knob. The status of each module is indicated by a padlock icon—a shaded icon with the padlock open indicates that the function is on but unlocked, whereas a closed icon means that it is locked. An unshaded icon shows that the function is not active and either unlocked or locked.

There are three screens for the Input module: Mic Gain (green screen) allows the gain to be adjusted to either channel or as a stereo pair. Gain offsets can also be introduced and the channels ganged. A small bar-graph meter indicates level for both channels and the display flashes red on peaks of +18dBu (3dB below onset of clipping). HP-LP (amber screen) controls the filters. Pushing the knob selects the HP or LP section and turning the knob selects the frequency. The Off position removes the filter completely from the signal path. Input Setup (yellow screen) switches phantom on and off (both channels only, which could be bothersome at times), and switches phase for each channel, mic or EQ input to both EQ channels. Input setup settings are not stored.

Each section of the equaliser has its own screen and pressing the screen

selects the section to be on (green) or off (amber). The turnover frequency is indicated in the screen and for the low and high sections, pushing the FREQUENCY knob changes the characteristics from peaking to shelving. In the case of the mid sections, pushing the knob calls up the Q function which can be varied between 0.6—2. For all sections, pushing the BOOST-CUT control selects Coarse or Fine settings, with Coarse being 2dB steps and Fine 0.5dB steps.

The Master module features four screens: EQ Gain Trim (green screen) allows the gain for each channel to be trimmed ±16dB in 1dB steps referenced to 0dBu) and features dual bar-graph output meters. The screen flashes red at 18dBu as per the Input screen to indicate danger of overload. Pressing the MASTER knob toggles control between the A and B channels. In Stereo mode, both channels are linked. Master Preset (amber screen) controls channel settings and presets, with current and pending memory positions being indicated. Loading a particular preset is accomplished by turning the MASTER knob to the number required and pressing it. The two presets indicated on the screen can be toggled by pressing the knob and this provides easy A-B comparisons. Master Setup (yellow screen) controls Channel mode (dual or stereo), Channel Select (for adjusting settings) and locking of presets. Any changes made to a locked preset are lost when changing to another preset. The screen also enables the Fader screen. The Output Fader (dark green screen) allows complete fades to be made to either the A or B channels or both together. In normal operation, the Fader function is disabled.

Before running any programme material through the MPE-200, I looked the unit up to an RTA to verify the flatness of the response and the shape of the curves. As might be expected, all was in order here and it was at once evident that a lot of signal processing power is available in the EQ and filter section. It was also reassuring to find that unity gain in means unity gain out when input and input are referenced to 0dBu.

The MPE-200 connected easily to a Neotek Elite console and the monitors were Spendor SA-200 actives. The usual range of test material was used, ranging from finished productions to individual vocal and instrumental tracks and it was clear from the start that the Element 78 is a formidable beast. Habit made me start with the 2dB steps in the EQ section, but I quickly moved into Fine mode as the 0.5dB steps were very useful.

Even though you 'officially' select either the HP or LP characteristic, the moment you pass the lowest low-pass frequency, for example, the filter then changes to high-pass. This means, for instance, that you can have a high-pass response with two turnover frequencies—unusual but very useful

The temptation in this situation is to believe that you are hearing changes, when in fact, they are just in your head. However, blindfold tests revealed that there is still some perception in this old timer's ears and that ±0.5dB can make a difference. Though difficult to put a finger on, there is just a little more space, depth, shine... Call it what you will, the difference is there and becomes really noticeable when you defeat the particular EQ section or sections. Timing would have it that a mix project called for some tweaking on a difficult female vocal and the MPE-200 rose to the occasion admirably—not bash-into-shape EQ, but more a gentle nudge.

We are all familiar with how much basic tailoring you can do with good HP and LP filters and the MPE-200 facilities are no exception. The concept is quite interesting as even though you 'officially' select either the HP or LP characteristic, the moment you pass the lowest low-pass frequency, for example, the filter then changes to high-pass. This means, for instance, that you can have a high-pass response with two turnover frequencies—unusual but very useful. For more dramatic slopes, you can piggyback the same frequencies for a powerful 24dB/8ve curve (LP or HP only).

The debate about extended frequency response pops up regularly. The MPE-200 provided a perfect opportunity to put this to the test and material with the LPF set to 20kHz sounded resoundingly dull compared to the flat response.

A good preamp demands good microphones and the instrumentation-type microphone preamplifiers (which handled line level happily) were fed with a Sanken CU-41 condenser and Electro-Voice RE2000—with stunning results and amazing detail. It certainly confirms why I bought my favourite mics in the first place.

The final check was to insert a piece of outboard gear between the mic pre outputs and the EQ inputs (Summit DCL-200 compressor, anyone?) and this provided what must be one of the ultimate signal channels.

It is interesting to note how careless you can become with quality equipment and it was only on afterthought that I realised that at several moments the overload indicators were flashing angrily at me, but that there was no distortion at all. This does not excuse the fact, but does show the tolerance of the circuitry.

The manual is of the 'get you up and running' type at the moment and a weightier tome is in preparation. I have to say that this is a must, as the unit does require a certain amount of explanation if you are not to waste time. The concept is elegant yet needs to be put over clearly. My only slight concern is the 48V phantom being only on or off for both channels—as opposed to being available singly. There are, no doubt, design considerations here and it would be rare that you would be using a condenser and a dynamic microphone at the same time. But it is a limitation all the same.

There is no doubt that the Summit Audio MPE-200 is an impressive piece of gear and I would recommend only those thinking about making the considerable investment to buy one to try this unit out—to limit the likelihood of sending anything else back. The unit really does combine the best of both worlds—top quality analogue and digital control. Try it at your peril. ■

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Euphonix R-1 stand first

Launched to popular acclaim but commercial scepticism, Euphonix' digital multitrack needed to bring something special to market. **Dave Foister** enjoys the spoils

ONLY A FEW years ago the pundits would have had us believe that tape was all but dead. By now we should all be working in tapeless studios where the hard disk is king. While there are areas where nonelinar random access media have taken over, it is patently not the case that tape has been abandoned, so the question has to be asked: in a technophile industry that has seen storage prices in free fall and disk-based recording acquire a flexibility that tape can never aspire to, why are we still using tape recorders?

The answer, according to some, is simple familiarity. We've been using tape transports for decades and we know what to expect of them, and don't have the time to learn new ways of working. And in many areas it's hard to see the benefits—the speed and power of a hard disk system may have transformed postproduction, editing and mastering, but for jobs like music recording the gains are small. Besides, however much storage you've got it's never a substitute for a box of blank tapes; tapes don't need housekeeping disciplines, and when you're down to your last couple of boxes you just order some more—you don't need to find the owner of Project X and ask if it's been backed up and can be taken off the system. But above all, if you've used one tape recorder, you an sit down in front of another one and be using it in minutes, as the facilities and methods of operation have become standardised in a way that DAW's seem to have deliberately avoided.

Some of these issues become less relevant as time goes on, as 9Gb drives can be had for a few hundred quid (how quaint that's going to sound in five years' time) and backup—archiving systems become faster and cheaper. As for the rest, the obvious answer, although it would have been anathema to the vanguard of hard disk recorder designers, is to make your DAW behave like a tape machine. Various gestures in this direction have been made with varying degrees of conviction and success, and the latest candidate takes the idea that little bit further still.

Euphonix acquired Spectral Synthesis some years ago with the aim of broadening its product base and consequently its appeal. Spectral's established expertise in hard disk recording has now given rise to the first product of the union, the R-1 recorder, and Euphonix' influence is perhaps best seen in the determination to make the machine as familiar and as intuitive to operate as a typical professional multitrack tape machine. Apart from the ergonomics and a certain styling similarity, there is nothing else to link the R-1 with the Euphonix consoles; there is no integration between the two beyond the usual machine control and synchronisation elements, and the R-1 is a fully-fledged standalone recorder that can operate equally happily with any console.

The work is done in three silver rackmount boxes. One contains a PC running the application software, and is fitted with floppy and CD-ROM drives for upgrades.

One is a signal router and synchroniser, using MADI as the digital interface, and this can be used separately as a hub for any MADI-based network. The DSP engine sits in the third box alongside the disk storage, which as standard consists of two Kingston caddies each containing a 9Gb hard drive (18Gb drives will be supported when they become small enough to fit in the slots). Further storage can be added, although the 18Gb as supplied gives 88 minutes of full 24-track 24-bit recording. >

< and Exabyte backup and archiving is a further option.

The boxes are connected via Firewire.

The system comes as standard with full sets of 24 convertors in and out, mounted in matching 2U boxes. In fact there are extra channels—an auxiliary pair on the MADI bus that can carry a raw sum of odd and even channels for checking, and an SPDIF output. Each convertor has a small led meter for checking signal presence, but otherwise has no controls or indicators so could be sited remotely along with the racked hardware for the system itself. Like the routeing hub, the convertor packages are available separately for use with any MADI-equipped digital system, and should eventually form part of a range of convertors including multi-channel AES—EBU units that will additionally complement the R-1 itself. The existing convertors are 24-bit but will not have 96kHz capability until the next release, scheduled for later this year. This development will be in parallel with the whole system handling full-blown high-resolution formats.

The R-1 is operated from a substantial remote control console, again supplied as standard complete with a sleek and rugged trolley with adjustments for height and tilt. A shelf at the back carries the monitor, which on the demo model was a spectacularly good TFT flat screen, with the widest field of view I've yet seen and stunning resolution. This does justice to the excellent graphic display, which is a prime example of how a screen can be made to look as though it has solid buttons on it, and is superbly well laid out to complement the main console.

Like the CS mixing consoles, the R-1 has a qwerty keyboard that slides out from under it, and this shares its shelf with a trackball. The system can be operated from the main console, the screen or the keyboard, although most operators will no doubt use a combination of all three. The keyboard is unlikely to be useful for anything more than naming tracks and files, but for other functions there's little to choose between the console and the trackball for convenience. The console is so self-sufficient that there is nothing on screen that can't be accessed from the console apart from the level meters.

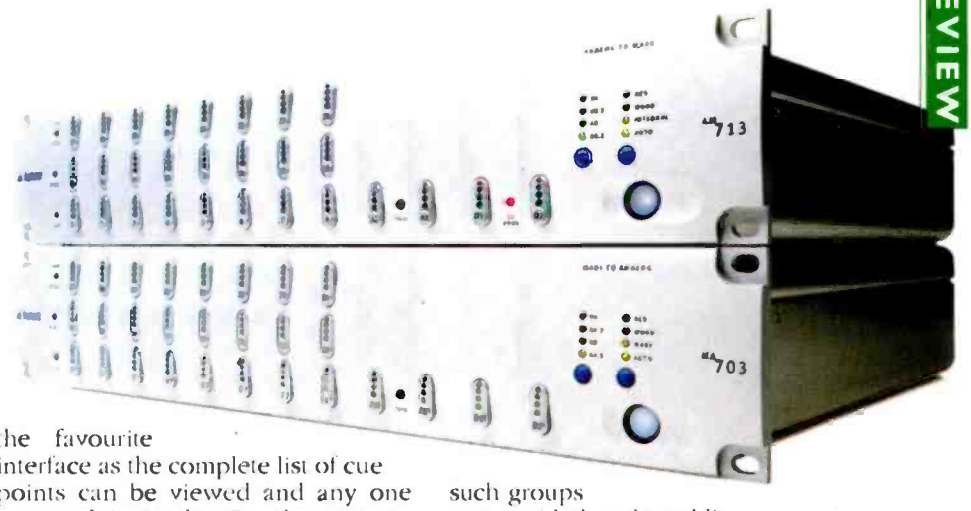
Without the screen, the console would pass for a tape machine remote at first glance, so determined have the designers been to emulate the familiar style of layout. Thus there are conventional transport buttons, a full bank of 24 sets of selector switches, time displays and numerous function buttons, all illuminated and colour coded for easy identification.

The concept is very much a 24-track machine rather than a system where you create as many tracks as you need, and by the end of the year it is hoped that the 48-track version will be available, requiring nothing more than a second Audio Deck DSP/storage unit and more convertors. Since the track number labels on the console are numeric displays they will be able to indicate 25-48 very easily, reducing the possibilities for confusion.

The 'transport' goes to unusual lengths to behave like a reel of tape. It has always seemed slightly odd to have Fast Forward and Rewind buttons on >

< a random-access system, but the R-1 revels in the oddness to the extent of ramping up the 'wind' speeds when the buttons are pressed. This simulates very closely the effect of the inertia of a big reel of two-inch, and there is a real benefit: when you want to run back or forward by a small amount, the R-1 gets you where you want to be more intuitively than any other disk system I've encountered. Of course when you hit STOP, it stops, with no over-run.

If, on the other hand, you want to use all the advantages of disk recording it has a very comprehensive set of instant-access locator memories. There are five on big buttons, always available, of which the last two define looping points, with a particularly friendly looping system. Not only are pre- and post-roll times adjustable, but the length of time the system waits between consecutive plays of the loop can be set. I thoroughly approve of this; looping a passage for a musician and then playing it at him remorselessly, without a break for a bit of thought and feedback from the other people around, is to my mind not conducive to good playing. Rewinding a tape provides just that moment's pause, and I am pleased to see even that duplicated here. Besides these dedicated locators, there are also an apparently limitless number of nameable cue points just a couple of button pushes away. Here the screen becomes



the favourite interface as the complete list of cue points can be viewed and any one accessed instantly. On the remote, moving time values around the various locators is done with the two time windows, one for the current 'tape' time and one for the locate time, and values can be transferred between the two, nudged, scrolled or entered directly. These windows are also used to get at the multitude of functions and adjust their parameters.

Each track has three function buttons, with three different modes of operation. One is the expected ready/repro/input combination, with the usual ALL SAFE button and a useful facility for grouping tracks. Eight memories for such groups are provided, and in addition adjacent sets of tracks can be linked to operate together. The same track control buttons can also be used for Solo, On and Select functions, which on a conventional tape machine would be a little worrying; the Solo button is also the READY button depending on the currently-chosen mode, and since the R-1 has a direct recording option that punches a track into record as soon as its READY button is hit, this means that you could inadvertently start recording on a track when all you meant to do was solo it. But of course this is not a tape machine, and therefore has no less >

< than ten levels of Undo, so a mistake like that is not a disaster.

An important part of the transport section is the big jogshuttle wheel, and this again is designed to feel like scrubbing a mechanical transport. The scrub audio quality is excellent, as we've come to expect these days, and the weight and feel of the wheel (using what Euphonix calls ReelFeel) is very friendly, making this one of the best such functions I've come across. Nearby are the controls for the varispeed, which has a huge hidden bonus: the R-1 can varispeed up or down by 12.5% with constant sample rate on the output; apparently the DSP cards in the Audio Deck have so little to do that real-time sample rate conversion across 24 tracks is no problem.

Although the R-1 can be operated without the screen, the ease of access to various functions and sets of information makes it the way most people are likely to use most of the system's features. There's a lot on the display, because multiple pages and windows have been deliberately avoided, but the layout is so good that it never seems cluttered and everything is easy to find.

A big pane in the middle shows the audio tracks moving across the now line; existing segments are blue while tracks currently in record show red. That's really all they show at present, making it a bit extravagant to devote quite so much of the screen space to it, but future plans include waveform displays within the track bars which will make it much more worthwhile.

Like the screen's buttons, the meters are remarkably well-designed to look like the real thing, with various peak hold functions and track status lights. The area beside the audio display shows the named tracks with mimics of the remote's status lights, and here it is also possible to re-route inputs to tracks, making for very fast repatching. In amongst all these main functions are drop-downs for things like sync source, frame rates and all the other parameters that need only occasional setting. All are available both on screen and on the remote via scrolling menus, with the result that anything you could ever need to get at is very close at hand by more than one route. Useful displays on both show how much disk space is left and the speed of the jog and shuttle functions. This last is in fact a speedometer indicating the speed of the 'transport' in all its modes, including play and wind, all in the interests of the tape machine analogy.

Simple editing is supported on the initial release of the R-1, consisting of basic cutting and pasting of blocks with variable crossfade times. Since the scrubbing is so good, this is actually quite powerful, but future upgrades should see considerably more flexibility built in. This is tantalisingly evident from the dedicated buttons on the remote that don't yet do anything; unavailable functions simply don't light up, like greyed-out options on a computer menu. As it stands there are unusual functions like Ripple, which allows copies of a block to be pasted into position one after another, each sliding the others along to make room—a quick and easy way of looping.

> For all its sophistication, for all its power and flexibility, this is a system you could sit down and work with in minutes even if all you'd ever seen before was an A80.

Much use can be made of the editing features in conjunction with the multiple Sheets that a project offers. The buttons that select groups of tracks can also switch between different Sheets, or views, of the project, each allowing new recording alongside existing material or different arrangements of audio segments—completely different edits or mixes in other words. Material can be moved and copied between sheets, and this is all part of a very flexible and intuitive project management system, showing titles and their associated files in a familiar style.

Full compatibility with the outside world is assured by every flavour of sync and control that could be asked, including, according to Euphonix, the ability to sync backwards. Certainly reverse playing is possible, so full synchronisation at any speed in either direction would seem to be no problem.

This is one of several aspects in which it scores over the tape machines it sets out to emulate, without compromising its essential familiarity.

And that is where it succeeds so well. For all its sophistication, for all its power and flexibility, this is a system you could sit down and work with in minutes even if all you'd ever seen before was an A80. All the things you need to get a session under way are staring you in the face, and getting deeper into its capabilities is almost as easy. By now we've reached the stage that we reached long ago with word processors: when you encounter a new one, it's not so much a question of finding out what it can do, more a question of working out how it does the things you know you can expect it to do. This is the bit it's easy to get wrong, especially when catering for those making the transition from tape to hard disk, but Euphonix appears to have got this important factor right.

And indeed the whole package. The sound of the system is exemplary, making the separate availability of its convertors particularly interesting, and the combination of functionality and usability in such an attractive and complete system should see it do well. ■

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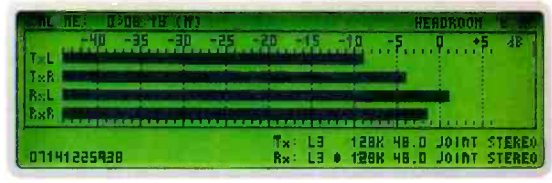

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Mackie D8B v2.0

In the days of digital updates, climbing version numbers have become as important to fun as hardware releases. **Rob James** tunes in to Mackie's digital 8-bus update

I WAS NOT alone in eagerly awaiting a chance to get my hands on a Mackie Digital 8 bus mixer. I was also not alone in waiting a very, very long time to do so. While there have been a few sample consoles in Europe, the machine I had for review is a real, genuine production version with CE approval and v2.0 software.

First impressions are important. The Mackie looks open and clear without being too large. This is a not inconsiderable achievement taking into account the number of controls on the surface. The downside is that this effect has been largely achieved through lack of colour—it has to be said that charcoal grey buttons on a charcoal grey background do tend to disappear. With the power off, the D8B is very dark. The internal illumination is clear enough, but it is difficult to find particular buttons until this becomes instinctive through familiarity.

The rear panel presents a forest of connectors and a card cage. Power comes from the separate rack-mounting computer via an elephant's trunk of a multicore cable terminating in a hefty, circular, locking, multi-pin connector. Adjacent is a 25-pin D-connector carrying data to and from the PC. The first four card slots take DSP effects cards, hidden behind a removable plate. The plate and the other cards are attached with neat, spring loaded, thumbscrews. The cards supplied are made for Mackie by IVL technologies in Canada. Each uses an Analog Devices processor and can run two effects for a maximum of eight when fully populated.

The other six slots take option cards. The first has the standard stereo AES-EBU and SPDIF digital I-O card. The second is for a sync card that, at the time of writing, was still not available. This is slated to provide wordclock or video black and burst in, SMPTE time code in and ESAM II machine control. The remaining four slots consist of one for alternative I-O and three for tape I-O, eight channels per card. Options available are the analogue AIO-8, with 25-pin D-connectors following the Tascam DA-88 format, the DIO-8 which is digital in both TDIF-1 and ADAT Lightpipe formats plus BNC sync out. These cards are made by Apogee. The other option is the PDI-8, a 24-bit AES-EBU card with sample rate conversion.

A 25-pin D-connector carries the eight analogue bus outs with the master LR stereo bus on XLRs. The bus outs are also used for surround monitoring. These are followed by a block of 30 jacks. The top two rows are analogue balanced line inputs for Channels 13-24. The rest are: Left and Right Master Out, Control Room Main and Nearfield Out, Studio Out, 2-Track A, B and C inputs, Stereo Headphones 1 and 2 out and two jacks for remote talkback and Punch I-O switches. The remainder of the panel has 12 identical sets of phantom switch XLR mic input, jack line in and unbalanced tip-send, ring-return insert jacks for each of the first 12 channels. Under these are the 12 analogue Aux outputs.

One of the nicer aspects of the D8B is the integration of the automation and control computer. It is not necessary to muck about with a MIDI sequencer in order to get decent automation and library capacity and the graphic mix editing in v2.0 is comprehensive. Mackie has also made a pretty good >

< job of disguising the PC. It runs MackieOS which presents a GUI to the operator but manages to avoid most of the complexities of Macs or Windows. The cooling fan makes an infernal din so the (approx) 5m cables may seem less than generous when it comes to remote siting.

Despite the PC host, it is not strictly necessary to 'quit' the application, as switching the mains off is perfectly permissible—although Mackie has provided a 'quit' function in v2.0. This is to divert you from powering down in the middle of an Autosave—which would probably corrupt the mix file. Incidentally, switching the console on or off puts big splats through your monitors.

Mackie has one considerable work on making file directory pointers less painful. With v2, and indeed, a lot of Mac and PC software it is all too easy to inadvertently save items to inappropriate directories. In v2.0 the working directory's pointer for each file type is updated only if a file is saved or loaded. This still doesn't entirely solve the problem so it is suggested you create a composite folder with all your favourite patches and the current Session files. This way you don't have to worry about finding things in the middle of a job.

The captive power cable may irritate installers. Console Data and parallel are on 25-pin D-subs although the parallel port is not yet enabled in software. I would recommend the largest screen you can afford to take advantage of the excellent SVGA graphics. MIDI emerges on a 15-pin sub-D with a natty little DIN converter. Keyboard is 5-pin DIN (IBM AT) and mouse, mini DIN (PS/2). A serial port will connect a joystick or tracker ball for surround panning although again, this is not yet implemented. Networking is taken care of by RJ45 and BNC connectors. Networking is present in v2.0 and uses 10baseT ethernet and TCP-IP protocols. This allows data to be moved between consoles, on different sides of the world if necessary without resorting to floppy disk 'sneakernet'. The control surface is pretty conventional (for a digital) in layout. The 24 channel strips are identical apart from MIC switches on the first 12. The meter bridge is built into the upstand so, starting at the top each strip has a 24-segment LED meter as does the master strip. I would like to have seen larger meters with more segments on the master.

On the surface the first knob is analogue preamp trim for the first 24 channels. Gain range, 0dB to +60dB on Mic inputs, -20dB to +40dB line for Channels 1-12 and -20dB to +20dB for Channels 13-24. The MIC switch toggles between mic and line inputs. These two functions, along with phantom, are not under automation control. The REC/RDY button arms the corresponding recorder track via MIDI. ASSIGN assigns channels to bus or tape outputs and indicates assignments in conjunction with the master assign buttons. WRITE arms or disarms for automation. The much vaunted V-Pot, or virtual potentiometer, is simply a rotary shaft encoder with an 11-segment semicircle of red LEDs to indicate position. A further red LED dot at the six o'clock position helps indicate when the V-Pot is centred. It also gets over the fact from a conventional operating position the knob obscures at least one segment. The all important SELECT button is followed by SOLO and MUTE and last but not least the 100mm motorised fader. Fader movements are heavily damped. This accentuates the 'rubber band effect' when two faders are linked as a stereo pair and also means it is possible to confuse yourself and the console when working fast—when grabbing a fader after a layer change. On fast position changes the faders move most of the way very quickly then crawl for the last bit, odd. There are four 'layers' selected by buttons in the Master strip. The top layer controls Inputs 1-24, the second, the Tape Inputs 25—48, the third FX returns and the eight ALT returns. The final layer controls virtual groups, eight MIDI channels and the bus outputs. There is no way of individually switching strips between layers. The channel V-Pots are globally switched between Pan, Aux send levels, Digital level trim and tape send level. EQ and dynamics are controlled via the assignable 'fat channel' with a variety of ways of controlling, for example, dynamics and effects in conjunction with four V-pots, the excellent screen built in to the upstand and a host of buttons. Alternatively, all this may be controlled using the SVGA screen and a mouse. All in all this is one of the neatest implementations of this type of assignable control I've seen to date. My only gripe is, if you are doing a lot of work in this section, the physical controls are a long stretch from the front on the console.

Version 2.0 provides four user selectable EQ types. British H/P: Hi-pass filter, 2 mid parametric bands and a high shelf, British EQ: Low shelf, two mid-parametric bands and a high shelf, 4-Band Parametric: four parametric bands with analogue style overlaps, 20/20k EQ: four bands of full 20Hz to 20kHz parametric. Unless my ancient ears are deceiving me this does not mean four different sets of algorithms, rather the four types are simply alternative ways of presenting information and control. The EQ sounds analogue. This will be seen as a virtue by some and a vice by others. I would like to be offered the choice. Musical, grungy, analogue—when appropriate and the surgical precision of phase-linear digital for clean-up work. I dare say if enough people agree this could be achieved on the D8B. In any event I would have liked a wider range of boost and cut and a narrower Q. The current limit is ±15dB with Q variable from $^1/_{12}$ to 3 octaves. The SVGA 'fat channel' display gives a clear representation of knob positions and a graph. Two sets of EQ settings may be locally stored and compared or you can 'morph' between them under automation control at variable rate. Dynamics are a bit basic although the new 'fat channel' SVGA displays are quite pretty if you like waggling analogue meters. The compression is hard knee only and makes itself fairly obvious in an analogue-like manner. On input channels dynamics are post digital trim and pre EQ, fader and pan. This is annoyingly inflexible. Channel inserts are analogue, unbalanced, and pre-convertor. Further, there is no provision of dynamics on the output buses or any external inserts as such. This means the only ways to use dynamics on groups of signals is to take a signal out of the console and route it back into a channel. An input channel if you want to use the internal dynamics or use the ALT I-O board to send buses 1-8 and return signals via the FX 1—8 channels.

Routing assignments are clear and logical although the surprise omission is there is no direct way to reassign buses to buses or the main LR output. I realise this can cause time-alignment problems but I would have expected at least to be able to re-assign buses to the main LR >

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< bus without mucking about with the ALT I-O. Machine control is pure MMC with good-sized, dedicated transport control keys and a huge jog-shuttle wheel. The REC button does double duty as global write and external machine master record.

My console came with Mackie's MFX-8 plug-in and the IVL Vocal Studio. Mackie's effects provide a good, basic, starting point. The five effects are reverb, mono and stereo delays, ping-pong and chorus. There's nothing spectacular here, but it's all usable and fully automated. The Vocal Studio processor is a horse of a different colour and is too rich in features to fully explore here. Suffice to say it offers 'formant preserving pitch shifting', 'intelligent vocal harmonies' and reverb. With practice this should have potential for exciting creative possibilities. It also demonstrates what might be achieved with this architecture if some of the other effects specialists get involved.

For stereo monitoring D8B is pretty well equipped. Each headphone output can take a different cue mix, there are main control room, close-field and studio loudspeaker feeds with independent controls. Alternatively, the CR and close-field levels can be set to track, making AB comparisons easier. The three analogue tape returns and two digital are selectable alternatives to the LR bus outputs. On the other hand there is no way of directly monitoring the individual buses other than via e-to-e switching and tape returns. PFL, AFL and solo functions are pretty conventional Mackie complete with the traditional 'Rude Solo Light'.

Things take a turn for the worse when it comes to surround. The console supports fully automated quad, LCRS, 5.1 and 7.1 panning with a very nice control window but surround monitoring uses up input channels and is generally inconvenient. An external monitoring control box is the best answer if a lot of surround work is envisaged.

Automation, however, is the D8B's forte. It's well thought out and comprehensive with, in v2.0, one of the best graphical mix editors I've seen. The Mix Editor uses a timeline display with various views. These show from 1-24 channels, or parameters, of data on the Y axis and time on the X axis (up to 24 hours). The display can be a single channel with all its parameters or multiple channels of one parameter type (plus a background event of a different type). This allows you to view, for example, 12 EQ parameter tracks stacked on top of one another, or six pan automation curves. Events are displayed as small squares which represent nodes, and lines that represent value ramping. The nodes are editable points that are either created during the automation process in real time, by the hand tool in the Mix Editor, or by adding Snapshots. On-off functions are displayed as stepped values. Automation tracks may be cut, copied and pasted. An entire time region across all parameters or channels (according to the current filter views) can be selected. Highlighted regions may be 'nudged' up, down, left or right, to trim or offset using four nudge arrows. The Auto Follow feature causes the Mix Editor to change views on the fly. Auto Follow updates the Mix Editor focus to any parameter you touch and Auto Scroll scrolls the screen past the timeline cursor. Add to this autofades and variable rate 'morphing' of EQ and surround pans and you begin to get the flavour.

The D8B is a highly impressive first attempt at a digital console but it feels unfinished. The current lack of external sync and SMPTE is part of the problem and for my purposes the inability to directly route busses to the LR master mix is a real pain. The TDIF currently only seems to work with DA-88s, not for instance, the Tascam format convertor or a DAW with a TDIF port that I tried. I really do not understand why there is no true touch sense on the faders. This feature makes a huge difference to the usability of moving fader automation. Mackie have the technology, it is fitted to the HUI, so why not on the D8B? I think they've really missed a trick here, proper touch sense would have put the console into a completely different class to the Yamaha 02R and its imitators. As it is, there is much else to admire and I am sure the software will develop a great deal further over time.

The plug-in, hardware and software, effects architecture is a great idea with the massive advantage of integrated automation control over all the effects. I hope this will develop with alternative processor cards and software both from Mackie and third parties. For my money, despite the lack of fader touch sense, the D8B has one of the most comprehensive and well thought out automation packages I have seen outside of $0.5m 'big gun' consoles. The learning curve is not too bad. Anyone familiar with any of the other consoles in this class will be quickly at home. But there is a lot to get to grips with. Other manufacturers should take a look at the manual. It may not be perfect but it is a hell of a lot better than most.

I think there is still considerable mileage for further development in this sector of the console market. It remains to be seen whether Mackie can capitalise on a promising (albeit late) start. ■

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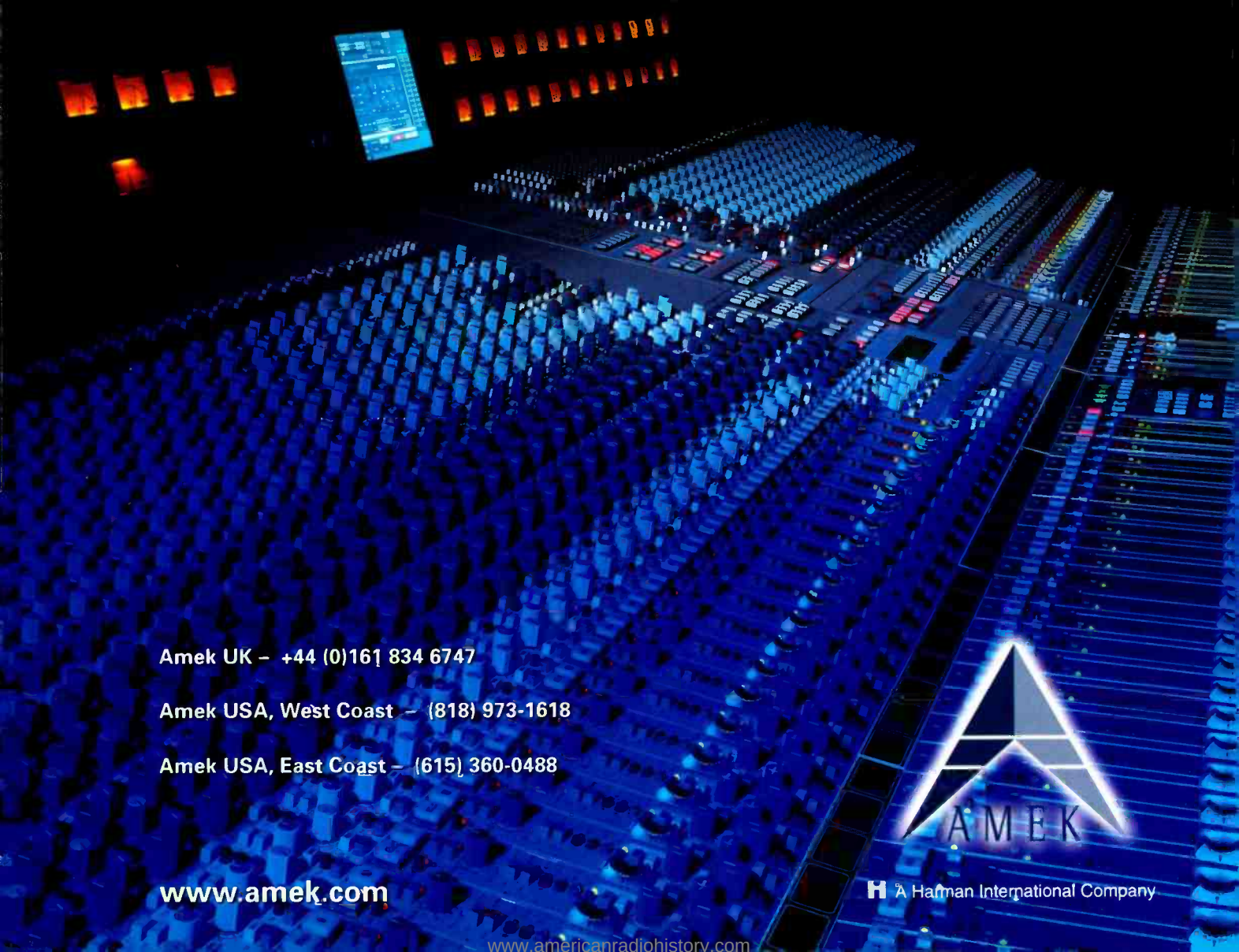

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Ribbon microphone focus

Despite past popularity, the ribbon mic is no longer a considered choice. That's a shame says **Dave Foister** who looks at contenders from Coles, Royer and beyerdynamic

THE RIBBON IS the shrinking violet of the microphone world. From its heyday as the best type of dynamic design, before the condenser took over the world, its use has declined to the extent that there are very few models available today, and many engineers who have probably never used one. This may have something to do with a perception that they are delicate, fragile things; most of us know that the principle depends on a very thin, light ribbon suspended between the poles of a huge magnet, and that very ribbon is surely prone to damage if the microphone is not handled like an egg. Indeed, tales abound of the days when engineers were engineers, and it was a routine job to replace the ribbon in a BBC PGS, rolling a strip of foil through a crinkling machine and fixing it in place. We can't be doing with that sort of thing nowadays, and if that's what it takes to keep a ribbon going we'd rather not bother.

But, of course, this is quite an exaggeration and the attitude deprives us of the pleasure of using a good ribbon, a microphone that can have unique capabilities and deserves a fairer place in the hierarchy. There may be only three main manufacturers offering us ribbons now, but a glance at the extraordinary variety in shape and application starts to show how unjustified is their neglect.

Once upon a time a company called STC built BBC-designed microphones just as various loudspeaker manufacturers have built LS3/5As and other BBC monitors over the years. Many of these became minor legends, such as the ball-and-biscuit and the PGS or 4038, and, although few studios can boast either in their collections, the BBC has an unbroken tradition of using the 4038 in certain specific applications and consequently owns large numbers of them. This continued demand means that the 4038 is still in production by STC's descendant Coles, along with some other specialised oddities from the same era. The best example is the famous noise-cancelling lip microphone beloved of sports commentators, unchanged for decades simply because it does its job so well. The current versions of both these microphones are identical in every way to the originals, even to the extent of continuing to use the special 3-pin spring-clip connector that the old STCs all used. The specimen supplied to me was no longer in the wooden box that they used to come in, but in a sturdy plastic carry-case with a felt bag to put the microphone in. Also provided, although it is an optional extra, was a standmount consisting of the special connector fitted to a threaded base, with a short tail sticking out of the side terminated in an XLR. Putting it up on a stand at the required angle is sometimes awkward, although the whole horseshoe head swivels on the connector base to help.

The 4038 is, perhaps, everyone's idea of the classic ribbon microphone. Its distinctive horseshoe shape is largely filled by an enormous magnet that also explains its unusual weight. The dangers of having such a magnet around a recording studio are obvious, and its destructive powers have often struck, usually accidentally, but sometimes not. A story is told of a major band in a major studio having major problems, and attempting to bail out and cut their losses by accidentally on purpose leaving a 4038 on top of the multitrack tapes overnight. The tapes were ruined and the producer tried to blame the studio for its negligence, until the studio was able to prove that its staff were not responsible and that it was a setup. Such is the power of this magnet; indeed if you put a 4038 up on a stand next to, say, a D12, you'd better make sure the stands are locked off properly or the magnet will pull them together from a range of several inches.

None of this, of course, has any significance in terms of the usefulness of the 4038; it merely means that it has to be handled rather more circumspectly >

< than even a conventional dynamic. But those who have taken the trouble will testify to the fact that it is worth it, because the 4038 can do things few other microphones can. For a start, its polar pattern, in common with most other ribbons, is accurate and consistent with frequency to an extent wholly unfamiliar to those accustomed to the vagaries of condenser capsules. These things really are true figure-of-eights (or cosine) microphones, as a moment's thought about the physics will intuitively suggest, and this predictable and uniform behaviour gives them roles that few others could fill. In the old days of mono radio the 4038 was the standard microphone for drama; two actors could face each other across it, with all the benefits of eye contact coupled with equal response, and could appear to leave the room simply by moving their heads round to the side of the microphone. So deep is the null at the side of the 4038 that it appears to pick up no direct sound from the side at all, leaving nothing, but room ambience. Radio drama is, of course, now done at least in stereo and often in surround, so the 4038 has been dropped from the cast, but this same characteristic is still used elsewhere. A visit to a BBC TV studio for a recording of a light entertainment show with audience is very instructive. A glance up at the roof reveals, among the lights and audience PA loudspeakers, a sprinkling of around a dozen 4038s, all very careful positioned and angled.

These are for audience pickup, and in order to give maximum control and minimum coloration, the side nulls are used in two directions. The microphones are edge-on to the stage, minimising pickup of the performers, and also edge-on to the adjacent loudspeakers, rejecting their sound, too.

But all this might give the impression that the only virtue of a 4038 is its polar pattern, and this is unquestionably not the case. Coles' brochure for the microphone makes much of the smoothness of its sound, backed up with ruler-flat response curves, and this is the hidden benefit of this venerable design. Many are vaguely aware that the 4038 is good for cello, double bass, trombone—as the list goes on it sounds as though its talents are at the lower end with, perhaps, not much up top. This is simply not so; the upper end is also well represented, with an amazing reluctance to show any signs of strain. Of course I tried it on all these instruments anyway, confirming that its reputation is more than warranted, but it surprised in other applications as well. I used it for voices a couple of times and it had a

smooth transparency and sense of accuracy that you rarely hear from even the best condensers. So impressed was I by everything the 4038 did that I made my mind up there and then to get my old one refurbished—it has been lurking neglected in the back of the cupboard, ribbon bent and case wobbly, for too long and deserves better.

A much better known and more broad-based manufacturer that has always retained a fondness for ribbons is beyerdynamic. Not for them, though, the big heavy unmissable style; beyer ribbons are so similar to conventional small condenser microphones in appearance that some may have used them without realising what they were. This is particularly true of the M 160.

The M 160 keeps its nature very quiet by being an end-fire microphone that could easily be taken for a small-diaphragm condenser with a windshield basket on the business end. It compounds the potential for confusion by not being a figure-of-eight, as we expect all ribbons to be; lurking within are not one but two ribbons, combined to pro- >

< vide a hypercardioid response. It has paper specifications that any microphone could be proud of, with a 4dB lift at about 3.5kHz being the only significant deviation from flat. Its partner is the M 130, very similar in appearance but with the hoop around the basket flipped through 90°. This is the obvious hint that the M 130 is indeed a traditional figure-of-eight, with just a small dot showing which face is the front.

The M 130's frequency response is considerably flatter still than the 160's, and its polar pattern, according to the graphs, is a perfect 8 at all frequencies.

The sound this produces is again very smooth indeed, at least as natural as many similarly sized condensers. I put up both these beyers and the 4038 on a string quartet and achieved a remarkably sweet blended sound; the strings were sparkling, yet never harsh, with a mellow lower end that made the whole thing very tonally complete. I then tried something similar with saxes and brass, fearful that the SPL of such things close up might be too much for the little ribbons, but the fears were groundless as a powerful yet still natural sound emerged. The sonic characters of the two models were quite similar, and I would suggest that they would make a good M-S pairing, where their small size and light weight would allow relatively easy rigging.

The beyers look to be rugged as far as such a design can be, and it seems self-evident that for many applications they would be interchangeable with a good small condenser and possibly more natural than most. The biggest difference is in the sensitivity, and this applies to all ribbons.

The voltage produced by the basic ribbon and magnet assembly is pitifully small, although its saving grace is its very low source impedance—effectively the resistance of the aluminium ribbon itself. It used to be said that you could run a ribbon microphone's signal down half a mile of bell wire without too many hum problems, and, of course, if this impedance is increased with a transformer to the kind of value presented by most microphones, then up comes the output voltage as well. It still remains very low compared with a condenser (of the order of 1mV/Pa), so needs a fair amount of gain in the preamp, although of course it generates effectively zero noise itself. This puts the onus on the preamp to get enough signal out of it without adding its own noise, and is a good test of any preamp. Note that this is no criticism of the beyers, and applies equally to all the ribbons here. Properly amplified, the situation causes no problems at all. >

< Coles and beyer are continuing a tradition; all the ribbon models they produce (which in the case of Coles amounts to the entire catalogue) have been around for years and we should be grateful that they are still around in the face of industry indifference. It is even more surprising to find a new company introducing a new high-end ribbon, but that is what Californian manufacturer Royer Labs has done with the R-121. Royer draws clear parallels between ribbon microphones and valve circuitry, suggesting that in the same way that enthusiasm for semiconductors obscured the merits of valves, so the advent of the condenser microphone made the world forget just how good the ribbon could be.

The R-121 is a lovingly built, slim, side-firing microphone whose internal construction is just visible through the grille when it is held up to the light.

This shows just how long and narrow the 2.5 micron-thick pure aluminium ribbon is, rather like some of the now-defunct models from people like Reslo and Grampian. The body is again much more reminiscent of a small side-fire condenser than of an original ribbon classic, and comes as standard with a bulldog-clip spring stand mount. An optional extra is an unusual suspension mount where a similar bulldog clip is hung in an elastic web, attached to the stand by a base that clearly carries the Audio-Technica logo for reasons I am not privy to.

Its manual makes claims for its performance that are by now familiar from the other ribbons on offer here. Its frequency response graph is even flatter than the others, with a maximum excursion of 3dB between 30Hz and 16kHz, and no significant lumps and bumps in between. Once again the published polar behaviour, figure-of-eight as expected, is almost completely uniform at all frequencies, and certainly far more so than any condenser you will ever see. Although it claims sensitivity surpassing that of 'classic' ribbons, it remains very low at -54dB ref 1V/Pa, and actually comes across as less sensitive than the 4038. At the same time its non-existent noise contribution makes for a very clean sound given a sufficiently quiet preamp.

Sonically the R-121 stands up more than adequately alongside the older ribbons, displaying similar attributes of smoothness, extended frequency response and low distortion. Put it up next to a 4038 and the sounds are essentially similar, although the big thunderous bottom end of the Coles is a little tamer in the Royer. The important common characteristic is the natural flatness of the response, with no mid or top-end coloration to speak of, and the same lack of strain during loud passages. Again this is a sound that would not shame a top-flight condenser.

For many of us a favourite stereo microphone setup is the classic Blumlein pair of 90° figure-of-eights, and in many ways the ideal way of achieving this is with a pair of ribbons. Something like a 4038 is simply too big physically to make for easy rigging of a crossed pair, but the smaller dimensions of the Royer make it much more feasible. Indeed the only problem I found in sticking a pair next to each other was the magnetic attraction between them pulling them together. Having sorted out a sensible configuration, the behaviour of the pair was just what Blumlein would have wanted, with a clearly-defined stereo image and uniform frequency response across the stereo stage—often the Achilles heel of an otherwise good array. The next step is a single-point stereo ribbon microphone which apparently Royer has in the pipeline.

I look forward to this, as I enjoyed the R-121s very much. If there is a parallel with the valve then Royer represents the real enthusiastic expert rather than the cynical me-too manufacturer, and flies the flag for the technology very well.

It would be good to see a resurgence of interest in the ribbon microphone along the lines of the revival of the valve, and this exercise of checking out the few available models is a salutary reminder of how worthwhile this could be. It would be a shame if this became a forgotten technology, yet Coles, beyerdynamic and Royer between them, albeit in very different ways, deserve to have us reappraise the role of the ribbon and reassess what it can offer. Valves have overcome ageist prejudices; perhaps ribbons too can once again become one of our favourite things. ■

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Lectrosonics Lectro UCR300, UM300

A radio microphone system that is useful in differing territories cannot fail to interest the location recording fraternity. **Neil Hillman** becomes radio active

IN 1963, on the steps of the Lincoln Memorial in the USA, Martin Luther King shared his dream of American freedom. In 1999, Moseley, Birmingham UK, upstairs in the attic—from where I write these missives—I wish to share with you the reality of American flexibility, that heralds a new era for location recordists wishing to legally use their own radio microphones while working in foreign countries.

Marketed as the Lectro-205 in the USA, with 100kHz channel spacing, the otherwise similar Lectro-300 series has been tailored to the European spacing standard of 25kHz; and who better to oversee these regulatory issues for European Conformity than British radio-mic guru, Ray Withers. This association with Lectrosonics might explain the mystery surrounding the absence of his influence on the current Sony radio products, given the huge success enjoyed by Sony after he redesigned their 800 series. His move on to new challenges like the 300 series must be a heavy loss to Sony, but a great gain for Lectrosonics.

Although Lectrosonics have been around for over 80 years, these UHF models—the UM300 transmitter and the UCR300 diversity receiver—are at the very cutting edge of today's portable, location, radio-microphone technology. The 300-Series offers 256 PC-programmable frequencies, which within their overall operating frequency range may be configured quickly and cheaply to comply with licence requirements in 'foreign' territories. Withers' company Raycom—as the 'Lectro European Service Centre' and UK and Eire distributors will be offering such a programming service for their customers. For a small fee the Lectrosonic factory-trained technicians can temporarily reprogram a unit—a real boon for the increasing numbers of us journeymen recordists.

The UM300 is a dual-conversion, frequency synthesised transmitter with a 75kHz wide deviation, to ensure a high signal-to-noise ratio in excess of 105dB. Transmitter circuits are regulated to enable full output power throughout the working life of the 9V battery down to 6.5V. If anything in a radio system is going to cause distortion, it is likely to be in the compander. There is a trade-off between the attack and decay times of compressor-expander circuits, causing the operating efficiency to be a compromise: if the time constants are too fast, high frequency transients will pass untouched while low-frequency distortion will be present. The converse is true for a time constant set too slow. To eliminate this, the Lectro has dual-band companding; two separate companders fed from a crossover network that separates the frequency bands at 1kHz with a 6dB octave slope.

The signal-to-noise ratio of the 300 system is also high enough to eliminate the need for a pre-emphasis HF boost in the transmitter and a de-emphasis HF roll-off in the receiver, that in conventional systems can provide an improvement in signal-to-noise ratio of up to 10dB, providing the two halves are perfectly matched; if they are not, this again results in an altered signal from the original; the dual-band compander of the Lectro provides its own dynamic pre- and de-emphasis function.

Other notable qualities are its Smart-Squelch muting and the dynamic frequency tracking front-end of the receiver. The muting system is sophisticated on the 300, as it needs to be, given the problems that it must overcome: squelch too hard and the audio will be swallowed up before it can reach the receiver; too softly and extraneous noise may be detected. Similarly with squelch speed: too quickly and the overall audio is clipped, too slowly and entire words may be lost. The 300 achieves an admirable balance by using several techniques to optimise its efficiency; one of these being an arrangement whereby the squelch 'waits' for a complete word or syllable to finish before it closes. Another check made by the receiver is based on the recent squelching history and signal strength, making adjustments dynamically to suit the conditions. The squelch system is operated by a separate ultrasonic tone modulation of the basic carrier. In the transmitter, a 32kHz pilot tone appears in the audio path just after the compander. The pilot tone is filtered out of the audio signal immediately after the detector in the receiver so that it has no influence on the compander or subsequent gain stages. The result is that the receiver will remain in its muted, squelched state until it receives a matching tone from the transmitter, even if a strong RF signal is present on the carrier frequency of the system. The muting is quoted as being greater than 125dB. Once a pilot tone is received, the receiver will remain open during all signal conditions.

The transmitter is powered by a single 9V MN1604 battery securely kept in place by a cover that is hinged and sprung on the bottom face, while one side houses a recessed sliding flap that reveals two preset pots—course and fine to set the operating frequency. The other side of the slim transmitter houses a bass roll-off preset pot, adjustable between 35Hz and 150Hz. The top face is home to a Switchcraft TA5M male 5-pin socket to accommodate virtually any lavalier, hand-held or shotgun microphone; an off-on slider switch with red LED to show power-on; a small rotary audio level pot with two associated modulation leds (to indicate -20 and 0, where the zero LED indicates that the input is starting to limit). The flexible antenna is located by an SMA connector.

While it is easier to design and build a receiver for single, fixed frequency operation, the challenge for multifrequency operation is to not just incorporate an RF front end that will pass any frequency within the tuning range of the system, as this leads to an unaccept- >

< able amount of interference being present. The Lectro-300 has a very sophisticated dynamic tracking front end with a bandwidth of 7MHz that tunes to the frequency in use, bringing the same narrow selectivity of a fixed frequency system to a multifrequency setup. The final design makes use of six transmission line resonators with variable capacitance applied to each resonator by hexadecimal switches. This allows each resonator to be individually tuned to a total of 256 user-selected frequencies, synthesised over a 25MHz range. The gain stages of the front end incorporate low noise, high current, and, interestingly, low-gain transistors which ensure that the front end is able to deal with stronger RF signals without overloading.

The receiver is said to be frequency stable to within ±0.002% and the FM detector utilises a digital pulse counter, clocking at 455kHz. The receiver controls are either on the top or bottom faces of the unit. On the bottom face is the male XLR output connector—a nominal 600Ω balanced out, a 3.5mm monitor jack with associated level pot, threaded 12V DC-in connector, recessed sliding flap covering the course and fine frequency selector switches and the audio output range switch. This 3-position slider sets the output of the receiver to low, middle or high and governs the range of the audio output level control knob on the front panel. In the low position the adjustment range is -50dBm to -20dBm, middle is -30dBm to 0dBm and the high position sets the output to a fixed +8dBm, with no front-panel control. Also on this top panel facing the operator are the two BNC antenna connectors at either side, a 3-position power switch allowing on (pilot tone off), off and on, set underneath two LEDs indicating red for power on, and green for presence of pilot tone. The 10-LED bargraph display runs along the bottom of the top face indicating RF from 1V to 1mV or if a small selector switch is thrown from RF to MOD, the leds show modulation level of the incoming signal in 6dB steps.

The choice of design for the diversity reception is interesting too. Unlike more conventional designs, the Lectro operates its diversity by means of antenna phase rather than the more usual two RF stages with a discriminator choosing the best signal out of the two. Lectrosonics claim that this reception technique effectively minimises drop-outs in short range sit- uations where multipath reflections can create problems, and I can confirm that on test in a short-range documentary scenario I perceived no problems whatsoever.

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Two small green LEDs marked 0 and 180 show the phase difference between the signals being received at the two antennas.

But what, I hear you cry, does it sound like? Well, rather good actually, to the extent where it is perfectly possible to differentiate between the characteristics of the mics being used, and had I not known about the antenna as opposed to RF switching of the diversity stages, I would have remained blissfully ignorant. With the very competitive prices these units are selling for, there are going to be a few sleepless nights spent by other top-end manufacturers.

It has been widely agreed that Sony's Freedom is not always what its cracked up to be—but given that the Lectro-300 can move freely between borders, that truly is liberty itself. ■

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WaveFrame v6.22 software

Having helped develop the workstation, WaveFrame is returning to the front line of its manufacture. **Rob James** re-aquaints himself with an old friend and finds a new ally

ANYONE WHO hasn't heard of WaveFrame is either very young or in the wrong business. The WaveFrame name has been around since the dawn of sampling which of course eventually begat the DAW. In recent years the name has changed hands once or twice... Timeline had it for a while and aimed the renamed Studioframe pretty directly at film tracklaying. The machine has been back under the WaveFrame moniker for some time but is still essentially aimed at the same market.

WaveFrame is a PC-hosted system even though many people see this as a disadvantage for serious professional use and, perhaps goaded by other manufacturers advertising jibes, some have gone to considerable lengths to disguise the PC lurking within their designs. But to leave it at that would be to do the WaveFrame an injustice.

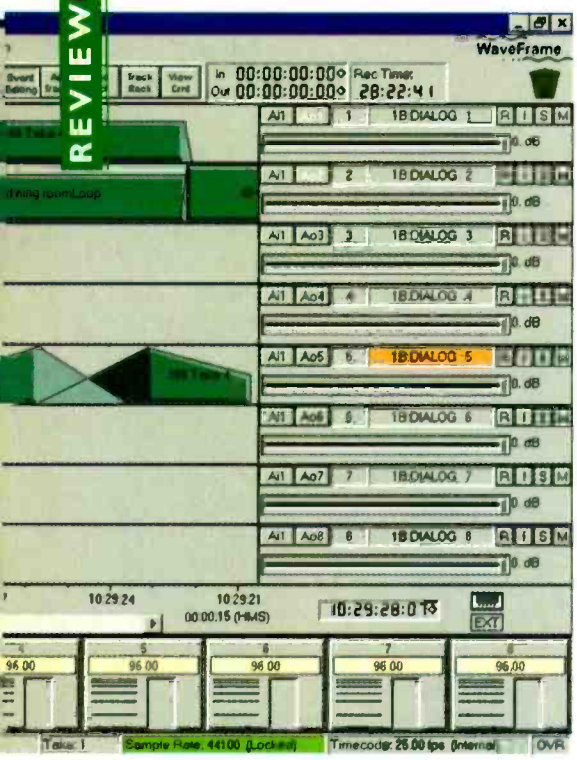
WaveFrame is PC based, but this is no ordinary PC. Housed in an industrial strength rackmount case the actual PC part of the machine is a 'single board' device of the type found in production line engineering where unreliability costs serious money. In any case, the PC is simply the control and housekeeping mechanism here. The audio cards are linked by a separate 256-way TDM (Time Division Multiplex) bus and have their own SCSI controllers. WaveFrame comes as a basic eight record channel device which can be expanded in increments of eight channels to a maximum of 24 by adding extra R8 cards and drives.

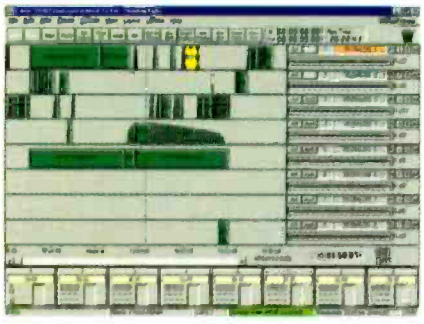
In hardware terms, a WaveFrame system consists of the main rack mounting processor unit and one analogue breakout box or expansion rack per eight I-O channels, again in rack mount format. The system unit is very noisy so it would be advisable to mount it outside the studio. There are a large number of configurations made possible by the many option cards. A basic 8-channel system would include an R8 card and an analogue IO8 card. Each R8 card has two separate SCSI chains and allows up to 8 simultaneous record tracks. A further two R8s and drives pro-rata may be added for a total of 24 record tracks. To increase the analogue playback capabilities further, IO8 cards may be added, again for a maximum of 24 channels. Digital I-O boards are also available. A Peavey MediaMatrix card and software offers enhanced mixing capabilities and DSP functions. For Foley and ADR work a GPIO card may be added to control external devices. To control a picture transport a card with two RS-422 (Sony 9-pin, P-2 protocol) sockets is fitted. It is also possible to add a network card. There are a plethora of approved storage options. Fixed SCSI drives, Rorke Data removeables, Magneto Opticals in both 1.3Gb and 2.6Gb LIMDOW flavours, Iomega Jaz and several varieties of Exabyte drive for backup. I really don't understand why, given the nature of the system, but it is cursed with a dongle. This is a hideous form of protection for a variety of reasons. Not least because dongles are extremely easy to steal. Synchronism options are generous. Internal, external wordclock, video, VITC, LTC and MIDI are all present. I used a Rorke Data V-MOD MO video machine for the review and both synchronism and speed of operation were highly impressive.

Like most DAWs, WaveFrame could be used for a variety of purposes but it is clear the majority of the development work over the years has gone into sound for picture applications.

The Windows operating system software is now the 98 version. There are five primary WaveFrame applications. Edit, Manage, ADR-Foley Assemble and Print. Edit is the main application for editing and tracklaying and can include spotting sheets for editing notes or for use during ADR-Foley recording sessions. Manage is used for loading and saving sounds and various other housekeeping activities. Assemble is better known as auto-conform and enables the WaveFrame to take a CMX format EDL and control an external transport to load the required audio. Print is a stand-alone application which may also be used on other PCs to print out spotting sheets and film style cue-sheets.

WaveFrame has a number of strengths. Particularly impressive are the supporting project management functions. Transport functions are sharp with little or no time-lag. Scrubbing is excellent and intuitive. The software strongly encourages methodical work, essential for film and TV. The first step is to define a project. A number of fields of information should be filled in including the name of the project, the episode title and number if the project is a series, and a variety of optional fields such as the date started and when it is due in the dubbing theatre, personnel involved and general notes. The next stage is to define a reel or reels. These might, for instance include, Dialogue Reel 1, Foley Reel 1, Library Effects Reel 1 and so on. From here you can start the Edit application and begin work on the project. The Edit window is fairly busy but does not oblige you to have several separate windows open at once in order to accomplish anything useful. Instead a variety of Layout options and preferences enable the operator to customise the screen to suit their own style and the job in hand. I don't propose to >





< give a blow-by-blow account of all the functions, rather to concentrate on what is good and not so good.

Track controls may be displayed on either side of the screen and the cursor can be set to move in either direction when playing. Alternatively, the tracks scroll. In addition to the main tracks it is possible to add one or more auxiliary tracks which can be used like a scratch-pad to audition or play about with sounds before adding them to the main tracklay. The principle difference between the two types is the main tracks may be synchronised to an external machine and the Auxes can't, although you can lock the Aux track or tracks to the main window.

Sounds are recorded into a library. If none is specified in preferences, Unknown Library is used. Libraries may be created deleted and managed using the Library Control function. It obviously makes sense to keep similar sounds in separate Libraries—'doors', 'gunshots', 'screams' and so on. The Sound Selector is the tool to use to find and place library sounds into the tracks. If recording is carried out methodically descriptive text data will have been stored with the sound files which makes it easy to find the required sounds. This information can be kept on-line and the actual audio on an off-line storage medium. In this way huge libraries of sounds may be built up and managed. To aid in this there are powerful search commands. This application also allows the descriptive information to be edited. Some of these functions could be extremely destructive and should be used with caution. Sounds can be 'layed in' at the play head position or their original time code position.

Once sounds are placed in tracks they can be moved about by selecting them and dragging. Obviously this can be restricted to moving between tracks only, in order to retain sync. Similarly the level and-or fades can be set by pulling on small square boxes once the item is highlighted. I found this a particularly intuitive way to work, especially since it can even be done when the tracks are playing. There are up to 256 levels of undo for when you change your mind...

Looping and crossfade options are complemented by a DSP based Time-Fit function which will stretch or shrink material to fit a given space.

The Track Rack allows the creation and management of complete tracks. An unlimited number of virtual tracks may be created and moved in and out of the main or auxiliary track windows as required. This is an extremely powerful feature for film tracklaying.

The system provides several ways of monitoring what is going on. There are two mixing applications, a basic monitor mixer and a far more comprehensive StudioCAD mixer. As the name implies this allows the user to design and use a mixer with up to ten inputs and four outputs using components such as meters, EQ, auxs and so on. Mixer layouts may be stored and recalled for later use. The mixer component also generates and respond to MIDI commands so it is possible for the mixer to control or be controlled by external equipment.

The WaveFrame is a highly developed tracklaying tool and I have barely scratched the surface in this review. It is ridiculously easy to use in some ways and highly complex in others. Like several other systems that have been through a long period of continuous development, I think it might benefit from major rethink to sort out some of the acquired baggage and make certain areas more intuitive. I have high hopes the recently announced v7, which is a major hardware and software revision, will do exactly this. Meanwhile, on this brief acquaintance I came to like and admire the WaveFrame. I now understand why it has such a loyal following and I will be sorry to see it go. ■

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valve classics

valve warmth

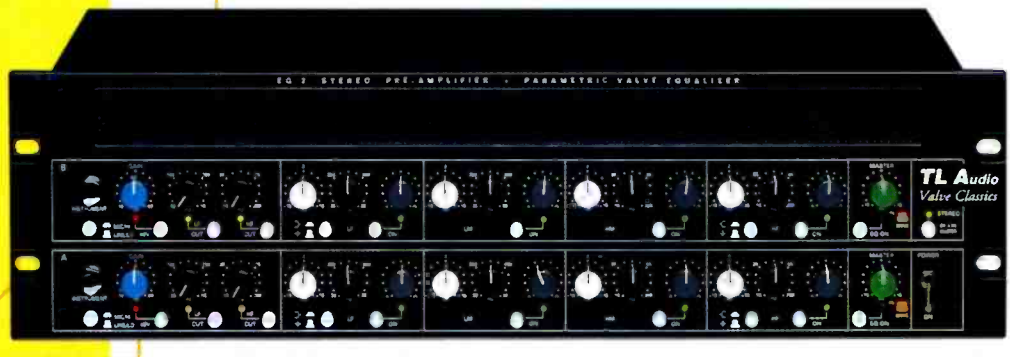
users

C-1
dual valve compressor

The original TL Audio Classic range products have been part of some of the most important records of recent years. Now, as part of the new 'Valve Classics' range, we have managed to develop and improve them even further. Extra features, uprated hardware and refined circuit design have given our best-sellers a new lease of life.

PA-1
dual pentode valve preamp

Each Valve Classics product now utilises US General Electric military specification ECC83 valves running at 250v DC for an even smoother, fatter sound - and the combination of tough steel chassis, 6mm milled aluminium front panel and gold plated ceramic valve bases means the units positively relish being bounced from one session or concert to the next.



EQ-2
dual parametric valve equaliser

The EQ-2 equaliser now boasts ultra-low noise bipolar op-amps and an improved ground planing system, in addition to a much requested shelving option on both LF and HF bands. The new PA-1 preamp has output level meters, improved valve stage frequency response and extra output drive capability - enabling even easier interfacing with today's high level digital recorders.

- Add these improvements to what were already the world's most flexible and affordable high-end valve processors, and you'll realise why everyone wants to own a Valve Classic.
- To find out more, contact your TL Audio dealer today.

TOBY WOOD
(Engineer - CTS Studios, London)
"The C-1 proved its worth very rapidly, sounding clean and transparent, and without any unwelcome artefacts - it also has excellent internal dynamic range."

JON ASTLEY (Mastering Engineer - Led Zeppelin, The Who, Tori Amos)
"I had auditioned other valve equalisers for the Led Zeppelin album, but the EQ-2 came out on top since its sound suited the project so well - both Jimmy Page and I loved it for the sort of top end we wanted."

ADRIAN UTLEY (Guitarist, Writer, Co-Producer - Portishead)
"There seems to be a real buzz about TL Audio equipment at the moment, and I've encountered so many engineers and producers using TL Audio products that it just seemed to be the obvious choice."

IAN DAVIDSON
(Townhouse Studios, London)
"We own both the EQ-2 Equaliser and C-1 Compressor units and are very happy with them."

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Tel: +44 (0)1462 680888
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TL Audio®

new valve classics

www.tlaudio.co.uk

TL Audio Classic Series

Revisiting one of the enterprises that established its reputation for cost-effective quality, TL Audio is peddling old-style valve outboard once again. **Dave Foister** enjoys the ride

HAS TIME REALLY flown by that quickly? TL Audio began, only a few years ago it seems, by espousing the revival of the valve. At a time when classic equipment was being rediscovered, and replicas, imitations and tributes were flooding the market, TL was one of the elite band of manufacturers whose enthusiasm was genuine and whose products stood up in their own right. While many jumped on the bandwagon, TL managed to produce original new processors at a price many of the cheap cash-ins struggled to match. Now those same boxes are revamped and relaunched, and TL has managed to suppress its natural modesty sufficiently to label the new range the Classic Series.

There are three models in the range, all revisions of highly successful boxes. There is nothing radically new on any of them, but some aspects common to all have been upgraded and the overall style has been slightly revamped. In this last respect TL Audio has never gone for the bold statements popular among some other manufacturers, unless you count a wilful functionality as a bold statement. All these units retain the mesh grilles in the front panel to let the valves' heat out, and however neatly these are done the home-grown image remains. Evidently then this look is deliberate. Still there, too, are the basic plastic collet knobs that also get used on home-built equipment; with the lines on the sides and the caps these do actually point at what the control is doing, which is more than can be said for some of the eye-catching aluminium monsters we see.

New, though, is the colour. TL's ranges have often used the colour as an identifying factor, so that we have had the Crimsons, the Indigos, and most recently the Ivory range, but, although the top range has also always had an associated colour, it has not been named after it. This, then, should be the Raven range as all the front panels are an elegant deep blue-black, much more stylish and attractive than the old colour and much more at home in a rack of top-end stuff; not boring old audio-panel black, note, but still dark enough to show up the screen print, the LEDs and the meters to their best advantage. Colours that make it difficult to see what the equipment is doing should be banned.

Another style change is the meters in two of the boxes. In a bid to make the appearance even more retro TL has followed in the footsteps of one or two others and fitted round meters—particularly clear and well-lit ones at that. Internally there are common improvements including General Electric military specification valves and high retention gold plated valve bases.

The simplest of the three units is the PA-1 dual pentode microphone preamplifier. TL is proud of all its mic pres, but regards this as the top of the range. Consequently, it has no other facilities fitted, although the expected functions have a few more settings available than usual. Switched coarse gain and ±12dB trim are joined by a continuous output level control, and both LF and HF filters with three switched positions each. The characteristic front-panel instrument jack is also retained. Inside it is much as before, although there are some circuitry refinements to smooth the frequency response and provide more output gain. The only problem I found was that like many valve boxes it is a bit microphonic, producing a ringing sound on the outputs when the switches are moved or the case is tapped. Otherwise the sound is smooth and quiet, easily passing the ribbon microphone test mentioned elsewhere.

The other two units also have mic preamps, but they take second place to the main function, which is also served by line inputs and the usual instrument jacks. The EQ-2 is the box that, perhaps more than any other, established TL's name, and here its impressive list of facilities is augmented by a feature whose absence on the original caused comment—buttons on the HF and LF bands to switch from peaking to shelving characteristics. Also new here, although familiar from other TL units, are LEDs to show signal peaks and valve drive level—even more useful here in fact as this is the only box without meters. The most notable features of the original are still here—the continuously variable controls throughout, and the remarkable STEREO switch that gangs the two equaliser channels together completely under the control of the lower set of knobs. In use the shelving-peaking switches really put the finishing touch to the EQ-2, making it the complete EQ. Its capabilities were impressive before, with detailed adjustment and a fine controllable sound, and now it also has the flexibility it did not quite achieve before.

Finally there is the C-1 compressor, again a complete microphone to tape path, this time with dynamic control. Like the PA-1, little has changed in the circuitry, although it is claimed to be fatter than the original. The controls remain the same, and in common with the EQ-2 rotary switches are absent, all parameters being continuously variable—not always the case with valve equipment. Use confirmed the memory of the original as being a particularly smooth and versatile compressor, with simple controls and a lack of any kind of auto setting, belie its strengths. It can be subtle or extreme or anything between, and is made even easier to set up by its reluctance to produce nasty side effects.

TL Audio have an unnerving reputation for rarely putting a foot wrong. Every one of its ranges of outboards has won it fans in different market areas, largely because common ideals run through them all. TL's cheaper ranges retain close family ties to the top-end stuff, and whatever may be left off, quality is always the priority. The new Valve Classics remind us where it comes from, reinforcing the status of these units as up there with the best of them. ■

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DIGITAL AUDIO RESEARCH

DAR

A Harman International Company

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Roister SNF-6

For methodology see Studio Sound, April 1998, page 14.
See it on the Internet website:
www.prostudio.com/studiosound/apr198/r_tannoy.html

Studio Sound's 'bench test' loudspeaker reviews continue with the SNF-6. **Keith Holland** reports

THE ROISTER SNF-6 is a 2-way active loudspeaker comprising a 180mm Kevlar cone, bass driver, a 25mm soft-dome tweeter and built-in power supply, amplifiers and active crossover electronics. The tweeter is mounted slightly to one side of the front baffle that, somewhat unusually, slopes backwards about 15° such that the drive-units do not 'fire' horizontally. The back panel contains balanced (XLR) and unbalanced (phono) input sockets, the mains socket and power switch and switchable controls for input sensitivity (-14dBu to +7dBu in 12 steps), bass roll-off (0 to -6dB in 2dB steps), bass level (0 to -6dB in 2dB steps) and treble level (+2dB to -4dB in 2dB steps) which allow the user to fine tune the response to suit the acoustic environment or taste. The cabinet is constructed from 21mm birch ply with a 30mm MDF front baffle and has external dimensions of 380mm high by 233mm wide by 358mm deep; the loudspeaker weighs 14kg. The review was conducted with the response controls set to 0dB and the microphone horizontally in line with the tweeter (rather than on the tweeter axis). Both internal power amplifiers are specified as 150W MOSFET designs and the crossover is a modified Linkwitz-Riley. Roister claim a maximum short-term output of 107dB SPL (half space at 1m) and a peak output of 116dB SPL with music for a stereo pair. The electronic package also incorporates three driver protection circuits: woofer overheating, tweeter overheating and woofer over-excursion. Fig.1 shows the on-axis frequency response for the Roister SNF-6. The response is seen to lie within ±3dB limits from 60Hz to 15kHz, with a 5th order low-frequency roll-off falling to -10dB at about 40Hz. Also shown on Fig.1 is the harmonic distortion for an output level of 90dB at 1m. Third harmonic distortion performance is very good, lying below -40dB (1%) at all frequencies above 50Hz and almost immeasurable above 80Hz, but the second harmonic is seen to peak to -35dB (1.8%) at 60Hz falling below -40dB above 90Hz. The horizontal off-axis performance (Fig.5) is good with no evidence of side-lobes and only slight mid-range narrowing between 500Hz and 4kHz, but the response in the vertical plane (Fig.6) shows the familiar crossover dip due to driver spacing. The step response (Fig.3) shows that driver time-alignment is good, but fairly strong early echoes can be seen in the power cepstrum (Fig.4) at quefrencies of about 500µs and 750µs. These reflections, that may be cabinet edge-diffraction effects, are responsible for the ripples in the on-axis response at high-frequency demonstrated in Fig.1. The acoustic centre (Fig.2) is seen to reach a maximum of about 3m behind the loudspeaker at low frequencies which translates to a maximum group delay of about 10ms. The waterfall plot (Fig.7) shows good time-domain performance at mid and high frequencies except for some ringing at about 320Hz. Overall, the Roister SNF-6 performs well. Harmonic distortion is low and the frequency response covers most of the audible range within acceptable limits. Time-domain performance is also good. The loudspeaker is well built and should fit most close-field monitoring requirements. ■

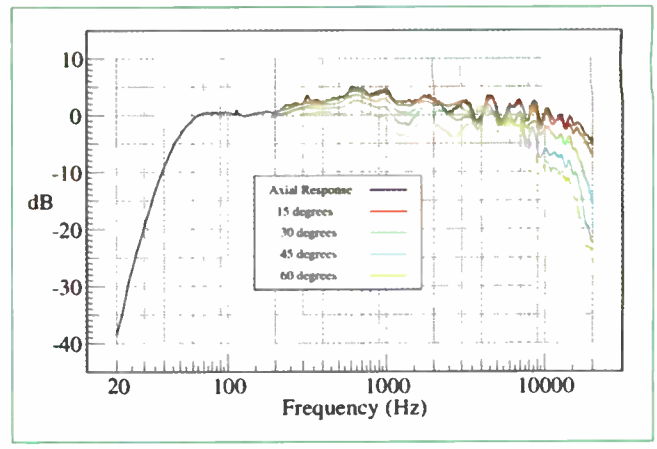

Fig.5: Horizontal directivity

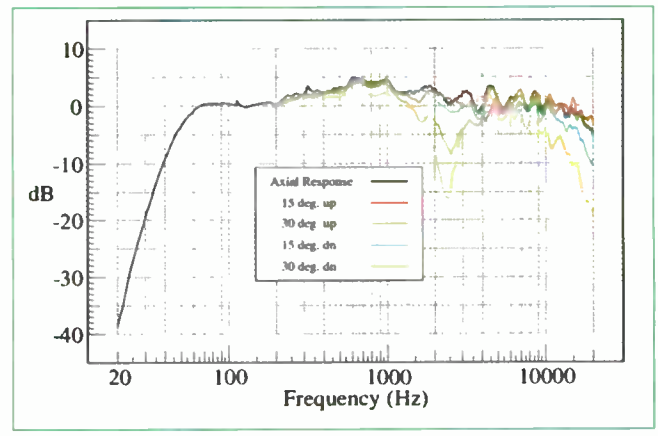

Fig.6: Vertical directivity

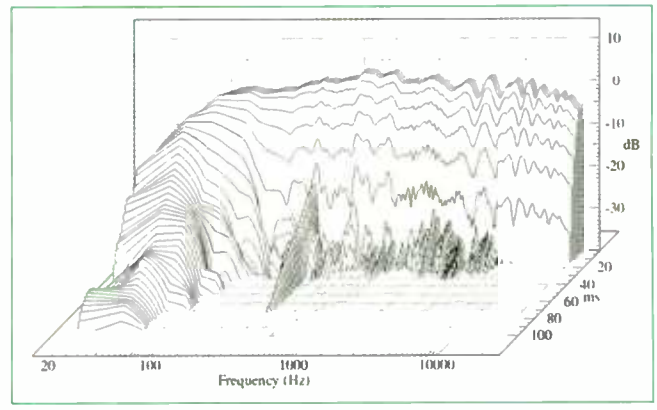

Fig.7: Waterfall chart

Contact

Soza Manufactures, Flearing 5, 182, 33 Rentis, Athens, Greece.
Tel: +30 1 48 34 340.
Net: www.roister.com

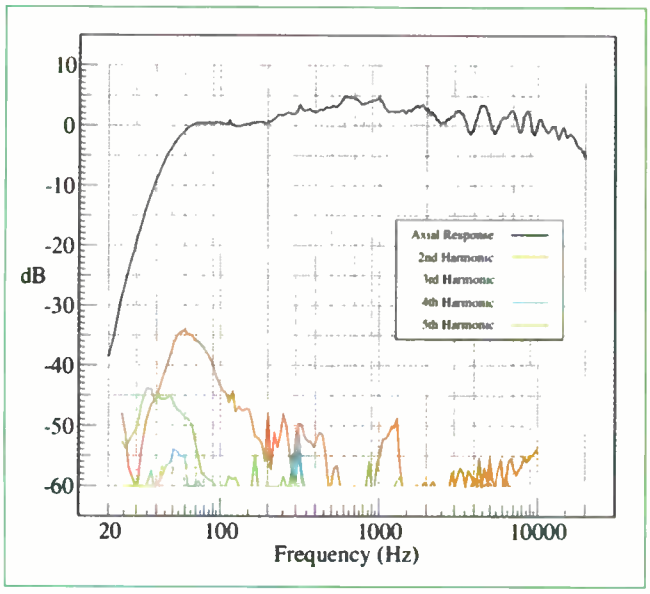

Fig. 1: On-axis response and distortion

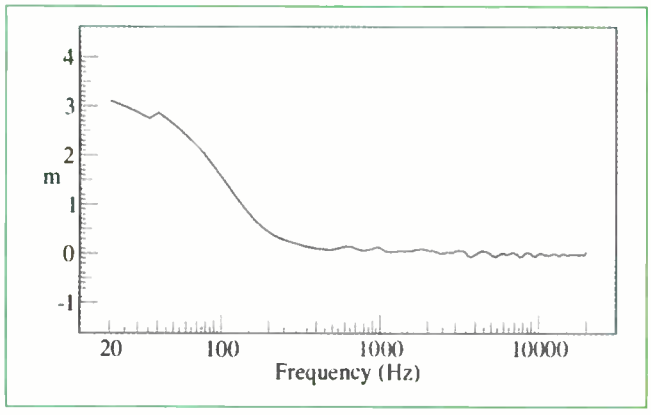

Fig 2: Acoustic centre

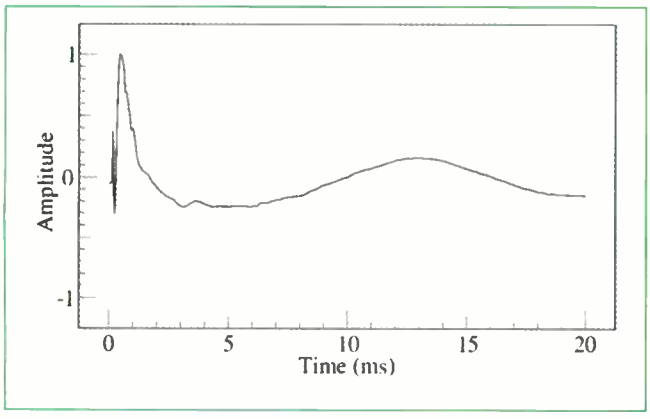

Fig.3: Step response

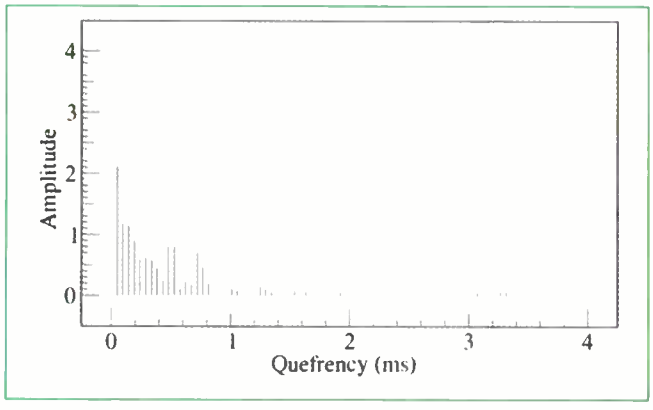

Fig.4: Power cepstrum

Chiswick Reach stereo valve

From providing studio time to providing equipment, Chiswick Reach presents an old school compressor. **George Shilling** pays attention

CHISWICK REACH STUDIO has carved out a niche for itself in the London studio market as a provider of vintage recording technology. Apart from collecting and maintaining ancient equipment, the company has been developing its own brand of processor, based on pre-digital and even pre-transistor technology. After considerable time and the involvement of three designers, the years of research and development have come to fruition in the form of the Chiswick Reach Stereo Valve Compressor.

The Compressor is a heavyweight 3U-high design. Any similarities with the Thermionic Culture Phoenix (*Studio Sound*, August 1998) are not entirely surprising, as Phoenix designer Vic Keary was also responsible for the original design work for this model—which has latterly benefited from development by Mike Craig and Brian Winters. Construction is very similar to the Phoenix. There is an enclosed metal base section which contains most of the circuitry on a pair of narrow boards with solder tags holding capacitors and resistors and what can only be described as higgledy-piggledy wiring. There are no ICs or PCBs. On the rear of this base are XLR connectors for inputs and outputs, perhaps a little inconveniently spaced for some wiring looms. An IEC mains socket is also located here, along with a couple of fuseholders. This is a 220V-240V only model, but dual voltage models are available to special order.

On top of this base section (behind the front panel) are an array of huge capacitors and transformers, and a selection of valves. A mesh casing encloses these. The whole construction is extremely heavy and robust, if a little home-made looking. In its defence, it must be stated that I had a prototype, therefore production models may vary slightly.

The front panel features controls for two channels side-by-side. Science-lab type vu meters and huge INPUT LEVEL knobs, beautifully (lightly) damped, and marked 1—11, >

NEW TECHNOLOGIES

Soundcraft digital on-air

Soundcraft has launched the RM1d digital on-air radio console. The RM1d is designed for self-op studios and combines an all-digital signal path with the simplicity of analogue-style control. A pool of digital and analogue inputs are provided, any of which can be assigned to any fader, and two frame sizes together with an input extender side-

car enable varying numbers of sources and different physical layouts to be accommodated. Features include 6-fader and 12-fader plus script tray frames, plus a 12 fader extender unit, 2 mono mic/line inputs with selectable 48V and insert point (4 on 12-fader) and 2 x analogue stereo line inputs (4 on 12-fader). There are 4 AES-EBU inputs plus an SPDIF input (8 x AES-EBU, 2 x SPDIF on 12-fader frame). Four analogue clean feed outputs (6 on 12 fader) allow telco operation (spare AES-EBU outputs can be used for cleanfeeds). Analogue outputs are provided for main programme (x2), Aux, >

< PFL, talkback, control room and studio monitors, control room, studio and guest phones and there are four stereo analogue External Monitor Source inputs plus 2 x AES-EBU and SPDIF outputs (4x AES-EBU and 2x SPDIF on 12-fader) Each input channel has gain trim, 3-band EQ, two mono/one stereo Aux and Pan control, via a central assignable strip. Comprehensive remote machine start interfaces are provided.
Soundcraft, UK: +44 1707 66500.

Nagra has DSP-2

Nagra-Kudelski has launched DSP-2 for the ARES-C and C-PP solid state recorders, thereby uprating a number of functions. The new processor board and software update

is standard from new models and can be retro-fitted to earlier models. Principal improvements include an extension in recording time to beyond two hours, due to support for 64Mb+ PCMCIA cards. Simul- >

< dominate the panel. Central toggle switches control POWER (also lighting a neon in the front panel logo) and STEREO LINK. Each channel features toggles for BYPASS and INPUT ATTENUATION. The former is a hard-wired bypass, although input is still fed to the compressor to give a visual indication on the meters. The meters indicate gain reduction at all times. The input attenuation (roughly 10dB) is almost always necessary in use, as without it the signal gain is huge. Even with the attenuation, you rarely needs to push the gain beyond 5 or 6—you could plug certain types of microphone in without a preamp. Each channel features rotary controls for setting up the compressor, usefully capped with coloured tops for identification. There is no ratio control: this is a soft-knee circuit which steadily increases up to a claimed 25:1 ratio at 20dB compression. Threshold, simply marked up to 10, is lowered by clockwise rotation. Attack is simply labelled Slow on the left and Fast on the right. At the extreme left, the knob clicks into a position labelled Thump. This operates a switch that changes the way that the control circuit behaves. In this mode, the attack characteristics intended to enhance percussive sounds. This setting provides a very slow attack, which I found too slow for my tastes in most circumstances. Release is also variable from 2.5s—0.25s, according to the panel. These are useful ranges, but I would prefer faster fast settings to be available. Maybe we will see a 'go-faster' version in the future. Rotary OUTPUT switches offer four positions labelled -8, -4, 0dB and +4. I struggled a bit with these and would have much preferred a variable knob to the switch positions. Presumably, this was used for sonic reasons, but it makes achieving the correct output level with the desired amount of compression a fiddly business using the INPUT and THRESHOLD knobs. Stereo operation was not helped by the discrepancy between the two channels of more than 1dB when the INPUT knobs were set high on the review model.

Like the Phoenix, I found this an extraordinarily friendly-sounding compressor. There is something immensely satisfying about the sound, which had more warmth and depth than any transistor or hybrid transistor-valve unit. While sounding good on almost every individual instrument or vocal, across a main mix this unit really excels, unobtrusively reducing dynamic range if necessary or sounding warm and squidgy—like putting your mix through rich chocolate gateau. Frequency response is superb and down only 3dB at 55kHz.

The manual tries perhaps a little too hard with its humour and although extremely informative comes across slightly smug and overly boastful. The Chiswick Reach sounds so good though, that all is forgiven, and it even comes with free local delivery. ■

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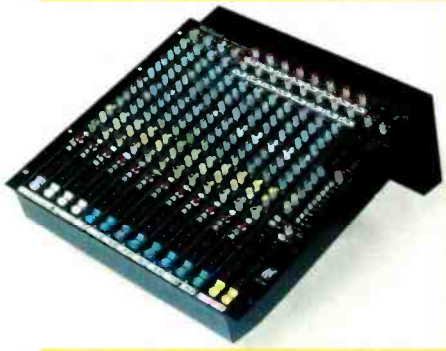
taneous live speech encoding and playback are now possible, allowing commentary to be mixed with previously recorded material for ISDN or phone transmission. DSP-2 also automates selection of the most suitable compression standard, and adds titling and date/time stamp capabilities.
Nagra, UK. Tel: +44 1727 810002.

Allen & Heath broadcast

WZ20S is a compact mixer aimed at smaller broadcast and production applications. The four mic/line channels are equipped with four band equalisation (two sweep mids) and six auxiliaries for cleenfeed and effects send duties. Eight stereo inputs each have four band equalisation and also six auxiliary sends. The stereo channels have A/B



input switching. These can be selected individually or mixed together. There is also an additional pair of stereo external inputs. Two assignable stereo mix buses can be used to create independent zone outputs, or with one as a subgroup to the other. Mix 2 includes mono sum and second stereo outs. Options include RIAA cards, remote control of the dim function, automatic muting and Alps faders with remote start/stop.
A&H, UK. Tel: +44 1326 372070.

Sennheiser's new receiver

The latest additions to the 3000 series of UHF radio microphone equipment are the EM 3532-U dual channel and EM 3531-U single channel receivers. The new designs are said to benefit from a higher degree of software control, with operational features readily addressed from within the menu-based system. Units may be integrated within multiple channel systems of up to 132 channels and controllable from a single PC or multiple networked computers. As many as 32 frequencies within a 24MHz switching bandwidth can be programmed and recalled from memory. A scan function surveys the local RF environment and reports the presence of any other signals within the spectrum which are likely to present interference problems. The units are fitted with large backlit LCDs, frequency select and switch controls, plus integral headphone socket and volume control.
Sennheiser, UK. Tel: +44 1494 551 531.

ITIS digital audio broadcast

ITIS has launched a new DAB range, designed to bring new operating features including dynamic reconfiguration, >

Focusrite Platinum

Just when you thought that there was little new in dynamics, an affordable Platinum compounder says otherwise. **Zenon Schoepe** reports

I CAN'T REMEMBER quite when it happened, but around about its Green period Focusrite metamorphosed from its rather staid persona and started to get decidedly funky.

In keeping with the mood set by the Platinum Voicemaster (*Studio Sound*, July 1998) and Tone Factory (*Studio Sound*, July 1998) both of which were unlike anything before bearing the F-word, the new ComPounder takes a different run at the business of dynamics control. As such it will probably be the hardest unit to justify in the Platinum range because, in my experience, dynamics is the least well understood are of the outboard rack. But we're really talking about recording musicians here.

We are told that this dual mono, stereo linkable compressor-limiter-gate has separate gain elements in each processing block. Also that it favours second-order rather than third-order distortion, that it employs a discreet class-A VCA in the compressor, has opto circuits in the gate and limiter, and inductor circuit design in a separate compressor bass expander.

For a unit that has to be regarded as living well within the affordable end of the dynamics spectrum, this is no stripped down box of compromises. Indeed the pot and switch count is staggering. The two channels of processing are split across the front panel with a separate defined section for the gate and the limiter living within the compressor block. The compressor and limiter can be stereo linked separately with control handed in both instances to Channel 1. The limiter has a single THRESHOLD pot, BYPASS switch and activity LED. The gate gets a BYPASS switch and fully-variable THRESHOLD and switchable release-hold pot, switchable fast-slow attack and switchable 70dB/15dB range. Alternatively the section can be switched to work as a 2:1 expander or keyed from a rear panel jack socket. Metering amounts to four attenuation LEDs. Each channel has a -10dBV jack output and +4dBu XLR output while XLR and TRS jack inputs can be switched between the two levels.

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The compressor is certainly the most interesting and able of the box' repertoire. There's fully variable threshold, ratio (1.3:1 to over-compression by way of switchable hard and soft knee slopes), attack (100µs 100ms) and release (100ms 4s) with a switchable programme dependent setting, and gain make up. This section includes metering for input level and gain reduction with a useful output level overload LED. It's fairly standard stuff so far but the inclusion of a BASS EXPAND pot turns things around a bit. This effectively allows low end to bypass the compression circuit and be dialled in after the event. From the plots supplied, you could regard it as wide bell that starts rising below around 100Hz on a pot marked flat to fat. However, press a button marked HUGE and the effect shifts east by 100Hz.

This is achieved by the aforementioned wire wound-inductor, which is said to generate bass harmonics and phase delay much as old board designs did. Correct it may not be, but great it does sound because it equates to separate control of the bass and the rest of the spectrum and you can, to illustrate the process, clamp down hard on the non-bass element of a signal to the point where it is all but swamped by the low end. Some of you will have sat up at this observation because the implications for kick-in-the-guts bottom end are obvious and 'my word' does it work well. Spare those woofers or unseat them. Interestingly the effect is different from what you can achieve with careful low end EQ contouring because there seems to be more happening with the Bass Expander, almost like an exciter for the LF. I also have to concede that Focusrite's claims that it remains punchy are true.

But it's not a universal cure-all, dance music, bass, in fact anything with a thump in it, is prime material for the Bass Expander but it is foul on acoustic guitars and piano, for example. But you don't have to use for that. It's also important not to let this pot and switch possess the rest of the box.

The compressor is a very, very fine processor and easily able to do anything you would ask of it. It's extremely controllable, capable of a wide range of gain reduction textures, and can do duties on the extremes of vocals or main mixes. The limiter suits this well and because it is independent you can use it as intended to mind errant overshoots and it squeezes nicely. By comparison the gate is least spectacular. Nothing wrong with it, it has the bits you'd want, but I like fully variable range controls and separate release and holds but these would have added to the pot count and I would not welcome control sacrifices anywhere else in this sound chain.

The ComPounder amounts to a fine combination of features with the sort of performance and quality you take for granted with Focusrite at any price point. And they've managed to bring something new to the party as they have with the other Platinums. We could do with a whole lot more of this all round. ■

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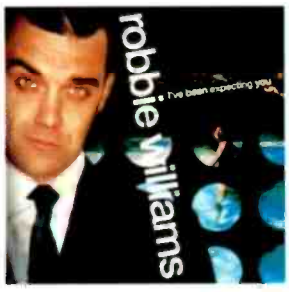

'I've been expecting you' the album: Mastered and listened to in Robbie's front room on PMC

Hebden Sound 1000 & 2000-series

The migration of Coles from contemporary contender to historical casualty cleared the way for the original personnel to regroup. **Dave Foister** welcomes new mics from Hebden Bridge

'APPEN, WHEN I were a lad there was these microphones from them Calrec folk at Hebden Bridge. Reet champion they were, and they'd not set you back more 'n a few quid. Gave them German KM84s a run for their money I can tell you. Course it were all fields round 'ere in them days.

When Calrec went to AMS, only the Sound-Field microphone was given much prominence, and although servicing was continued for some time, eventually the rest of the range became unavailable. True, they had never become standard items in the average microphone cupboard, but those of us who had grown used to their surprising quality and value were sorry to see them go. The good news then is that they are back: local outfit Hebden Sound, in the capable hands of Keith Ming, ex-Calrec and AMS, has reintroduced the entire range, virtually indistinguishable from the originals and still at bargain-basement prices.

In fact when I first saw the Hebden microphones I thought they might be old Calrec stock re-badged, as some appeared to have the Calrec logo milled off and Hebden Sound engraved in its place. It turns out that only the external metalwork is a hangover from the old days, and everything inside is new to the original specs: even the individual parts of the capsule assemblies are specially made by Hebden.

The range is very wide-ranging and flexible. Two basic types are involved, the 1000 series, comprising one-piece cardioid-only microphones, and the 2000 series, a modular preamp-capsule arrangement with a choice of heads. Essentially they are the same microphones: the electronics are the same throughout and, for instance, the capsule in the cardioid 1000 (the CM1050) is the same unit as found in the detachable CC50 cardioid head. Printed specifications for corresponding pairs are identical, so there is no sonic trade-off in either. The considerations are price and flexibility; the 2000s are good value and highly adaptable, while the 1000s are ridiculously good value for those who are happy with a fixed-pattern design. Model numbers and designations are carried over exactly from the original Calrecs.

The two 1000 models are both cardioid microphones differing only in the bass roll-off characteristic on the CM1051C. It still goes down to 40Hz (the CM1050C gets to 30) and otherwise its specifications are identical. Both of these are carried across to the modular range as the CM2050C and CM2051C (you get the picture). The 2000 series then adds to the basic design with detachable capsule assemblies that comprise a windshielded cardioid with bass roll-off, a general purpose omni and a hand-held omni differing only in the mechanical design. Again the specifications are identical, with the exception of the length, suggesting that the only differences are mechanical shockproofing measures to allow the 2001 to be hand-held.

All the microphones come in soft vinyl cases with foam inserts to cradle the body. These too are exactly the same as the Calrec originals except for the printed name, and the same goes for all the accessories—simple stand mounts, phantom power supplies and so on. They were all supplied to me without any accessories at all, not even a stand mount, but their 22mm diameter allows many other types to be used. I have always found, however, that they are just that little bit thicker than a lot of others, and that continued use of a 21mm mount can stretch it so that it no longer fits the microphone it was originally intended for.

While these microphones might look fairly anonymous and their price suggests that they can't be serious competition for the familiar names, the sound they produce is always the kind of surprise that brings a smile to your face. They should have a mediocre little thin dull sound at that price, but they don't: they are full and open, with the kind of extended top you expect from a small capsule and plenty of depth to go with it. Since I still use some of the original Calrecs, which must by now be about 20 years old, I was able to do a straight comparison with a new CM1050C, putting them up as a crossed pair, and they matched exactly. This says much for the longevity of the old one, which was never really in doubt, and also for the precision with which the new range has been re-created. The long life is no surprise when the build quality is taken into account; besides the sound, another reason these should be more expensive than they are is that the engineering and finish are excellent. Some of the comparable Eastern European newcomers can deliver surprising sound but are let down by a shoddy finish, a criticism that could never be levelled at the Hebdens.

If like me you have lived with Calrecs for years and missed being able to add to the stocks at such a good price, the appearance of the Hebden Sound revival will be cheering news. If on the other hand the delights of the little Calrecs have passed you by, now's your chance to catch up. ■

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NEW TECHNOLOGIES

< duplication of key components, new standardised interfaces and adaptability to all types of network architecture. The first elements in this chain, the D-ACE source encoders accept analogue and digital sources, with built in sampling rate conversion, and supports program associated data, independent data and service information for the multiplexer. The D-SMUX is the service multiplexer for pre-multiplexing a group of audio and data signals. Interfaces with up to six inputs are available and there is a wide range of physical interfaces.

D-CAST2 is said to represent a new generation of COFDM coders for DAB transmitters. A completely new design, it is said to combine on a single card, all the functions previously carried out by four boards and a modulator. Management software is available for all stages in the process.

Community contractor

The new CPL series of loudspeaker enclosures is intended to provide high quality but cost-effective contractor solutions for smaller installations. Standard inclusions are selectable passive and biamp modes, three-position HF voicing, a choice of 90x40-inch

or 60x40-inch horn dispersion for most models and black, white or unfinished enclosures. Barrier strips and six rigging points, each with a rating of 68kg, are provided for easy installation. Protection is provided for the Ferrorfluid-cooled drivers. There are currently eight products in the series. With the exception of a 15 inch subwoofer, all enclosures combine cone drivers with a one-inch titanium compression driver, loaded into a 13-ply cabinet and protected with a perforated steel grille. The two smallest units in the series are based on 8-inch driver and coaxially mounted dome tweeter combinations. These devices are passive-only, have no HF switching and have a quoted dispersion of 100x100 inch. **Community, US. Tel: +1 847 998 0600.**

Chilton in double debut

Broadcast equipment manufacturer Chilton has two new products, a self-op mixing desk and a 'studios to transmitter' switcher unit. CAD200 is a self-op on air desk with solid state switching, +26dB headroom throughout and stereo PFL on input modules. Options such as the number of channels with phantom power, pre/post settings and fader starts are all done on jumpers. The unit can be set at the factory or an engineer can set the parameters on-site. Also new is a 'studios to transmitter' switch unit, which enables the on air signal to be selected from any of four studios, without any modification to existing equipment. >

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Tascam CD-D4000

With two drives in one frame and not a connector in sight, personal CD duplication has become a reality. **Zenon Schoepe** dupes

FALLING BETWEEN THE spread of standalone audio optimised CD-R machines and the short-run desktop contraptions that are appearing in increasing numbers, Tascam's CD-D4000 is a one-to-one CD duplicator. Based quite clearly on the sort of slot-in drive you might want to attach to your PC and upon which so much of TEAC's expertise has been drawn, this unassuming device is simplicity itself. But then what it attempts to do is pretty straightforward with very little room for deviation from its rather limited set of options.

This is an audio CD and CD-ROM duplicator that doesn't even have I-Os on the back in any form, performing all its functions from two drives marked MASTER and SLAVE, accompanied by an SPX90-sized LCD, two associated buttons and a power switch. Each of the drives additionally has a mini stereo headphones socket, thumbwheel volume pot and an EJECT button. The front panel's 'Professional' legending alludes to the fact that there is no SCMS involved.

One of the problems with using two standalone CD-R machines for duping purposes is ascertaining which record mode would do the process most justice. This becomes more complicated if you don't know the machines involved and need to connect them up yourself as certain I-Os can have conditions attached to them. The CD- D4000 avoids any such complications by simply not giving you the option to get involved. Instead you decide that you want to copy disc A (in the Master drive) onto disc B (in the Slave drive), how desperate you are for it (real time, 2x or x4x), and then hit the button. And go and do something else.

The temptation, like with the first automatic washing machine in the household, to sit and watch it do its stuff is unrewarding as aside from a display that tells you how much there is to go there's not much to see so you really ought to be taking the opportunity to finish up on a little dusting or making executive decisions on the condition of the grapes in the fruit bowl. Forget about it, because once underway you can't stop it short of pulling the power and that will trash the destination disc anyway. When it's done it finalises the slave disc and tells you it's finished. Next.

To say this machine has a menu is probably aggrandising the matter. You have five modes paged through with the MODE button and selected by the other one (ENTER) and then options within each mode are adjusted on the MODE button and confirmed with the other. You can copy a disc, instigate a Test Write mode, which dry runs the copying process without writing to see if it is indeed possible to perform the function you have asked of it at the selected speed, and you can set write speed. It will tell you if either disc is bad, whether they have incompatible storage capacities, or if the transfer rate at the speed requested is too much for it (more likely to be a problem with CD-ROMs). You can also compare data on master and slave CD-ROMs, but not audio CDs, and if it does detect inconsistencies then you'll just have to try again. The last mode allows you to play back CDs in either drive with jumps to the next track.

That really is about all there is to explain about the hidden secrets of this innocuous looking rackmount.

It can't record onto CD-RWs which is no big issue but imagine the flamboyance of menu options if it did. The drives are blatantly PC-style in feel and operation. This is not a complaint - treated well there is no reason to believe that they wouldn't last and last - it's an observation. It generates a surprising amount of ambient noise, sounds like a fan, for so simple a unit. I did come up against a couple of instances where it refused to dupe due to space incompatibilities on the discs involved even though I knew these to be marginal and do-able manually and digitally with two standalone drives. However, that is missing the point because what this box does is automate one of the most boring and repetitive tasks known to man and as such I welcome it. Now where's that duster... ■

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NEW TECHNOLOGIES

Chilton, UK. Tel: +44 181 941 5214.

Mackie goes Pro

There are now 'Pro' versions of the 1604-VLZ, 1402-VLZ and 1202-VLZ mixers. These incorporate the XDR (Extended Dynamic Range) mic pre-amps used in the Mackie Digital 8-Bus console. These are said to benefit from improved headroom, lower noise and improved RF rejection compared to earlier designs. Level setting has also been simplified through improved silk screening. The first product from RCF since the Mackie takeover is the SRM450 two-way, biamped monitor. Based on a 12 cone driver and 1.75-inch exit titanium compression driver, the system contains 300W and 150W monolithic amplifiers. The enclosure is suitable for pole mounting, flying or use as a floor wedge. A range of enclosures is set to follow.

Makie, UK. Tel: +44 1268 571212.

Arboretum in Harmony

Now available are the Arboretum Harmony pitch processor for Mac OS and Restoration-NR noise remover for Windows. Said to be the first implementation of the developer's new formant-based pitch processing technology, Harmony is claimed to be easily the world's most powerful software for pitch shift and harmony creation. The graphical interface is said to allow intuitive editing of 'fixed' pitches, new vocal lines and complex independent parts. Arboretum claims its system is less artificial sounding than other systems: natural vibrato is apparently left intact and users can even change the size of the vocalists 'throat'. Restoration-NR uses 32-bit floating point calculations to generate more than 4,000 bands of gated EQ, according to Arboretum. The result is said to be greater transparency and more hiss reduction than other software-based systems.

Arboretum, US. Tel: +1 650 738 4750.

Jünger has new Vamp

Jünger Audio has announced the VAMP3 voice processor. The all-new VAMP3 is a dual-channel, remotable, high performance microphone preamplifier, which also combines sophisticated digital voice processing. It complements, rather than replaces, the existing VAMP1 and VAMP2 digital voice processors. The German digital dynamic control and processing specialist is also promoting new high definition audio products with 'real' 96kHz/24-bit processing. New models in this premium series of digital dynamics devices are the Accent1 and Accent2. These feature a configurable audio chain for expander, compressor, filter, de-esser and limiter. Powerful signal processing and menu-driven user-friendly programming are combined with multi-function level display and new noble metal design.

Jünger, Germany. Tel: +49 30 6777 210. >

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Lafont Audio Labs LP-24

Essential but unassuming outboard, the 'cinema filter set' has been revived and updated. **Rob James** favours the French

ANYBODY WHO HAS spent time in film dubbing theatres will have noticed huge white dials occupying the outboard territory. Usually to be found in a rack behind the console, these units look as if they would be more at home in the radio room on the Titanic than in a modern studio. But no: for while the enduring Urei Little Dipper filter set is now out of production, it owes its considerable longevity not to looks but to a unique set of features. Unique, that is, until now.

They say if you build a better mousetrap the world will beat a path to your door. With the LP-24 Cinema Filter Set, Lafont Audio Labs have set out to retain the all the virtues of the classic Little Dipper while adding a few wrinkles of their own. Jean-Pierre Lafont claims the unit to have been designed specifically for, and with considerable input from, several Hollywood dubbing (sorry, rerecording) mixers and I can well believe it. The LP-24 is more compact than its predecessor. It is a neat 2U-high rack-mount with the front panel finished in the Lafont

restrained dark claret, dominated by four prominent knobs, skirted in translucent white with black markings. A single-channel unit, connections are few, with XLRs for audio in and out and an IEC mains socket.

The Little Dipper had two identical bands of peak-notch filtering—to this, the LP-24 adds a third. There are also high-pass and low-pass band limiting filters. Each filter uses a latching pushbutton (with associated LED) for insert into or bypass of the audio chain. The controls of the band rejection filters are almost identical in layout to the Urei. A second pushbutton with two indicator LEDs switches between Peak and Dip modes. A 3-position rotary RANGE switch selects the frequency multiplier to be applied to the legends on the big dial. This gives ranges of 18Hz—200Hz, 180Hz—2kHz and 1.8kHz—20kHz. The indicator LEDs are green, yellow and red respectively allowing the operator to see at a glance which range is selected even in the stygian gloom of the average dubbing theatre. A pot selects the width of the notch and a further pot adjusts the 'balance' of the filter. The LP-24's band-pass filters are 24dB per octave and the dip is fixed at a whopping 60dB. Peak is a mere 6dB by comparison.

If this sounds like a rather odd specification for an equaliser, it is. The LP-24 and the Little Dipper before it, really have only one application in film mixing. However, it is arguably the most important application of the lot—cleaning up location dialogue recordings.

You might imagine the quality of location dialogue recordings would have improved as technology has advanced. In fact, due to a combination of factors, if anything the average standard has deteriorated. HMI lights which emit multi-frequency whistles, noisy cameras in inadequate locations and the general trend away from a trained, theatrical style of delivery are just some of the factors involved.

The usual technique of removing a sufficient amount of unwanted signal may be unfamiliar to some. Essentially, it is to first identify and remove the dominant fundamental(s) frequency(s) followed by objectionable harmonics then to apply broad-band noise reduction if necessary, such as is provided by a Dolby Cat 43a or Cat 430. The easiest way to identify specific frequencies is to boost a narrow band and sweep the centre frequency of the filter until the unwanted signal peaks, at which point the filter is switched to Dip. The width is progressively narrowed and the filter re-tuned until the greatest benefit is obtained. The BALANCE control helps with fine tuning.

There is, of course a catch. Too narrow a notch may result in the unwanted signal drifting out of range, too wide a notch can ruin the quality of the remaining signal. Over use of this type of filter tends to result in a hard, phasey quality to the voice, particularly with some female voices. Careful design of the filter elements obviously plays a large part in the equation. Analogue filters are not phase linear. Theory states this should not matter but I remain to be convinced. While it is perfectly possible to design linear phase digital filters with very narrow and deep notches there are surprisingly few stand-alone units about. I suspect there are several reasons for this. The total market for boxes aimed specifically at this task is, even in global terms, tiny and therefore unlikely to attract the volume producers. The digital filter units available tend to be aimed at a wider market and therefore have features which clutter them up and make them awkward and time-consuming to use for dialogue clean up. Film mixing, especially in Hollywood, commands a high hourly rate so speed is of the essence. A device that presents a familiar, unfussy user interface and can be used with little or no training will be far more acceptable than an unfamiliar, complex, programmable unit.

Lafont has done an excellent job of updating an old friend. From memories of hours spent using original Little Dippers I would say the Lafont design is more tolerant and rather less likely to severely degrade the dialogue. It is also very much quieter. The LP-24 may well be the answer to many a dubbing mixer's prayer. ■

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NEW TECHNOLOGIES

Lindos AES-EBU

The portable LG1 AES-EBU portable audio generator and matching LM1 monitor are battery powered, with rugged metal housing. Suggested for OB and field service use, they are also said to be priced to meet 'almost any budget'. The LG1 generator supports 32kHz, 44.1kHz and 48kHz as well as external clock, with 24-bit wordlength. It also has 1kHz and 400Hz modulation with selectable digital and analogue output levels, plus channel ident on CH-B digital and right channel analogue. Validity bit selection for audio/data identification is also provided. LM1 monitor supports the same sample rates and has a headphone output with volume control. Accurate level indication is given for digital and analogue inputs, plus digital status and error monitoring.

Lindos, UK. Tel: +44 1394 380307.

THX projector spec

Lucasfilm THX is introducing a specification for electronic cinema projectors as part of its theatre programme. There are also plans to certify electronic masters and develop standards for digital transmission schemes in the future. While the start of commercial electronic cinema is said not to be imminent, the THX specification is intended to guide theatre owners to selecting an electronic projector which produces the best possible image and sound, while also providing the reliability and ease of use of a traditional film projector. THX has turned its attention to digital masters because the transfer to digital will be critical to the overall quality of electronic cinema.

THX, UK. Tel: +1 415 492 3900.

HDA has archive transfer

Houpert Digital Audio has developed an automated transfer system, designed to take bulk analogue and other audio archives into a unified digital domain as efficiently as possible. Badged as 'Quadriga - the AudioCube Solution', the system was developed in cooperation with the IRT (Institut fÅr Rundfunktechnik) in Munich. According to the developers, automatic supervision of the source devices is designed to free the operator of the monotony of transfer work. At the same time 'sophisticated digital audio analysis and supervising systems' are used to log any errors which occur. The audio material is then stored in BWF (Broadcast Wave Format) together with associated meta data. HDA says the resultant files are suitable for use in many kinds of archive systems, including robotic, CDR, Exabyte- >

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beyerdynamic MCE 90

Joining the effort to establish electret condenser mics as a professionals' tool, beyer has launched the MVE 90 **Dave Foister** is converted

THERE'S OBVIOUSLY a concerted campaign in motion to raise the profile of the electret microphone, with major players adding one to their portfolios. Not long ago AKG introduced the C4000, and now we have beyerdynamic with the MCE 90. Of course B&K-DPA have been using back electret capsules for years in classic microphones, but the new trend is for large capsules that are indistinguishable to the user from conventional condenser designs, rather than the more specialised small omni diaphragms we've known before. In fact, B&K-DPA aside (and possibly the Tandy-Realistic PZM), electrets have always been seen as the poor man's version of a proper microphone, and it is that image which is now being called into question.

beyer's MCE 90 is very much a new departure for the company. Its whole styling and presentation is new, even down to the way it attaches to a stand. It is a short squat chunky thing, with most of its casing taken up with the windshield basket on top of a connector-carrying base. The supplied kit is simple and effective, incorporating a suspension mount as standard. I rather like the way the mount attaches to the microphone body: there is nothing to clamp or screw down at all to make a very secure mounting. Instead there is a groove running round the middle of the microphone, and sprung tongues on the mount click into the groove when the two are pushed together. The microphone can still be rotated within the mount's ring, and the presentation angle is easily adjusted—for once the swivel has enough friction out of the box to hold the thing in place. There's no screw on it though, so if it should ever start to droop you've had it.

In fact that's it as far as accessories are concerned, with the exception of some universal power supplies and stands: there is no windshield and no stand attachment other than the suspension mount. This means that the whole kit, with no optional extras, comes in one of the increasingly-standard black plastic carrying cases with its built-in handle. This is more than adequate to protect the microphone, which is pretty small and light. At the same time its all-metal construction gives it a reassuringly solid feel so that it should survive what the average studio has to throw at it without too much trouble.

The MCE 90 is a cardioid pure and simple, although it bucks the trend of a lot of microphones I've seen recently by actually having some switches on it. The first is the obvious pad, at a distinctly less obvious 15dB, but the second is less expected still. At first glance it's the ubiquitous low cut switch, rolling off at an unspecified but clearly useful frequency. In fact the cut-off frequency is a little higher than might always be necessary, but the big difference between this and other such switches is that it boosts the treble as well. Again the figures for what it does aren't given, but beyer clearly feels that when the microphone is used close enough to warrant the use of a proximity effect filter, the top should also be boosted 'so that a balanced, brilliant sound is created'.

The combined effect of the two parts of the resulting curve—the extra-cautious low cut and the corresponding high boost—is to give the microphone a very pronounced character when the switch is engaged rather than just the same sound with no rumble. The character is however not unattractive; although the whole thing becomes quite bright, it doesn't in the process acquire the edge that so many bright microphones have. This makes it effectively a microphone with built-in vocal EQ, and quite an appealing one at that. The presence lift and sheen added by the upper end tailoring certainly short-cuts some of the expected processing on the desk.

Without the switch in place the MCE 90 almost goes to the other extreme of being a pleasantly neutral microphone. It is more than adequately quiet and its extended top end, even without the added help, gives a good impression of openness. The bottom end doesn't quite boom and thump like some other microphones but still has plenty to offer, blending well with the upper registers to give a pretty smooth sound. There is an undeniable flattering presence but not so extreme as to limit its usefulness too much. This really isn't what we have come to expect from beyerdynamic. On the one hand it has an excellent reputation for dynamics, including some of the few ribbon designs left on the market: on the other, it offers some very successful high-end condenser models, with a reputation for being a bit different and pushing the boundaries that encompasses the world's first digital microphone, the MCE 100. In between there is very little that has captured the industry's imagination to any great extent, so a good all-round condenser with a little extra to offer would not go amiss. Possibly the MCE 90 is exactly that, and could fill a gap in beyer's perceived range of expertise. ■

Contact

beyerdynamic, Germany.
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Fax: +44 1444 258444.
beyerdynamic, US.
Tel: +1 516 293 3200.
Fax: +1 516 293 3288.

< based schemes. Quadriga supports all commonly used sampling rates up to 96 kHz, with a wordlength of 24-bit, plus ATM, FDDI and Ethernet networks.
Houpert, Germany. Tel: +49 421 201 44 11.

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Intended to give recording studios an economical way to copy CDs, the latest Discmatic multi-drive systems include one which will produce 21 discs per hour. The MDX7000 is based around one read drive and six write drives, while the smaller MDX300 has two write drives but can still produce up to nine discs an hour. Both systems are based on Discmatic's EZ-ONE controller engine and a redesigned SCSI bus for faster transfer. They can also copy directly from CD, eliminated the need to save to hard disk first, or copy to hard disk while duplicating from CD, thereby saving time on subsequent passes. The manufacturer sates that its designs are based on flash ROM, rather than less reliable PC components and OS. The ability to upgrade internal firmware form CD or web site is also said to be a key advantage. The new products are designed to be operated without any special skills and have features to enable correct setting-up without the need

to burn CDs before compatibility has been confirmed. Discmatic plans to offer the option of connecting up to eight MDX7000 and MDX3000 systems via SCSI, enabling as many as 56 discs to be produced at once.
Discmatic, US. Tel: +1 516 864 7900.

Orban upgrades Optimod

New software is available for the Optimod-AM 9200, Optimod-FM 8200 and the Audicy digital audio editor. Version 2.0 software for the Optimod-AM 9200, brings new presets for shortwave broadcasting. These can also be used by AM broadcasters to provide extended coverage to protect the signal in adverse conditions such as low power night time operations. New software for the Optimod-FM 8200 adds an improved PC control interface, allowing fine tuning from anywhere a modem can be used. Version 2.5 software for Audicy extends its networking capabilities by supporting TCP/IP and Novell protocols. This allows the workstation to be used on WANs as well as LANs. It can also embed the necessary traffic and continuity information directly into sound files, so that finished audio products can be sent direct to air.
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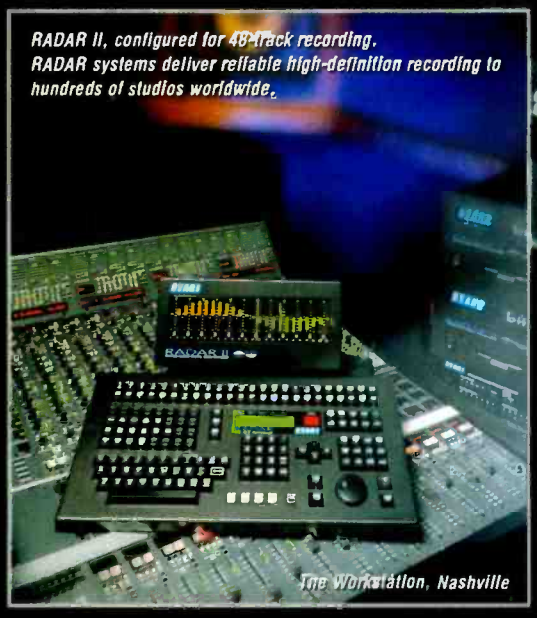

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Todd Rundgren

Media master

Musician, engineer, producer and technologist, Todd Rundgren had traded the limelight of the charts for the sunshine of Hawaii but is enjoying a gentle return to notoriety. **Kevin Hilton** searches out a true star and finds a wizard

A SPECULATIVE CONVERSATION last summer left me with the prospect of securing an interview with Todd Rundgren—if I could get him. That was the point, if I could get him. Musician, producer, songwriter and, now, general multimedia madman, Rundgren had slipped into the background. He no longer had a record deal; he was one of the pioneers of the Internet as a means of record promotion and distribution but his site did not include an email address.

Then his profile started to rise. *Mojo* magazine hailed him as pop's lost genius. Three of his albums featured in a Top 100 poll of alternative works (ignoring the obvious *Sgt Pepper* and *What's Going On*). And then Castle Music issued re-mastered versions of his first five solo albums, accompanied by a double compilation, putting Todd back on record store shelves for the first time in several years.

Perception of him and his work, he says, depends very much on the target audience. 'The population at large, who listen to the radio, may know 'I Saw the Light' and 'Hello, It's Me', but the loyal core fan-base, who've been with me for 20 to 30 years, know the whole repertoire.' He once told another interviewer that he had always hoped for success but never really demanded it. This is pretty much how his career has gone; he is an influential figure (very much a proto-Prince) and successful in his self-made niche. He emphasises that he pays attention to his core fans, not necessarily the public at large: 'The support I've had from the masses has been fleeting.'

He's probably gathering such fair-weather support right now, with the re-release of his first five solo albums. These will be followed by further batches through the year, covering all his Bearsville albums up until the mid-eighties. And he's touring again, although, as if to bolster his eccentric image, if it needed it, it's as part of Ringo Starr's All Starr Band travelling circus.

Born in the Philadelphia suburb of Upper Darby on 22nd June 1948, Rundgren was into R&B and Ventures-style guitar instrumentals but changed direction with the Stateside arrival of the Beatles and the Rolling Stones. Getting his first electric guitar at 17, he played in various local bands before forming his own group, the Nazz. This is the real starting point for both Rundgren's musical career and his development as a producer, engineer and all-round technical smart ass.

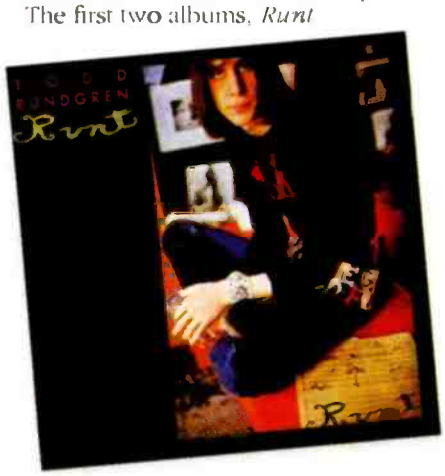
The Nazz were very British in both sound and look. Something else they took from the Beatles was the belief that a producer was as important to the sound and success of an act as the band itself. 'I put great importance on the role of the producer before we [the Nazz] made our first record,' Rundgren says, in a low, relaxed voice. 'We could see that the engineer was important and that the producer was important, even though we didn't know what the guy who produced the first album did.'

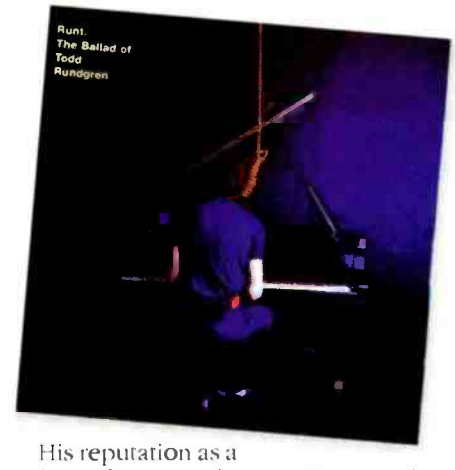
The band was not pleased with this producer, which forced Rundgren behind the console. 'His role seemed far less important and when it came to the mix, nobody was that happy with it,' he recalls. The producer disappeared soon afterwards, leaving Rundgren to finish the project. 'I ended up getting involved in the remix, which required learning about engineering, although I knew about it to a certain extent because I had worked on the demos prior to recording. When it came to the second album, I decided to take over the production, guiding the band through the musical processes and absorbed everything about engineering. I had enough knowledge then to assume the production responsibilities.' >

< Leaving the Nazz in mid-1969 after three albums, Rundgren began his solo career, combining some deeply personal music with technical expertise. The first two albums, *Runt* and *Runt—The Ballad of Todd Rundgren*, were both released in 1971 and were wholly written and produced by Todd, who played the majority of the instruments but with the back-up of rhythm section Hunt and Tony Sales.

As time progressed, Rundgren worked less frequently with other musicians on his solo projects. Three of the four sides of *Something/Anything?* (1972)—still considered his finest work by many—were completely solo affairs, with the crazy, carefully organised aural chaos of *A Wizard, A True Star* (1973) being wholly a one-man effort. 'Once I had a solid musical direction,' he says, 'I was probably making less subtle records because everything was there in musical terms. As time went on, it went the other way and I started looking more in terms of music.'

In 1974 Rundgren released the overlooked *Todd* and the critically savaged *Initiation*. This saw a move towards progressive rock, continued by forming the band, Utopia, that existed independently of his solo projects. Rundgren has described Utopia as more democratic, where he was not the sole songwriter, with five musicians bringing their own ideas and influences.





His reputation as a solo performer and songwriter grew in parallel to his image as a producer-for-hire. Early outside productions are a mixture of the now obscure and the historically important. Rundgren engineered for The Band and the Butterfield Blues Band, going on to produce Beatles alumni Badfinger. They later complained that Rundgren had been 'unbelievably rude' about their writing and playing. In 1973 he received the unprecedented advance of $50,000 to helm Grand Funk Railroad's *We're An American Band*, the same year he produced the debut album by the New York Dolls.

> The independents want music distributed as much as possible—they make more money distributing it rather than keeping track of it

Such credits made Todd Rundgren a steadily in demand producer but in 1977 came the project that would secure his reputation. At the time Rundgren was introduced, through a mutual acquaintance, to Jim Steinman and Meat Loaf, he was not doing that much outside production. He went on to produce, engineer and mix *Bat Out of Hell*, although three tracks were remixed by engineer John Jansen. Todd also played guitar and sang backup; the other musicians were variously members of the E Street Band and Utopia.

The popular misconception is that Steinman produced the record but Rundgren does not appear bothered by this. Evidently Steinman and his singer had definite views about how the album would sound, which explains why, despite being arguably his most famous project as a producer-for-hire, it sounds less like other TR productions. 'It's the most familiar of my works but it's the least characteristic of my sound,' he agrees, modestly giving Jimmy Iovine, one of the four recording >

< engineers on the sessions who also remixed 'Two Out of Three Ain't Bad', much of the credit for how *Bat Out of Hell* sounds.

He characterises his style by saying, 'My approach to sound is that it is in your face; it's very close in, even if it's ambient. I start with the drums, the rhythm and work upwards. I usually avoid anonymous acoustic spaces and I've never been one for gated snare drums or other gratuitous effects.' As polished as his work is, he obviously has a dislike of 'endless mixing', which happened during both the New York Dolls and *Bat Out of Hell* sessions. Chris Anderson, Rundgren's sound engineer since 1977, has said that the mix was always the most stressful part of a Todd production, with the producer banning artists from the studio and presenting the result as a *fait accompli*.

Offers increased in the wake of the Meat Loaf album. Some were logical collaborations (Patti Smith's *Wave*, *Remote Control* by the Tubes and the Tom Robinson Band's second album), others were positively bizarre, notably Shaun Cassidy (younger brother of teen idol David). In 1986 he worked with XTC on *Skylarking*, a universally lauded album, but band leaders Andy Partridge and Colin Moulding have criticised Rundgren ever since it was released.

His own output continued to be prolific, more so considering his contributions to Utopia. But he remained a sideline figure. There is the conspiracy theory that *A Wizard, A True Star* was a concerted effort on Rundgren's part to sabotage his career after *Something/Anything?* showed he could be commercial. It appears that record companies in the seventies may have allowed more adventure but Rundgren is not sure: 'I don't know whether record companies let artists be more experimental, unless it is commercially advantageous. My problem was that I was inconsistent. *Something/Anything?* was popular but there were experimental passages that people chose to overlook. *A Wizard...* completely ignored song structure and it's upsetting to the companies. I never started making records with a big market sensibility.'

The experimentation and introspection continued through the end of the seventies and into the eighties. *Healing* (1981), a soulful cry for humanity made in the wake of a traumatic robbery on his home, relied for the most part on synthesisers, another sign of Rundgren's attempt to bring humanity and technology together. 'The first serious sampler I used was the Fairlight,' he says, 'which was humungous and expensive. Five years later it was better, so I was lucky that I didn't have to pay for it. It had this one-and-a-half foot rack and I felt like a dork using it. With some technologies it pays to wait.'

This is at odds with Rundgren's image as a technologist but it does show that he has a strong pragmatic sense. 'I'm not the first to use anything,' he admits. 'Usually somebody else has done something before I have. For example, I came relatively late to MIDI. My attitude is that the early uses of some technologies didn't sound that good. People get drawn in by the marketing but there are unexpected elements involved in some things and you can spend a lot of time trying to make the technology real >

< and work. I used MIDI on the last full album by *Utopia* and it was the most miserable experience. I had to find my own way into it and decided that the best thing to do was to wait for the technology to mature so that it doesn't draw so much attention to itself.'

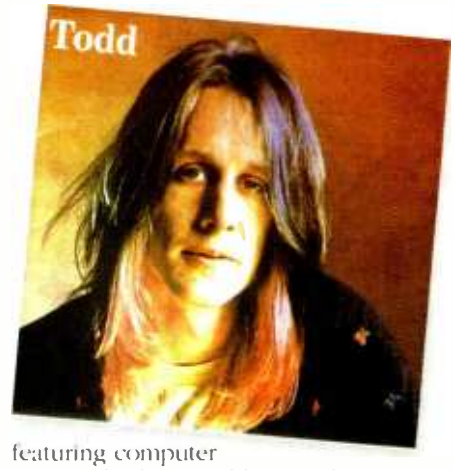
Things have obviously become easier as equipment has improved. 'The recording process has become relatively effortless because of the onward march of technology,' he observes. 'Today, a home studio can sound as good as a real studio. We're going through a period now where some people are coming to work in a real studio after recording their demo and all they're doing is reproducing the demo, which is pointless. A home studio can give enough flexibility; the only thing lacking is having somebody at the console. All my records have been made in home studios, with the exception of *Nearly Human* [a 1989 32-track digital recording of 30 musicians], which was the last that called for me to book studio time.'

In keeping with his pragmatic attitude, it is only now that Rundgren is considering a shift to hard-disk recording. 'It's the next move,' he agrees. 'The technology is far enough along now for me to use it. My aim is to eliminate tape altogether from the process but it is an experiment that is fraught with problems and I expect to encounter them as I go along.'

Explaining that a project has not yet come up where he would use direct to disk, Rundgren adds, 'I'm doing a lot of digital multitrack recording but, then, sometimes, I never live record. There's one song at the moment that is totally on a laptop computer.' Being a multimedia artist, he says, is a way not to focus fully on one thing: 'I've got a kind of short attention span and what I end up doing is multitasking. I've got a network of computers in the studio. I'll probably be working on a program on one, have various songs on another for a sound project and then have data transfer, video and graphics on the third. It's not untypical for me to be even half an hour working on each. And in the midst of that I have to get outside and mow the lawn.'

The mid-eighties onwards saw Utopia on hiatus and Rundgren concentrating on completely, often experimental, solo work. After an acrimonious split from Bearsville, he signed with Warner Brothers, who demanded a commercial album. The result was the acclaimed *Nearly Human*, which he says was a reaction to the implications of technology.

The follow up, *Second Wind*, bombed and Rundgren was without a major deal again. *Up Against It!* was a failed musical based on a Joe Orton screenplay for an unmade Beatles film. He then plunged into multimedia with the first ever all-music interactive CD-ROM, *No World Order* (1993). As TR-i (Todd Rundgren interactive) he toured this collection of techno-rap tirades in a specially designed 'pod', relying on automation for the backing. The follow up was an enhanced CD, *The Individualist* (1995), featuring computer animated videos in addition to the music.



To further draw himself away from the mainstream, he has now decided to do without a record deal and sell his work over the Internet, relying on the >

< devotion of his fans to finance his work. 'The Internet enables people to promote audio that may be geographically appreciated, allowing fans from all around the world to support the record company,' he states. 'In the future, it may not be seen as an industry anymore. There will be more independent entrepreneurs who find people to underwrite the records; the amounts of money that were paid as advances are going to pale in comparison with now. After it's been financed and promoted, the artists-businessmen can give the record to the traditional system and see what they can do with it but I don't think the old structure will be around for much longer.

The record industry is nervous about MP3 audio but Rundgren sees a time when music brokers could operate in the same way as cable TV companies, offering a monthly subscription to a service that provides all listening needs. 'The thing that makes the record industry upset about the independent movement is that is less concerned about copyright. The independents want music distributed as much as possible—they make more money distributing it rather than keeping track of it. The biggest cost in this business is pressing, distributing and marketing the discs. On the Internet, you can duplicate willnilly. MP3 distribution is instantaneous. The opportunity is to globally distribute and promote material without spending a dime. What it will come down to is the quality of the work.'

At present, Internet distribution will keep Todd Rundgren known to a select audience. Even his outside productions have become fewer and less mainstream: in recent years he has worked with The Pursuit of Happiness, Bourgeois Tagg and Jill Sobule. The Castle re-issues may change things to a small degree but Rundgren does not appear too concerned. 'There is interest in me going to Europe and stoking the ashes to see if the embers catch again,' he says, adding that there is also a possible tour based around himself and three other singers.

Surprisingly, Rundgren did not work on the remasters himself, saying that these were done some time ago by Rhino Records, who then had problems with the licensing. 'I don't return to my back catalogue that much anymore. The main reason is because one record is a springboard to the next. Once I've done a record, I listen to it until I'm sick of it. This weeds out the habitual elements and forces me to be original. In doing this I have the choice of either continuing with what I've been doing or taking a different direction. When I came to listen to *No World Order* afterwards, I asked myself whether I could make it more personal. *The Individualist* came next and it is radically different. The concept behind *No World Order* was an elaborate song structure, with eight to ten different passages in the songs. This was the first album where I aggressively incorporated MIDI and I couldn't have done it without. The Individualist is more controlled, with a core sensitivity and classicism.'

Rundgren says that he producing new music all the time; two examples are on his Web site (www.tr-i.com), enticing people to subscribe and support his work. Despite his track record, he continues to a marginal, even bizarre figure, and he will doubtless drop out of sight again. Which is not to say he is idle. As infuriating as Todd Rundgren is, you cannot help admiring him. ■

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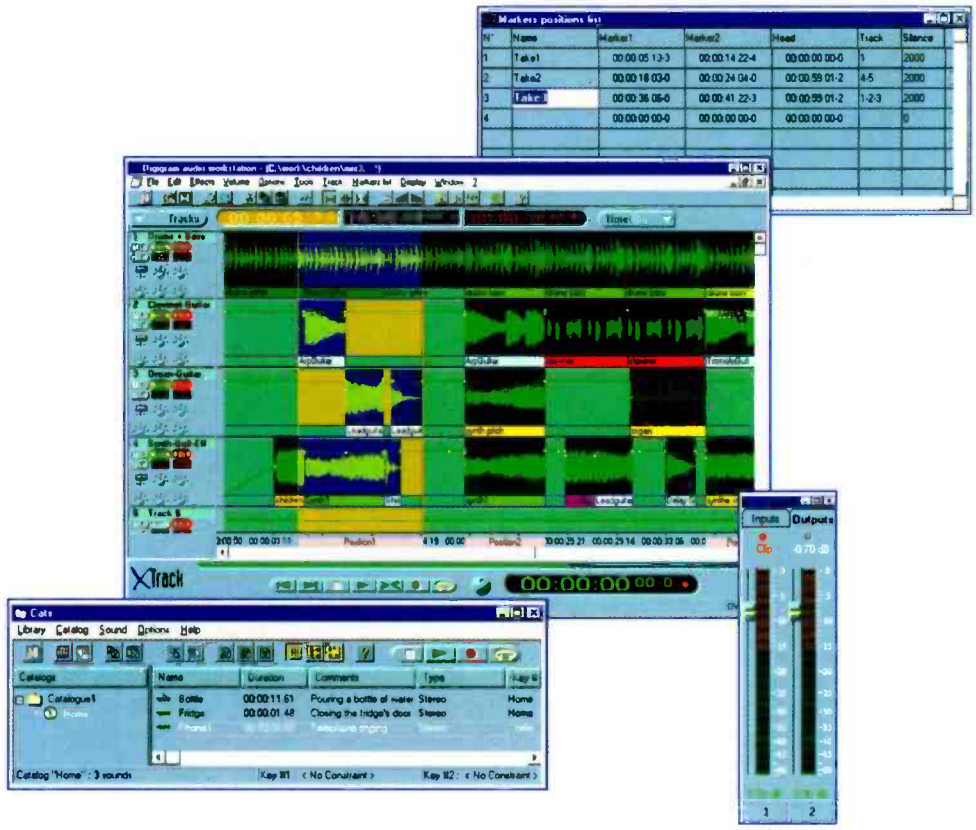

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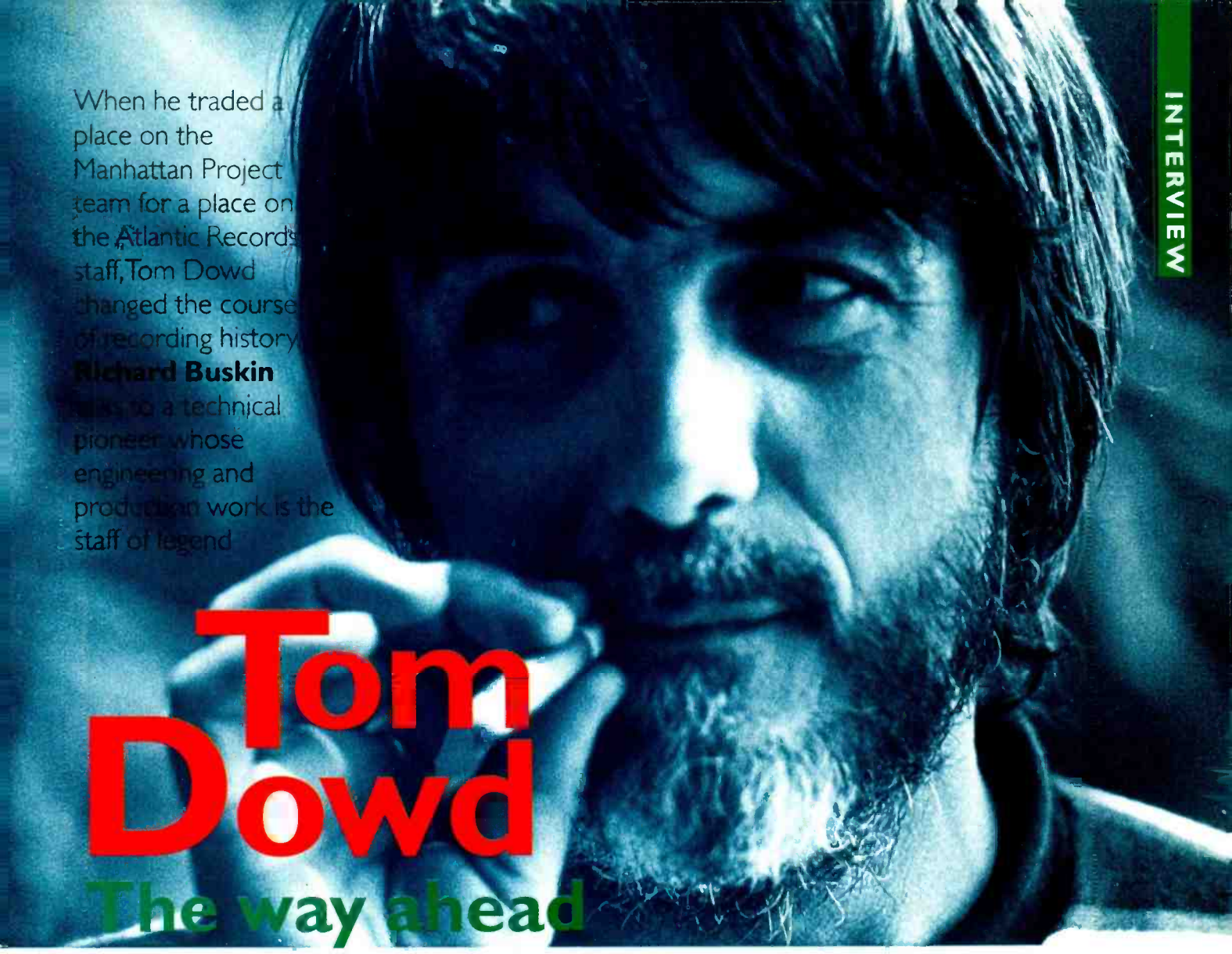
When he traded a place on the Manhattan Project team for a place on the Atlantic Records staff, Tom Dowd changed the course of recording history. **Richard Buskin** talks to a technical pioneer whose engineering and production work is the stuff of legend

Tom Dowd

The way ahead



PHOTOS: REDFERNS

'YOU CAN'T hold artists to the responsibility of being easy to work with,' says Tom Dowd. 'You have to assume—and I am serious when I say this—that all artists have to be unbalanced. You see, at the time of their most creative period their equilibrium is not the same as another human being's.

It can't be, otherwise they wouldn't be creative people, and whatever their motivation is, whether it's duress or stress or what have you, when they are doing what they do they are not like your average person walking down the street.'

Neither, for that matter, is our interviewee. Tom Dowd's in-studio career stretches all the way back to 1947, when he decided to combine his love of music with an expertise in physics and electronics that had been put to good use during four and a half years working on the Manhattan Project. It is a career that has seen him engineer and—or produce acclaimed projects by an all-encompassing array of major artists— Aretha Franklin, Otis Redding, Rod Stewart, Cream, Eric Clapton, The Allman Brothers, ABBA, Meatloaf, Lynyrd Skynyrd, Dr John, Ray Charles, Dizzy Gillespie, Charlie Parker, John Coltrane; the list goes on and on—and it is these credits, together with his pioneering efforts in the field of multitrack recording, that have earned Dowd his position as one of the most important figures in the history of Atlantic Records.

Indeed, it was as a freelance engineer in 1952, only a few years after he had been recording direct to disc, that Tom Dowd began working with stereo. 'I designed and built a console for us that would record either mono or stereo depending upon the artist,' he recalls. 'For singles there was no interest in using stereo, whereas whenever we recorded a jazz artist it would always be "do it 2-track". It may be hard to believe, but we were selling 7½-inch 2-track tapes, because there was a market for the hi-fi enthusiast who could afford that kind of thing and those doggone tapes were selling for, like, $15 or $20.'

When I point out to Dowd that most of the other major record companies and studios didn't even start toying with stereo pop recordings until the late-fifties, his response is 'Oh, by then I was into 8-track.' That's right, 8-track, which wasn't really utilised elsewhere until the late-sixties... 'by when I was into 16-track.' But of course.

'I've heard George Martin relate how in Abbey Road they used to position the musicians around a microphone, and they'd listen to our records and they couldn't figure out how we were getting some of the sounds that we got. They didn't realise that we were putting microphones on every instrument. I mean, we were blowing everybody out of the water. 'Back then everyone was intent on making perfect records. Deutsche Grammophon had the best pressings—"You can't beat them. They're the quietest," and so forth—and the engineers would be saying, "Oh God, the hiss level when you record 8-track is worse than the hiss on the record and we can't stand that," and I used to scratch my head and think, "Anybody who leaves the tracks open and lets the hiss go by is out of his cotton-pickin' goddamn mind!" The engineers were putting down multitrack recording because they were still trying to preserve the integrity when transferring to disc, and I was saying, "Who gives a good God bless?" You know, if this is going to help me make better records then something's got to give!'

While Dowd always had the technical know-how, he was also fortunate to have the backing of those true music >

< aficionados Ahmet and Nesuhi Ertegun and Jerry Wexler at Atlantic, where he joined the staff full-time in 1954.

'For me working on the staff at Atlantic was like culture shock,' he says with tongue in cheek. 'However, I'm not complaining. There could be a day where I would be doing The Coasters at 2 o'clock in the afternoon and Charlie Mingus at midnight. It was like "Hello?" You had to keep your head on straight and remember what you were doing. However, with time always as the main consideration and money as the prime factor, I must say that everyone back then was going by the existing union rules. This amounted to three hours for whatever the union scale was, and four songs or 15 minutes of music, whichever came first. So, if the first composition you did was 15 minutes long and you did it in the first hour, the session was technically over and you had to pay again to do another song. I mean, those were the rules, but the endeavour was to get three if not four songs in three hours, and that didn't vary whether we were doing a 30-piece or 40-piece orchestra or a jazz quartet. That was the way it went.'

It was by the mid-sixties that the old rules and work methods began to disappear forever. Not only did the sessions start taking much longer, but also the in-studio balance of power shifted as youth culture and counter-culture came to the fore and artists exerted greater leverage with regard to their work.

'During the first session I did with Aretha Franklin down at Muscle Shoals in 1967, after completing 'I Never Loved A Man (The Way I Love You)' she walked out and went back to New York and all we had were one and a half sides,' Dowd recalls. 'We never finished the second side 'Do Right Woman—Do Right Man'.'

Not that Aretha was trying to be awkward. 'She was a sweetheart,' asserts Dowd. 'I never had an ounce of protest or any problems out of her. She was a buttercup. The walkout had to do with the climate in Muscle Shoals and the fact that in the Deep South integration wasn't the favourite word. We had all kinds of complications between the white and black musicians, there were one or two drinks, and all of a sudden the fur hit the fan, nobody was talking to one another and it was better to get out than to stay around.

'When I got back to New York, Wex [Jerry Wexler] said, "We don't have anything to put out," and I said, "Wait a minute. Just give me a little time," and I went to the studio that night and managed to hack together a concept on the second song to make it complete. We did the overdubs and stuck that track on the back side of the record, and all of a sudden we had a hit with Aretha Franklin. The problem was we only had a hit single, we didn't have anything else to put out, and, when the single hit, everybody was clamouring for more Aretha. Columbia had made some exquisite records with her but they just weren't in the right market. The company couldn't get arrested, but suddenly everything that Columbia had in the can was selling like crazy and we pulled them out of the red in about 30 days. In the meantime Jerry was saying, "Man, we've got to get those musicians up here. We've got to make an album." So, we flew the musicians in from Muscle Shoals and Memphis and crammed together a recording session, and we made the album *'I Never Loved A Man (The Way I Love You)'* with 'Respect' and 'Dr. Feelgood' and all of those things on it.

'Whenever I recorded Aretha I always tried to get her to sit at the piano and play, because for my money her input was vital. I soon discovered that when she stood up to sing she was a different artist to when she was sitting playing piano and singing. By this I mean dynamically different, and so I was always anxious to make sure that she sat down and did what she was going to do while leaving the dirty work up to me. You know, "Don't worry about it. Just don't wander too far off the mic." My pleasure with Aretha was to capture her. It was a challenge to capture her everytime, because she never sang poorly in her life. Everytime she opened her mouth to sing it was beautiful.

'Aretha would do her homework. She'd record and then we would go our own separate ways for a week, a few days, whatever, and then one day she >

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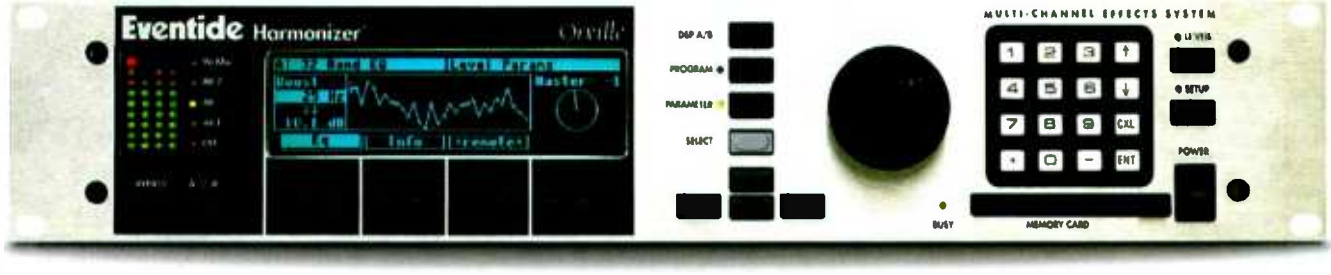

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< might call up and say, "Hey, I want to punch in a line here. I want to change that one line." Well, there have been three artists throughout my life who I've had the pleasure of working with, to who, if they said that they wanted to change a line, I couldn't say, "No"; Ray Charles, Aretha Franklin, Eric Clapton. If they said they wanted to change something it would be a case of "Whatever you say." I'm not going to argue with them, because they're artists. So, if Aretha called and said, "Hey, I want to change..." I'd say, "Fine."

'There we would be, with this exquisite take, and I'd be listening to what she wanted to do and I'd say, "Okay, I can cover that. Don't worry about it, I'll punch it in," but when I punched in and played it back the timing would be wrong. I'd be thinking, "What the hell is wrong? How can this happen?" and then it would dawn on me that the phrasing was different when she was standing up and singing to when she was sitting down and playing and singing at the same time. All of a sudden I wouldn't have the easy job of punching in and out; I'd have to anticipate whether she was going to change the phrasing and whether she'd be moving this way or that way, because the line that she was changing wouldn't fit the line that she originally sang.

'We went through that a couple of times, but Aretha is something special as an artist. I never, never had a problem with that woman. The same thing with Ray [Charles]. I mean, Ray and I joke about it and we talk about it every now and then—Once he found out that I had an 8-track machine [in the late fifties] and he knew what the hell I was doing he'd call up and say, "Hey man, I've got a great idea. I wanna do this, I wanna do that! You got the tracks?" I'd say, "Yeah," he'd show up and within half an hour he'd do three parts. Then he'd say, "All right partner, thank you," and be gone. If you got three other people to do it you'd spend two days trying to get it.'

John Coltrane, on the other hand, was his own worst critic. A tough taskmaster with regard to himself, his preoccupation with realising a specific type of performance often meant that he was oblivious to the magic of what he considered to be a sub-standard take. Tom Dowd recorded the albums *Favorite Things* and *Giant Steps* with Coltrane, and now describes him as 'something else. John was another world, another kind of artist.'

'In those days he never said too much,' Dowd continues. 'He was very serious about his music, and when we were doing a session he would show up an hour or an hour and a half early, and like a classical musician he would go over and stand in the corner and play so that he could hear what he was doing. He'd change reeds and he'd do this and he'd do that, and then he'd find a figure that he wanted to play and he'd find different ways of doing it, and this was all while he was standing in the corner, with not a word out of him. The musicians would be walking in and all of a sudden they'd hear what he was doing and where he was coming from, and so when it was time to start the session their minds were already set. He didn't have to play the song for them four or five times. If they got there on time and they heard him running through the song there were no questions as to how to do it.

'John Coltrane, John Lewis, Eric Clapton; if you watch them play you never see any finger pressure at all. If you observe their technique when they are playing they never press down. John Lewis would never press on a piano key, he'd touch it like a feather, and Coltrane was the same way. When he played there was never any violence or any firm, authoritative squeeze or push. He didn't even blow hard. He was the master of his instrument and he was going to make that instrument talk his way.'

Dowd initially encountered Clapton during the recording of Cream's *Disraeli Gears* album in 1967, a project that called on him to largely serve as an arbiter between the trio of conflicting personalities.

'The first meeting was bizarre,' he recalls. 'Ahmet Ertegun called me up one day and said, "There's this group that I've signed to Atlantic and they're on tour, but they have to be out of the country by Sunday because their visas expire and I promised that I'd record them. See what you can get out of them." I didn't know what he was talking about. I went in my studio one >

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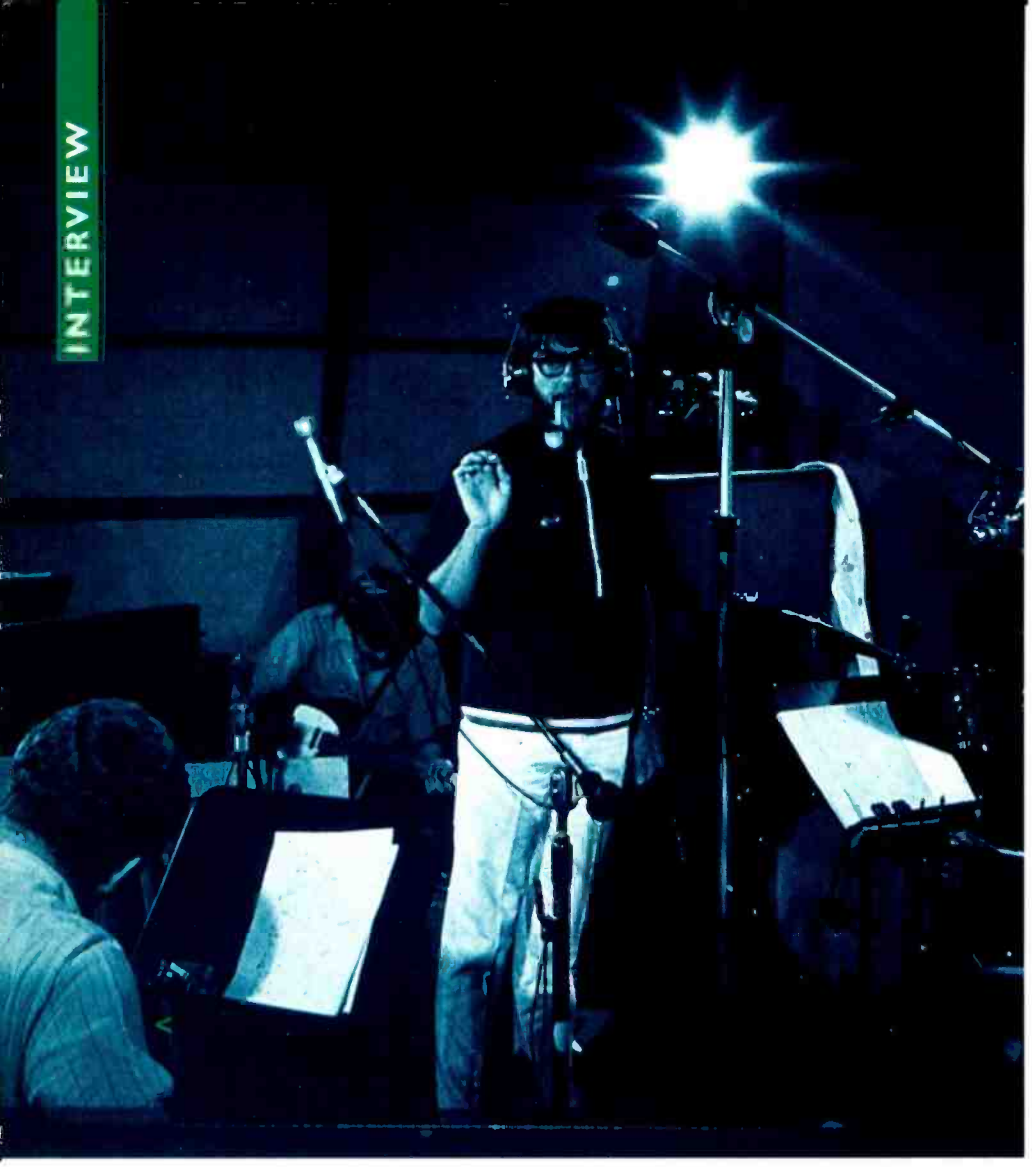


< morning and there was the road crew setting up double stacks of Marshall amps and two bass drums, and I'm thinking, "I've got two drummers? What the hell am I looking at?" Then, when the band arrived and started playing, I was flying around the room trying to set everything up and I was thinking, "Help!"

"We did *Disraeli Gears* in three days. We started on a Thursday, and Sunday at 5 o'clock a chauffeur came into the studio and said, "I'm looking for a group that I've got to take to the airport," and so I looked at the guys and said, "See you later!" The trade rules and the exchange between America and Great Britain in terms of touring musicians was not the way it is now, so they had to leave and, when they left, *Disraeli Gears* was in my lap and I mixed it."

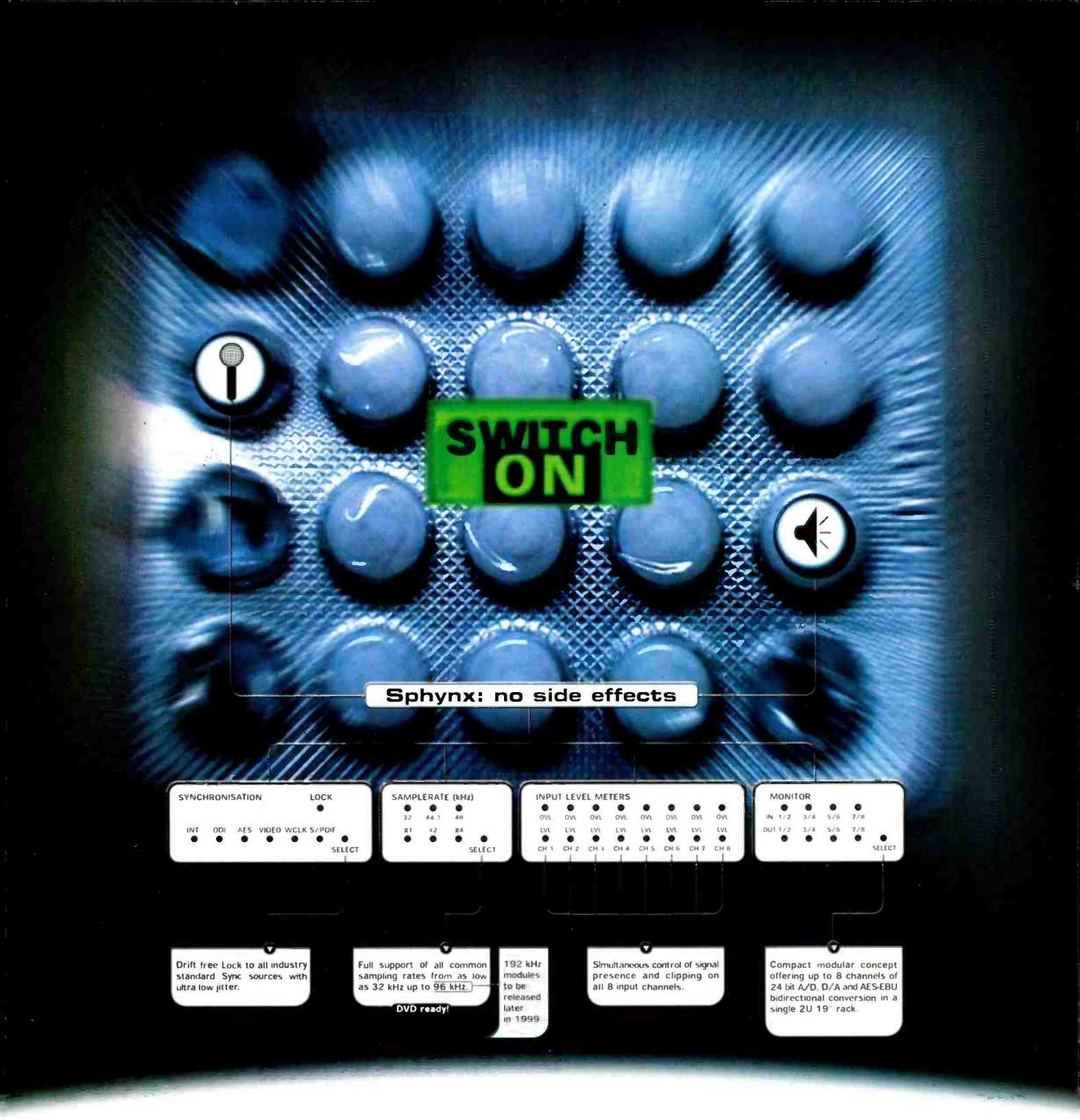
During the late-sixties and early-seventies Tom Dowd was somewhat averse to employing the overdubbing features of multitrack recording. He preferred group musicians to play live together in the studio, and to that end, when embarking on a project with an outfit such as The Allman Brothers, he would visit Macon, Georgia and rehearse them for a couple of days prior to the band going out on the road and performing their set for weeks at a time. Then Duane would telephone Dowd and say, 'Okay, we've got it, we're ready to record.'

'When they came in they couldn't take more than a day or two off the road because that's how they made their livelihood,' Dowd now recalls. 'They would come into the studio and it would be a matter of getting two or three songs done in a couple of days. Everything was done live on the fly, and the only things we would repair would be vocals or solos.'

On the other hand, when Tom Dowd produced Rod Stewart's first two solo albums, *A Night on the Town* and *Atlantic Crossing*, the gravelly-voiced one had just quit The Faces and didn't have his own band, and so Dowd found himself casting the musicians depending upon what songs needed to be done.

'I used studio musicians or we would go to Muscle Shoals, and I was literally acting as a casting director,' he explains. 'You know, "If we're going to do ballads I want this drummer with this bass player and this keyboard man, and if we're going to do hard-drive I need to use..." I continued in this vein after 'Tonight's The Night' became a hit and Rod got ready to go off on tour while we were remixing in England. He was auditioning musicians and asking for my advice as to who would play together best, and although he didn't necessarily agree with me he would listen and ingest what I was saying.

"Well, all of a sudden it was time to make another album. We were talking about the songs and so on, and Rod said, "We're going to use my band." It was like putting handcuffs on me. This is not a criticism, but I had to compromise a lot of the things that I had in mind when I had been casting the musicians myself. Now I couldn't do that anymore. I >



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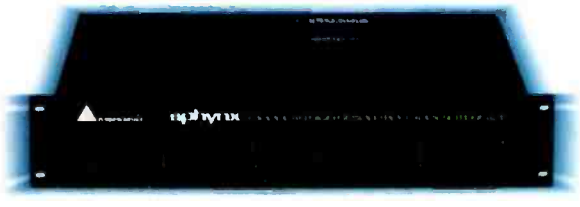

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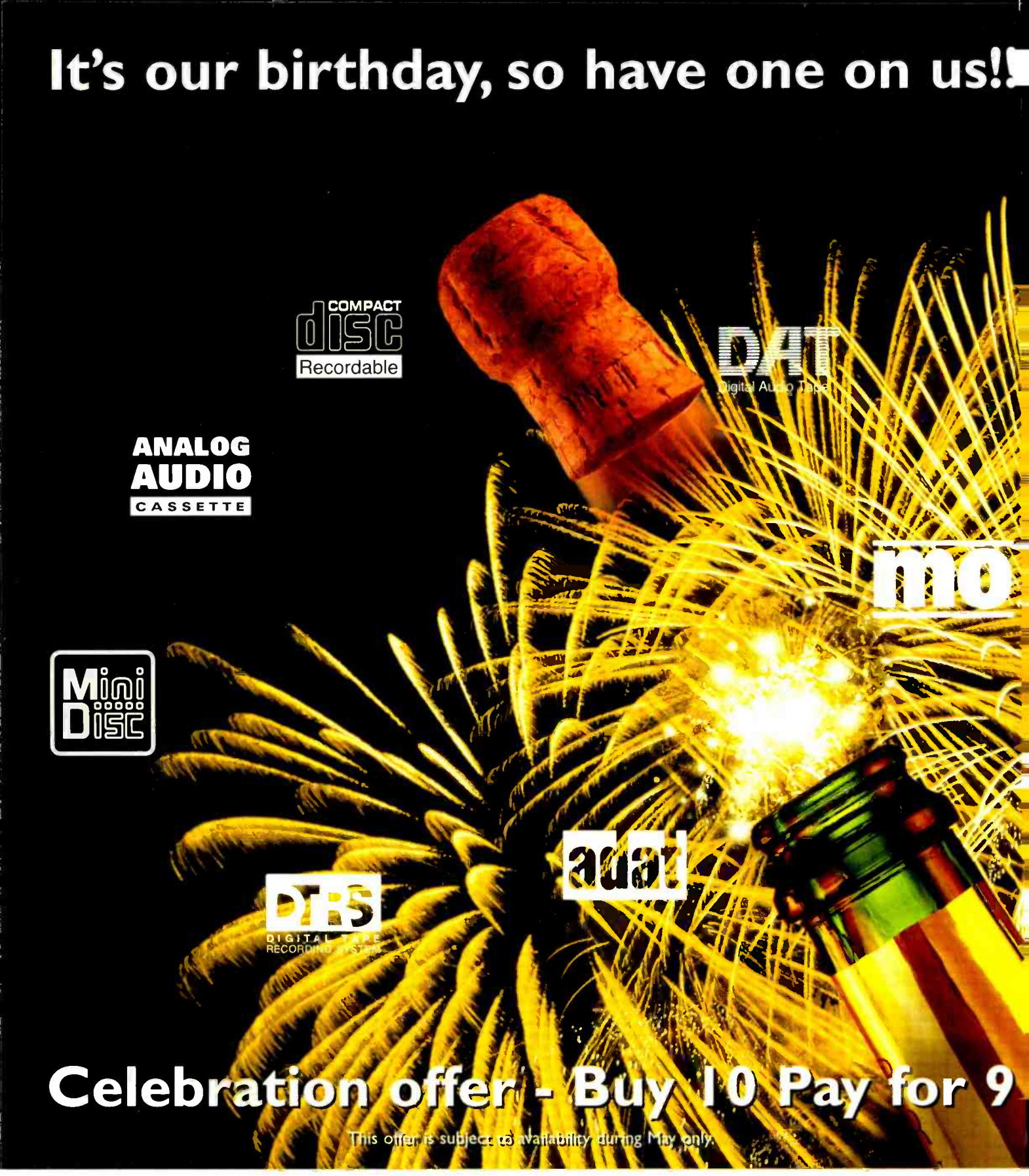

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had to use the guys who he had sworn allegiance to, and this meant that some of the songs couldn't come off as well as similar songs on previous recordings. That's not a criticism, but they couldn't bend enough and there was a limit as to what some of them could do because you can't get hard-drive guys to play soft ballads and you can't get ballad guys to play hard-drive.'

Nevertheless, for the most part Dowd and Stewart got on famously. 'I'd be over at his house at 10 in the morning having tea,' Dowd recalls, 'and Rod would be showing me these records that he had heard the night before or while listening to the car radio. "Who played on this?" "Where does this come from?" He was a student, and a diligent student, and he knew what he wanted.

'For me Rod and Ronnie Van Zant were the perfect illustration of people prepared to sing. Rod would say, "Let's try recording tomorrow," and he wouldn't want anyone in the studio but him and I. Not even the engineer. He'd say, "Play me the song," he'd listen to it once or twice and then he'd say, "Okay, let's try it." He'd sing just a little bit and he'd say, "Let me hear that," and then he might say, "Change the mic," so I'd change the mic and he'd record another few bars, he'd come in and listen to the playback, and then sometimes he would say, "I'm not ready today," and he'd just walk out. He knew when he was in charge of his instrument, and he wasn't going to sing for five hours, sing himself hoarse and not come up with the perfect take. Well, now, I have to respect that. If he doesn't feel like singing I'm not going to argue. I'd rather have the effort even when the voice isn't at its best than the *bel canto* with the unhappy attitude.

'Rod was in charge of Rod and he knew Rod better than anybody else, and Ronnie Van Zant was much the same. Ronnie would be sitting there for days on end watching us make tracks, we'd have two or three songs done and he'd say, "What else do you have to do?" I'd say, "Well, we're going to change the guitar solo here and we're going to do this and that," and he'd just look at me—and sometimes he'd be carrying around a fifth of Jack Daniels—and he'd say, "How long's it gonna take?" I'd say, "I don't know. It depends on what the guys are up to," and he'd just put the cap on the fifth of Jack Daniels and he'd say, "All right, tomorrow at 2 o'clock I'm gonna sing," and he'd walk out the door, leaving the bottle on the end of the console to indicate to me that he wouldn't be having another drink the rest of tonight or tomorrow morning.

'The next day he would come in and, like Rod, he too wouldn't want anyone else around. Okay, fine. I'd say, "I want to try this song," and I'd put the song up and he'd say, "Take this." He would be sitting on a little stool that he enjoyed sitting on when he was singing, he'd sing the song and I would say, "Okay, we can punch in that part..." He'd say, "No, no, no, no, no, no! Let me hear it, let me hear it," and he was just like Rod. He'd sit there and he would listen for two minutes, and he'd say, "I ain't singin' worth a shit!" and walk out the door. Or he would say, "One more take," and he would go in and he would absolutely nail it. Then it was straight on to the next song. He knew when he was capable or not of producing the performance that he wanted.

'Ronnie and Rod were not the kind of vocalists to keep you in the studio for three days and still never give you the good performance. With these guys, when they were singing and they were on, they didn't work more than an hour and a half to two hours and the damned two or three songs were done as well as we'd ever get them done. Then they'd be ready to go home.'

All of which leads Dowd to believe that working with Ronnie and Rod was both productive and gratifying. So why, I ask, when I first mentioned Rod Stewart's name, did Tom Dowd exclaim, 'The crazy man!'

'He was impetuous,' comes the reply. 'He had the patience and the discipline to sit and watch a thing develop, but then all of a sudden he would run out of patience and say, "Let me know when it's ready," and he would just disappear. Then, when he came back he'd say, "That's not what I wanted," and I'd think, "Hey, butthead, if you'd been here and told me I wouldn't have done it." He didn't do that too often, but when he did I'd think, "Help!"' ■

Briefed by Bernardo Bertolucci to turn a grand piano into a major film character, **Maurizio Argentieri** layed siege with a battery of mics and a smattering of ingenuity

MY ADVENTURE began when my phone rang and I was invited to talk to Italian film legend Bernardo Bertolucci about working on his new film. Later, reading through the script of *L'Assedio* (*Besieged*) with the film's producer, Massimo Cortesi, I realised that something special was needed.

The film, from a soundtrack standpoint, offered great freedom and a great challenge. The story, set in Rome, is about Mr Kinsky (a pianist played by David Thewlis) who falls in love with an African woman (Shandurai, played by Thandie Newton) who is living in his household as his 'domestic' while she is studying medicine. The love affair begins through his piano, on which he composes music to accompany her movements, her gestures and his emotions. As a result, Bernardo explained, there are moments in the film where the piano is the main character, and it was important that I find a way to give a kind of character to the sound of the instrument.

A simple recording would obviously not be enough to achieve this. Instead, I reckoned that I would have to create the sensation of someone playing personally to the members of the audience, music that correlated directly with the film's images. In addition to this basic consideration, as the story unfolds, the music is heard from various places in the house. So we will hear the piano in the room where he is playing. Later we will hear the same piece as heard by her in another room or as she passes from room to room as she does the pianist's cleaning.

So, the sound had to be constructed in such a way as to give the audience the sensation that they were hearing the piano from both of their points of view. For the most realistic sound possible, we decided that we had to record the piano in the house in which the film was being shot. The music—composed by Alessio Vlad's, following his score for Franco Zeffirelli's *Tea With Mussolini* (*Studio Sound*, March 1999)—should seem to come from a room in the house, rather than be recreated in a studio, where it might seem sterile and without character.

The location chosen for the film was a magnificent villa at the famous Spanish Steps in Rome. The villa was uninhabited, and, although the walls were thick and able to isolate a large part of the external noise of the city, the villa's great number of windows allowed in pedestrian and traffic noise. Consequently, in order to begin recording the music we had first to acoustically isolate the entire house from the outside world. This was necessary in part for the editing phase of the film, as it would give us the opportunity to choose between various takes, and in part to insure against any unanticipated noise. To isolate the location we constructed a series of panels consisting of wood to support a sandwich consisting of 2mm of lead and a layer of 'polymer', 50mm thick, open-celled, with a great absorption capacity. In the absence of a specialist acoustic constructor, my boom man Vincenzo and I rolled up our sleeves and had fun constructing and mounting these panels on all the windows of the rooms in which the music was to be recorded. We finished the job in just one week with astounding results—the sound of a fly's wings would not be heard from the outside, but the acoustic interior remained unchanged. The only thing left to do was to furnish the rooms exactly as they were to appear in the film. Our set designer did this two weeks before shooting to give us the opportunity to rehearse and then record. At this point, we began working on the sound.

We had to make sure that we had various sound 'points of view' to accompany the changing scenes, giving the editor the greatest number of alternatives to choose from for all situations. We placed the mics in three different locations, giving each piece of music the possibility to be heard naturally as the action moves from room to room.

After that, we reasoned, there wouldn't be much else to do apart from fading from one track to another to accommodate the sound change. In the

sequences where we were to begin to hear the piano from her room, following her passage, uncut, into the room with the piano, we needed enough material to pass dynamically through various listening points. This we could do by fading from one pair of tracks to another, each track being in itself adjustable in terms of electronic processing. To make this as natural as possible, we decided to use the M+S mic technique in order to be able to vary the width of the sound images and the amount of ambience reverberation during mixdown. This was to be fundamental to our efforts to regulate and match the sound with the pictorial image. In the close-up shots, we decided to use the ORTF ophonic technique for its capacity to reconstruct a 'sound scene'. In other words, to make the audience feel as if it is in the room with Mr Kinsky while he is playing, almost able to touch the piano itself.

For recording duties, we used two Nagra digital recorders, giving us the ability to record 8 tracks. For the listening position nearest the piano, we used a pair of B&K microphones in ortophonic configuration with Millennia Media preamps and in this same position, for a fuller more sensual tone we used a pair of Sennheiser MKH-80 with a Manley valve preamplifier. This would give us a choice of sounds that are crystalline, descriptive or softer, sinuous, according to what was deemed necessary. For the second listening point in another room about 6m away, a pair consisting of a Sennheiser MKH-40 and an MKH-30 in M+S configuration were used. This way, during the mix, we were able to regulate the amount of reverberation. The third position was situated in the centre of a circular staircase with a beautifully natural reverberation. Here, again, the Sennheiser MKH-40 and MKH-30 pair were used in M+S configuration. These two pairs of microphones were recorded using the preamplification in the digital Nagra.

The Steinway & Son piano was chosen for us by the film's pianist Stefano Arnaldi. As soon as it was delivered and set up, we realised that being a new piano, it had a grand, arid sound while we were looking for something sweeter and smoother. We were able to accomplish this by a slight adjustment of the principle microphones, experimenting with the piano's lid and

PHOTOGRAPHS COURTESY OF MEDUSA FILMS

Bertolucci's Besieged

Arnaldi's playing technique.

After the recording was complete, we transferred the 8-track master of the four pairs of microphones into a Pro Tools station for editing. From here we mixed the production version of the music track, which consisted of four different listening points that could be used during the editing of the film. After all of this we were finally ready to begin shooting.

As it worked out, our sound editor, Sandro Peticca, had more than enough material to choose from as he worked to match music to image.

The end result of this adventure is notable because, if for no other reason, it gave us the possibility to have done it, and for this I must thank Bernardo Bertolucci. From a recordist's point of view the experience was particularly encouraging because, in spite of the fact that this was our first (and hopefully not our last) collaboration with the film director, he had complete faith in my decisions. He was continually a point of reference for me and was always there if I needed to consult with him, offering comprehensive advise and being respectful of the work of others.

Others fundamental to the project were Mauro Mercuri from Exhibo, the distributor in Italy for Sennheiser, Luigi D'Anzelmo of Nagra Italia, and Augusto Cherubini of Musical Cherubini. Without the exceptional producers and support of these people, none of this would have been possible. ■

Shotgun Marriage

The dedicated 'Shotgun' mic is an ideal tool for location recording.
Neil Hillman weighs up new offerings from Neumann, Sanken, Sennheiser and Pear

WE HAVE OBSERVED that there are amongst our readers a certain type who will only read a review in the following manner: turn page; browse title; peruse picture; scan by-line; glimpse first paragraph; sweep to last paragraph; turn page; move on. Well quite frankly, this is simply not good enough on your part.

[Louise had seen Nigel often enough across their respective desks, but in commodities you let your concentration wander at your peril; they had in fact barely acknowledged each other before now]

So this article will attempt to grab your attention and maintain it in a blatant yet shameless fashion each time you start to feel your eyes glaze. Together, you and I will get through the following 1500 words with ne'er a desire to look elsewhere, even allowing for the sandman sponsored nature of the subject matter.

Location recording of stereo sound in drama or documentaries is widely agreed to be best accomplished by the adoption of M-S encoding techniques where the central image ('M'id) is recorded on one track, whilst the difference ('S'ide) signal is recorded onto a separate track. It is this difference signal that provides the stereo image information, as the M signal can be assumed to be in effect the mono signal. Given that at any subsequent stage the M-S signal may be converted back to conventional LR stereo, this is one of the reasons that M-S working is so much more preferable to dialogue gathered by a spaced pair (AB) or co-incident—near co-incident pair (XY) arrangement—not least of all it offers the advantage of a recordist being able to point straight at the person speaking as they move within the shot. Subjectively, a conventional stereo pair can result in an over-wide sound-stage; an end-fire M-S microphone can produce narrow dialogue from its M element whilst a little width introduced from the S element can convey much more a feeling of space yet still relating to pictures being recorded of the scene; indeed such is the prevalence of M-S recording now that all leading mixer, and some recorder, manufacturers will offer M-S decoding on their location products.

[But this felt different somehow, it had another worldly feel to it. He was clearly vulnerable, she knew she could help and the faint smell of his cologne did little to stem the flushing she started to feel]

In a stereo rifle microphone system, the M element is usually similar to the hyper-cardioid types currently in use by recordists for mono recording; Sennheiser actually offer an arrangement of cardioid and figure-of-eight microphones physically piggy-backed together. They, however, created a 'super-cardioid' for their M microphone offering better rear rejection than other pressure-gradient hyper-cardioids with their inherent sizeable rear pick-up lobes, typically only 6dB down from its front pick-up lobe, and hence compromising the microphones directional capability. The rear rejection of Sennheiser's super-cardioid is almost twice that of a conventional hyper-cardioid. Wind and handling noise are also very real problems presented to velocity-sensitive figure of eight S elements the stuff of headaches to recordists and manufacturers alike, and so mechanical isolation, adequate windshielding and judicious use of LF roll-off is called for.

['Our eyes are mirrors of the soul', she thought and at that moment she was looking deeply to him; as he to her. His jacket came off first, then the tie. Her business suit jacket already lay crumpled on the seat, just the foam shoulder pads jutting, pouting upwards.]

Sennheiser is just one of several manufacturers enjoying success in this particular sector of the location recording market, other notables being Neumann, Sanken and Pearl—all taken out to play and used on a recent social history documentary series cataloguing industrial unrest in Britain during the 1970s; recording M-S stereo actuality, presenter pieces to camera and exterior interviews direct to DigiBetacam.

[The beads of perspiration began to play along the plunging neckline of her silk blouse.]

The Neumann RSM 191 is a short shotgun M-S stereo microphone of two elements, a hyper-cardioid and a figure-of-eight, that operates through its own matrix amplifier box which enables adjustment of the pick-up angle by varying the gain of the S relative to the M in six 3dB steps. The output of the matrix may be either left-right XY or mid-side MS, the signals being converted through transformerless sum and difference circuitry. Designed for fish-pole use as well variable width recordings, such as an overhead for drums, the mic. showed none of the flaws present in its earlier guise as the 190, which suffered badly with handling noise and caused much heartache to boom operators. Unlike the 5-pin convention of the other integral M-S mics, the 191 outputs on a special 7-pin connector to the matrix box and from there out on the familiar 5-pin Cannon connector. The sound is smooth, with a well rounded coverage and good bottom-end response that gives a very full impression of the scene. For over the shoulder location work however, the facilities available on the matrix box are duplicated by most available mixers- losing the extra 400 grammes was welcome.

[At first, her breath just quickened but then short stabbing exhalations left her].

The Sanken CMS 9 MS microphone is not dissimilar to a baby's rattle in looks and a first listen bore this out until loose screws retaining the metal mesh grille were identified. Sanken has adopted an innovative design approach boasting 'Axial Directivity' using a DC-biased push-pull condenser for its M element that while only cardioid, offers a 6dB gain over other cardioid microphones. The microphone outputs its M-S signals through a 5-pin Cannon connector, and handled fish-pole work comfortably. The directivity of the cardioid middle was impressive, but the self-noise of the microphone as a whole became an irritation in anything other than well-modulated signals. >

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< [By now she was sobbing, but gently. 'Please' she moaned; 'Please'.]

Conversely, the Sennheiser arrangement of a super-cardioid MKH-50 coupled with an MKH-30 prove to be an extremely quiet device and during interviews indoors offered the opportunity to allow the ambience of the room to be a positive addition to the overall sound. The 30/50 arrangement is so beautifully matched and the inadequacies of simply adding the figure-of-eight to my beloved MKH 416 was clearly illustrated, even on just this speech-based material; the difference on music would be much more marked. But care must be taken in the fish-pole stakes as handling noise can become evident if movements are taken when not mindful of what is bolted to the end of the pole- two tails exit the suspension for instance, and a certain sense of fragility surrounds the assembly.

[Until finally she was screaming 'Yes, yes, oh yes.]

Much as I liked the Sennheiser though, it did not become the microphone that I reached for first after the first few days of leisurely time-to-craft-the-product filming. As the pace quickened, surprisingly it was the cheapest microphone in the box that came into its own, and the Pearl MS-8 became my favourite. This is just about the shortest and lightest of all the integral M-S shotgun microphones, and appeared to be the most rugged in construction, even allowing for the puzzling red LED that illuminated under the metal grille to indicate that phantom voltage was connected. The stereo imaging was very crisp indeed, which given the generally poor listening environments of television viewers gave a slight edge toward television applications over the perhaps more rounded Sennheiser or Neumann microphones. Handling noise was never a problem and the ease with which it could be stripped from outdoor to indoor use without concerns over re-routing microphone tails made it to be an ideal travelling companion. The only problem I encountered during the whole of the shoot was whilst in the close proximity of a micro-wave transmitter at a car plant, which if I could have been quicker with my mental ASCII, I could have decoded whole packets of data—given it peaked at zero level- and told you precisely how many ragou red Rover 400's with despotic damson interiors had been ordered that morning from Longbridge, the home of the fine British motor car. In the event, and in the purpose of scientific interest, of all of the microphones with me, only my old and trusty 416 could be used.

Progress indeed.

[Finally the last wheel-nut on Nigel's Mazda came loose and the flat could be changed. 'Thank you ever-so, Louise- I was worried I would be late picking Mother up from Bingo. I'm not really what you might call a physical type of man'. His effeminate manner of speaking had come as somewhat of a shock to her.]

And so to the last paragraph. Well done—you made it; and if you have come here straight from the first paragraph, shame on you. Now you will never come to know how it was that I found that the Pearl MS-8 to be a most agreeable bed-fellow. ■

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The Steinberg Saga

From being one of the pioneers of computer sequencing, Steinberg helped define the role of the computer and software in audio production. **Simon Trask** studies the event list

EVEN COMPUTING BEHEMOTHS have to adapt or else face extinction—or worse, irrelevance. However, for small to medium high-tech companies to not only survive but also grow and prosper requires a special willingness to be bold and flexible, pioneering and yet pragmatic. The constantly evolving nature of computer-based recording technology and practice over the past 15 years or so has presented particular challenges in this respect, with companies having to get used to the technological ground constantly shifting, ready to swallow up anyone who stands still for too long.

From the Commodore 64-based Pro 16 MIDI sequencing software through to the latest Cubase VST MIDI + Audio technology for the Mac and PC platforms, music-software house Steinberg has always pushed the envelope of computer-based music technology. Based in Hamburg, Germany, Steinberg Soft- und Hardware GmbH, to give the company its full name, was founded in the Winter of 1984 by Karl Steinberg and Manfred Rurup. The 16-track Pro 16 was a strong start for the company. However, Steinberg and Rurup saw which way the digital wind was blowing and began developing for the Atari ST. Greater processing power, more memory, and built-in MIDI sockets all made the move to the Atari a logical one, but so did the ST's graphical user-interface—Steinberg already having shown with Pro 16 that accessible design was an important consideration for the company.

The resulting 24-track MIDI sequencing software package, Pro 24, propelled Steinberg into the limelight and established it as the leading MIDI sequencing software company in Europe. Pro 24 was the company's core product through the rest of the eighties, though it also continued to push the technological envelope with the introduction of MROS, the first operating system developed for musical applications. Steinberg's next-generation MIDI sequencing software, Cubase, arrived in 1989 and laid the foundations for the company's development path through the nineties to the present day.

However, it was not the Atari ST that was to carry Steinberg forward, nor the more powerful Atari TT and Falcon computers that the company also helped with development. Once again the company made a timely move to another computer platform, in this case the Apple Macintosh, with Cubase for the Mac first appearing in 1990. The switch allowed Steinberg to move forward with integrating not only scoring but also digital audio capabilities into the MIDI sequencing environment, laying the foundations for one of the most significant production technology developments of the nineties. Pragmatism prevailed with the introduction of Cubase for Windows in 1992, and the company has followed a dual-platform path ever since, though it is only latterly that the Windows implementations have been on a par with the Mac versions.

It was with the launch of Cubase VST on the Mac in Spring 1996 (the Windows version followed a year later) that the contemporary era of Steinberg products really began. Cubase VST introduced Virtual Studio Technology, which allowed audio to be digitally recorded, edited and mixed, complete with built-in EQ and effects, within the Cubase environment. The company's eye for accessible graphical interface design was at the fore once again, with VST providing a virtual representation of a familiar mixing console and effects racking studio environment. The ever-growing processing power of desktop computers allowed Steinberg to develop the concept of native (onboard, or host-based) real-time effects processing, integrated into Cubase's virtual mixer environment through the open VST effects plug-in protocol that Steinberg developed.

While Steinberg has long worked with Digidesign to provide support for Digidesign hardware within Cubase >

< for those who can afford it, the significance of VST plug-ins was that Cubase users could utilise effects processing in their mixes without having to invest in expensive DSP-based hardware. Latterly, another open Steinberg protocol, ASIO (Audio Stream Input-Output), has helped spawn a market in relatively inexpensive, but increasingly sophisticated, PCI I-O cards, such as the Korg 1212 I-O, Event Layla, Lucid PCI24, Lexicon Studio, and Sonorus StudI/O. Perhaps most notably, Yamaha's DSP Factory card has provided an affordable combination of I-O and card-based DSP multi-effects processing, allowing Cubase VST to provide a 'best of both worlds' scenario combining on-card DSP and native VST effects.

While the VST plug-ins protocol provides a standardised way for host-based effects to be developed and integrated into the Cubase VST environment (or another environment supporting the VST protocol), ASIO was developed as a superior way for audio hardware and software to communicate, allowing hardware developers to write audio drivers that bypass the suboptimal OS audio handling routines. By opening up these cross-platform protocols to wide use and support through licensing and making SDKs (Software Development Kits) freely available, Steinberg has not only stimulated the plug-in and I-O card markets for computer-based native systems, they have also created protocols that have become *de facto* standards. At last Autumn's AES Convention in San Francisco the company even bowed to requests and opened up the host side of VST and ASIO to developers, enabling other music software programs to host VST plug-ins and ASIO-compatible I-O cards. In the three years since the release of Cubase VST, it has become increasingly apparent that Steinberg will settle for nothing short of an all-in-one recording studio in a computer—and that means not only the capability to record, edit and produce a complete mixdown of audio tracks including effects, but also the ability to integrate virtual synthesisers and drum machines into the environment, controllable by the MIDI sequencing aspect of the software. The ever-greater processing power of desktop computers, once again, coupled with the online sales and distribution power of the Internet, has encouraged the growth of a new market in 'softsynths'—synthesisers implemented in software on desktop computers. And again Steinberg proved itself to be on top of developments when it picked up Swedish company Propellerhead Software's ReBirth RB-338 Roland 303 808 emulator (launched in May 1997) for distribution as part of the Steinberg product range. Propellerhead had developed the ReCycle sample loop editor for Steinberg back in 1994, a program that has been very influential in dance music production, particularly in the development of jungle and drum'n'bass production techniques. ReBirth is similarly attuned to the dance market, providing in one software program faithful software emulations of Roland's TB303, TR808 and (latterly) TR909 classic dance machines. Steinberg knows its market, and historically, going back to the Atari ST days, it has been grounded in the European dance music scene. This perhaps explains one of the more off-the-wall products in Steinberg's product range, the X<>Pose Visual Sampler from Belgian company Arkaos Software, which is distributed by Steinberg. Essentially, X<>Pose allows pictures, video sequences and animations to be played and sequenced via MIDI like samples, complete with visual 'scratching' effects as well as various other visual SFX: as such it is a natural for club visuals. Steinberg seems to have a propensity for taking other products and companies under its wing—a very nineties synergistic approach to business, in which both parties benefit. As well as the tie-ins with Propellerhead and Arkaos, Steinberg has recently begun distributing the Sounds&Cycles series of professional sample and sound libraries from sound developer Sounds Good, and also distributes VST plug-ins from Prosoniq, SPL, Arboretum, Waves, Apogee and Waldorf.

Product integration is further served by the Propellerhead-Steinberg-originated REX file format, which allows ReCycle's grooves and sliced-up loops to be imported into Cubase for further creative use, and the ReWire protocol, which allows ReBirth to operate within the Cubase sequencing and audio recording environment. Introduced by Propellerhead and Steinberg in June 1998, ReWire allows up to 64 channels of audio data to be transferred in real time between different applications running on the same computer (think of it as a virtual multichannel audio cable), ensures sample-accurate sychronisation between applications, and provides common transport control.

Both ReBirth and Cubase VST support ReWire, so Propellerhead's softsynth can be used within the >

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< Cubase VST environment. However, the ReWire protocol has also followed the same pattern as VST and ASIO, with an announcement earlier this year by Steinberg and Propellerhead that they were making ReWire available for other manufacturers to adopt in their products. Through its actions with VST, ASIO and ReWire, then, Steinberg has sought to support and stimulate the broader development of the MIDI + Audio market. VST and ASIO themselves are maturing, with a move to v2.0 for each specification; both versions are the result of consultations between Steinberg and other companies which have adopted the protocols. VST now supports up to 16 parameters per plug-in, adds virtual MIDI In-Out functionality for dynamic parameter control and time-syncing, and allows programmers to develop a software synth or sampler as a plug-in. ASIO 2.0, meanwhile, adds a protocol for sample-accurate syncing (1.0 used only the less precise MIDI time code), allows one program to hand ASIO control to another when they are switched, and implements a new protocol for zero-latency monitoring.

In a development announced earlier this year at the NAMM show, Steinberg, true to its pioneering tradition, became the first company to add Res Rocket Inc's RocketPower functionality to its software (the reader may recall that *Studio Sound* wrote about Res Rocket and its online virtual MIDI studio system back in November 1997). Using the new Rocket Network API (Application Programming Interface) and SDK, other companies can integrate the formerly stand-alone Res Rocket client functionality into their own software. When the RocketNetwork 2.0 client becomes available (by this Summer, according to Res Rocket), software supporting the client functionality will be able to connect on-line to the Rocket Network and allow users to log into virtual studios on the Internet for remote collaboration. Only where the Res Rocket system was formerly MIDI only, the new version will implement transfer of audio data across the network as well, with support for several codecs including the (in)famous MP3 and QDesign's Music Codec. The principle is that musical parts (MIDI and now audio) are transferred across the network between musicians working in the same virtual studio, and played back locally, at the correct song location, in each musician's multitrack client software—such as Cubase VST. Extra-musical communication is by means of a text-based interface built-in into the Rocket client.

Companies will be able to set up their own Rocket Network servers, so, for instance, Cubase users could log into virtual studios hosted by Steinberg at www.cubase.net. The timing is right for this new push for Res Rocket, and the addition of audio functionality, as broadband net access starts to come on-stream this year (*Studio Sound*, March 1999). At the same time, the sophisticated studio environment now offered by Cubase VST, complete with its plug-in effects and virtual synthesiser capability, will allow musicians to work together online at a level not possible with the more basic client setup of the present Res Rocket system—while more musicians than ever are hooked up to the Internet. Whether remote collaboration will take off in the broader musical community is anyone's guess, though for recording professionals the Rocket approach does offer an intriguing alternative to dedicated ISDN links. Steinberg evidently intend to be one of the first, if not the first, to offer it, as yet another level of functionality in Cubase VST.

The Cubase VST range on both Mac and PC has settled into three versions: Cubase VST, Cubase VST Score, and Cubase VST/24. The 'base level' Cubase VST is a fully professional program, supporting up to 64 simultaneous CD-quality audio channels, with four equalisers, four insert effects and eight auxiliary sends available per channel, eight >

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VST Score has the same features as the base VST version, but, as its name suggests, adds professional-level notation, editing and printing capabilities, while the top-of-the-range Cubase VST/24 marks Steinberg's move into 24-bit /96kHz high-resolution audio recording. VST/24, which includes all of VST Score's features, also ups the maximum number of audio channels to 96 and supports additional hardware options. Steinberg has also worked with Digidesign to jointly develop an ASIO driver that allows VST/24 and Pro Tools 24 to work together. The driver, which is available for free download from Steinberg's web site, provides a 24-bit audio recording and editing path between the two programs.

Steinberg also have a budget MIDI + Audio program, Cubasis AV, for musicians who do not need the full power of Cubase VST. In fact, the company divides its product range into two categories, which it labels Beginners and Professionals. Cubase VST is joined in the Professionals category by ReBirth and ReCycle on both platforms, while the PC has the audio editing program WaveLab and the Mac has the dedicated time and pitch correction software TimeBandit. Cubasis AV, meanwhile, is joined in the Beginners category by three 'budget fun' programs for the PC—the B.Box Sample Groove Machine, JamStation, and Tekknotron jamming software—and Clean!, a budget audio restoration and CD burning program.

Steinberg is also developing NUENDO, a high-end audio postproduction workstation for the SGI computer platform. In line with what it sees as a trend in the high-end market towards Windows NT-based workstations, the company has switched NUENDO development to NT from SGI's IRIX operating system, and is concentrating on developing an NT version optimised to run on SGI's computers. NUENDO is scheduled to ship in Autumn 1999. Furthermore, in line with growing interest in the BeOS operating system for music and audio applications, Steinberg has also announced a version of NUENDO for BeOS, scheduled to ship shortly after the SGI/NT version. This will give Steinberg a product spread ranging from budget programs like the aforementioned JamStation, Tekknotron and B.Box all the way up to NUENDO's high-end pro specification.

Back in my early days of writing about music technology, I reviewed both Pro 16 and Pro 24. Seeing Steinberg develop the promise and potential of those programs over the years has always been interesting. Now the company has a vibrant and versatile product range tied together by an underlying logic and clear concept: the creation of a complete MIDI and audio recording studio capable of running on a single computer. Steinberg has grown to a point where it has some 85 employees at its head office in Hamburg, subsidiaries in Bremen, Los Angeles, Paris, Tokyo and Toronto, and a worldwide network of distributors. With developments like the integrated Rocket Network functionality taking Cubase VST onto the Internet, the company continues to innovate and find new angles on the computer studio concept. I expect Steinberg will continue to have its head in the clouds and its feet planted firmly on the ground—while never standing still for long, of course. ■

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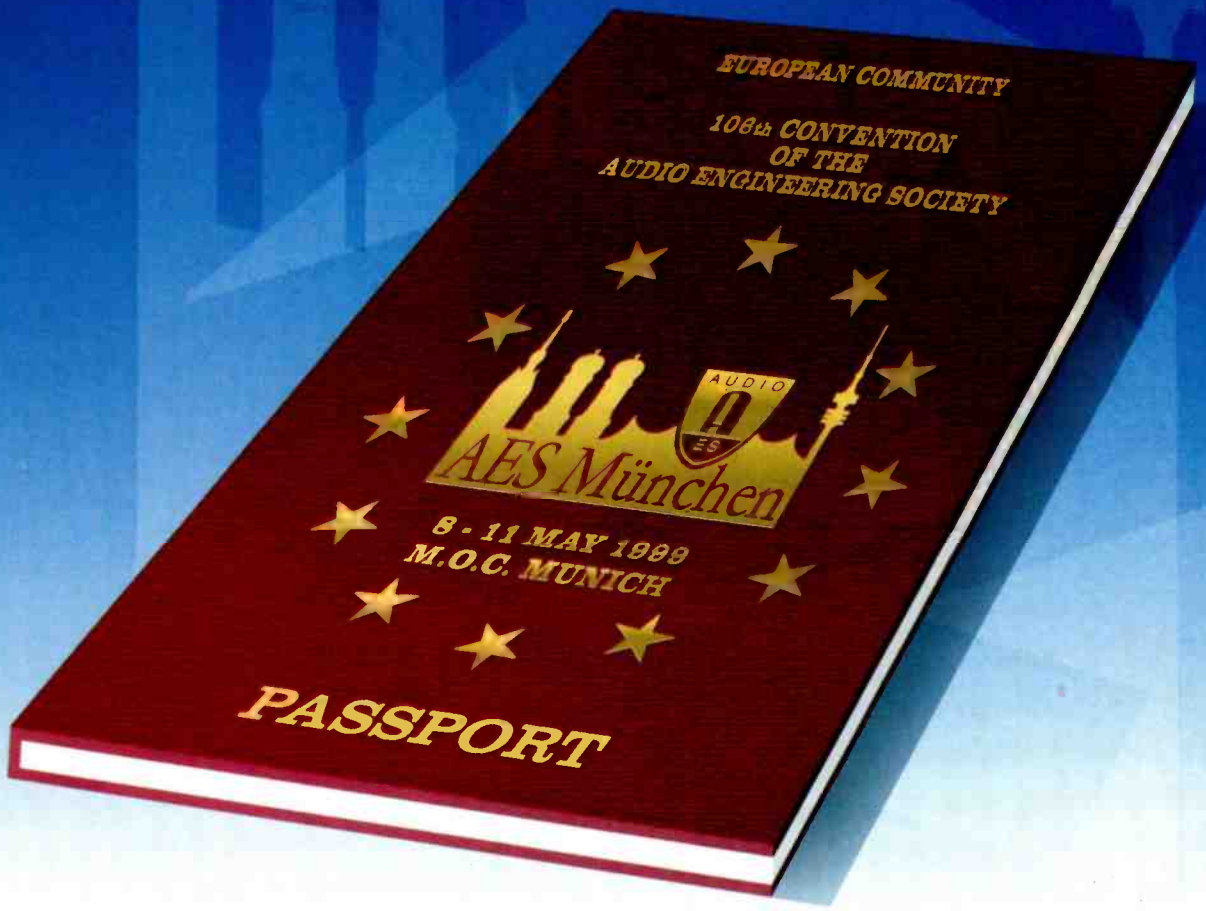

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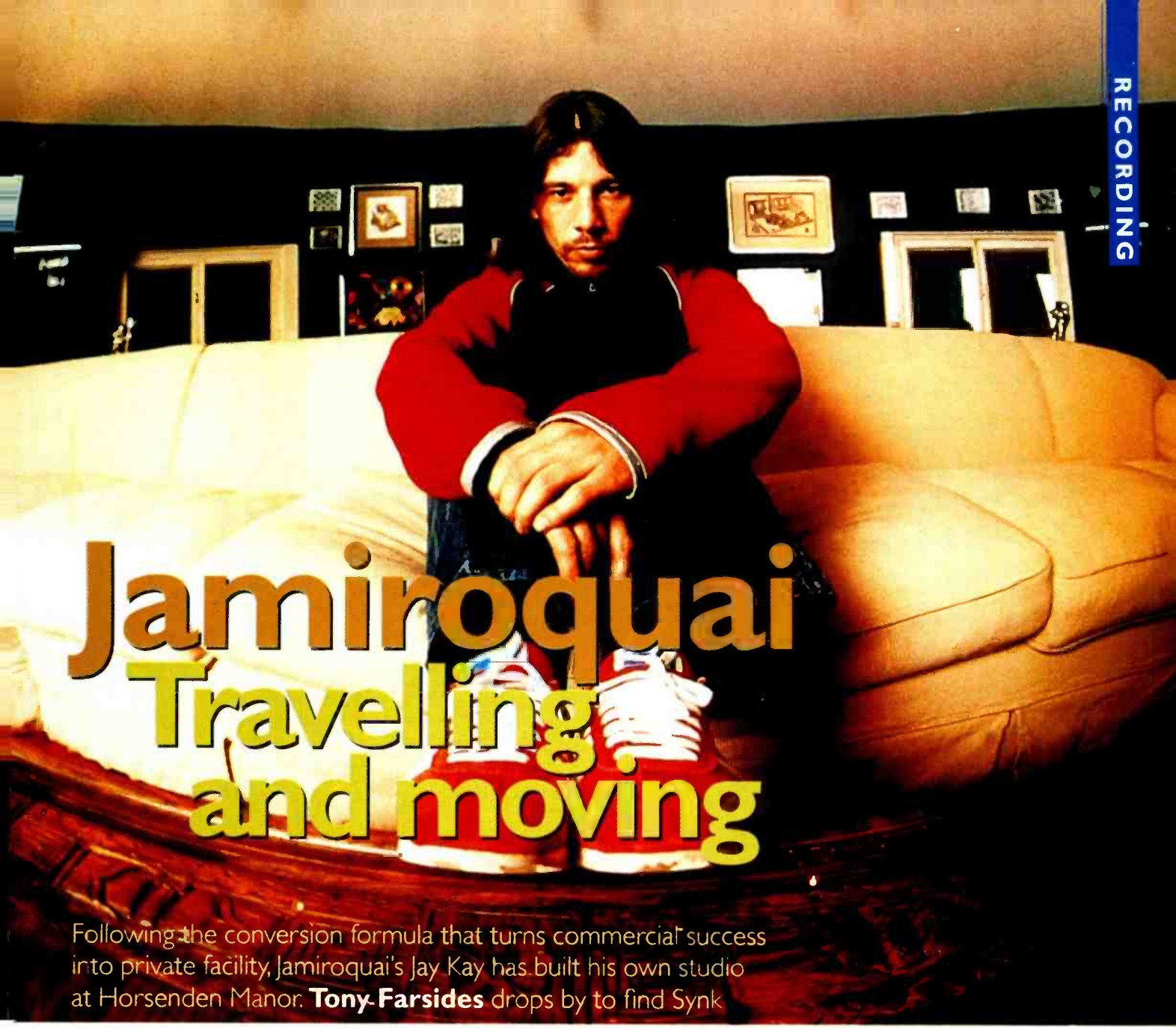

Jamiroquai Travelling and moving

Following the conversion formula that turns commercial success into private facility, Jamiroquai's Jay Kay has built his own studio at Horsenden Manor. **Tony Farsides** drops by to find Synk

MANY COMMERCIAL STUDIOS enjoy luxurious facilities and sensational settings, but few better the view from Jason Kay's newly built Chillington studio. Situated in an old pool house on the grounds of the Jamiroquai singer's Buckinghamshire manor house near Princes Risborough in the English countryside, the windows of the immaculate live room offer a vista from the pages of *Country Life* magazine. A brook running from a lake twists its way across a rolling lawn while in the distance stands the 500 year-old manor house itself. Given the tranquility of the surroundings, its hard to believe that this has been the setting for the most fraught 18 months of Jamiroquai's career as the group fought what often looked to be a doomed battle to finish their fourth album in time for a summer release.

Sitting in the control room, two days after delivering the master tapes for *Synkronized*, the stress of the situation has manifested itself with Kay in a dose of 'flu and almost a palpable sense of weariness. For the singer the stakes are very high—and it shows. Simply put, *Synkronized* could be the most important album of Jamiroquai's career to date and Kay is only half joking when he says, 'If the album doesn't sell all this (indicating the house and studio) will be going back.'

With their last album *Traveling Without Moving* (1996) selling nearly eight million copies as well as winning a Grammy and handful of MTV Awards, Jamiroquai moved into the international superstar bracket alongside the likes of George Michael and Madonna. The success of *Synkronized* will now determine whether the last refugees of the acid jazz era get to stay there. To this end, upon finishing their gruelling 1997 world tour, 1998 was left clear so Kay could spend the first half of the year building the studio before starting work on the new album in July. Things were not to be so simple.

'It was the first time I'd ever been able to stop,' says Kay, 'and I still don't feel I've stopped because all the time I could feel looming in the distance that we were going to have a problem and I was right.' The problem he refers to was the departure of bass player Stuart Zander. After a period of tension the bassist quit of his own accord mid-way through recording in September last year. Kay is diplomatic about the departure saying only, 'It was best Stuart left and did his own thing'. Thus recording stopped for six weeks while a new bass player—Nick Fife—was auditioned and recruited but more importantly all the tracks recorded which featured Zander's playing were dumped to avoid any possibility of future complications. As a result the group were left with little over four months in an untried studio to record and mix this crucial album, often writing new material on the spot.

Rather than being overwhelmed by stress, Kay says it galvanised him. 'I absolutely thrive on it and I know now for sure. It's a great learning curve >

process about yourself. And if you look back over the years it's always been that way with me.'

A key ally during this time was the album's co-producer Al Stone. Serving his apprenticeship at Town House Studio, West London, Stone made his name as a producer on The Stereo MCs' *Connected* and Bjork's *Debut*. The producer's relationship with Jamiroquai goes back to the group's second album *Return of the Space Cowboy* where he was brought into help with overdubs before going on to produce the group's third album *Traveling Without Moving*. 'This time round there's been a lot of time with me and Al there on our own,' he says.

According to the singer there was a certain amount of pressure on him to use a new producer. 'A lot of people said, "Why not use somebody else", and I thought, "No". The geezer helped us do eight million albums last time so you can't go wrong. So we sat down and had a serious talk about how we were going to do this album and he's done a fantastic job.' One thing that was decided by both from the start was that everything from recording right through to overdubs and mixing was going to be done at Chillington.

For Kay having his own studio has been a goal since early in his career and Chillington is very much a studio with a quintessential English country house and garden attached rather than the other way around—in a similar vein to Great Linford Manor where Jamiroquai found their feet. As Kay says, 'I bought this house for the sole purpose of finding somewhere to work. If it hadn't had the building for the studio, forget it.'

Stone says he greatly admired Kay's decision to build the studio. 'So it was important for me to show Jay that it could work on any level. Because there were a few raised eyebrows at the record company like, "You're going to mix the album there as well?" But I think the studio's proved itself. It's a studio that I'd love to use for everything.'

Indeed for Kay the finished product is very much a testament to the studio. 'Remember a lot of people build a studio and it sounds fucking awful. It's alright if you're covering everything up with guitar but if you're a band like us and you've got a lot of bits bobs going on the sound of the studio is crucial.'

The studio also compelled Kay to take more of a role in the production process than on the previous albums. 'I put a lot more thought into it than I usually do because I didn't want people to think he's got his own studio and look at that pile of shit he's put out.' The studio itself was built for Kay by Al Smart of Smart Research who has a longstanding relationship with the group. Central to the whole operation is an SSL SL4056E with G+ computer.

Kay was originally intending to buy a Neve for its warmth but was eventually advised against much to the relief of Stone—an unreconstructed SSL fan who worked on them throughout nine years at Town House. 'I just love them,' he admits. 'It's the best desk on the planet. Ergonomically it's the dog kahunas. I can be quick on one of them and when you're working with Mr Kay you've got to be quick.'

For preproduction duties, meanwhile, one of the rooms in the manor house houses Apple Macs running Logic Audio and two 16-channel Mackie desks.

When recording finally started in earnest in November, the first things laid down were the basic rhythm tracks and band parts. Since forming in 1992 the band have developed into one of the UK's most most musically sophisticated outfits drawing complements from the likes of Quincy Jones and Maurice Starr of Earth Wind and Fire for the playing. The level they've achieved is demonstrated by the latest single, 'Canned Heat, Where Do We Go From Here' with its breakneck Latin breakdowns and the beautiful twists and turns of the mid-tempo 'Butterfly'. Such is the group's cohesion that—according to Stone—the recording process itself takes hardly any time at all.

'The cutting happens very quickly,' he confirms, 'because they are such competent players. Individually they're all brilliant but when you put them together they're on fire. You could get a group of the best session players together but they still wouldn't have what they've got.'

The basic tracks are recorded live with the group all playing. 'That's why it's important that Jay put a good size live area in Chillington. They're a band and have to be set up like a band.'

The band also usually avoid recording to a click track wherever possible. 'It's funny, you give over the tapes to a remixer and they're horrified because there's no click. But the thing is with a drummer like Derrick Mackenzie he is a click. You go again and he'll be dead on it every time,' says Stone.

Musically Jamiroquai have moved towards a more layered, harder edged sound with last summer's number one from the *Godzilla* soundtrack Deeper Underground laying the ground work for the sound of the *Synkronized* album. 'What we have on this album is a fusion of two elements—the edge from the Godzilla vibe and the boogie factor, as Jay calls it, which the band have built from the first album onwards,' says Stone.

A key element in the group's current sound is the doubling up of bass lines with keyboard player Toby Smith using and array of keyboards, including Mini-moog Moog Source, Clavinet and in particular Novation's Super Nova. Another feature of the new album is >

< a harder edged drum sound. Describing the change in Jamiroquai's sound himself Kay says, 'I wanted a harder thing. Because to be fair some of the older tracks they're not me. 'Virtual Insanity' for example is a nice track and all that but it's not what I'd get down to. It's a nice song but I'm sick of being nice. Let's have a bit of nastiness in there.'

The most extreme example of this is a track entitled 'Supersonic' that showcases the band's longstanding digeridoo player Wallis Buchanan. The track which features Kay playing the bass line almost wanders over into trance house territory and Kay himself envisages it getting played at the summer's festivals. 'Supersonic' will be remixed by The Prodigy's Liam Howlett.

Previously being very vocal in his dislike of the remix phenomenon Kay's attitude has mellowed over time. 'I was against remixes,' Kay says. 'But that's because I always said the older stuff wasn't remixable whereas a track like Supersonic is. A lot of the tracks are specifically designed to avoid the problem of remixers having to deal with two different speeds for the verses and chorus. We've really paid a lot off attention to keeping things simple for that purpose.'

The album also debuts a new vocal sound with Kay finally laying to rest the trusty Shure SM58 with which he recorded his vocals on previous albums. 'I'm from the school of plug it in and let me sing. The last album they were all done on an SM58. I like to move about and I need something to hold, otherwise I find it hard to get the vibe. This time it's all done on a proper mic,' he says.

On this point, it was at Stone's prompting that on this album an AKG C12 was used. 'On the last album I'd just pump the track really loud through monitors and he'd sing along on an SM58 actually in the control room. I'd get so many complaints from remixers about the whole track bleeding onto the vocal track. The thing I didn't like is that you wouldn't be getting all the tones. This time everything—including guides—were recorded on the C12. Sonically he's also a lot more to the fore on this album than he's been in the past.'

The album also features more sound processing than before with Kay allowing Stone his head. 'The first three albums were very dry and almost two dimensional. I'd switch a reverb on in the past and Jay would walk in and go, 'That's great but can you take off the reverb.' So it was a case of let me show you and again it falls back to that thing of trust. I said forget the dry close thing. You've got to use the studio,' says Stone. The outboard gear used on the album included two plate reverbs that Kay had installed as well as an EMI and a Lexicon 480.

> The woman I bought the house from had the world's worst taste in decor and one of the rooms had this horrible padded wallpaper

The manor house itself was also brought into use as Kay explains, 'The woman I bought the house from had the world's worst taste in decor and one of the rooms had this horrible padded wallpaper with flowers all over it. I walked in there and I thought what an excellent drum room.'

The room was thus put into service with the help of a close circuit link up to record the drums on one of the album's best tracks and one of the finest the group have so far produced, the bitter sweet 'King for a Day'.

That track also features another Jamiroquai secret weapon Eddie the Piano. 'That's the Jamiroquai piano'. It's this. I think Technics, keyboard that Jay owns that's got weighted keys and two or three piano sounds and some strings. We used it on 'Virtual Insanity' just to lay the part down and then went to all these studios to get a 'proper' piano sound. We tried out Steinways, Bosendorfers everything but nothing sounded as good. So Eddie The Piano stayed and now is on 'King for a Day'.'

With the new album finished, Kay is already turning his thoughts to the next one. 'This album's still a tester. The next one I think will be utterly superb,' he enthuses. 'I now know the studio does the job.'

For the time being, the group have a UK tour starting in June with a world tour following into 2000. However when Jamiroquai do return Kay will finally be able to realise his dream.

'This is the last time I'll have to do ten tracks all at once. Now I'll be able to come back do things in my own time, learn the desk and get to make a career out of it. That's all I've ever wanted,' he says. Then he will be finally travelling without moving. ■

Lou Gonzalez from New York's Quad Recording and Mega's Thierry Rogan

Mega Studios

With a Parisian ambience and a newly-installed SSL Axiom-MT, Mega Studios is high on the 'A' list of European music studios. **George Shilling** takes French lessons

FRENCH RECORDING STUDIOS have a distinct flavour all of their own. It is difficult to pinpoint exactly why this is so—perhaps it is their style, with warm atmospheres and low lights. Mega Studios certainly includes these attributes, being an extremely modern and stylish complex, with studio design by California-based studio bau:ton and construction by Oakwood Building Services. Mega is located right on the edge of the Bois de Boulogne in Suresnes, Paris. This is a quiet residential area, although it is a mere ten minutes drive from the Champs Elysées and the Eiffel Tower.

Compared to British studios, it would seem that the French are braver when it comes to upgrading to cutting-edge technology. Paris's Guillaume Tell was the first studio in the world to install SSL's current flagship analogue desk, the SL9000j. Now Mega Studios, in addition to two 9000j-equipped studios, has installed one of the first three Axiom MT desks in the world. If you aren't aware, this is the new all-singing and all-dancing all-digital SSL music production desk, with a control surface and computer that will look familiar to users of the 9000j.

Studio A hosts the larger of the two 9000s. The huge 180m^2 recording room is modern and spacious, with attractive architectural features and natural daylight. A large drum booth adjoins, and there is also a small vocal booth. The most striking feature of the control room, apart from the 80-channel desk, is the unusual monitoring system. Designed in-house, this system features 6-channel TAD Pioneer speakers, powered by Bryston and McIntosh amplifiers, with the unusual arrangement of multiple subwoofers above the horns. During my brief (stereo) audition of the system, I was impressed by the lack of a specific sweet-spot: the tonal balance seemed to vary remarkably little around what is a huge control room. LPS amplifiers drive surround speakers, and full 5.1-channel surround monitoring is available. The desk includes the (still relatively rare) SSL DiskTrack (48 track at 16-bit or 24-bit), while DASH (16-bit and 24-bit), ProDigi and 2-inch analogue multitrack machines are also available, stationed in the large machine room. SSL's VisionTrack is also present, with 1 hour direct-to-disk picture capability. The conveniently located outboard rack is brimming with desirable toys ranging from a bank of Tube Tech EQs, mic preamps and limiters, to Neve 1073s, Telefunken LA2As, and API EQs and mic preamps. The top of the rack provides a convenient surface for clients' own or hired equipment. A range of synthesisers and samplers, and a Pro Tools 4 system are available for hire in-house.

Studio B is the Axiom MT room. This includes a much smaller studio room, compared to Studio A, more suited to mixing than large-scale recording. DiskTrack (up to 24 bits, 48 track) and VisionTrack (with 2 hours' capability) are provided, as is 5.1 surround monitoring, enabling sound-to-picture work to be easily set-up. A 24-bit 48-track Sony DASH machine is also available. The desk is surprisingly small physically, but with the Axiom MT, the number of 'actual' channels is double the number of channel strips: 96 channels are included in this desk. Although narrow, the control room is quite deep so there is plenty of space for clients to relax and discuss the mix at the rear of the room.

Finally, Studio C features the smaller 9000j. This is a 48-channel board, which was formerly located in the room that now houses the Axiom MT. No DiskTrack or surround monitoring is included here as the studio is intended for conventional stereo music tracking and mixing. Again, 48-track 24-bit DASH and analogue 2-inch recorders are provided.

The Mega complex is an impressively modern recording venue in all respects, aimed at clients who demand the best. The serious investment undertaken by owner-engineer Thierry Rogen enables all types of work to be undertaken, from acoustic recording to sync-to-picture. For all its modernity, there is a warm, friendly feel to the rooms, with a central kitchen provided to enable a break from work for clients. Meals are available, and there is even a Turkish bath and sauna to unwind in after a hard day slaving over a hot mixing desk. ■

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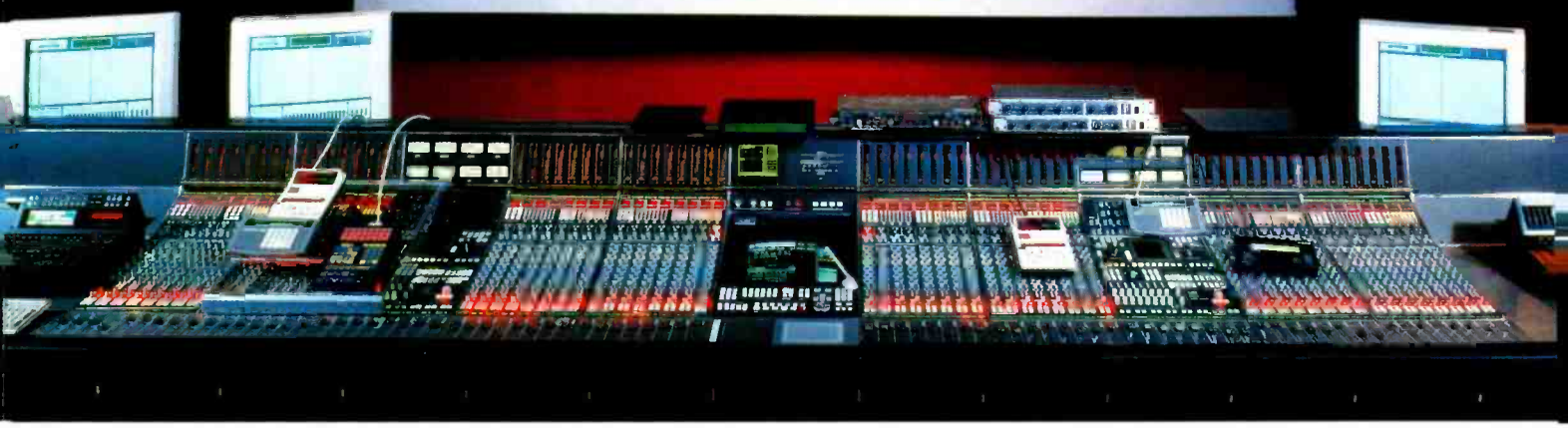


A study in how corporate and technical culture affects audio postproduction brings **Dan Daley** over to France's SIS Studios and back to old values

PASS THROUGH THE HALLS of most postproduction facilities and it is easy to get the impression that this is a universal environment. Maybe the pictures on the wall are different, and there are various aesthetics in the interior design. But the technology engines are pretty much the same—virtually all-digital now, and with somewhere between three and six speakers placed in a suite. Allow for some differing brand names on the equipment, and different people in the family pictures that mixers and engineers put on the consoles to remind them that somewhere out there they actually have a life, and overall you have a rather uniform set of facilities throughout the industry, right?

Look a bit deeper and you'll find that there are some significant cultural differences between regions in the world of audio postproduction. In France, the film industry has a long legacy that runs from Le Freres Luminere to Jean-Luc Goddard and which is growing partly due to subsidisation from the government Ministry of Culture, which provides some protection against the Blitzkrieg of Hollywood, and partly from an increasingly global film market that Hollywood still seeks to control. The culture of audio post here is undergoing a revamp that illustrates how different the fish in other fish bowls can be. Much of this comes out in the course of long and smoke-filled conversation with Jean-Robert Gibard, managing director of Societe Industrielle de Sonorisaton (SIS), in the company's recently redecorated restaurant lounge in its headquarters in La Garenne Columbes, a suburb north-west of Paris.

Comparing the way Hollywood film audio post works, Gibard states the difference starkly. In Hollywood, film sound mixers and editors are almost always employees of the facilities in which they work. More to the point, the best ones are courted vigorously with offers of high salaries and other perks, up to and including the occasional really, really nice car. In Hollywood, like in advertising audio (and the two are increasingly related), the client follows the mixer, and the facility builds itself technologically and operationally around him or her. 'Not so in France,' says Gibard. 'Here, almost all mixers and sound editors are freelance. And that is a major thing that affects the way the entire industry here operates and what it can achieve.'

Gibard notes that, among other things, film sound editors tend to own their own equipment. Generally this is what is most affordable—hard disk-based systems such as Digidesign Pro Tools and, for the somewhat more affluent, Sonic Solutions workstations. But a considerable amount of French film audio post work is done on systems that are now commonly sold in music stores in the US and the UK. That's not to say that the systems aren't capable, but it does make the technology base of the entire French post business somewhat less consistent than in Hollywood or Soho. (What is consistent in the business in Paris is the pervasiveness of the Akai DDR1500 hard-disk recorder, which has become the country's *de facto* standard platform.)

'What we have is a wide range in the levels of technology between companies and even within companies,' says Gibard. 'Some editors are coming in with things like Mackie 8-bus mixers into facilities that already have SSL consoles. When everyone is freelance, you can't get a high degree of consistency of technology in your studio, and that can make the studio less efficient and productive.'

SIS is part of France's long cinematic history. While it has undergone several corporate twists and turns over the last

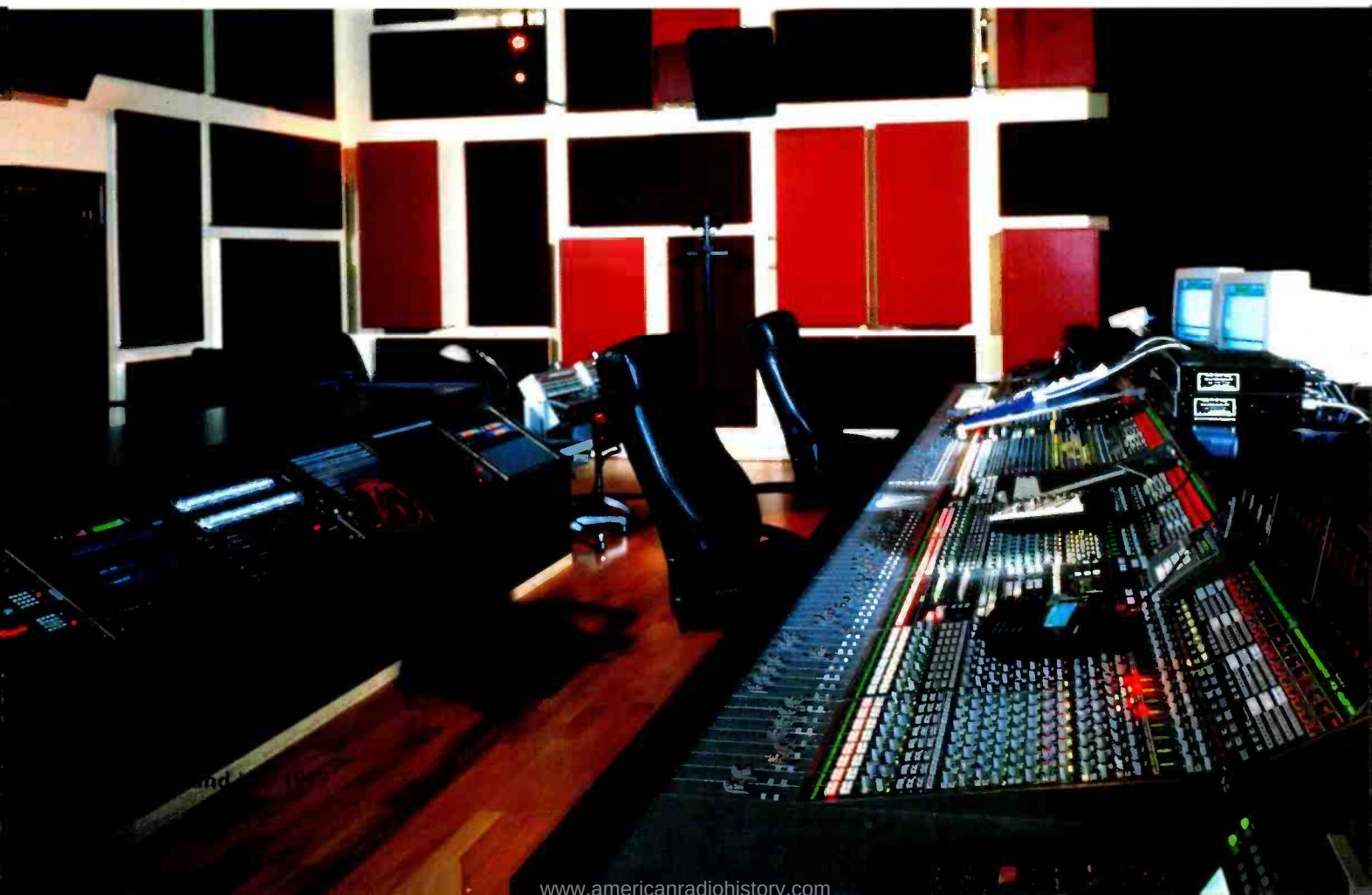
seven decades, the company was founded in 1948 as a division of a larger French film operation that dates back a decade earlier. Hollywood had established a pronounced hegemony over the worldwide film industry even then, but the French film business was still major player until World War II intervened. The film industry in post-war France took on a decidedly different character. While the country produced several notable auteurs such as Goddard and Francois Truffaut, as the movie business became more competitive in the 1960s—part of the cinema's counter attack against the incursion of television—France's film business took on the cast that characterises it today. Gibard describes it as one in which, 'producers are basically accountants. They don't have the same kind of creative latitude that producers do in Hollywood. They don't make big deals; they count the francs. The director of photography is usually a representative of the production company. At one time, the film editor was also responsible for the film audio.'

Part of the reason that this system has developed is the cyclical nature of the entertainment business in general, making it hard for production and postproduction facilities to carry the salaries of mixers and editors during lean times. But it was the reaction of French cinematic service providers that set the tone for the culture today: layoffs were real and numerous over the last several decades in the Paris movie business, and Gibard says that meant that loyalties and relationships between individuals and companies never had the chance to develop. Thus, the freelancer looks out for himself, preferring the uncertainties of self-employment to the uncertainties of being on someone's staff.

And this is what Gibard and SIS are trying to change. He says that fully half of the company's sound editors are now on staff, and hopes to continue increasing that percentage. In order to attract top-flight mixers and sound editors, the company has taken action on several fronts. Aesthetically, SIS looks like one of its Hollywood counterparts, with muted, business-like interior decoration and a bright and inviting restaurant-bar, while most of the major suites have their own lounges. Technologically, SIS has been updating its facilities; a 64-fader SSL Avant digital system was installed last September, and three of its four mixing stages are now equipped with SSL consoles, including a 72-input SSL SL5000-series desk. One stage is still fitted with a classic Quad 8 console, though that is slated for replacement soon. SIS technical director Christophe Rajon says that the Quad 8's equalisation will be put into racks for outboard use. The studios' acoustic design is equally classic, with the large rolled sound diffusers still found in older audio facilities, and will likely be retained, although they are in the process of modernisation. Transfer rooms now have 5.1 capability, and while some of the many mag machines in the studio will be kept on for transfer purposes, the trend at SIS is decidedly digital in terms of formats. While nonlinear storage revolves around the basic formats in Paris—the Akai and Digidesign Pro Tools with a smattering of Avids—there is ample linear digital media, mainly in the form of the Sony PCM 3324 and 3348 digital multitracks, which Rajon prefers as an archive format, as well. (Dolby SR is still a popular format for analogue recordings and will be available for the foreseeable future, too.) A Yamaha 02R suite is also in place with the mixer used to reduce multichannel audio from films to stereo and surround formats for television broadcast, part of a broadening of services that is part of SIS' strategy for the future, which also includes the formation, last November, of the SIS Repiguages division, what Rajon calls 'an old word for a new service'—film transfer.

> Jean-Robert Gibard: 'Producers are basically accountants. They don't have the creative latitude that producers do in Hollywood. They don't make big deals; they count francs. The director of photography is usually a representative of the production company'

But it is the basic business of post that is experiencing change on a fundamental level at SIS. 'We are taking more responsibility on a management level for how our business develops,' says Gibard forthrightly. 'No more >



passing the buck, no more bureaucracy. If a client has a problem on a Sunday, then we are here on a Sunday to help him.'

In fact, Gibard is representative of a growing segment of the future of the post industry. A former auditor at the French subsidiary of global accounting firm Ernst & Young, SIS is Gibard's first job in the film industry. Interspersing his conversation about postproduction with terms like 'proactive', 'vertical integration' and 'yield management' that would sound appropriate in any corporate marketing seminar, Gibard says he approaches post as he would any other service-orientated business. Some of the technical responses to changing the facility's corporate culture include new high-speed data transmission systems for audio, and having an SSL training technician on site at the facility, helping the stream of freelancers that pass through with the ins and outs of the Avant and the other SSL consoles. 'We're changing our perspective regarding who supplies our equipment from looking at them as vendors to seeing them as resources,' says Gibard. 'And SSL have been very good in that regard.' On the business side, SIS has revamped its rate structure, making it more reflective of service actually rendered. 'Before, things were more like a flat rate for everything,' he says. 'Now, we charge based on which services we have provided on various projects.' And services are increasing in large and small ways, from new technologies to keeping an English-speaking receptionist on duty until 11pm on weeknights—about when Hollywood heads home on the other side of the globe.

> 'We are taking more responsibility on a management level for how out business develops,' says Gibard. 'If a client has a problem on a Sunday, then we are here on a Sunday to help him'

On the long-range side, Gibard is building bridges with Hollywood, the behemoth he acknowledges will remain the 600lb gorilla of the film business for the foreseeable future. As blockbusters become ever more expensive to produce—the average Hollywood film now costs about $70m, including marketing costs, according to a pre-Academy Awards analysis on the UK's Sky TV—even Hollywood is looking for capital partners to share the risks. Major studios are now co-venturing among themselves on such pictures as *Titanic*, but the French are getting into the act, such as the French funding for the special effects-laden Bruce Willis vehicle *Fifth Element*, directed French filmmaker Luc Besson. Gibard is making trips to Hollywood four or five times a year now, promoting SIS' capabilities as a partner in post and as a versioning facility for Hollywood films into French. At the moment, 90% of SIS' work still originates in France.

'But two years ago it was 100%,' Gibard says optimistically. In addition, now fully 40% of the processing work done by sister company Film Lab (both are owned by French corporation LTC, as well as a video lab and telecine operations, and the former Studios de Billancourt, that merged with SIS before closing two years ago) is for foreign clients, up from 5% a couple of year ago.

All this has cost money; Gibard estimates that he will spend another FF30m ($5m) in addition to the FF40 million SIS has already expended on new technology and other infrastructure. It's worth it, though, he states, pointing out that SIS increased its overall sales an estimated 25% in the last year. 'The whole postproduction and entertainment business is changing,' says Gibard. 'We have to change ourselves in order to be part of it on a worldwide basis.' ■

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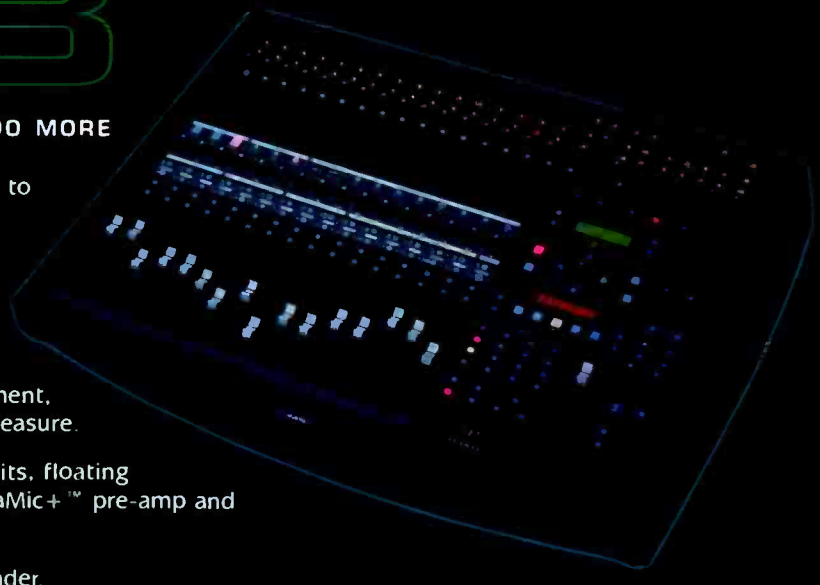

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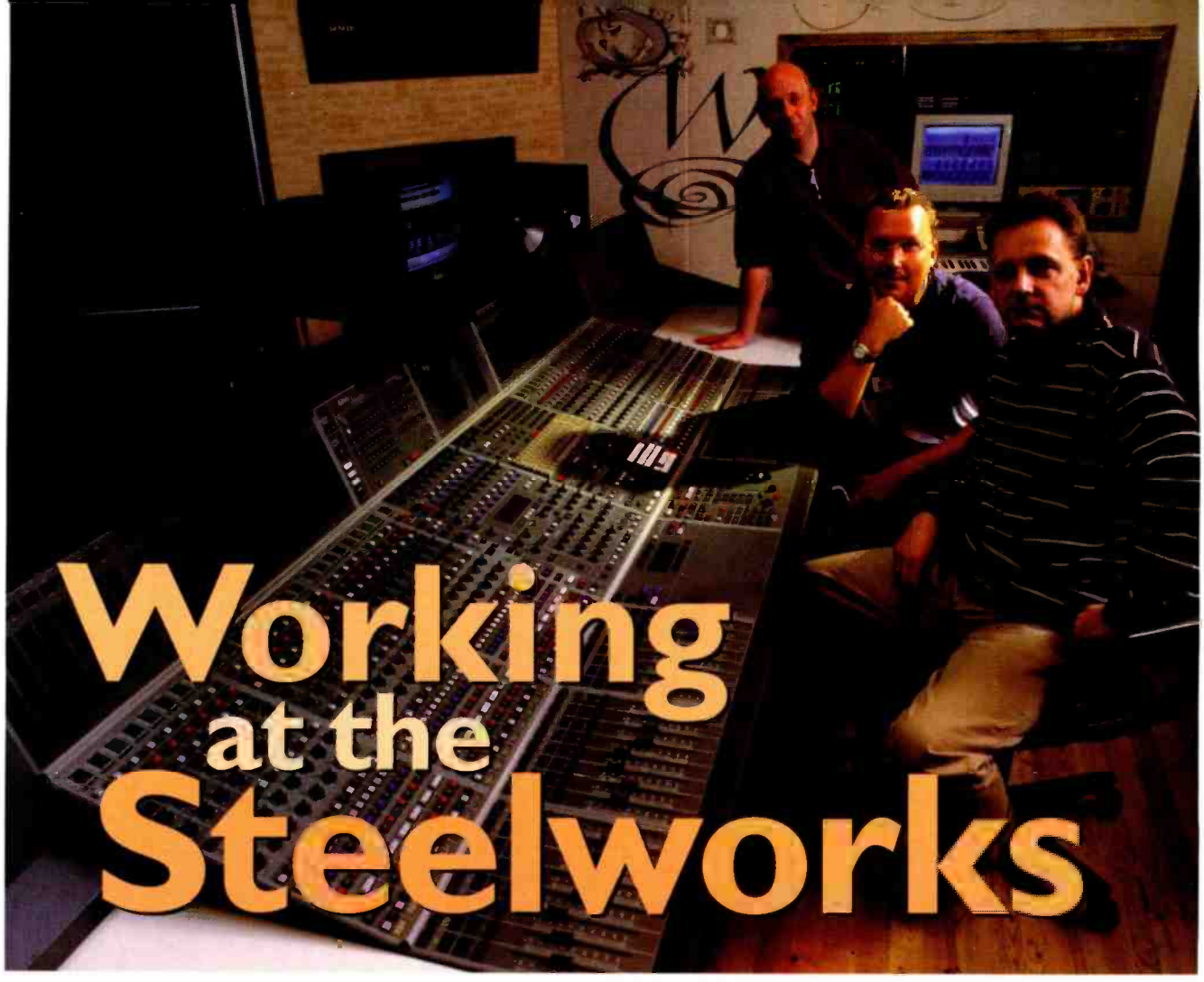

Working at the Steelworks

The latest and most ambitious incarnation of a northern studio site, Steelworks is set to play a significant part in British pop music. **Caroline Moss** checks the foundry proof

IT IS RARE in any profession to find three people whose partnership is based on the knowledge that they can work autonomously, then merge their individual efforts into a complete work that everyone is happy with. Steelworks is one of these rare entities. And since the production trio built a dedicated facility at the former Fon Studios in Sheffield last year, then upgraded to an AMS Neve Capricorn console with conversion from ADAT to Pro Tools as the sole recording medium, this process has become even smoother.

Steelworks consists of Mike Percy, Tim Lever and Eliot Kennedy. Percy and Lever were in bands together throughout the eighties before setting up as a production duo. Percy explains. 'We got tired of making one album a year just for us, we wanted to make more tracks and get into production, so we got a little studio setup in the house, then progressed to a bigger building in the garden.' Most of their output was pop-based, and work immediately took off with acts like Danni and Kylie Minogue, the Pasadenas, Kenny Thomas, Kim Wilde and, more recently, Peter Andre and Take That. 'We've always done what we call kids' pop,' says Lever. 'As a band we worked down at PWL in the days when it was at the Marquee, and came right through that school, that's where we learned. We left the band to become a production team, bought a studio package from HHB, and straight away it started happening.'

After several years of working at their house in Beaconsfield, the duo began collaborating on the odd project with Eliot Kennedy, a young songwriter based in Sheffield.

'We were working with an act called Higher Ground for Cooltempo and all these demos started coming through from Sheffield,' recalls Lever. 'We thought the tracks were really good; the act consisted of two girls, plus a bloke who used to sit at the back saying nothing, but we thought he was responsible for writing these great demos. Then we found out it wasn't him, it was this guy called Eliot.'

Kennedy was duly hooked up with Lever and Percy's manager and things moved up a gear or two, resulting in his first No.1, Take That's 'Everything Changes'. At around the same time another act was waiting in the wings to take the world by storm, and the tale of how Kennedy hooked up with them has passed into pop folklore.

'Five's manager Chris Herbert wanted me to work with a girl called Maria Rowe,' Kennedy relates. 'It didn't really interest me, but I asked him if he managed anyone else, and he said, yeah these five girls, and I'll let you work with them if you work with Maria Rowe. That was the payoff.' At the time the five girls were known simply as Spice. A few days later Kennedy was working in a studio in Sheffield when he got a call from Fon to say there were two girls looking for him. 'It was Mel B and Gerry, and they said, "We need to talk to you, we've got a problem."' he continues. 'They'd driven to Sheffield and looked up some studios in the phone book and called around until they found me, because they wanted to work with me. And I thought that was great, they were really together and knew exactly what they wanted. The next day we went to the bus station to meet Emma, Mel C and Victoria and the first song we did was a track that ended up on the first album called 'Love Thing'.

'When the five of them got together I could see that they were fantastic. They all had their individual images and attitudes and that hasn't changed. And it worked out brilliantly, we wrote more and more songs, one of them turned out to be "Say You'll Be There", and another was "Step To It" which was used on the Pepsi commercial. Everything we did during that time ended >

< up being used somewhere.'

The sessions took place in Kennedy's home studio, a small ADAT facility that started in a back bedroom before growing into a 24-track studio with his dining room commandeered as a vocal booth.

Also around this time was the first major collaboration for the trio as Steelworks, an unsigned act called 911, which they worked between Sheffield and London, with Kennedy starting things off before sending it down south for mixing on Lever and Percy's Amek Mozart console. 'Even though I'd had a No.1 with Take That, I didn't feel I could confess to being a record producer. I just didn't have the confidence at that time,' admits Kennedy. 'So when I began work on 911 I rang Tim and Mike and we ended up doing it between our two houses. We both worked on ADAT and fortunately my old oil-powered software could convert to their top-of-the-range Mac stuff. They had two hits, the album was signed to Virgin and we got some cash for it.' With songwriter Kennedy completing the circle, Steelworks took off as a team and began getting offered pretty much every new act that came along. Then came an event that changed their lives. While working at Fon, Kennedy heard the landlord was about to reclaim the premises because so much back rent was owed.

'Someone told me if we were interested we could have the studio. Straight away I said, "We'll have it", without talking to these two, who had families, houses and a studio in Beaconsfield.

That afternoon I told Tim who went back down to talk to Mike and within 24 hours they were moving up.'

Acoustician Nick Whittaker tested the studio design and advised that nothing should be altered. The Mozart was moved up from Beaconsfield, new Genelec 1039A main monitoring installed and two new production suites plus vocal studio constructed where the old Fon cutting room, demo studio and lounge had been.

A main core of gear inhabits each of the three rooms—Pro Tools Mix Plus running on Apple Mac G3 computers and Akai S5000 samplers. Lever has a

Soundcraft Ghost console in his studio, while Kennedy has two Soundcraft Spirit 328s. 'I love them, they do the job perfectly and give me the flexibility I need,' he attests. All three studios are linked to two live rooms, the original Fon studio plus a smaller vocal area in Kennedy's studio.

And the work has continued to flow. Among acts Steelworks has worked with since the move are Bryan Adams, Spice Girls, Five, Take That, Celine Dion, Mel C, Ultra and former Spice Girl manager Simon Fuller's new act S Club. The team attribute their strength to being able to work different acts alongside each other. 'We're able to do things like Bryan Adams alongside the Spice Girls and S Club, or Rosie Ley Dayton, which is a folky, quite obscure, but wonderful project,' explains Kennedy. 'From a songwriting point of view we can change to different styles and that gives us all a buzz.'

A new factor that is helping with this process is Steelworks' latest acquisition—the AMS Neve Capricorn console. Lever takes up the story. 'We started looking for a big analogue desk, then I persuaded the others to look at digital. In the end we went to Abbey Road and tried the Capricorn and were shocked at how good it was, the sound is brilliant. We wanted a desk that would give us the flexibility of a digital console while maintaining a clean, punchy sound. Initially we were attracted by the knob-per-function approach because it was familiar, but what we found in practice was that the Capricorn surface, which was specifically designed to access all the added functionality of digital, was quicker to learn and easier to use.'

Adds Percy, 'What we found with some of the newer digital desks was we were told if we wanted something it would be coming with next software update. The Capricorn's had all the software updates it can have, although they are tweaking it a bit all the time.'

'We had the same experience with Neve that Pete Waterman reports on buying his Libra,' continues Lever. 'They told us exactly what it would cost for everything we needed to do, rather than finding out the cost of the desk would double by the time we bought all the racks and accessories we needed. They were very straight talking and came up with the desk we wanted.' Percy, who occupies the Capricorn room, testifies to the flexibility the new console has granted him. 'You'd finish a track on the Mozart and it'd take an age to recall it then you'd be waiting for it to be okayed. With this you finish the track and move straight onto the next thing. I can swap and change as I like. Quite often we're doing *three* projects at the same time.'

Adds Lever, 'The other beauty is, say you're doing four tracks for an A&R man, you can mix them all, send him a tape, he can decide what he wants changed then you can mix them all on the day he comes up.'

Among acts Steelworks has worked with since the move are Bryan Adams, Spice Girls, Five, Take That, Celine Dion, Mel C, Ultra and former Spice Girl manager Simon Fuller's new act S Club

On purchasing the console, Steelworks took another major decision: to ditch their trusty ADATs in favour of Pro Tools. 'They've been a real eye-opener for us,' says Lever. 'One of the reasons we went down this route was to liberate ourselves from recording things on the loop and that sort of thing.'

'What I found was that when we used ADAT, Tim would tend to put music all the way through, just in case,' says Percy. 'Now you tend to find a lot less going on so Tim can do more arranging if he wants, but we can always change it again later.'

The new desk has also changed the studio's outboard setup, a liberating process because, being a non-commercial studio, Steelworks is under no pressure to stock outboard just because a client may one day want to use it.

'One of the things we discovered when we were trying the desk out is that digital reverb sounds amazing connected to it, because you don't get any image blur,' says Lever. 'So we made a conscious decision to blow out a lot of our old reverbs which we loved and replace then with digital stuff. For example we had tc M5000s which was easy because we just replaced them with digital ones. And we ended up getting rid of a lot of gates and things because there's so much quality gating and compression on the desk. It's the same with the plug-ins —the Pro Tools plug-ins are stunning.' Outboard equipment to remain includes dbx 160A, Urei 1176, Focusrite Red 3, Drawmer 1960 and TLA EQ2 units. >

< A typical Steelworks project will start with a backing track dumped onto Pro Tools, then put through to either Kennedy, Lever or both. Kennedy will start with backing vocals or arrangements, with his Avalon mic preamp going straight into Pro Tools. Lever will put guitar and keyboard parts to the same song, and at some point they will update each other to get a more complete version of the song.

'It's just dragging *stuff* around really,' says Lever, somewhat modestly. 'It's an evolving thing. Quite often with production teams there's one of them just twiddling their thumbs; this way we can all be solidly at it. It's a great feeling knowing that the vocals are getting done while I'm working on the track.'

Adds Kennedy: 'It comes down to trust as well, that's the rare thing. Some production teams need to be in the same room together and correct each other all the time. It doesn't happen often that you can separate three people at the beginning of the day, then meet for lunch to discuss what each has done and know that it's going to be exactly the right thing.' Once the preproduction work is complete, it goes through to Percy in the main room for the final mix.

The tightness of this approach is not lost on the artists, who appreciate not having to sit around and wait until they're needed, and are impressed at being able to hear several songs simultaneously. 'When Five are in there'll be two of them in my room, two in Tim's and another in with Mike,' says Kennedy. 'There'll be three different songs going, and lots of dashing between the studios.'

Looking to the future, Steelworks is hoping to broaden its activities by signing other producers and writers to a publishing company and are in the process of linking up with teams in Malibu and Nashville with whom they've begun writing, which they think could double or triple their output. 'It's frustrating when we want to work on something but are too busy,' says Kennedy. 'Louise wants some songs for her new album but we're chocka for the next few months. And we don't want to see the opportunity go.'

Another plan is to develop local talent and give people they're working with the opportunity to use the studio during down time—evenings and weekends. 'Developing a new act takes a lot of our time, and if we've got more teams than just us, so we can delegate, it will become a much quicker process,' says Lever.

There are parallels to be made with a certain car manufacturing centre in America renowned for churning out the home-grown hits. This comparison hasn't been lost on Steelworks, who are passionate about their desire to discover, nurture and break talent. It looks as if a northern English town famed for its steel production could well become the Motown of the millennium. ■

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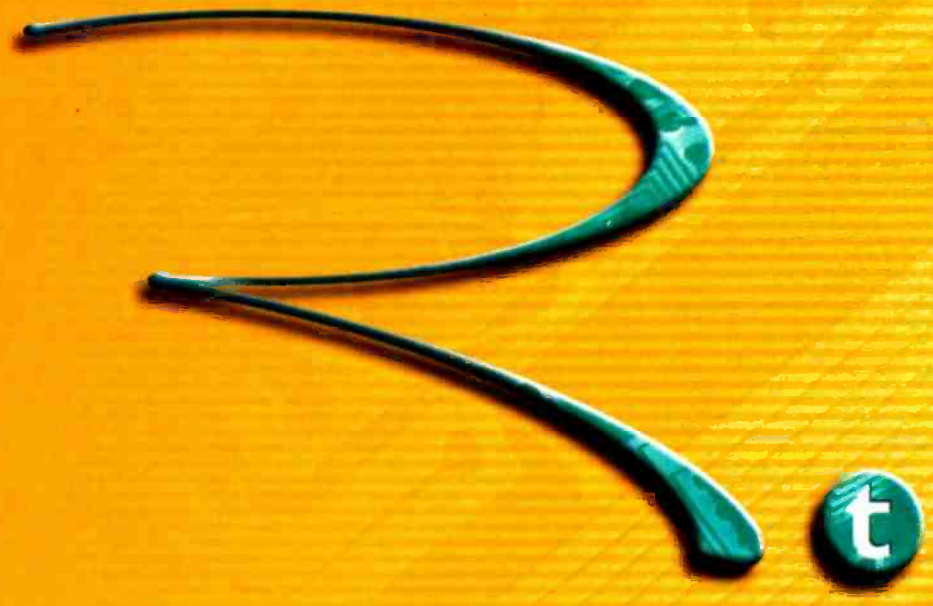

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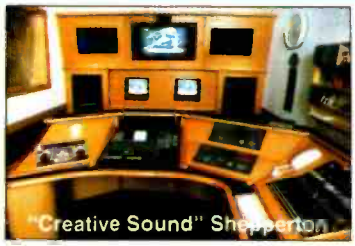

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US: Content, the new intent

In a rapidly changing business, recording studios may find the content of their output as important as its quality writes **Dan Daley**

IT'S NOT as if anyone needs reminding just how fundamentally the studio business is changing. In fact, for a bunch of putative nonconformists, studio owners as a group are becoming uncharacteristically nostalgic for the 'good old days'—that almost Jurassic point in time when it was conceivable to make a reasonable profit in the business of studio ownership.

Nonetheless, studios of all sorts will always be a necessary part of the media machine, and there will always be people alternately passionate and daft enough to want in on what is increasingly a business game of musical chairs—or Russian Roulette, depending upon your preference of metaphors. But what can help even the score is that studios are also well positioned to participate in that very traditionally American game—from PT Barnum onward—of content creation.

From publishing to software to television to movies to whatever, ownership of what comes out of media facilities like recording studios—content—has become far more lucrative than the process of creating or retailing content. The perfect example is how the growth of cable and satellite television throughout the world has put a new value on properties that until relatively recently seemed quaint at best. Who would have thought less than 20 years ago that Hogan's *Heroes* (and in Germany too) would be regularly shown on prime time television again, pulling in tonnes of residual revenues? Even closer to home, the CD revolution that began 17 years ago became a gold mine for record labels and music publishers who watched consumers buy *Disraeli Gears* and everything they already had all over again.

For television and records and other audio products, studios were places critical for content creation but rarely involved in content ownership. There have always been the studio owners who would fancy a particular local artist and-or themselves as producers, using the studio as a tool to pursue those avenues. But for the most part studios were a waystation, with the ownership of what was produced in them residing elsewhere. And there are plenty of records still selling well today that were made in recording studios that have long ceased to exist.

The way studios perceive themselves in regards to content ownership is beginning to change. While it was the personal studios equipped with affordable and powerful new generations of pro-audio gear that had driven the trend of independent record labels, conventional studios are increasingly getting in on that game, places like Platinum Island in Manhattan, purposely allocating specific assets like physical space and time to finding, developing, producing, marketing and promoting artists on whom they own or at least participate in copyrights on publishing and master recordings.

Other ways to exploit content are cropping up, such as finding a lucrative market for what were essentially aural noodlings that he made a decade or more ago simply in the process of learning the equipment, but which are now making perfect musical sound bites for cable shows and commercials. Back Pocket, a New York City studio that supports a commercial music house when its not renting itself out for hire, has collected its huge assortment of commercial ad pitches that didn't make the cut on Madison Avenue onto a CD and now pitches them as music bits for film, television and industrial applications. Other studios have been taking vocals off tracks cut years ago, looping parts like solos and selling them to similar markets. And don't overlook taking even smaller pieces of existing recordings and sampling them into sound effects libraries and drum and keyboard patch collections.

This last application will likely open up some interesting legal arguments. The question will eventually arise as to who owns the sounds, especially if these are tapes >

Europe: Is it safe?

Confusion over protection systems for the new generation of audio delivery formats is growing alarmingly writes **Barry Fox**

The RIAA, those wonderful people who told us we could not hear the CopyCode notch, are now driving SDMI, the Secure Digital Music Initiative. This is the plan to bury a copyright watermark inside music, to identify source or trigger copy-protection. Bob Ludwig is now on record as warning that the mark may affect the sound.

The launch of super hi-fi is already cursed with a format war between DVD-Audio (backed by Warner, Toshiba and Panasonic) and Super Audio CD (backed by Philips and Sony). The Copy Protection Technical Working Group (of IBM, Intel, Panasonic and Toshiba) has now agreed a copy control system for music DVDs. This relies on encryption and watermarking. A DVD recorder will detect the watermark and let the owner make one copy of an audio DVD, but only of CD quality.

The record company can add extra code to the disc that controls how many other copies, and of what quality, the recorder can make. Non-volatile memory in the DVD recorder will log its use. So the music industry is hoping to sell audio DVD on the strength of super hi-fi quality which is deliberately degraded by copy-control and may or may not copy more than once. This nonsense is on top of the DVD-A versus SA-CD battle.

Even Sony's top executives are confused: 'The DVD Audio format successfully addresses one of Sony Music's key concerns: the protection of our artists' copyrights. . . and we plan to make their music available on formats that provide proper copy protection,' said Al Smith, Senior Vice President, Sony Music.

Meanwhile in Europe, Scottish company Memory Corporation promises 'Three steps to heaven'. Memory's MP3-Go is another solid-state MP3 system like Rio, but with a difference. It encourages home copying. Music Store is a CD player with built-in MP3 encoder and 4Gb hard drive. The owner plays and stores up to 100 CDs, for playback through a hi-fi. SoulMate is a portable player with up to 64Mb of flash memory that docks with Music Store, and digitally copies an hour of music in 10 seconds. The owner can then listen on the move. Memory's Chief Executive David Savage says this system will go on sale this Christmas, through Dixons, for under £300 (UK). Dixons will say only that it has been talking to Memory. Although Memory's publicity pictures show only dummy Music Stores and SoulMates, the company has proved the principle with breadboard prototypes.

So did spokeswoman Alexandra Walsh. So I briefed them with a description. A week later I had still got no comment on what the RIAA thought about a device that encourages people to record CDs into a home juke box and then copy them into a portable player

In October 1998, the RIAA sued Diamond Multimedia to block sales of Rio. Then Diamond sued the RIAA. Both sides are now waiting to go to Appeal, probably in November. Rio now incorporates SCMS, the Serial Copy Management System that stops digital recorders cloning by making a copy of a digital copy. MP3-Go does not.

< abandoned by copyright owners years earlier. How many studios could build entire new facilities using unclaimed two-inch tape boxes that clients once asked if they could 'store them here them for a couple of months' 15 years ago?

Regardless of the potential legal and other implications that entering the realm of content implies, it's an inevitable move for conventional studios. I can recall being told more than once in the course of interviews over the last year that, to paraphrase the sentiment, 'the value of equipment starts going down the minute you buy it, but the value of what you make with it could continue to go up forever'. Interesting talk, particularly from a group of people for whom the equipment had been central to their lives since the business began, and for whom the its value was not always measured in dollars and cents.

Is this a legitimately an 'American' trait and trend? It's not any particular sense of national pride that makes me respond 'yes'. Rather, it's the inescapable realisation that this is what Americans do best now. From Hollywood blockbusters to *Baywatch*, we've got the content thing down, and from the 'swoosh' of the Nike emblem to the GAP to Microsoft, we know how to package it and sell it. We used to export cars; now we export concept. It's quite probable that recording studios will germinate some of the next rounds of content, and not just as hothouses for sounds anymore. ■

Memory says the benefit of MP3-Go over Rio is that it cuts out the inconvenience of using a PC. So MP3-Go does what SCMS would prevent, and copies CDs through two generations. But Memory thinks this is acceptable because the Music Store copy is accessible only for hi-fi listening, analogue copying or digital copying into SoulMate. 'We are talking to all the relevant organisations and are founder members of the SDMI' says David Savage. IFPI spokesman Adrian Strain says 'There is no change in our policy on SCMS. Being a member of SDMI is not a free ride for non-compliance'.

I tried calling the RIAA for comment, and was plunged into voicemail hell, with my enquiry bounced between a string of extensions all referring to other extensions which were also on voicemail. I never did get a return call so I tried email.

The RIAA's Executive Vice President and General Counsel Cary Sherman knew 'nothing' about Memory or MP3-Go, and asked for more info before commenting. So did spokeswoman Alexandra Walsh. So I briefed them with a description. A week later I had still got no comment on what the RIAA thought about a device that encourages people to record CDs into a home juke box and then copy them into a portable player.

I wish the record companies the very best of luck in the new digital age, because with representation like that, they are clearly going to need it. ■

Recasting broadcast

Rapid changes in the nature of broadcasting will force us to reassess our conception of radio, TV and computers writes **Kevin Hilton**

Around four years ago I attended a discussion session at a computer show. The panel was made up of high positioned executives from leading companies. It was clear they were keen that the Internet—and computers in general—should become an integral part of home entertainment but some were aware of the general shortcomings behind the concept. Prime amongst these was that home computers and, even more so, Internet connection, was almost completely confined to the monied, professional classes.

This, by definition, would make a mockery of any notion of 'broadcasting' over the Internet, which is why the term webcasting developed. In those four years, computer prices have fallen dramatically but while just about every household has (at least) one television and perhaps several radios, not all have computers. The converse argument is that the early days of television saw a similar slow take up, which increased over the years to the point of almost general acceptance.

> 'The PC, and MP3, is an entertainment device as much as an educational device.'

While this is comparison cannot be denied, there is still the point that TV and computers have very different functions. The delineation has been summed up by Abe Peled, CEO of digital link and compression specialist NDS, as leaning forward (working on computers) and leaning back, (watching TV). 'The distinction will remain because of human nature,' he says. It is this that will continue to make PCs a difficult proposition in terms of being a 'broadcast' terminal. Abe Peled is convinced that things will change to an extent, saying that this situation will make the overall experience richer. 'There is a different generation growing up today,' he states. 'The PC, and MP3, is an entertainment device as much as an educational device.'

MP3 (MPEG-1 Layer 3) audio is the current big thing on the Net. And very wonderful it is too—with a few reservations. We are used to sounds on the Internet, through RealAudio and other formats; webcasts, in both sound and vision, have been intermittent for at least two years. But the quality has been poor, partly because of the bandwidth of current connections and partly because of the speed of servers and modems. Listening to radio stations from around the world over the Internet is fun and fascinating (a friend of mine is currently teaching himself Russian, partly by listening to a Moscow station over the Net) but it can be frustrating. The other evening I tuned into RTE's Radio 2FM and it sound like AM, albeit without the coming and going.

Downloading MP3 still takes time (around half an hour for a five minute track) but this will doubtless improve with better data handling. The next move is higher quality video over the Internet, which is coming through another MPEG, this time Layer 4. Philips DVS demonstrated this technique at NAB, although it is largely seen as a professional tool for news links. David Philips, managing director of DVS in the UK, admits that Net video in general is 'not very good' at present, adding 'It's not providing a full specification but it is a means of getting information out quickly and cheaply.'

Satellite service provider GlobeCast Northern Europe recently introduced DigiCast, a direct-to-PC service that can be used for a variety of business applications. MP3 music sellers could use the Internet as a promotional device and then deliver the goods by satellite. This solves the download time problem and may go some way to dealing with the problematic issue of copyright and royalties. The Net is free game for anyone wanting good quality pirates of commercial material; all record companies and many musicians go twitchy at the mention of the two letters and one digit. The record industry is trying to clamp down on MP3 in general and the Diamond Rio player in particular, offering up such solutions as a2b, an encrypted technology developed by Liquid Audio and AT&T. This ensures that any downloaded music files cannot be copied.

Computer companies believe in the Internet as a 'broadcasting' medium; broadcasters, if not convinced, know that having a Net presence is good business. The shift towards more integrated systems continued at NAB, when Oracle introduced its iTV platform, which enables broadcast, cable and telecommunications providers to deliver interactive services, including email, Internet access, and video-on-demand.

Access remains a barrier. Internet connection is even more marginal than PC ownership but the growth of free services should help. In the bits of the interview you haven't seen, Todd Rundgren told me, 'We've seen a popularising of technology and if enough people are on the Internet, then the cost will come down. The advantage of TV and radio is that they can reach a large audience at once...but it's difficult to get new things. The Internet enables you to have a choice of whoever or whatever you prefer.'

Problems remain. You still have to pay for a local call, even with free services. And cable and digital TV do offer a broad choice of material. The key is finding a true purpose and audience for webcasting but there is a case for the Internet as a complementary service. All it needs to do is cast off its Geek TV image and it may have a chance. ■

Turandot

A live performance of *Turandot* in Beijing exposed many of the problems facing RF microphone systems. AKG specialist **Stefan Frese** tunes in to the Forbidden City

LAST SEPTEMBER saw Beijing host an ambitious production of Puccini's *Turandot*. The event saw the Opera On Original Site organisation collaborating with film director Zhang Yimou, sound designer Wolfgang Fritz conductor Zubin Mehta, and the Italian Musicale Fiorentino company to bring the opera to its setting of the Forbidden City. Countless earlier attempts to perform *Turandot* in its intended setting, including one by Herbert von Karajan, had failed, and it took OOS three years and cost $15m to bring it to fruition last year.

AKG radio mic systems were used throughout for the stage performers and the equipment necessary for the eight performances included a 24-channel WMS900 wireless microphone system along with 30 skin-coloured CK77WL, 40 C414B-ULS, 22 C480B + CK69-ULS, 20 C480B ULS/61 microphones, and 25 C547BL boundary microphones. Before flying to Peking we were informed that nine singers needed wireless microphones and the usable TV channels were channel 55 and channel 58. To be on the safe side we took two complete 12-channel WMS900 systems. The second WMS900 was intended to serve as a backup, the idea being to provide each singer with two independent microphones and transmitters so that the sound engineer could switch over to the backup in case of failure.

The WMS900 is an old timer but in some aspects it is still superior to contemporary equipment. For example, what makes it very versatile is its 100m long antenna cable which can be extended up to 200m so that the position of the receiving antennas does not depend on the location of the receiver racks.

One factor that obviously determines the reliability of the system is its electromagnetic compatibility. As a result, we spent many hours in front of the receiver racks with disabled transmitters chasing down causes of interference—all we found were two temporarily and two permanently disturbed microphone channels. Fortunately there were enough interference-free channels to allow each singer two microphones. Nevertheless I doubt that we used the proper frequency range because there are no more than 36 TV channels in China.

The receiving aerials we used were two unobtrusive 'billboard' antennae. These are directional antennae with only 10dB gain and enough beam width to cover at least 60% of the stage. They were mounted at a height of 12m on two scaffoldings that covered the left and right-hand sides of the 80m wide stage. Power splitters distributed the received signal among the frequency converting boosters of the current receiver rack and the backup rack. If we had known in advance that the singers would use only a small fraction of the stage area, we could have installed more directional antennae (such as a Yagi with 16dB gain) because sacrificing 6dB gain means an increase of the output by a factor of 16. The reason for not using omnidirectional antennae and place them in the middle of the stage is that a directional antenna 30m away is superior to an omnidirectional antenna placed in the immediate vicinity of the singers, due to its uniform relative distance. The worst case scenario for omnidirectional antennae occurs when some singers are close to the antennae and others further away as this can cause a problem known as the 'near-far' effect.

One mechanism at work here is the reception of transmitter and reciprocal noise which reduces the signal-to-noise ratio of the signal received from the most distant singers. Since the symmetric skirts of the sideband noise follow a 6dB/octave the SN reduction depends heavily on the frequency separation of the channels concerned. The second effect is the well-known IMD.

At the first rehearsals the WMS worked sufficiently well that the level indicators on the receivers were saturated for most of the time. The diversity system was switching back and forth even when the singer was not moving at all. This phenomenon is actually reassuring because the fluctuation of the electromagnetic field makes it very unlikely that a dropout will last very long. It also shows how ridiculous it is to try to avoid dropouts by the popular practice of marking out the problem areas on the stage.

Surprisingly, the absorption of the wooden walls of the medieval palace in which *Turandot* was staged was so high that the RF reception level dropped almost 40dB if the singers moved off the stage—but at least it was still high enough to transmit the state of the battery. During one rehearsal the RF level of the singers playing the 'mandarins' dropped 20dB. Significantly, this happened the first time hat they wore costumes with gold braid on their dresses, and it was this that shielded their pocket

transmitters. A loss of 20dB does not necessarily cause dropouts but it certainly increases their probability.

This problem was effectively eliminated by moving the pocket transmitters to sit on top of the dresses, but I still felt that the field strength never returned to what it had been without the robes.

One sound engineer told me that he was very annoyed by a crackling background noise. My suspicion here was that this noise occurred when, for example, a gold braided sleeve rubbed at the robe of a singer.

The following evening the statistics of the RF level changed dramatically because they moved a small temple into the centre of the stage. This interrupted the line of sight between the right antenna and the singers; this increased the fading depth alarmingly. To add to the problem, when regiments of solders entered the stage, the pocket receivers were almost completely shielded by the crowds. What made things even worse was that at one point some of the singers had to sit down on the concrete staircase in front of the stage and here the transmitters were totally covered by their bodies. During rehearsals, the squelch indicator was never triggered but during the premiere it produced a big bang in my headphones. Nobody else noticed it. That the RF level reached the bottom at the premiere has a simple explanation: once the line of sight between the singers and the receiving antenna is interrupted the transmission depends heavily on the reflections from the auditorium which are absorbed by the audience.

Technically the show was a great success. It involved three complete casts totalling more than 1000 people and 900 costumes. The best tickets cost some US$1500 and were aimed—unsurprisingly—at overseas tourists, while the local audience paid 150-800RMB (US$17-92). It will be interesting to see what Beijing hosts next. ■

Footnotes

1 The attenuation of the cable is reduced by the frequency converting booster of the WMS900 which translates the UHF frequency to an intermediate frequency of 70MHz.

2 The performance of multichannel wireless systems is limited by two incompatible demands. The most obvious of these demands is a high transmitter power that is necessary to reduce the output. The second demand is a negligible intermodulation distortion (IMD). The IMD can disturb the other microphone channels .It is caused by (a) nonlinearities of the receiver input stages (b) nonlinearity the transmitter output stage, whereby of the transmitter antenna picks up the intermodulating signals and emits the intermodulation products(c) any nonlinear (rusty) metal junction in the vicinity of the transmitter.

3 The output of a diversity receiver is the probability for a dropout and depends on the square of the power of the receiver input signal. So a 6dB decrease in input level increases the output by a factor of 16.

4 Reciprocal noise is due to the side band skirts of the receiver LO (Local Oscillator). And has a similar effect to the transmitter side band noise if one disregards the selectivity of the receiver.

DR JOHN

Error-correcting audio amplifier

Pursuing power amplifier design principles brings **John Watkinson** to the crossroads of idealism and practicality, trading efficiency, distortion and class distinction

AS WE SAW LAST month, the class-B amplifier is significantly more efficient than the class-A, but suffers from crossover distortion. The use of negative feedback can reduce this distortion but only with infinite loop gain can the distortion be eliminated, and this simply is not practical. The error-correcting amplifier is intended to give the best of both worlds by combining the efficiency of, typically, class-B with the low distortion of class-A, allowing us to have our cake and eat it. Although it sounds far fetched, error-correcting amplifiers really work, although the design process requires a rather greater understanding of principles than that of a conventional amplifier. The cost will fall somewhere between the cost of class-A and class-B amplifiers because the signal circuitry is more complicated than class-B, but the massive heatsink and power supply of class-A is not required.

Fig.1 shows the basic principle.

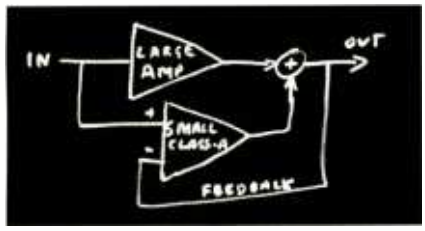

Fig.1: Basic error correctings amplifer

A powerful but sonically challenged class-B amplifier efficiently provides most of the load power, and the output of this amplifier is added in some way to the output of a smaller yet agile class-A amplifier. If the overall feedback is taken to the class-A amplifier, then the output waveform will be determined by that amplifier alone provided only that the class-B amplifier can get close enough to the waveform that the correction amplifier never clips.

This is the one major difficulty of the error-correcting amplifier: to find a way of driving the big, crude, amplifier in such a way that the small agile amplifier is always in control. The other difficulty is the addition of the two amplifier outputs without them driving excessive current into each other, and without incurring too much dissipation or loss of output level.

Fig.2 shows the three main techniques used in adding the amplifier outputs. In

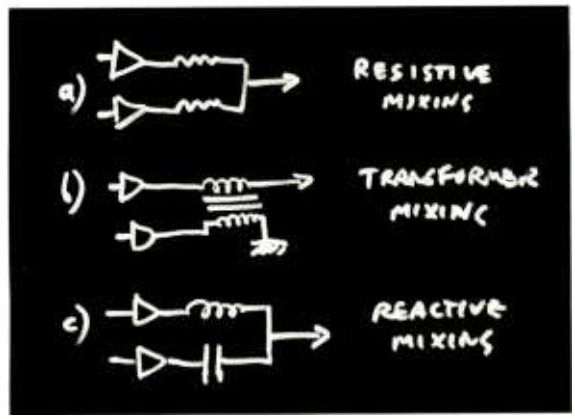

Fig.2: Summation techniques

Fig.2a the amplifiers are combined with load sharing resistors that dissipate heat and reduce output swing. In Fig.2b the small amplifier output voltage is added in series with the main amplifier output by the use of a transformer. This was developed into a practical amplifier design by Stochino. It has the advantage that there is no dissipation or level loss in the combining process, but has the disadvantage that the transformer is physically large because it carries the main load current. In Fig.2c the approach used by Walker in the current dumping amplifier is used. Here the combining is done with reactive components so that there is no dissipation.

Fig.3 shows the resistively combined amplifiers in the configuration due to Sandman. The philosophy of Sandman's

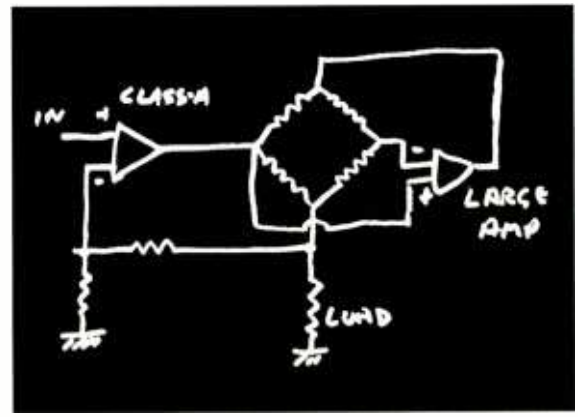

Fig.3: In Sandman amplifier the large amplifer raises the impedance seen by the small amplifer

system is that the large amplifier is driven in such a way that the load impedance seen by the small amplifier is maintained as high as possible. This is one way of meeting the key criterion that the small amplifier should remain 'in control' at all times. As Fig.3 shows, the small class-A amplifier drives the load via one leg of a resistor bridge. The large amplifier attempts to keep the bridge in balance by sensing the difference between the two bridge arms and driving the top of the bridge. If the large amplifier were ideal, the small amplifier would see infinite impedance, but in practice the shortcomings of the large amplifier mean that this does not happen. This is not a problem because it is not a requirement. The feedback is taken from the load as usual, and provided the impedance seen by the

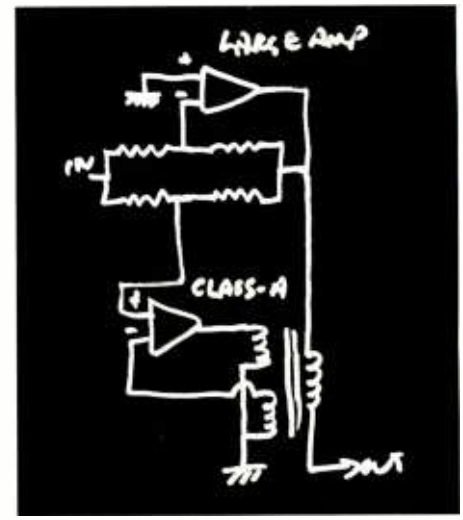

Fig.4: Stochino amplifer using transformer

small amplifier is reasonably high, rather than infinite, the small amplifier will always be in control.

Fig.4 shows the transformer-combined approach of Stochino. The negative feedback to the large amplifier ensures that its output remains close to the target voltage, but a separate potential divider between output and input computes the residual error on the main amplifier output. Again, if the main amplifier were ideal, this residual would be zero, but in practice the residual represents the distortion products of the main amplifier. The residual error drives the class-A correction amplifier, that in turn drives the summing transformer. Note that the class-A amplifier derives its feedback from a separate winding on the transformer so that the distortion in the transformer core is also cancelled. When the amplifier is properly balanced, the distortion signal added by the transformer is exactly equal and opposite to the distortion component of the main amplifier, so that the summing process cancels the

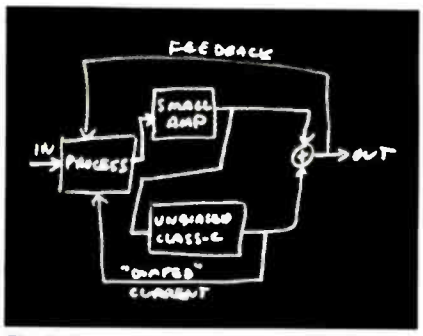

Fig.5: Current dumping

error perfectly.

Fig.5 shows the current dumping amplifier pioneered by Peter Walker at Quad. In this amplifier the design philosophy was to produce an amplifier which would offer high performance but without any critical setting-up process or risk of drift as components aged. In practice the philosophy resulted in an error-correcting amplifier in which the error-correction performance was taken further than normal so that the main amplifier could be extremely basic indeed.

In current dumping, the main amplifier is unbiased and in fact has a small dead band so that for small signal voltages in the centre of the audio waveform it does nothing at all and the small class amplifier drives the load alone. As the signal level increases, the small amplifier has to deliver increasingly high currents as the voltage rises in each half cycle. At a pre-determined but non-critical level, the large amplifier starts to conduct and dumps current into the load, relieving the small amplifier of the main current requirement so that it then becomes an error-correcting amplifier, which cancels the distortion of the main amplifier.

In practice, the non-critical nature of the large amplifier drive means that it can be driven by the small amplifier. Strictly speaking the large amplifier works in class-C because each side conducts for less than half a cycle; a configuration that is impossible to use alone in audio. Class-C amplifiers need no setting up because they have no bias current. The current delivered by the large amplifier is measured and subtracted from the required load current to deduce the current that the small amplifier needs to deliver. This is a feedforward mechanism ensuring that the sum of the currents of the two amplifiers is what is required.

The use of feedforward to make the load current merging process work means that there is no demand on the overall feedback for this function and the conventional negative feedback is used to further reduce distortion. Thus at small output voltages the current dumping amplifier is pure class-A, but as output rises, at some point on each half cycle the current dumping amplifier operates to reduce the load on the small amplifier.

Walker's current dumping amplifier has a further interesting twist, because the amplifier combining stage uses reactive components so that there is little dissipation. The main amplifier feeds the load through an inductor so that the drive of the small amplifier is not shorted. The amplifier combining process in made frequency dependent by this approach, but an inverse frequency dependent stage is incorporated into the signal processing system so that the effect is cancelled. One way of considering the current dumping amplifier is that it is rather like a speaker crossover working backwards. The main amplifier drives the load via a low-pass filter and the error-correcting amplifier drives the load with antiphase harmonic distortion via a high-pass filter.

As was seen last month, the class-B amplifier is still relatively inefficient, especially with reactive loads, whereas the class-D or switching amplifier is highly efficient. The main difficulty with the class-D amplifier is achieving low distortion, and this makes it an ideal candidate for error correction. Fig.6 shows an error-correcting switching amplifier. If the small class-A amplifier has prodigious bandwidth, not a difficult design job, then not only can it cancel the residual distortion of the switching amplifier, but it can also cancel the residual switching frequency and its harmonics which come through the non-ideal filter.

The error-correcting switched mode amplifier is difficult, but not impossible, to design on several counts. Firstly, it represents two utterly different amplifier philosophies and demands competence in both. Secondly, the class-A amplifier must have faultless supply rejection because the power supply will be heavily modulated at the switching frequency of the main amplifier. Thirdly, the grounding and layout will need to be impeccable in order to keep switching current pulses out of the analogue signal processing. Any common impedances could result in the class-A amplifier amplifying the switching instead of the error. Lastly the stabilising and timing, or phase characteristics, of the two amplifiers will need to be approached with care because the switching amplifier requires a low-pass or reconstruction filter to recover the analogue output. The phase and delay characteristics of this filter are inside the amplifier loop. A delay in the filter could mean that the correction amplifier is seeing a reactive load that needs higher currents than it can manage.

However, I did say it was only difficult, not impossible. The advantages of such a unit are considerable, including low weight, small size, minimal heat dissipation and class-A performance. Just the thing for that active speaker design. ■

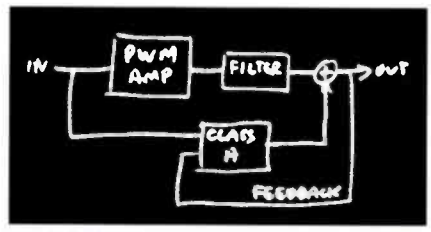

Fig.6: Switching error-correcting amplifer

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Manufacturing success

High-tech is a synonym for rapidly-changing, and in professional audio timing is everything. The Warp Corporation's **Ted Hayton** talks time and motion

IT HAS BEEN SAID many times by many companies from all walks of manufacturing, 'We've got a great new idea for a product, but we haven't got the right or enough in-house resource to design it.' There are usually only two outcomes, either the idea gets filed in the drawer 'ideas that we should really be doing' or the company in question tries to juggle their existing resources in order to exploit the idea before the window of commercial opportunity snaps shut on their fingers, usually with dire consequences for the products that are already under development.

In all areas of industry, experienced, highly qualified hardware and software designers are becoming hard to find and subsequently expensive to employ. To smaller firms or ones just starting out, such a luxury appears out of the question, even though it is precisely these highly experienced skills that such companies require to progress.

In these modern high-tech times, manufacturers are constantly squeezing the drawing board-to-market timeframe trying to get a march on the competition. And if deadlines get missed there is the ever present danger of feature creeping, that frustrating, seemingly never—ending list of modifications and enhancements to a design that the product 'must' have, which for some reason never made it into the original product specification.

And all live with the spectre that a chipset will undoubtedly be superseded the moment the solder has cooled on the prototype.

So how else could it be? Consultancy, employing an outside R&D resource to undertake new product design, isn't a new idea although the concept is rare in audio manufacturing where such activity tends to be restricted to third-party plug-in authoring. But outsourcing R&D can have distinct benefits and as technological evolution accelerates, it could form the standard model for future hi-tech manufacturing.

In employing a consultant, a company will be employing experts that it either doesn't possess at all or doesn't possess enough of. An expert designer will require little or no supervision, and will be accustomed to reaching the desired result. One of the usual reasons for using a consultant rather than 'in-house' facilities is to reduce the management overhead of the project. An expert will have the experience to suggest subtle architectures, increase the performance of a system for a given price or, conversely, decrease the price for a given performance. Designing and developing a system requires intelligence, experience, creativity and skill. It is almost always more cost effective to pay a little extra for the expert than to trust to a neophyte.

Similarly, a manufacturer needs to know that the system, once designed, can be put into production. It is no good having a system designed for which you can't get the parts, or for which the parts are unreliable. The most fantastic piece of software in the world is useless if the user cannot install it, or it only runs on a machine with an obsolete configuration.

Perhaps one of the greatest benefits of using expert consultants is that they come to a company with fresh eyes and have a habit of asking obvious questions like 'What exactly do you want to manufacture?' It seems to be a simple enough question and yet the answer can often be buried beneath a list of wishes and features. Discussing a product requirement with the consultant invariably acts as a focus to nail down the actual product specification. It is a lot easier to make changes at the preliminary specification stage of a design, rather than when the design has started or, once you have started manufacture. There is an engineering rule of tens, if a change requires one day in the specification stage, then it will require ten days in the design phase, or 100 days in the manufacturing stage.

It doesn't necessarily follow that the same consultancy service will be required by every company. Some manufacturers require the consultant to perform an independent technical audit of a new or existing in-house design to verify its viability. Others rely on the consultant's freshness, experience and knowledge to help them develop a preliminary design specification and point out weaknesses which they might otherwise have overlooked. Or consultants will be employed to develop a product from drawing board to production prototype in parallel with in-house company development.

In all hi-tech manufacturing today, there is a virtual certainty that there will be cross-pollination with other technologies somewhere along the line. There are increasingly so many design disciplines required that to employ all this expertise on a full time basis is just not practicable. Even if the right team can be recruited, the cost of manufacture would be a serious reflection of the wage bill. These factors have led many companies to the conclusion that outsourcing may be the only practical way to bring the right product to market on time and at the right price. ■

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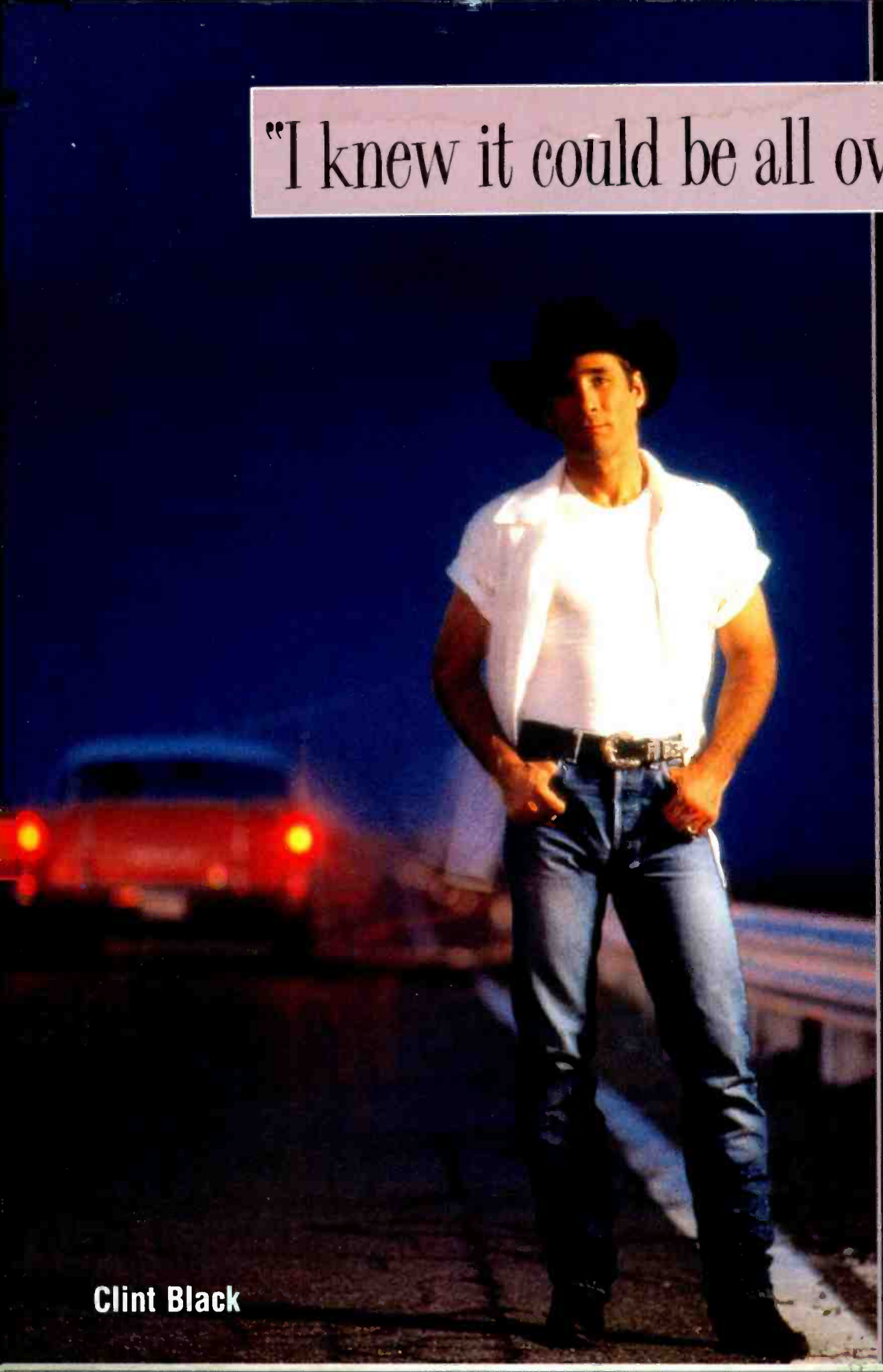

Clint Black

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