

August 1999

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# Studio Sound

THE INTERNATIONAL PROFESSIONAL AUDIO MAGAZINE  
FOR RECORDING, POSTPRODUCTION AND BROADCAST



## EXCLUSIVES

- TL Audio VTC
- Sek'D Samplitude 2496, ARC 88
- Manley Massive Passive EQ
- Grace Design Lunatec V2
- Denecke Dcode AD-20
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KURLANDER**  
Interview

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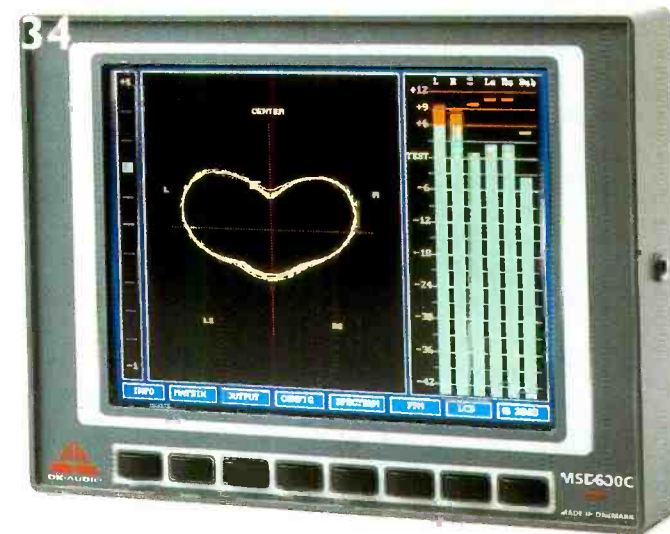
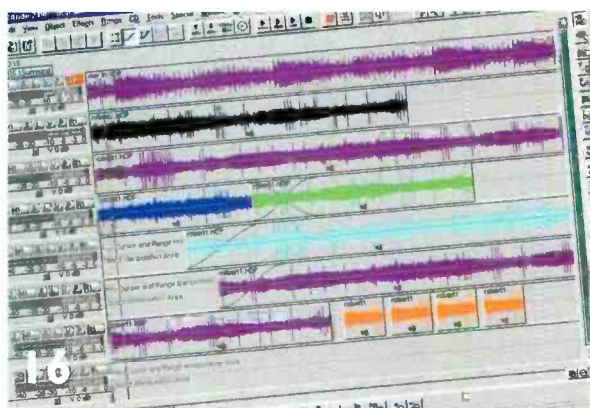
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**Studio Sound online edition**

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Studio Sound May 1999

**Product Reviews**

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- Broadcast: Getting it right on the night
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- Recording: New album, new studio
- Facility: Retaining a French audio post
- Facility: Retaining a British workhorse

**Editorial**

On the future of broadcast and recording

- Try our online tools! It's the easy way to talk to people in your industry!
- Download our documentation! Read Steve Souders' white paper on Pre-mastering CDRs and Super Audio CDs (pdf format requires Acrobat Reader)

Visit our splendid Studio Sound web-site for a comprehensive archive of reviews and features on [www.prostudio.com/studiosound](http://www.prostudio.com/studiosound)

## Snake bites

PEOPLE FEAR what they don't understand. It's a natural reaction but one in which the preservation instinct can also mask opportunity.

A long conversation with Trident founder Malcolm Toft reminded me of an attitude that was prevalent at the time of the initial airings of the Trident Di-An digitally controlled analogue console. That the design and ergonomics were seen as radical by potential users, who were embedded in a quite traditional analogue bedrock, was predictable. Many were scared that the desk would make them look stupid and inadequate, yet I remember clearly that to many it represented the demon encapsulation of the future face of desk technology and was damned for it—if this was what the future looked like then they didn't want it. Most alarmingly these were beliefs held and broadcast by those who hadn't even sat in front of the desk—most that did had to acknowledge that its operation was remarkably simple and I still see shades of the Di-An in modern successful equivalents.

Matters were not helped by Trident's decision to air its development laundry progress on the exhibition circuit as this was largely counter to the practices of the time and was not appreciated despite the complexity of the task being attempted. It is something we have learnt to live with now. Fear can be conquered, but picking a snake up by the tail ten times does not mean you won't get bitten on the eleventh attempt. And people do get bitten, regularly, it is now an occupational hazard. You put your hand in the basket expecting to be bitten and are relieved when you're not.

Part of this has to do with the oft quoted march of technological progress, but most has to do with what we are now prepared to accept. Somewhere along the way we lost our naive primal fear and replaced it with a nervous yet risk-taking disposition. Opportunities have certainly been missed, but the need to take the time to simply understand is greater now than it has ever been.

**Zenon Schoepe, executive editor**

## Order of play

IT SEEMS TO BE a peculiarly scientific preoccupation to force an order on a sequence of events. Whether you are talking about the first moments of creation or the heat death of the universe, there are those among us for whom nothing is valid unless some order of service is observed. You could argue that it is a curiously artistic indulgence to adopt anything other than a natural order to creation—why shouldn't a detective novel be written from conclusion backwards? Yet it's only those with a specific need to rationalise who seem eager to bring the argument about.

There is an inescapable justification to believing that the current view of the physical universe is better than the last—which, in turn, is better than previous one—but applying the concept to art seems sadly misplaced.

So why the fuss when the secrets of the recording studio first leaked out? Why should it matter to a critic that the second movement of a symphony came from an earlier take than the first, that a single musician played more than one instrument on a pop record, or that all the choruses on a dance track are from an LP that's 30 years old? With what wonderful irony the MIDI sequencer was so named.

Perhaps it's simply a form of professional jealousy; the aspiring scientist obliged to master the machinations of calculus before accepting the challenge of quantum physics may well resent the writer's ability to write chapter one last. And music critics are often musicians who couldn't get their chops in order.

But you who work on the divide between art and science, what philosophy do you follow? If it's okay to record the intro last, why should the mouse replace the razor blade? Why should the chip replace the valve, or the disk replace the reel?

It's not entirely a new argument, I hear you say. But then you don't really know when I wrote this, do you?

**Tim Goodyer, editor**

# Studio Sound

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■ Atlanta-based Turner Studios has built a new broadcast and post complex around two 24-channel MFX3plus workstations and Avid nonlinear video systems. Designed by San Francisco-based architectural firm Gensler, the facility consolidates postproduction and studio work for the Turner Entertainment Networks and supports Turner's sports and news divisions. The Fairlight editing suites will perform recording, editing and sound design and will support the new complex's three new television studios, two new broadcast control rooms and video suites.  
**Fairlight, US. Tel: +1 213 460 4884.**

■ British Virgin Radio has taken delivery of beyerdynamic MCB34 mics for use on the televised version of Chris Evans' breakfast radio show. Alongside performance, the mics were chosen to allow a relatively unobscured view of Evans' face for the camera. Another recent taker for beyer mics was Reuters whose MCE86 shotgun kits (with pistol grips and windshields) form part of a major re-equipment programme. Elsewhere on the British airwaves, Classic FM has adopted five Orban Optimod-FM B200s following an exacting evaluation process on the station's classical music staple.  
**beyerdynamic, UK.**  
**Tel: +44 1444 258258.**  
**Orban, US. Tel: +1 510 351 3500.**

■ OB vehicle operations in France and the UK have been on the move with Le Voyager III taking an SSL MT console. BBC Resources putting a Calrec S2 in its first Type 11 vehicle and Corinthian Television Facilities installing a Telex RTS-ADAM digital matrix intercom system in its new OB2. Le Voyager III's MT boasts 48 channels, 96 remote mic preamps and is 5.1 capable while the 16-camera BBC Type 11 also has 48 channels and supersedes the Q-series Calrec. The 20-camera OB2 has a 64 x 64 ADAM CS and is being built to meet Sky Sports' commitment to cricket coverage.  
**SSL, UK. Tel: +44 1865 842300.**  
**Calrec, UK. Tel: +44 1422 842159.**  
**Telex, UK. Tel: +44 1908 233916.**

■ Australia's Channel 7 has purchased an LA Audio Pro Series DigEQ EQ-dynamics processor for use in its Brisbane based television studios to address sub-sonic noise and harmonics caused by a standby generator.  
**SCV, UK. Tel: +44 171 923 1892.**

■ London's new Waves Recording post house has just opened for business in the postproduction square mile of Soho. Owners Johnny Byrne and Warren Hamilton have opted to put two Fairlight MFX3plus digital audio workstations at its centre and use the Fairlight Media Link to allow movement of projects and effects around that facility. West End post house The Sound Store has installed a DynaudioAcoustics surround monitor system consisting of M1.5 mains, BMS surrounds and a BX30 sub. Slightly further north, Camden-based M2 Television has taken a 16-fader, 160-channel Soundtracs DPC-II console that is already in use on programmes for Channel 4, ITV and FilmFour trailers. Moving west, Wembley's Fountain TV has ordered a third

Calrec S2 console to replace the Raindirk presently in Studio A.

**The Sound Store, UK.**  
**Tel: +44 171 637 7472.**  
**M2 Television. Tel: +44 171 343 6789.**  
**Fairlight, UK. Tel: +44 171 267 3323.**  
**Munro Associates, UK.**  
**Tel: +44 171 403 3808.**  
**Soundtracs, UK. Tel: +44 181 388 5000.**

■ German television and media network, ZDF, has installed five 360 Systems Short/cut audio editors, some of which are for use in its OB vehicles. ZDF produces a wide variety of material from sports to game show programming; the Short/cuts find use in such applications as theme music editing and location interview editing.  
**Thum + Mahr, Germany.**  
**Tel: +49 2173 967322.**

■ Swiss Radio has begun the move to digital operation with the installation of a 64-fader Soundtracs DPC-II production console. The facility quoted the console's 24-96 capability as a factor in its selection.  
**RSI, Switzerland. Tel: +41 91 803 5111.**  
**Soundtracs, UK. Tel: +44 208 388 5000.**

■ London-based Trojan recordings has purchased a CEDAR BRX+ debuzzer to complete its complement of Series-X units. The setup is currently in use on the back catalogues of Motorhead, The Fall and Bad Manners.  
**CEDAR, UK. Tel: +44 1223 414117.**

■ Helsinki's University of Art and Design is to install a 64-channel SSL Avant console in a new THX-approved film mixing facility at the Centre for Media Research where UIAH's film, TV, theatre and new media facilities are being amalgamated. The console will be the first of its kind in Finland.  
**SSL, UK. Tel: +44 1865 842300.**

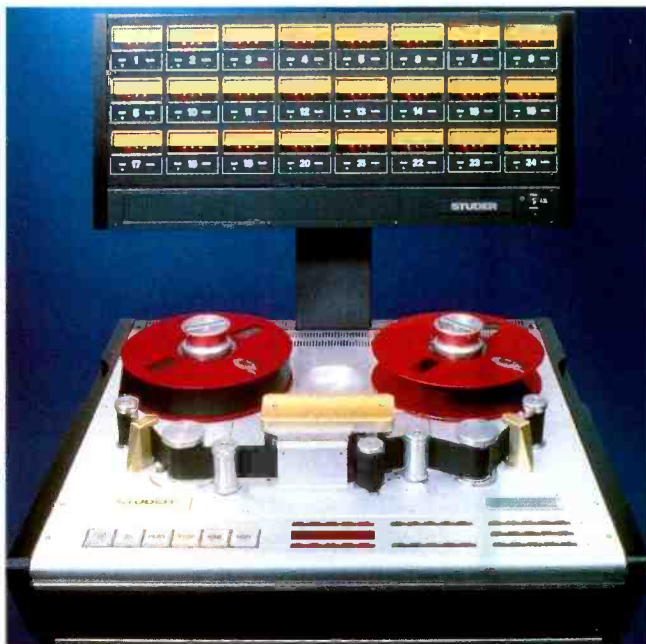
■ German broadcaster Hessische Rundfunk has equipped its new Frankfurt facility with a Telex-RTS ADAM intercom control system, in line with fellow German broadcaster SWR whose FSU-1 mobile uses an Adam Matrix.  
**EVI Audio, Germany. Tel: +49 9421 7060.**

■ Hire companies recent acquisitions include Dutch Dageraad PA's 10 Klark Teknik DN360 dual-channel graphic equalisers. British Concert Systems' two Midas Heritage 3000 consoles and Audiolease-Electrotec taking 20 XTA DP226 loudspeaker management control systems.  
**Dageraad, The Netherlands.**  
**Tel: +31 24 6456 606.**  
**Concert Systems, UK.**  
**Tel: +44 161 274 3859.**  
**Audiolease, UK. Tel: +44 1223 837775.**

■ British composer and sound designer Peter Lawlor has taken the delivery of the first Eventide Orville Harmonizer in the country. Currently working on advertising commissions for Gordons Gin and Dockers jeans, Lawlor enjoyed success with Stiltskin's advert crossover hit, 'Inside'.  
**Eventide, US.**  
**Tel: +1 201 641 1200.**



▲ US: Jersey City's Blue Meenie recording studios has installed the US' first Amek 9098i analogue console. Specialising in 'indie punk and metal aesthetics', Blue Meenie's other two studios house a 44-channel Langley Big and a Mozart RN. Pictured around the 9098i are (L-R) founders Joe Mahoney, Julie Gilles, Tom Aldi and Tim Gilles. Recent clients include Stormtroopers of Death and Vision of Disorder. Amek itself has moved its entire console manufacturing operation into a new factory which will increase its capacity for the simultaneous building and testing of larger analogue and digital consoles. Amek: Langley House, Third Avenue, Trafford Park, Manchester M17 1FG, UK. Tel: +44 161 868 2400. Fax: +44 161 873 8010. Net: www.amek.com



▲ Switzerland: The final run of Studer's A827 24-track analogue recorder is currently underway. A special Gold Edition is planned to celebrate the popular industry standard, each of which will sport a numbered identification plate as well as an RS232 card, test generator, audio channel remote and autolocator. Interest in secondhand A827s remains strong and industry statistics claim some 70% of US hits are recorded or mastered to analogue recorders. Studer, Switzerland. Tel: +41 1 870 7511.



## RT 99

**UK:** London's RT99 earned the appreciation of its exhibitors over two days in late June, and answered long-standing questions concerning the viability of a British Pro-audio event. The RT99 show, reborn from the troubled APRS show, set its sights on delivering quality visitors to a modest number of exhibitors at the new venue of the Islington Business Design Centre and succeeded in recapturing much of the friendly atmosphere and positive attitude of its early days at the Connaught Rooms. Well, for one day at least. Staged on a Friday and Saturday, the second day failed to deliver the high level of activity of the first questioning the wisdom of a weekend event. And sure enough, next year's show has been scheduled for Thursday 22nd and Friday 23rd June, on the main floor of the Business Design Centre. Certainly, the overall feeling this year was of a show that had exceeded the expectations of its exhibitors and is well placed to build on this with next year's event.

**APRS, UK. Tel: +44 1803 868600.**

## Surrounding manoeuvres

**Singapore-Germany:** Singapore is to accept Dolby Digital audio encoding in its forthcoming digital television transmission system. The decision follows a protracted evaluation conducted by the Singapore DTV Technical Committee, under the Singapore Broadcasting Authority. Meanwhile, the opportunity to make the first feature film broadcast to carry a Dolby Digital 5.1 soundtrack has been taken by German broadcaster ProSieben. Quoting the acceptance of DVD in mitigation, the broadcaster is also planning a programme sample loop for retail demonstration purposes in collaboration with the Astra satellite. The pioneering transmission follows the announcement of Dolby Digital as an accepted audio format for the DVB standard, in line with its standing with the ATSC digital television standard and the SCTE digital cable standard.

**Dolby Labs:**

**US: +1 415 645 5116.**

**UK: +44 1793 842100.**

## The Point Source

**World:** Responding to an ongoing and growing demand for reliable industry information, Studio Sound is readying an international industry directory of manufacturers and distributors for



▲ **UK:** London's Lansdowne recording studios has undergone a major refit that has included the installation of a custom 72-channel 5.1/7.1-capable AMS Neve VX-S console, the largest of its kind in the city. Other improvements can be found in the new ATC monitoring system and Pro Tools 24 system. Lansdowne's sister facility, CTS, has installed two further Studer A827 analogue tape machines, making a company count of four, one of which resides at Lansdowne.

publication later this year. The directory will carry comprehensive listings of manufacturers and their international distributors, providing a single source of contact information for those needing to obtain information or availability of any pro-audio equipment - and those seeking distribution arrangements.

## German take-over

**Germany:** Hamburg-based Management Data Software Engineering is to take over DAVID in a DM17m transaction confirmed last month. The move further establishes its new owner as the leading player in the German media software market. One of the key justifications for the

acquisition is the complimentary nature of DAVID's systems and Management Data Software's digitisation packages for radio and television services, the declared 'overlap' being just 10% of the DAVID line. The intention now is to secure a greater presence in the broader European market.



▲ **Germany:** Studio Hamburg and Studio Berlin have become the 100th and 101st customers for Fairlight's FAME digital workstation. The systems have firmly established themselves in the German postproduction market. Fairlight, UK. Tel: +44 171 276 3323.



# Pro Audio World Report

## Volume I

More than 350 pages  
of numerical analysis  
and strategic appraisal of  
trends in the industry.

# Studio Sound

Knowledge is power and never more so than in today's pro-audio market. And with information in short supply, *Studio Sound's* Pro Audio World Report and Facility Survey are the keys to the kingdom

**I**N RESPONSE TO industry demand, *Studio Sound* magazine has produced The Pro Audio World Report and The Facility Survey. Together, these reports offer a reliable source of essential statistics on the recording and audio-for-video postproduction industries for the first time.

ducted by *Studio Sound* in collaboration with specialists Market Tracking International. These two volumes present an analysis of recording and postproduction, detailing such issues as market structures, facility operation, equipment usage, market forces, company performance, technological development and market forecasting.

The need for a reliable source of information is made more important by the fragmented nature of the industry and the major changes being brought about by its own technology and enabling technologies such as telecommunications and the Internet. If the changes brought about by the application of digital technology are any guide, forthcoming developments will radically alter almost every aspect of preparing and delivering audio to the consumer - with or without accompanying images. As media formats from DVD and Super Audio-CD to radio and television prepare to deliver multichannel audio to the market, the move from stereo working to surround is undergoing change in almost every respect. The recording process and the technology needed to achieve it - from loudspeaker number and placement, room acoustics, console busing, audio recorders and provision of outboard through to recording techniques and the ability to successfully market a more costly facility - are being reinvented. Some of the territory is so new that a consensus of opinion has yet to be established. And for the uninformed, the territory is particularly dangerous.

Assembled from an extensive international survey conducted through *Studio Sound* and a variety of business sources, The Pro Audio World Report presents a comprehensive breakdown of the pro-

audio industry, prevailing market forces, and international economics complete with illustrations and graphics. It explores the present condition of the audio industry and examines likely developments in the light of emerging technologies.

The Facility Survey explores the setup of recording, broadcast and post facilities from around the world. Complete with supporting opinions from industry personnel, the Survey presents a picture of current recording and post studios and gives a reliable indication of how they will need to adapt to meet the needs of tomorrow's entertainment media.

The performance of facilities in the current climate and how their areas of activity break down gives an early indication of the shape of tomorrow's facilities. It is easy to identify that the demand for surround sound work will be a major factor in studio development - some 46% of facilities expecting to concentrate on this area. Beyond this, realistic projections from today's analysis to tomorrow's reality with world-wide economic growth likely to remain at around 2%-3% suggests that some 38% of studios will open new facilities in the next two years and 68% will upgrade existing facilities. The larger the facility, the larger the anticipated investment, with top-line studios likely to spend US\$2.1m on average.

In addition to their value as an examination of the pro-audio market, The Pro Audio World Report and The Facility Survey offer a

unique opportunity to put your knowledge and opinions to the test: which are the most popular microphone, digital multitrack recorder and recording media? These, and many other definitive answers, are available here - and for the first time. ■

**Pro Audio  
facility  
survey**  
Volume II

Results of the  
Studio Sound Survey  
including over 1000 audio  
manager's views. Over 100 pages  
of numerical analysis and  
strategic appraisal.

**Studio  
Sound**

As it has developed from an obscure and quirky indulgence into the business mainstream, audio recording has acquired many of the trappings of less glamorous industries but has consistently escaped formal analysis. Apart from figures gathered by specific companies for their own ends, and guarded with the zeal associated with military intelligence, those trying to quantify the audio business have largely had to rely on their intuition and the industry's own PR machine. And as the leading magazine serving the audio professional, *Studio Sound* has long been aware of the need for an accurate and comprehensive source of information on a wide variety of aspects of audio.

In response, The Pro Audio World Report and The Facility Survey represent a period of extensive research con-

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**Tel: +44 171 940 8598.**  
**Email: [lkdavey@unmf.com](mailto:lkdavey@unmf.com)**





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Email: show@ibc.org Web Site: www.ibc.org



## September

2-5

**AES UK Conference:  
High Quality  
Audio Coding**

Florence, Italy.  
Contact: AES.  
Tel: +44 1628 663725.  
Email: uk@aes.org  
Net: www.aes.org

5-8

**Plasa 1999**

Earls Court, London, UK.  
Contact: P&O events.  
Tel: +44 171 370 8228.  
Email: sophie.matthews@eco.co.uk  
Net: www.plasa.org

10-14

**IBC 99**

RAI, Amsterdam, Netherlands.  
Contact: Michael Crimp  
Tel: +44 1525 750880.  
Email: ibcpress@compuserve.com  
Net: www.ibc.org.uk

15-17

**Infocomm Asia**

Singapore International Con-  
vention Centre, Level 4.  
Contact: Infcomm Asia  
Tel: + 65 297 2822  
Fax: +65 296 2670.  
Email:  
Net: www.infcommasia.com

23-26

**Nordic Sound  
Symposium**

Bolkesjø Mountain Hotel,  
Bolkesjø, Norway.  
Contact: Richard Andersen  
Tel: +47 67 54 14 83.  
Email: riander@online.no

24-27

**107th AES Convention**

Jacob K Javits Convention  
Centre, New York, USA.  
Contact: Chris Plunkett, AES.  
Tel: +1 212 661 8528.  
Email: 107th\_exhibits@aes.org

## October

8-17

**Telecom 99**

Palexpo, Geneva, Switzerland.  
Tel: +41 22 730 5969.

12-13

**DVD Conference  
Europe 99**

Alfa Lisboa Hotel,  
Lisbon, Portugal.  
Contact: Understanding  
& Solutions.  
Tel: +44 1582 607744.  
Fax: +44 1582 472 946.  
Email: DVD99@undansol.co.uk.  
Net: www.undansol.co.uk.

15-17

**MusicBiz 2005**

Ex'pression Centre for New  
Media, Emeryville, California, US.  
Contact: Keith Hatschek.  
Tel: +1 415 227 0894.  
Email: info@hatschek.com.

21-23

**Broadcast India 99**

World Trade Centre, Mumbai  
(Bombay), India.  
Contact: Kavita Meer, Saicom.  
Tel: +91 22 215 2721.  
Fax: +91 22 215 1269.  
Email: saicom@  
bom2.vsnl.net.in.  
Net: www.saicom.com  
/broadcastindia

## November

2-3

**24th Sound  
Broadcasting  
Equipment Show**

NEC, Birmingham  
Contact: Point Promotions.  
Tel: +44 1398 323 700.  
Email: info@pointproms.co.uk  
Net: www.sbes.com

18-21

**Reproduced Sound 15**

Residential Weekend, Stratford  
Victoria Hotel, Stratford upon  
Avon, Warwickshire, UK.  
Contact: Institute of Acoustics.  
Tel: +44 1727 848195.  
Fax: +44 1727 850553.  
Email: acoustics@clus1.ulc.ac.uk

19-22

**SMPTE Conference  
and exhibition**

New York Marriott Marquis,  
New York, US.  
Contact: Bryan Nella.

Tel: +1 914 761 1100.

Net: www.smppte.org

22-24

**Messe Frankfurt**

Trade exhibition and conven-  
tion for audiovisual system  
installation  
CMF, Ludwig-Erhard-Anlege  
160327 Frankfurt  
Contact: Metin Ergül  
Tel: +49 69 7575 6130.  
Email: metin.ergul@  
messefrankfurt.com

## December

8-10

**Convergence India 99**

Pragati Maidan, New Delhi, India.  
Contact: Exhibitions India.  
Tel: +91 11 463 8680.  
Fax: +91 11 462 3320.  
Email: exhibitionsindia@vsnl.com  
Net: www.exhibitionsindia.com

## March 2000

5-7

**Entech 2000**

The Dome, Sydney Show-  
ground & Exhibition Centre,  
Homebush, Sydney, Australia.  
Contact: Caroline Fitzmaurice,  
Connections Publishing.  
Tel: +61 2 9876 3530.  
Fax: +61 2 9876 5715.  
Email: caroline@conpub.com.au  
Net: www.conpub.com.au

## June

6-9

**Broadcast Asia 2000,  
Cablesat 2000 and  
Professional Audio  
Technology 2000**

Suntec Centre, Singapore.  
Contact: Singapore  
Exhibition Services.  
Tel: +65 338 4747.  
Fax: +65 339 5651.  
Email: info@sesmontnet.com  
Net: www.sesmontnet.com  
UK contact: Overseas  
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## INTONATOR VOCAL INTONATION PROCESSOR

# SAVE TIME PRESERVE VOCAL INTEGRITY



Encompassing the heritage of more than 20 years of delivering professional tools to the professional industry, TC Electronic proudly introduces a high-end vocal processing tool aimed at reducing tedious engineering time spent on doing vocal re-takes - dedicated to the professional vocal recording engineer.

The Intonator not only provides the ultimate solution to vocal pitch correction, but offers various highly useful tools as well, including adjustable De-esser and Adaptive Lo-Cut (ALC™) filtering techniques.

### Vocal Integrity

Preserving integrity is a must when dealing with delicate human vocals. By dramatically reducing the amount of re-takes needed, you minimize the risk of fragmenting and potentially destroying the emotional integrity and consistency of the artist's expression.

The Intonator provides you with an ultra-transparent signal path thanks to industry-leading hardware specifications, incorporating TC's world-renowned DARC™-chip technology, 96 kHz internal processing and real 24 bit resolution. Utmost care has been taken in the software development as well, ensuring that all adjustments applied to the incoming signal are being processed in a subtle, yet highly effective manner!

### The Human Touch

Preserve the Artist's personal touch by allowing vibrato, initial intonation and limited correction individually. Use the custom scale feature to achieve a unique "Do-not-process-anything-but-this-note" setting. Specify when a specific note must be considered out of tune with the Pitch Window and limit the amount of Pitch correction added to these notes by using the Amount control.

### Features:

- ▶ Unique Pitch Intonation Processing
- ▶ Vocal specific De-essing
- ▶ Vocal Specific Adaptive Lo-cut filter
- ▶ 96 kHz, 88.2 kHz, 48 kHz and 44.1 kHz compatible on digital and analog I/O's
- ▶ Wordclock Input for external clock synchronization
- ▶ Fully integrated industry standard connectivity: AES/EBU, S/PDIF & ADAT digital I/O's
- ▶ ADIOS™ (Analog Dual I/O's) configuration enables simultaneous recording of processed and un-processed vocal
- ▶ Full MIDI automation makes correlation to external reference-signal a breeze
- ▶ Audio-to-MIDI conversion allows tracking of correction history
- ▶ Easy Edit user interface with dedicated chromatic front panel controls and Alpha dial control
- ▶ High resolution display provides instant visual feedback of intonation and corrective action

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Mistaken identity: the real beyerdynamic M99

### Mixing mics

FURTHER TO Dave Foister's review of our beyerdynamic M99 I feel we must point out some anomalies within the review, which will probably have left your readers as confused, as we are!

The picture shown in the article (June 1999) is the TG-X50 Mk 2 which is a side-fire dynamic microphone which has recently been upgraded and recent press information output probably explains how this picture entered got into your pending tray in the first place.

The M99 (see the correct photograph) was designed as an end-fire, large-capsule dynamic microphone specifically for on-air radio broadcasters and high SPL instruments such as saxophone and trombone. It is therefore very much at home with the applications Dave found it good for and judicious use of the EQ switches can certainly extend its applications. However the suggestion that the microphone may 'think' that it can also be a condenser is a bit wide of the point especially as this is far from the intended application and would probably perplex engineers who may try to use it as such.

Dave's review of the microphone has covered most of the design functions the M99 was created to fulfill very well. It is a high-performance dynamic microphone with all of the characteristics microphones with this operating principle enjoy: it has no aspirations to be

anything else. When we have designed a microphone, which can auto-detect what function it has to perform, we will get it to give you a call!

**John Midgley, Managing Director, beyerdynamic UK.**

### Challenger landed

DIRK BRAUNER recently (*Studio Sound*, June 1999) wrote about the application of surround recording techniques to different 'recording situations'. My objection to his argument is the way he takes unqualified and subjective research and attempts to imply a qualified conclusion from it.

Used by the experienced, most techniques quoted by Mr Brauner will probably render a totally different reaction from an 'independent' set of 80 non-professionals. The student's research as described is 'interesting'. Used as support for product promotion is a misuse of state educational funding. Or did I misunderstand Mr Brauner's motives?

Mr Brauner uses the term Foley rather loosely as a word for what I think he means as a 'live effects recording'? I hope this is a mistranslation and not the understanding of this subject. Mr Foley did not author the architects guidelines for Dusseldorf main railway station.

Making sense of a 5.1 recording on anything, but the production setup is a challenge indeed, we've done the research in that area and I am interested





to get Mr Brauner to explain exactly where the listener should stand or sit when listening to a recording made with his array in order to get the optimum results and whether they are allowed to move. If only audio, or physics for that matter, were easy.

Manufacturing microphones is an art for which I have the greatest respect and maybe selling simple solution fancy microphone arrays to students just out of college wanting to start live-recording companies is a good marketing strategy? Then again, selling worthwhile technology to an established and busy industry is maybe really the 5.1 challenge.

If this Challenger article represents the true depth of knowledge and understanding behind such developments, there is still a long way to go before these surround newlings catch up. I look forward to more speakers, more understanding of regenerating energy in rooms and a better understanding of what the late Michael Gerzon certainly understood very well.

**Anthony G Morris.**  
Net: [www.agmworld.com](http://www.agmworld.com)

### Degrees of accuracy

I READ WITH INTEREST Carl Snape's informative article on the history and development of recording media.

However, I believe there is an error in the unit of temperature used in reference to the heat treatment of

degraded analogue tapes (p76), where the values of 55, 70 and 45 degrees should read Centigrade and not Fahrenheit as printed.

I realise this is a typographical error of which you are already aware.

**Jonathan Lewis, Product Support Manager, Quantegy Europa**

### Lines on the timeline

I WONDERED who was responsible for the details and dates of the AES Audio Timeline [www.prostudio.com/studio/sound/may98/aes\\_timeline.html](http://www.prostudio.com/studio/sound/may98/aes_timeline.html)?

It reads '1881: Clement Adler, using carbon microphones and armature headphones, accidentally produces a stereo effect when listeners outside the hall monitor adjacent telephone lines linked to stage mikes at the Paris Opera.' Why would you say 'accidentally'? This is exactly what is specified in Ader's 1881-1882 patents. And the Paris Theatrophone parlayed this effect commercially for many years.

You have KDKA broadcasting in 1921 as the first commercial radio station—they started in 1920 and they weren't first, anyway. And what do you mean that EMI didn't renew its stereo patent in 1959? Normally, patents are not 'renewed'—if England is meant, then patents do continue for a specified term as long as proper government fees are paid during the course of the patent, but the absolute maximum was 14 years, if I recall.

If you need more details on the history of recorded sound, please visit my net-site at: [www.members.aol.com/allenamet/PhonoBooks.html](http://www.members.aol.com/allenamet/PhonoBooks.html)

**Professor Allen Koenigsberg**

### Radio daze

THESE THINGS are very difficult to compile, and I commend you for trying, but not only is the year wrong, the station is wrong too. Your timeline says: 1921: The first commercial AM radio broadcast is made by KDKA, Pittsburgh PA.

Umm, it was the 2nd November 1920, and no, KDKA was not first. There were several other stations already on the air. Westinghouse had a massive publicity department and they spread press releases about KDKA all over the known universe. The truth is about four other stations could also lay claim to having been first. A more accurate version would say something like 1920: commercial broadcasting begins with stations like KDKA in Pittsburgh PA, WWJ in Detroit MI and 1XE in Medford Hillside MA.

There are some other myths and legends on your timeline too but again, I commend you for trying to put something together.

**Donna Halper**

PS Don't forget 24 December 1906. Reginald Fessenden broadcasts voice and music over the wireless to the ships at sea (first time this had ever been done).

# & CONTROL



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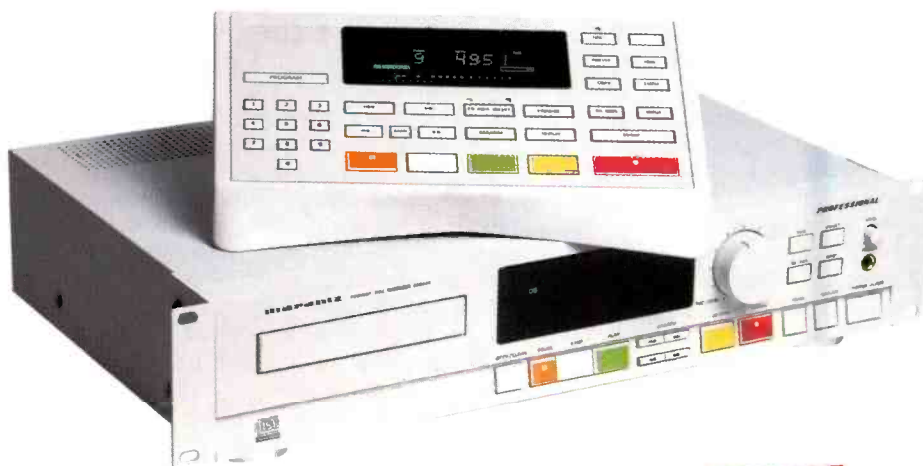
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# RUBY REWARDS

STUDIO SOUND'S 40TH ANNIVERSARY party continues with the Marantz CDR640 CD recorder taking centre stage. As you can see from the accompanying listing of equipment, many of pro-audio's top manufacturers have conspired to make our celebration one to remember by building a one-off custom model. And as a unique *Studio Sound* Ruby issue, each unit is destined to become a collector's item, not to mention being a talking point in your studio for years to come.



In every issue of the magazine until the end of the year, you will have the opportunity to win a further selection from the *Studio Sound* Ruby series. In this fourth installment, it's a ruby version of the Marantz' CDR640 CD recorder pictured above that is stealing the show. The CDR640 (*Studio Sound*, February 1999) comes with a wired remote (also in ruby red) and uses 20-bit sigma-delta A-D convertors and exclusive 20-bit BSDAC convertors. It also incorporates a high-precision 20-bit sample-rate convertor capable of turning an incoming digital audio signal, between 12kHz and 56kHz to 44.1kHz.

The RC640 remote control offers identical control and display to the unit, as well as additional features and functions. Control of the unit is possible simultaneously from the CDR640 front panel and the RC640 and operational status is displayed at the same time on both LED screens. All in all, it's a well-featured package.

ALL YOU HAVE to do to secure a unique Ruby issue Marantz CDR640 is to answer the questions below and light a ruby-red candle for the deity.

## THE QUESTIONS

- Q1** What was the first CD-R machine produced by Marantz?
- Q2** Can the CDR640's sample-rate convertor be bypassed?
- Q3** What nationality is the Marantz company?

**CLOSING DATE: MONDAY, 1st NOVEMBER 1999**

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

As long as you are a registered *Studio Sound* reader, you may enter any number of installments of the competition as long as you do so separately (multiple entries will be collected and used as fuel for *Studio Sound*'s summer barbecue), and include your Unique Reader Identification Number.

**...include your Unique Reader Identification Number.**

**The Unique Reader Identification Number is the 9-digit number located in the middle of the top row of your *Studio Sound* address label.**

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

# Studio Sound

## REWARDING RUBY PRIZES

- AKG 535** stage condenser, C1000, 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 VCI** compressor
- KT Graphic DN-360** graphic
- Marantz CDR640** CD recorder
- TL Audio CI** Classic compressor
- Purple Audio MC76** compressor



# hot property



POST PRODUCTION



MUSIC RECORDING



FILM SOUNDTRACK

## wave studios soho - london

*When Johnnie Burn and Warren Hamilton decided to create their own facility "Wave", in London's Soho district, the decision to go fully digital was immediate. However, their selection of equipment took a little longer.*

*They knew that in order to satisfy their Client's demands they had to optimise not only their award winning talents but also their speed of operation. The evaluation of the DPC-II was conclusive.*

*The consoles demonstrated the highest level of audio performance with an unmatched ease of operation. Johnnie has this to say:*

*Having had the demo we knew we wanted the DPC-IIs before we even knew the price. We had both previously worked on other major systems yet still remain consistently happy with our choice of console.*



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# DPC-II

digital  
production  
console



# Sek'D Samplitude 2496, ARC 88

Taking the established Samplitude and bringing it into line with surround-sound applications has supercharged Sek'd's sample editor. **Rob James** boots up and settles in

**T**HE SUCCESS that German graduate engineers, Tilman Herberger and Titus Tost enjoyed with their early digital audio processing experiments led directly to the formation of Sek'D. The first audio application, a sample editor for the Amiga computer, was released in 1988 and was capable of processing in 24-bit resolution, unusual for the time. Shortly after, the first multitrack version of Samplitude for the Amiga was released. From the beginning, the program has been based on virtual audio objects with real-time effects. Back in 1993, Samplitude was ported to Windows in an 8-track multitrack version and has been continually enhanced since. Sek'D is also responsible for the successful Red Roaster CD mastering package first released in 1995. The first hardware product, the Pro-dif 24-bit stereo interface card came in 1996 and was swiftly followed by the ARC 44, 4-channel and ARC 88, 8-channel cards. More recently, Samplitude's functions have been enhanced to include support for 24-bit, 96kHz working. The latest version of the software includes surround capabilities and MIDI record and replay.

For this review I had a late beta version of the new 2496 surround software and an ARC 88 card to enable the surround functions to be evaluated. The ARC 88 is a half-length PCI card and installed with ease. The eight channels of simultaneous I-O appear as stereo pairs to Windows in the usual way. Analogue connections are made via a 37-pin sub-D connector. Digital I-O, at 16 and 24 bits is via optical ADAT connectors. The ARC 88 driver provides a number of windows for setting input and output levels, metering and routing. The driver also allows live inputs to be mixed with playback channels. I used a 450MHz PIII with 128Mb of RAM and a 10Gb 7200rpm DMA33 EIDE drive for audio, with an 8.4Gb plain vanilla EIDE drive for housekeeping and software. With the current price of computer hardware this means my (modest) surround monitoring system costs more than the complete workstation package including card and software.

At this point I should declare an interest. I have been using Samplitude as a quick and simple source of audio when reviewing other equipment. I first encountered it last year, partnering a Yamaha DSP factory card, but until this latest release I had not explored its capabilities in full. Probably as a result of my background I am more attracted to

PC hosted DAWs which have audio recording and manipulation as their first premise. MIDI sequencers with added audio capabilities approach the problem from the opposite angle and I find this usually results in the audio functions being compromised in some way. Most often in the user-interface.

It is important to understand the trade-offs involved in using PC hosted DAWs as against dedicated hardware (whether the interface is a PC or not). In my experience, hosted DAWs are more prone to unexplained crashes and generally require more patience to fully exploit. One example is the amount of fine tuning necessary to extract maximum performance from the computer hardware. In Samplitude's case this means juggling parameters such as the number of buffers and their sizes and being prepared to find workarounds when the hardware cannot cope with the demands placed on it by over-ambitious use of effects or large numbers of simultaneous tracks. There are almost always ways around these problems but it takes time and ingenuity to establish satisfactory ways of working. A lot is being written and discussed on the subject of 'latency'—the delay introduced by inputting a signal, processing it and outputting it. This is always a compromise between number of tracks, effects and speed. Samplitude allows you to tweak parameters for minimum latency or maximum performance. Once suitable setups for particular purposes have been established, they should be saved as empty 'template' projects. Using these templates will allow much better productivity to be achieved without having to start configuration from scratch for each session.

Some of the terminology used by Sek'D may be unfamiliar at first. There are three types of 'project'. Hard Disk, RAM and Virtual. A Virtual project is used to make non-destructive decisions on recordings made in Hard Disk or RAM projects. Many of the editing and processing functions may be applied destructively or non-destructively. The advantage in the destructive processes is that less processing power is needed to play back a processed copy than to process on-the-fly. Samplitude can use up to 32-bits internally, but if this option is chosen roughly twice the processing power is used for a given number of tracks. As the manual says, 'With PC-hosted DAWs speed is king.'

The VIP (Virtual Project) window is where most of the action takes place.

It is a conventional track display with floating, dockable toolbars and standard Windows drop-down menus. Supplementary windows for transport control, time display, mixer, and so on, may be overlaid and positioned as desired. Each track has a row of seven buttons which give access to track properties, mute, solo, lock, volume and pan curve display-hide. Beneath these are stereo LED bar graphs and volume and pan sliders. The track display has numerous options for zoom level and the amount and type of detail. The tracks can be set to scroll, but this takes considerable processor power, or to jump a page at a time when the play cursor hits the screen edge. Alternatively, for minimum processor overhead, the cursor may be allowed to move off screen without updating the tracks. There are a number of cursor modes of which the most useful is 'universal'. In this mode placing the cursor in the lower half of a track gives access to 'object manipulation', in the upper half, 'locator and range manipulation'. Object manipulation is a powerful aspect of Samplitude. Apart from the usual editing functions each object can have 3-band parametric EQ and dynamics added. Once set these will move with the object and are independent of the track's EQ and dynamics, set in the mixer. Once an object is selected, by clicking in the lower half, five 'handles' appear which allow the object to be moved and or fades to be created. This can be done even while the project is playing. If multiple objects are selected, a fade, for example, may be created across multiple tracks in one operation. Crossfades are also catered for both across tracks and within the same track. If two objects are overlapped the Crossfade Editor window can be selected. This powerful tool allows all parameters of the crossfade to be set and adjusted. What all of this adds up to is an able set of editing and manipulation tools with the great bonus of speed.

The Effects menu allows a number of non-real-time effects to be applied, destructively, to objects or hard disk projects. Apart from third-party Direct X plugins Sek'D supplies dynamics, graphic and parametric EQ, de-clipping, DC offset removal, timestretching, pitch-shifting, sample-rate conversion, noise reduction, and a room simulator. This last uses the highly topical technique of convolution filtering to impose an acoustic derived from an impulse response sample onto the target audio. All of these effects can be previewed in real time before com-



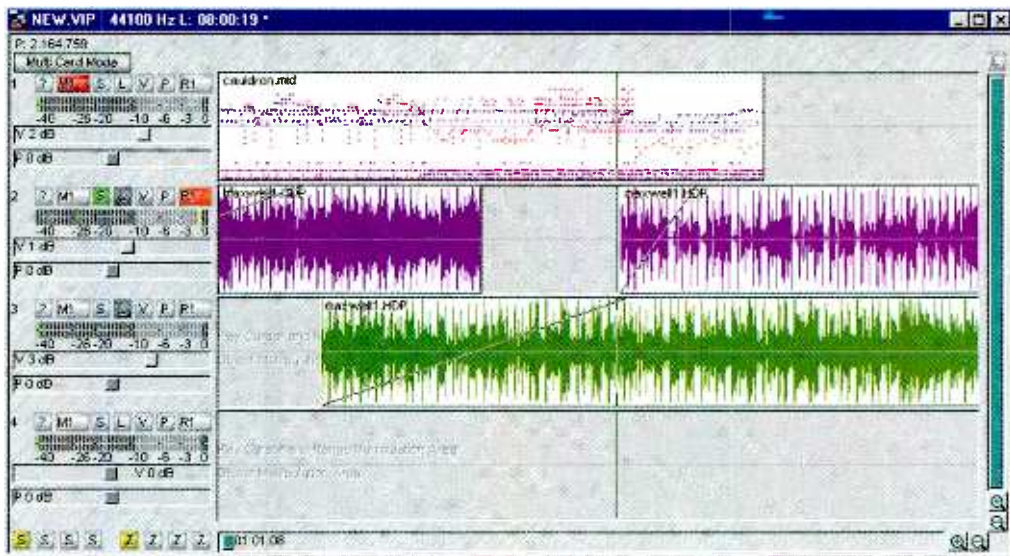
mitting to processing.

The Mixer window gives one channel strip per track, with a master section on the right. In the latest version, the mixer window may be resized. The graphics resemble a conventional console with knobs, buttons and faders. If an EQ or dynamics knob is right-clicked, a window opens with more comprehensive controls and an image of the curve applied. The mixer has dynamic automation of level and panning. This is fairly simple and works on a track basis. Once a mixer strip is armed (by pressing **AUTO**), any fader or pan pot movements are recorded. Subsequent passes with the strip armed simply replace the existing movements. The automation writes changes to the pan and volume curves in the Track display. These can be adjusted by pulling boxes around with the mouse. Direct X plugins are catered for and may be inserted into individual channels or the master section. The master section also contains a real-time de-hisser and stereo enhancer. Samplitude will generate MTC and MIDI sync or slave to them. I would like to see MMC (MIDI Machine Control) as well.

The surround capabilities are a big bonus. Samplitude is now able to work in 5.1 and simple 2-channel matrix surround. Encoding algorithms are included which allow final mixes to be produced which may be played back on any Dolby Pro Logic or similar decoder.

To get a feel for what might be possible I began by recording some sections of a track from DVD decoded into discrete 5.1. I then edited these including crossfades, EQ and level changes and overlaid some new material. Until you hit the 5.1 button, nothing appears different, but once in 5.1 mode the mixer changes a lot. The first job is to configure the outputs for monitoring. Because of the Windows stereo output pairing limitation I sent LR to 1 & 2, LS & RS to 3 & 4 and C and Sub to 5 & 6. Without a surround monitoring controller, I used a Yamaha 03D for the purpose. You could connect directly to the speaker amps, but I would strongly advise some form of volume control external to the DAW for sanity and safety's sake, if not convenience. Once you are happy with a mix it can be bounced to a new file without hearing it, alternatively it will be possible to mix to file, playing the audio in real time and adjusting on the fly if required. For matrix working a LtRt (left total, right total) file is produced and for 5.1 there is the choice of three stereo pairs or six mono tracks.

The PAN knobs in the channel strips



are replaced by square boxes each with a red dot indicating the current position of the channel output. Right-clicking the box brings up the channel's surround panning dialogue box. This has a larger representation of the soundfield. The red circle represents the audio source signal of the relevant track, the blue circles, the speaker positions. All of the circles can be freely positioned within the room by clicking on them and moving them to a new position. Right-clicking a circle displays another dialogue that allows further settings to be made. The concentric circles around the red source indicate the sound field of the source. Each circle represents 1dB volume drop. A divergence slider alters the area the rings cover—the amount the source drops in level at a given distance from the set point. This works in conjunction with a **SOUNDFIELD CHARACTER** slider in the **Panorama Settings** dialogue box. This varies the incremental distance between rings—whether the source sound drops in level with distance in a linear or logarithmic manner. The **Fade Offset** setting determines the volume level of the speaker output when the sound source is positioned directly above it. This is provided because the source signal may appear to be louder when directly moving over a specific speaker channel position.

The **SUB-BASS SETTING** button opens the sub-bass (LFE) dialogue that allows filter characteristics and routing to be decided (only for 5.1 Surround mode). **VOLUME** sets the volume for the track that is used for the sub-bass. **FREE FILTER EDITING** permits use of an FFT Filter as the Master filter. This allows you to draw the frequency response characteristic for the LFE channel. Right-clicking one of the blue circles displays the speaker channel properties box. This enables individual speaker levels to be adjusted and may

prove useful for setting up proper monitoring levels in the absence of a surround monitoring unit.

To please the noise police there is also a **Sigma Channel Constant Output** mode. When this is active, the overall output is reduced if the sum of all five main output channels increases beyond the specified value. Surround panning moves are automated in various ways. Either the red circle may be moved with the mouse or the two pan curves can be manipulated in the track display. Samplitude can also cope with surround panning of stereo tracks. The left and right channel signals appear in the left and right channels respectively of the **Surround Panner**. A combined mono signal produced from the stereo signal is placed in the centre and sub-bass channels. For 2-channel surround sound, the signal is also converted to mono for the rear channel.

Samplitude 2496 was already massively specified before the addition of Surround and MIDI capabilities. I am still making discoveries. For example Samplitude also supports integration with AVI or Quicktime video files and has the same CD-burning capabilities as Red Rooster. Bearing in mind the software I had is Beta it is reasonably stable, although one or two things are not

yet working properly. It appeals on many levels. Despite being feature rich it is possible to use it for simple tasks without taking weeks of practice to achieve a reasonable level of proficiency. On the other hand, with patience, it is suitable for a mind-boggling range of applications. The equation is

simple. If you want to do surround mixing and editing on a budget Samplitude will do the job. It will be less convenient than dedicated hardware solutions and may be frustrating at times, but it will do all this and a lot more for a fraction of the usual cost. ■

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# TL Audio VTC

If you're looking for a valve console and think that your options are limited to old classics, it is time to think again. **George Shilling** encounters a brand-new console with traditional valves and values

**T**HE TL AUDIO VTC (Valve Technology Console) has been some two years in development under the guidance of designer David Kempson. The ex-Neve project leader was also responsible for the hugely successful (and recently upgraded) TL Audio Classic Valve series. His long-standing association with Tony Larking Professional Audio Sales started with the EQ-1 and has proved fruitful ever since.

The VTC came about partly through demand for a console with similar sound quality to the famous outboard modules and partly because the demand for used classic consoles increases as their availability at length decreases. And surely a brand-new desk, without all the foibles, unreliability and irritating customisations of a desk that is 20 or 30 years old, is very appealing. Many digital-based facilities will plainly see the attraction of a console featuring valve circuitry. The first production VTC, a 32-channel model, has been sold to UFO Studios in Berlin. I was lucky enough to have a chance to try it before it was shipped.

An 8-bus design, the VTC is available in sizes from 16 to 56 channels, extendable in banks of 8 channels. However, unlike the typical project studio 8-bus console, each channel is a separate module, typically mounted

with two edge connectors. This in itself qualifies the console as professional. VTCs can be extended with additional channel banks. Each channel includes three upright ribbon-interconnected PCBs, only a few inches deep, featuring an array of socketed chips and other components—there are no valves here though. The twin triode for each channel is mounted upright on a ceramic base in the rear section behind the top of the channel strips. There is a valve on every microphone amplifier, monitor return and bus amplifier (including the mix buses). The surface is gently raked when the console is seated level on the sturdy stand (this is optional), which gives plenty of knee-space underneath, due to the quite shallow channel boards. The top panel of each channel bank can be removed to access the calibration pots for each valve. The control surface is very cool, and even the section containing the valves is only tepid, despite the valves operation at around 200V stabilised DC. Plenty of venting around this area helps, and also provides the operator with a glimpse of the glowing valves. Although the desk itself is cool, the remote power supply—a 3U-high affair for the 32-channel desk I tried—runs extremely hot.

The VTC looks terrific, with heavy American oak side-cheeks and front trim lending

the desk a classic appearance, reminiscent of old Neves and Tridents. The control surface is a smart uniform deep blue, similar to that of the Classic Valve outboard range. All knobs are large and pleasantly damped, having an 'oily' feel to them. They are secured by collet nut, so no screw or nut is visible with the cap on, and a sensible variation of cap colours guide the user around the channel. Sadly, the same cannot be said of the push-buttons, whose uniform grey colour makes things awkward, especially alongside the fader where there is a long row of switches. To a newcomer it is not clear at once whether the legending refers to the button above or the one below. Another problem with the buttons is that very few are accompanied by a LED, and their travel is quite shallow, so one cannot instantly spot which buttons are depressed. This could lead to a mishap or embarrassment, especially with the routing buttons. Generally, though, the layout is spacious and uncluttered, bucking the trend of other modern consoles that cram many small controls into a small area.

The input section of each channel features a preamplifier similar to that of the outboard PA-1. A single GAIN knob controls microphone and line gain, (centre detented for Line), a button marked LINE switches these inputs. >



Unlike the typical project studio 8-bus console, each channel is a separate module, typically mounted with two edge connectors. This in itself qualifies TL Audio's VTC valve console as professional





< Switches for Phase and 48V phantom power sensibly reside here. A useful 90Hz high-pass filter can be switched in here, the same as that on the C-1, (12dB per octave). A FLIP button effectively reverses the faders, but the small fader cannot be routed to the eight buses. A monitor trim allows  $\pm 20$ dB of gain for the monitor input, so all sorts of devices can be interfaced. There are also internal jumpers to allow +4dB or -10dB operating levels. Each channel features eight Auxiliary Sends. Sends 1-4 feature individual on buttons and rotary pots. Sends 1 and 2 are always postfade. Sends 3 and 4 can be switched to route to send Outputs 5 and 6 or Mix B (the Monitors' mix bus), and can be switched pre- or post-fade. Sends 7 and 8 are controlled by a single Level pot and a pan pot, and are switchable pre-fade or post-fade, and routeable to Mix B. All in all, this is a very flexible system, and in combination with the central section Phones routing, a very well thought-out arrangement.

The EQ section is arranged below the Aux send section and is within easy reach of the seated engineer. This is a 4-band EQ with two fully parametric mids and fixed shelving

High and Low frequency sections at 12kHz and 80Hz respectively, each with up to 15dB gain or cut. All GAIN knobs are centred. The parametric EQ bands are variable between half-octave and 5-octave bandwidths, enabling rich wah-wah sweeping or gentle sound shaping. High Mid ranges from an indicated 500Hz right up to 18kHz. Low Mid is indicated from 50Hz to 2kHz. Small boosts or cuts are easy to achieve, as the gain is gentle during the first 60° or so. At maximum 15dB boost, however, there is real power. I found the whole character of the EQ remarkably forgiving, and a joy to use.

The monitor section includes a 60mm fader that routes to Mix B. This stereo bus can be routed to the main Left and Right outputs or sourced from its own dedicated outputs. Unlike the knobs, all faders are undamped and extremely light in operation, making the ends of fades tricky. The monitor section includes switches to enable either the two EQ mid-bands or the HF and LF bands (or both) to operate on the monitor section instead of the channel—a very useful feature. Oddly, these sections switch on in the monitor path irrespective of the status of the EQ ON button.

There is also a button marked SRC that takes the channel source and feeds it to the monitor fader as well. The square MUTE buttons on channel and monitor are pleasant to operate, lit red when muted. Both channel and monitor faders are accompanied by Solo buttons with accompanying LED. PFL is the default mode, but the centre section features a SOLO-IN-PLACE button. In this mode, Monitor and CHANNEL MUTE buttons are linked, so this is really only useful when mixing. Incidentally, on the review model there were no visible channel numbers, but I was assured they would be printed on the CHANNEL MUTE buttons and a scribble strip below the large channel faders. Both faders are accompanied by a pan pot with centre detent, and green Signal and red Peak LEDs. These light at -30dB and +18dB respectively. With headroom of +26dB these are sensibly set, and very useful, as channel meters are not provided as standard. These will be optional: a 16-segment LED bar graph for each channel, globally switchable between tape out and tape return, sitting atop the rear of the mixer. Each bank is provided with a 25-pin DL socket for their connection. The meters that are provided as standard are beautiful back-lit vintage-style VU meters, one for each bus, and two for the main output. These look similar to those found on sixties' EMI TG-series desks and look superb, with arrow-headed needle pointers. A tiny red peak LED accompanies each meter, and the centre section additionally features Power and Solo LEDs.

A routing button for each pair of buses accompanies the channel fader. By default, each channel's individual output works as a direct tape track output. However, by pressing down the BUS button, the output is sourced from the related bus (1-8). For example, Bus 1 will also feed the tape outputs of Channels 9, 17 and 25 if those channels' bus buttons are pressed. There is also a LR routing button, that sends the channel signal (postfade) to the main outputs.

Although automation is not standard, monitor and channel faders are accompanied by dedicated automation buttons. A momentary STATUS button and a latching AUTO button are in place, ready for whatever system specified: there is no 'in-house' automation yet available. VCAs are not standard, but faders simply plug in, so moving faders are an attractive possibility. With automation on monitors and channels a huge amount of flexibility is possible. Incidentally, research is now taking place into a desk with digital control of all functions.

The centre section features individual master GAINS, MUTE and AFL buttons for the auxiliary sends. There are a generous six stereo returns, each featuring a balance control that becomes a pan pot if only the left input is connected. There is a fader for each return, along with AFL and MUTE switches. These are also attended by routing to the two phones buses. An oscillator sends to all buses and main outputs, selectable between 1kHz or 10kHz. A socket is provided for a talkback microphone, which can be routed to tape, studio, and the two phones circuits, with one overall Level control. Pressing TALKBACK also dims control room level, maybe slightly too >

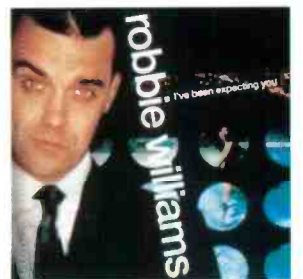




**PMC**

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





< much. The two phones circuits are wonderfully flexible, enabling stereo foldback, which can be sourced from any (or all) of the following: Control Room, Mix B, Aux 3 and 4, Aux 7 and 8 and Ext.

The Control Room monitoring section features a PFL trim  $\pm 20\text{dB}$ , a switch for Alt loudspeakers and a MONO button. Monitoring can be sourced from the main LR bus, Mix B, either of two 2-track inputs or an external stereo input. The large volume knob has a pleasant feel. Adjacent is the Studio Monitor section, with similar sourcing options. This section can usefully be set to follow Control Room selection.

Full-length faders are provided for bus masters. They can be switched on to route to the main bus and soloed. Automation buttons accompany the master fader.

On the review model all connections were

rear-mounted. XLRs are provided for microphone inputs and main outputs. Most other connectors are balanced TRS jacks. These are provided for Line and Monitor input, Channel (tape) output (the label DGROUP is confusing) and Return inputs. Inserts are unbalanced tip-send, ring-return, sleeve-ground jacks, and Aux send outputs are unbalanced. An internal Mosses & Mitchell bantam patchbay is optional choice. Alternatively, the console can be supplied with flying leads for connection to an external patchbay. In this case, just the XLR microphone inputs are left on the back.

Sound quality is quite excellent:  $-1\text{dB}$   $10\text{Hz}-40\text{kHz}$  is quoted, and the low-end sounds particularly good. Distortion from

channel to bus to LR is claimed as typically  $0.017\%$  across all frequencies. While noise is acceptable, this is probably not the quietest desk in the world. However, a warm and open sound with great coherence is the VTC's strongest attribute. It is very flexible and simple to use. Built in the finest traditions of solid British console design, it seems that TL Audio has identified a gap in the market and intend to exploit the situation. Although a lot more expensive than most 8-bus desks, the competitive pricing makes one wonder how the big boys justify their stately-home-sized prices. This is the only valve console on the market. Call me predictable, but I want one, and I want it now. ■

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# Choosing the right audio Codec.



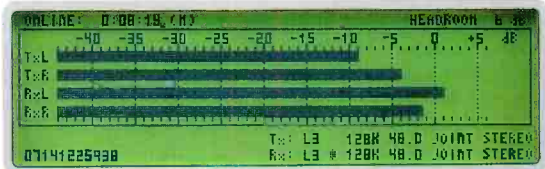
The Dialog4 MusicTAXI range is one of the most comprehensive codec packages on the market today. It contains all the standard ISO/MPEG audio coding algorithms in common use today such as Layer 2 and Layer 3, as well as CCITT G.722 for high grade voice bandwidth connections, and G.711 so it can talk to a plain old analogue telephone line, too. Connectivity features include upto three ISDN terminal adapters and X.21 port, for operation up to 384kbps. Dialing is quick and easy using the 96 entry directory.



The range of network protocols included means that it can be taken to virtually any part of the world. In the studio the audio i/o can be analogue or digital (AES/EBU & S/PDIF interfaces are both provided). The aux data channel enables embedded control data to be sent alongside the audio, and the unit can be controlled remotely from a PC or the external Remote Panel if desired. Most importantly automatic sensing of the codec at the other end of the call means that it sets itself up to communicate with the most commonly used systems in use today, i.e. Telos Zephyr, CDQPRIMA, Glensound and



others without complicated manual programming. Operationally the buttons are large and straightforward to use, while the illuminated LCD display gives a clear indication of what is going on at all times. No noisy internal cooling fan to worry about in quiet studio conditions. The Remote Panel can control a MusicTAXI from over 500m away via the RS422 interface. The online menu indicates online time, send-level, receive-level, adjusted headroom, Rx



and Tx audio configuration, SYNC flag of MusicTAXI at the other end.

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# dbx Quantum

Representing a leap from its established analogue expertise, dbx Quantum mastering processor promises much for the other domain. **Dave Foister** takes it to the limit one more time

**T**HE CONCEPT OF THE MASTERING processor is such a good one that now everyone has to have one. Normally this might spawn a series of dull me-too products, but by its very nature the genre offers huge scope for individual touches within the basic structure. dbx might well have been expected to apply years of dynamic experience to producing its own distinctive version, and sure enough here it is in the shape of the Quantum.

The essentials of the all-in-one digital mastering processor make up such a huge chain of treatments, with such a vast palette of adjustable parameters, that the display screen-data knob way of doing things might have been invented especially for it. However desirable one knob per function might be, that approach would make the Quantum the size of an SSL. Instead it has a big bright screen with a variety of helpful graphics, a bank of 15 buttons to call up the functions, and a data-wheel with integral push-button for selecting and adjusting parameters. The screen, while bigger than most, squeezes a lot in, and the resulting text is quite small and not as black as it might be.

Other similar processors have just one chain of building blocks; the order cannot be changed, and the only options you have are whether to use the blocks or not, or sometimes which variant in a block you prefer. The Quantum has three different signal path options, one of which immediately broadens its scope beyond that of overall stereo treatment of a finished mix. The first approach is the familiar one of a complete linked stereo chain with multi-band dynamic treatment, in this case dividing the spectrum into four bands with user-definable crossover points and slopes. The dynamics include the whole range of compression, limiting and gating, and are joined by flexible 5-band EQ that can be placed before or after the dynamics—an important option I haven't seen elsewhere. There is also an Ambience block, a stereo image adjustment, a normaliser and various dither options.

Another possibility is stereo broadband processing, where the multiband approach is sacrificed to allow additional processes. This introduces a complete EQ stage into the dynamics side chain, and also adds a de-esser. Finally the box can be used as two completely independent mono processors, allowing a complete path of EQ, de-esser, dynamics and dither-noise shaping to be used on individual signals. This is as far as I know unique; all the other such devices are stereo pure and simple and not intended for treating separate tracks.

Of course everything now has to be 24/96, and dbx has gone one better here by making all the internal processing 48-bit, allowing the use of only one stage of dither at the output. A-D conversion uses dbx' proprietary Type IV

process, claimed to give more headroom and the ability to add Tape Saturation Emulation. It also allows deliberate coloration of the signal from bright to dark with neutral in the middle, all of which is variable in its amount; if all this makes you nervous you can turn it off and use straightforward 24-bit 96kHz converters. In fact the differences are, while perhaps not subtle, perhaps ideal as a first mastering step to tailor the overall sound if this type of change is needed. Conversely, nothing very drastic is going to happen to the sound if the unit is left in its default position of no coloration. Note that it only does anything at all with an analogue input as the treatment is part of the conversion process—digital inputs remain untouched.

The processes themselves have everything that would be expected and then some, which is no surprise considering who made it. Central to any mastering processor is compression, and as this is dbx' strong point it's only to be expected that the Quantum com-

pressor is particularly elaborate. It features the familiar dbx OverEasy soft knee characteristic, complete with VariKnee giving ten different variations on the basic soft knee shape. Not only that but this parameter is separately adjustable for each of the four frequency bands, as are the threshold, the makeup gain, the ratio and the time constants, and even the application of automatic attack, hold and release times.

The limiter also works multiband, and also has ten levels of OverEasy available. This seems strange at first, but the point is that while the upper limit is a fixed brick wall, the transition into that limiting is variable. This makes the limiter far more powerful than the simple protection device it might be; playing with the knee almost obviates the need for a separate compressor if straight loudness is required. The gate section too is versatile, with variable ratio that turns it into an expander as well, plus the multiband operation that helps a lot with ends of tracks.

Adjusting all these can be done on a global or band-by-band basis, and the multiband crossover setting is assisted by a band monitoring mode that allows the crossover points and their variable slopes to be set to precisely the positions needed to home in on the areas requiring treatment.

All the dynamic processes benefit from TCM or Transient Capture Mode as featured in the dbx 172 Super Gate. This is a look-ahead (or more to the point a delay on the main through signal) that allows the gate to

open, or the compressor to compress, before the signal that it is responding to is heard, removing many of the unwanted side-effects and making attack time settings far less critical. This is by no means unique to dbx but is still very useful, particularly as it is fully variable up to 85ms—enough to have the gate open and close before the audio has even hit it in extreme circumstances.

EQ is very comprehensive indeed. Top and bottom bands are shelving only, but are both sweepable from 20Hz to 20kHz with five slope settings; all three mids are identical, with the same frequency range and variable Q, and all five can be globally switched between constant Q and adaptive Q. Impressively, exactly the same setup is available as the side chain EQ when in broadband mode. The one slight disappointment is the graphic EQ display, which is smaller and less informative than on some units. On the other hand, showing the EQ curve in the window has always seemed like something you do >



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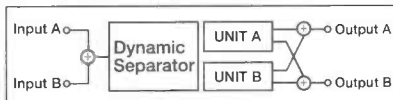


# 24-bit Reverb with Soul.

The SRV-3030 24-bit Digital Reverb Processor is truly a cut above other reverb processors on the market today. Thanks to its new DSP chip, superb 24-bit converters and a unique dual-processor design, the SRV-3030/D delivers lush, soulful reverb unlike anything in its class.

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# 24-BIT DIGITAL REVERB SRV-3030

\*The SRV-3030D model includes 24-bit coaxial inputs and outputs



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Everything works extremely well, with the range of control from subtle to brutal that can allow it to tackle virtually anything. Harnessing the power is always the difficulty, so that it becomes easy to alter presets and set things up just the way you want them rather than feel intimidated by a hostile and complex front end, but dbx seems to have done a good job on that score

◀ because you can, not because it's essential; your ears and a simple display of what you've adjusted should be all you need.

The stereo adjustment block is a simple width control, turning stereo into M-S and back again. A graphic shows the degree of change, which can go all the way from mono to a big hole in the middle. Note that unlike some of the competition this only works on the complete signal, not split into frequency bands. The Ambience stage is a dbx special, enhancing low level information such as reverb tails and guitar finger picking. In essence it seems to be a compressor working on bringing up the low level signals, with variable ratio, threshold and range, and on suitable material is a useful addition.

Gain normalising is a standard feature on a unit like this, intended to deliver the absolute maximum signal level to the destination recorder. On the Quantum this is sensibly the last thing in the chain, immediately before the dither and noise shaping section, and has its own limiter that can be set to soft or hard clipping. Although it is manually adjustable, it also has an automatic optimising function that monitors a representative sample played through it and then adjusts its gain so that the peaks hit zero and no more. This is followed by the stage that allows the output word length, three dither options (including dbx'

proprietary SNRZ) and two noise shape algorithms to be selected.

Setting this lot up is quite a daunting prospect, made easier by the presence of a good selection of factory presets and the now-obligatory Wizard. The presets are plentiful—a hundred altogether—and varied in style and approach so as to show the palette on offer; of course some are mono treatments intended for particular instruments and these are sometimes paired up in useful combinations like Fat Kick/Slam Snare or Country Voc/Twang E Guitar. The Wizard asks the usual sort of questions—whether you're mixing, mastering or tracking, what sort of music it is, how heavy you want the treatment to be—and then assembles a setup to suit. It is more flexible than it might appear, as the degree of processing is influenced by the music style choice, so that if you choose light compression on hard rock it will be more extreme than heavy compression on classical. The Wizard also allows the gain optimising routine to be invoked so you end up with the whole box completely set up for your material—with, of course, the option to tweak if necessary.

Digital tools include sample rate conversion and a bypass mode that allows true digital cloning. A nice touch is the option to only dither the digital output down to the required word length while sending the full 24 bits to the onboard D-A converter—perhaps so you can see what you're missing. There is also a 1.75Hz high-pass filter switchable on the digital inputs to remove DC offsets, and level adjustments for both channels of the digital input signal.

There's a lot of power in the Quantum, and all of it sounds very good, with an excellent degree of control. There's really no point putting together a mastering processor unless this can be achieved, as a weak link that necessitates the use of another processor alongside rather defeats the object. Here everything works extremely well, with the range of control from subtle to brutal that can allow it to tackle virtually anything. Harnessing the power is always the difficulty, so that it becomes easy to alter presets and set things up just the way you want them rather than feel intimidated by a hostile and complex front end, but dbx seems to have done a good job on that score. Nothing is very many buttons pushes away, and the screen shows

enough information simultaneously to allow you to keep track of what you're doing very well.

The Quantum package has a wide appeal that should see it stand up well against the existing competition. It does the standard stuff just the way it should, and adds enough of its own

twists to separate it out without identifying itself too closely with any particular musical area. No doubt there are more of these to come, but dbx looks to have got a good enough balance to stay in front. ■

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BE INSPIRED



# Lectrosonics IFB system

Applying its IFB technology to on-air communications, Lectrosonics has delivered a new approach to in-ear monitoring. **Neil Hillman** lends an ear

**S**OME DISCOVERIES, inventions or naturally occurring phenomena are so immensely useful to humankind that it can take a long of time to actually find a use for them. Take the bladder of a pig for instance—for thousands of years it performed a sterling, if unspectacular, task inside the pig until a stroke of genius saw it ripped from the animal, inflated and remarketed as a football. Those were the days. Or consider Teflon—widely assumed to be a development of the American space programme, when in fact an invention that prolonged the life of countless black pots and pans more than a decade before man hopped on the dusty bed of the Sea of

except for the channel spacing, which like the radio microphone system is 100kHz in the US and 25kHz in Europe; hence model number differences to denote the territory of operation—US TX/RX sets are known as T1/R1s while in Europe they are denoted as T5/R5s.

The IFB transmitter can provide a hefty 250mW of power, where local regulations permit which, allowing for the different absorption and reflection that occurs in most studios, means that the range is not going to become an issue of concern given sensible, rather than critical, antenna positioning. Otherwise power outputs may be either 50mW or 10mW. Outside broadcasts may fare even

+4dBu; RTS 1 is unbalanced, Pin 2 hot at +4dBu and RTS 2 is unbalanced, Pin 3 hot at +4dBu. Pin 1 is factory set to ground although an internal jumper may be reset if a floating earth is required. The inputs can withstand  $\pm 50V$ , although connecting the unit to a telephone line directly is not recommended, not least of all in case bell-ringing volts are sent from merrily on high into the input stage. Also on the rear panel are the BNC antenna connector and the 12V DC external power input. Current consumption is stated as no more than 250mA.

The transmitter has an audio processor stage that performs several functions. A shunt limiter looks after audio limit-



Tranquillity, in that summer of 1969. Today I just remember it as the time I got my first real 6-string.

Somewhat less left-field, then, is the application by Lectrosonics of their superbly efficient Lectro UCR300 UHF radio microphone technology to create an Interruptable Fold Back (IFB) producer-to-presenter 'on-air' communication system. The requirements are straightforward enough, allowing the presenter to wear a concealed ear-piece fed from a belt-pack wireless receiver and to be able to monitor any relevant programme audio sources as well as receive cues from a director in a studio gallery or OB control room. The Lectro offers five programmable memories, with a nonvolatile memory that remembers the last frequency selected on the receiver even if the power has been turned off for a prolonged period of time, or if the battery is removed.

The Lectro IFB system is identical in operation between the US and Europe

better given that the stated outdoor range at full power is in excess of half a mile without resorting to monster aerial rigs.

The transmitter itself is housed in a compact, black anodised aluminium enclosure measuring just 5¼-inch long, 3¼-inch wide and 1¼-inch high and weighing only 9oz. A microprocessor controls the 256 operating frequencies available within a factory set block of 13 bands and all transmitter circuits are regulated for frequency stability and improved audio response. The input to the transmitter is on a female XLR socket mounted on the rear panel, and this is a discrete differential circuit that enables a variety of input sources to be accepted. Alongside the single XLR input are a row of four DIP switches marked MODE that set the input pin configurations and input sensitivities to accept five standards: CC (Clear Com) is unbalanced with Pin 3 carrying audio at -6dBu; MIC (microphone) is balanced with Pin 2 hot at -40dBu; LINE is similarly balanced at

I think it possible that the company will be surprised by the popularity and take-up that these systems will enjoy in many European studios

ing, while the band-pass filter dispenses with signals below 100Hz and above 10kHz. A single-band compander is half of a pair that is made whole by the matching receiver, that decodes the signal and restores it to its original dynamic range. A 2:1 compression-expansion ratio is used with HF pre-emphasis providing a further 10dB of improvement in the signal to noise ratio. A complementary de-emphasis is provided in all receivers.

The Lectro IFB transmitter mixes an ultrasonic tone modulation at >



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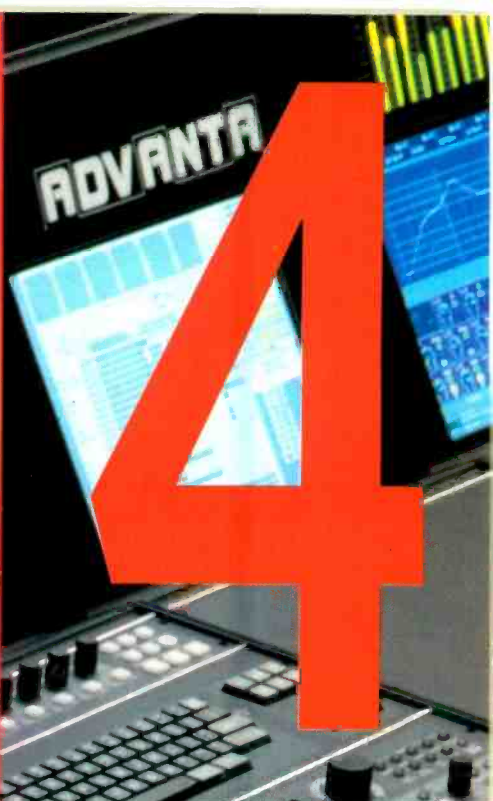
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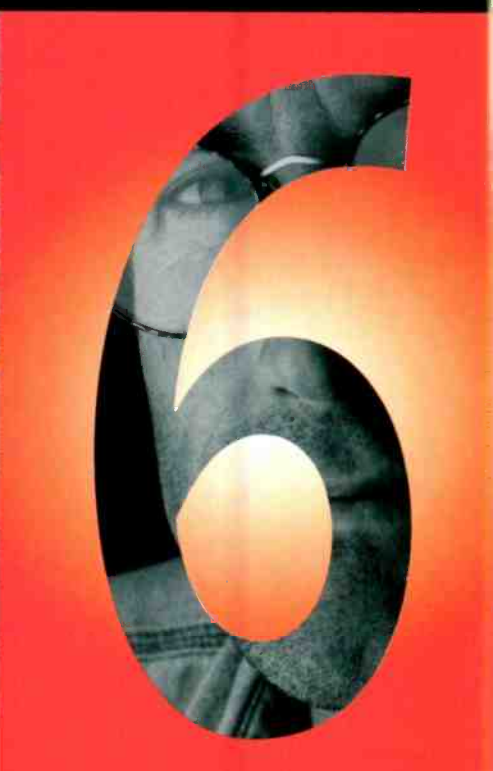
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< 29.997kHz with the audio signal on the carrier to operate the receiver squelch. This pilot tone controls the audio output muting of the receiver and is filtered out of the audio signal directly after the detector in the receiver so that it has no influence on the operation of the compander or later gain stages. The advantage of such a system is that the receiver will remain muted even in hostile and noisy RF conditions until such time as it hears the pilot tone from the matching transmitter.

The front panel of the transmitter houses the centrally placed 4-figure LED display that shows the frequency selected to 0.1MHz. The frequency select UP and DOWN buttons sit to the left of the display, with the 3-position OFF/TUNE/XMIT slider switch underneath them. The audio modulation level LEDs are underneath the display window and the rotary knob to adjust the audio level is to the right. The two audio level LEDs are set for '-20', to show when sufficient audio is present, and '0' that lights up when there is sufficient level to cause limiting. In practice some limiting is desirable to maximise the signal-to-noise ratio, and in fact the high overload threshold of the Lectro makes the limiting action all but inaudible.

The IFB receiver offers robust reassurance, matching black aluminium with a strong belt clip, and its simplicity is deceptive, with just one knob for ON-

OFF, audio level, channel programming and channel switching; and a single LED to show channel number, programming functions and battery status. The unit is powered by one MN1604 9V battery, that gives an operational life of 8 hours. A sliding cover on the left-hand side of the receiver accesses a preset potentiometer to set maximum output level and to match high-impedance or low-impedance ear-pieces, and a sliding 2-position switch selects mono or stereo for the ear-piece mini-jack plug.

Setting the system is also straightforward. The transmitter is set, firstly, by configuring the MODE DIL switches for the input type, and secondly, by connecting the antenna and power. The front panel slider switch is set to TUNE, disabling the RF output, and the desired frequency is selected using the frequency UP-DOWN buttons on the front face. The audio level is set to light the '0' LED on peaks, and then the slider switch is moved to XMIT to lock the frequency setting. If necessary, the LED display brightness is adjusted—by pressing and holding the frequency UP button while switching on.

To set up the receiver ensure the unit is switched on and is in range of the transmitter then press down and hold the VOLUME knob until the LED starts to flash quickly, then release. The unit is now in

programme mode and is scanning the band. The unit will stop scanning on reaching the transmitter frequency and the receiver LED will stay on as audio is heard on the ear-piece. Storing this frequency in the receiver is now achieved by pressing down once more on the VOLUME knob until the LED blinks to show that it has stored the frequency. In multiple transmitter setups the LED blinks in accord with the memory position it has allocated for that particular frequency (1-5). When the desired frequency has been stored, turning the receiver briefly off then on will ensure the last selected frequency before switch-off is selected the next time the unit is switched on.

Lectro claims that this IFB design is the result of extensive market research among users of such cueing-monitoring systems in the US. I think it possible that the company will be surprised by the popularity and take-up that these systems will enjoy in many European studios. Given the reasonable price of these units I suggest that it is in the best interests of Lectrosonics

to assemble a capacious wooden shed in the clear air of the Rio Grande Valley of New Mexico and stack it to the rafters with these IFB systems. Incidentally, the side of a shed makes a good ball-stop for lunchtime soccer games; with jumpers as goal posts... ■

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# Manley Massive Passive

Taking valve equalisation to new levels, the Massimo is an all-round heavyweight.

**George Shilling** flexes his credulity and appraises the 1999 SSAIRA award-winning EQ



**M**ANLEY HAS ESTABLISHED a mighty reputation for uncompromised outboard equipment. The attention to detail is astonishing; the manuals informative and entertaining; and the sound quality undeniably superb. So why make the Massive Passive? Surely, the Pultec copy has been done-to-death? Well, the MP goes much further, with Pultec-derived technology pushed into new realms. Like a Pultec, EQ is achieved passively—with no amplification of frequencies as such, only subtractions, with an overall gain make-up circuit. Here, the four EQ bands are wired parallel, (unlike most EQs). This avoids extreme signal loss, so less gain (50dB) is required. Manley claims other benefits to this approach. In essence, it makes it difficult to overdo things, by virtue of the way the bands interact. Three bands boosting a similar frequency by 20dB will give a 20dB boost, not a 60dB one (who needs that?). Transformer-balanced outputs are claimed to also bring a sonic benefit. Components have been carefully selected, and designed to interact musically, rather than achieving any artificial numerical goals in terms of bandwidth or decibels of boost. Rather than using a large knot of transistors (like most EQs), the MP uses metal film resistors, film capacitors and hand-wound inductors to sculpt the sound. The restorative gain circuits use valve gain stages. There are two valve amplifiers per channel, and valves are run at over 300V DC. The output is capable of (cleanly) driving up to 37dBu.

'Massivo' lives up to its nickname. This 3U-high beast is extremely heavy. The thick metal front implies that this is not a box to be sniffed at. On the back, a big mains transformer is oddly mounted outside the case, no doubt for sonic reasons. XLR and TRS jack connections are all at +4dB, but the jacks can be made to work at -10dB by flipping internal DIP switches. These are about the most modern things inside, and looking through the mesh top is like peering into the back of a veteran TV set.

The front panel has a smart, simple approach with the two channels' controls laid

out side-by-side with most of the controls mounted in black panels. The rest of the surface area is attractively etched metal. The larger panels are bolted-in modules which feature the controls and electronics of a single band, enabling possible future upgrades such as active bands, stepped-gain mastering EQ, and so on.

In the centre are the main controls: power is switched with a rotary knob. The illuminating TX button for each channel stays off for the first 20 seconds while the voltages build up to a relay click. The little GAIN knobs for each channel are really just fine-trims, with a usefully high-resolution range of -5dB to +4dB. High-pass and low-pass filters are also positioned here in the middle. These each offer five frequencies (and Off) which are a sensible range of 22Hz, 39Hz, 68Hz, 120Hz and 220Hz for high-pass, and 6kHz, 7.5kHz, 9kHz, 12kHz and 18kHz for low-pass. These are approximately 18dB per octave for the high-pass filters, but somewhat steeper low-pass filters, with an especially steep 18kHz filter that is a remarkable 60dB per octave (theoretical) for 'warming up digital'. The lowest three low-pass filters have a little boost just below the cut-off frequency, that adds some colour, instead of just dullness.

Each band on each channel includes two panels of controls. The first, permanently fixed into the front panel, features a toggle switch for Boost, Cut (with LED indicators behind the leg-ends) or Out, and a shelf-bell toggle. The former relates to the gain control in the other panel, and with only one direction to turn the knob, this gives double the range normally available on a rotary control. Therefore,

20dB of gain or cut is not unwieldy. These are stiffer and have a better feel than knobs on other Manley gear. There is little by way of calibrated legending, but this is deliberate, as with different settings there is between 6dB and 20dB maximum gain. Switched fre-

quencies are well-chosen, being roughly spaced in octaves. These settings overlap and interleave, with the Low band ranging from 22Hz to 1kHz, Low-Mid from 82Hz to 3.9kHz, High-Mid from 220Hz to 10kHz, and High from 560Hz to 27kHz. As well as its conventional function in Bell mode, the BANDWIDTH knob also controls the steepness of the shelf. When in Shelf mode, setting a narrow bandwidth introduces what is referred to as a 'Pultec shelf'—the effect you get on a Pultec when you boost and cut a low frequency simultaneously. This gives a little dip in the low-mids above the main LF boost. With the Massimo you can also do this 'upside-down' using Cut, and the effect is pleasing with an HF shelf too. And all four bands have shelving capability. By the way, the two highest and lowest shelves behave differently from other frequencies, so as not to cause problems with extreme settings.

In use, the subtlety of extreme settings is sometimes surprising and I found myself freely EQ'ing everything in sight as I recorded, often when I may not have EQ'd at all. Despite this perceived subtlety, the results were always far more satisfying than the 'flat' sound, and nothing like you would get from the conventional EQ on any console.

The manual is remarkable in the depth of its approach, with incredibly detailed explanations of why the unit is the way it is. The POWER ON switch warrants over 200 words. Almost every design feature is justified, and any thoughts of criticism are headed-off with an explanation. There is even a highly enjoyable section on studio engineering, that I suspect is more useful than certain audio engineering

courses. The only moan I can come up with is that the BANDWIDTH and GAIN knobs feel a bit too loose.

But either I am losing my touch, or this is the best outboard EQ I have encountered. The latter, I hope. ■

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## Denecke Dcode AD-20

A mic preamp and A-D converter brings a generation of portable DAT recorders into professional use. **Neil Hillman** bolts it on

**T**HE QUEST OF THE ALCHEMISTS to turn base metals into gold may recently have been advanced by an American company calling itself Denecke. That the announcement of the Dcode AD-20 was made at the ABRA (All By Ritual Activity society) annual conference held as usual at Camelot, only serves to support the suspicion.

Denecke is perhaps better known for time-code products than audio products, so the appearance of a battery-operated microphone preamplifier coupled to a 20-bit A-D converter may seem a strange departure. Further examination of the crystal maze, however, reveals the

inclusion of some electronic wizardry rather more reminiscent of a time-shaping nature.

The declared purpose of the Dcode AD-20 is to improve the performance of the generally poor microphone input front-ends on low-cost domestic DAT machines. It offers the output of the AD-20 microphone preamp as a 48kHz, 20-bit SPDIF signal, to be fed as either an optical or a co-axial digital input to the budget DAT recorder. An improvement in the signal-to-noise figure of up to 15dB is claimed, and at around only £240 (UK), it offers to make otherwise lowly DAT man-type machines to lead a much more useful life.

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## NEW TECHNOLOGIES

### Stellavox converter

The Stellavox ST2 D-A calibration converter is based on the company's 24-bit, 96kHz technology and claims exceptional signal time response. The D-A circuitry and



analogue filter proprietary design are said to give low-level linearity and exceptional time linearity said to be especially applicable to critical lab measurements and calibration duties.

Stellavox. Net: [www.stellavox.com](http://www.stellavox.com)

### Waves go a bundle

Plug-in specialist Waves has announced four bundles of processors, two each for TDM and native Windows-Mac environments. TDM II and Native Power Pack II are essentially similar, offering additional plug-ins to the existing bundles. Both contain the new equaliser and compressor from the audiophile Renaissance series, plus the DeEsser and MaxxBass plug-ins, and the TDM bundle also features the PS22 Stereomaker and MultiRack, offering real-time DSP processing using the Waves plug-ins. Pro-FX is a bundle of three specialised plug-ins now available for TDM systems, comprising the UltraPitch 6-voice formant-corrected pitch shifter, Meta Flanger for vintage tape flanging and phaser emulation, and MondoMod's selection of AM, FM and panning modulations. The Gold Native bundle consists of Pro-FX plus the Native Power Pack II selection, the L1 Ultramaximizer, the full C1 dynamics, EQ and effects package and WaveConvert Pro.

Waves, Israel. Tel: +972 3 510 7667.

### Studio Suite V4

Ingenium's studio management software, Studio Suite, has seen a major upgrade to Version 4. The package offers a comprehensive set of modules to handle all aspects of studio management from bookings to personnel, recall sheets (with over 130 standard sheets included), label printing, inventories and invoicing.

Ingenium, UK. Tel: +44 181 442 1522.

### Trace Services CD printing

Direct printing on to CDs is catered for by the latest addition to Trace's range, the Affex CD Artist, designed for high quality six-colour low-volume desktop CD printing. Its electronic sensors and unique tray loading design ensure registration accuracy of  $\pm 0.005$  inches and can print 72 CDs per hour at 360dpi on a 25% coverage. The resolution goes as high as 1440x720dpi for photo-quality imaging.

Trace Services, US. Tel: +44 1462 484248.



## NEW TECHNOLOGIES

**NEATO for DAT**

Having made its name with its CD labelling kit, NEATO now expands its labelling range with a kit of labels and insert cards for DAT cassettes. Each kit contains 20 label and insert sets plus practice sheets, along with MediaFACE design software for Macs and PCs, including copyright-free images. The labels are designed for clean removal to allow easy updating.

**NEATO, US.Tel: +1 800 984 9800.**

**Cadac recording desk**

The first recording console from Cadac in 21 years, the C-Type location recording console is aimed at on-site acquisition duties with up to 5.1 operation with level trims on the speaker outputs together with individual muting and phase reversal switches. Additionally the arrangement has the ability to solo in 5.1 and blend in the remaining channels.

Housed in a robust 'small-blue' burnished aluminium case and weighing in at about 11lb, the AD-20 has balanced, low-impedance microphone inputs on female XLR sockets set into the bottom face of the device. The left-hand side houses both the covered optical connector and the co-axial 3.5mm socket; a red LED that lights when the battery voltage is low; and the two small, uncalibrated rotary gain controls for the left and right channels. Due to the tininess of these they are best set to full bore and adjusted at the DAT input. The top face is three-quarters covered, the gap allowing entry for the powering 9V MN1604 battery, that is retained in position by a spring to allow for rapid and easy change. The battery life is given as between 8 to 10 hours and a large, stoutly riveted sprung belt-clip is affixed to the rear of the device ensuring its secure retention in

the front pocket of a recordist's mixer bag.

The AD-20 is also of use to owners of rather more sophisticated time-code DAT recorders, as the optional 'TCXO' socket mounted in the top face of the unit provides a highly accurate crystal-locked output signal, eliminating problems of time-code drift that can be encountered by such DAT machines as the HEB Portadat or the Fostex PD-4 when referencing or locking to their own internal generators. This option costs a further £110 (UK).

The device certainly does seem to work, noticeably so, on the inputs to my much-trusted professional machine; giving a much crisper, punchier

signal when compared to the same material recorded directly.

In spite of the AD-20 and the evident progress in metal transmutation, Excaliber remains undrawn from the stone. ■

**Contact**

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**Tel: +1 818 766 3525.**

**UK: Richmond Film Services.**

**Tel: +44 181 940 6077.**

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Broadcast Solutions

Available in 12, 24 or 24-input channel variants with 8 main groups, the console has dedicated stereo group, monitoring and comms facilities. The desk's input section can be expanded with bus extension connectors allowing additional channel frames to be added. Multipurpose LED meters are included together with the facility to connect external meters to all outputs and tape returns.

Spec wise the C-Type has been designed to give a phase shift of less than 1 degree at 20Hz with 100 channels routed to one group. **Cadac, UK.Tel: +44 1582 404202.**

**JBL maximises the output**

JBL has announced the 2012H 10-inch and 2020H 12-inch Maximum-Output cone mid-range transducers for direct radiating and horn-loaded applications. An innovative magnet structure aims to reduce harmonic distortion by means of a larger magnetic gap with a symmetrically placed copper shorting ring, producing a flat impedance curve over the entire pass band of the transducer. The smaller driver has been used in JBL's custom mid-range horns in the Venue Series, while the 2020H has been used in special custom systems on tour and in stadium installations.

**JBL, US.Tel: +1 818 894 8850.**

**Audio-Technica boundary**

Just introduced to Europe is Audio-Technica's AT849 stereo condenser boundary microphone, designed to provide full, natural stereo ambience and sound reinforcement. It is an X/Y stereo microphone with full mono compatibility, and features two wide range UniPoint elements giving a frequency response of 30Hz to 20kHz and SPL handling to 137dB.

**Audio-Technica, UK.Tel: +44 1132 771441.**



# DK Audio MSD600M

Master Stereo Display **Dave Foister** takes the necessary measures



**T**HE BUSINESS OF MEASURING audio signals, digital signals in particular, has become more important as we strive to wring the last drops of resolution from our recording chains. It is a business DK Audio knows well, putting it in a informed position to provide the kind of measuring tools an increasingly multichannel and space-conscious industry needs.

DK's range of stand-alone meters and vectorscope displays is reasonably familiar, and is now joined by the biggest and most versatile model yet, the MSD600M. In a tiny slim package dominated by a colour LCD screen it manages to squeeze in eight channels of level metering, a vectorscope, surround monitoring and spectrum analysis. Each pair of inputs

can be switched between digital and analogue, and there are also audio outputs, either echoing the inputs for monitoring or providing a range of test signals.

With all the possibilities installed and connected, the plugs on the back take up more space than the box itself. They are all D-type multiways, and DK provides snakes to break these out into the relevant connections. Various options allow for combinations of digital and analogue I-O on the main audio modules, and further connectors on the master module provide an output for an external VGA monitor and serial links for software updates from an external PC.

The main screen is divided into two main sections. On the right is the metering area, with eight vertical bar-graph displays, while on the left is a bright and fast vectorscope. This has vertical and horizontal axes plus markings for left and right at the appropriate 45° positions, and is augmented by a correlation meter alongside it, showing green above centre for in-phase signals and red below centre when there are significant out-of-phase components. This is a useful adjunct to the main display pattern, which shows more information but can not give this immediate correlation check.

The patterns shown on the main display are familiar to anybody who has used a vectorscope

## NEW TECHNOLOGIES

### Z-Sys SRC



Z-Systems' z-3src is the successor to the company's z-2src which adds support for high bandwidths and longer word widths. With 24/96 capability the box can perform sample rate conversions over a 1:3 to 3:1 range and output in 16, 20 and 24 bits.

It also supports a variety of input and output formats and synchronisation options.

**Z-Systems, US.Tel: +1 352 371 0990.**

### Amek DMS Plus Pack

Amek's Digital Mixing System consoles see a major upgrade in the form of the Plus Pack add-on. This comprises the DMS-XP audio expander, increasing the capacity of the DMS to 96 mix inputs all with EQ, and the Channel Panel, offering control-per-function operation of all channel parameters using 48 rotary encoders and 32 switches. At the same time the software reaches Version 3.3, with simultaneous Dynamic and Snapshot automation, Pan/Divergence editor and Multiple Operators Mode. More new hardware includes 24-bit analogue I-O featuring improved converters, which can be retrofitted by existing users.

**Amek, UK.Tel: +44 161 868 2400.**

# Opal

## DPR-944 2+2 Parametric Compressor & Gate

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NEW TECHNOLOGIES

**ServoDrive Unity**

ServoDrive's Unity series loudspeakers have a patented Unity Summation Aperture design that is based on employing a pyramid-shaped, multiband waveguide to combine the amplitude and phase from a variable number of drivers into a single coherent output. Key claimed benefits include unmatched clarity for voice intelligibility and music reproduction, controlled directivity in a 60 x 60 dispersion pattern, increased efficiency resulting in a 30% reduction in the number of speakers required for a given application, and 'distortion free' performance to 130dB (80Hz-20kHz ±2dB).

ServoDrive, US.Tel: +1 847 724 5500.

**Rorke Galaxy Series**

Rorke's leading edge storage range now includes the Galaxy Series of solutions ranging in capacity up to 3Tb. Three models are included; the Galaxy 50 is a Fibre Channel to Fibre Channel RAID solution, the Galaxy 5 a Fibre Channel to SCSI (LVD) solution, and the Galaxy 100 a Storage Area Network centralised storage solution with simultaneous Fibre Channel connectivity to up to eight servers.

Rorke Data, US.Tel: +1 612 629 0300.

or even a simple oscilloscope in X-Y mode. For the benefit of anybody who has not, a mono signal shows as a straight line (vertical for both channels, 45° off for one channel only), and a stereo signal as a kind of dancing wire-wool effect. Healthy stereo with good correlation is taller than it is wide, while potential phase problems show when the width is greater than the height. Simple tones will produce the Lissajous figures familiar from school physics. The point about DK's display is its speed and brightness, being visible from across the room and continuous enough to be meaningful all the time, probably thanks to its scaling as much as anything.

The eight level meters are equally visible, and have a multitude of options to suit different operational preferences. Seven different scales are provided, including traditional PPM and vu, digital with 0dB at the top, one showing the top 6dB in very high resolution, and other international standards. For each, colour schemes are adjustable, including changing the colour of the bar graph at a user-defined level, and peak hold is available too.

Two elements of the software are optional extras. The first expands on the vectorscope display by interpreting the directional components of a surround sound signal, and it can do this in one of two ways. Since the unit has eight inputs, it can accept full discrete 5-channel surround information that is then shown as what DK calls a jellyfish display, indicating where signals will appear in the sound stage. There is also an optional surround pseudo-

decoder, accepting an encoded 2-channel signal and displaying where the decoded result will appear.

The second option is an FFT spectrum analyser with 1024 frequency bands and an 80dB dynamic range. This can analyse individual input channels or summed pairs, and even has a choice of windowing options and a memory for storing curves. A movable cursor shows the instantaneous level at any chosen frequency.

All of these options are controlled by a soft-key system using eight buttons along the bottom edge to access menus and alter parameters. Nothing is very far away, although I would like to see a PEAK RESET button in the main menu rather than tucked away with the metering options. Trying to press the buttons with the meter simply propped up on top of something shows why there is a mounting hardware kit provided with it.

The intention is that the unit should become a permanent partner to your console, either mounted within it or fixed to the top using the supplied brackets. There is also a stand base available for less permanent installation, and this would seem to be essential as the combination of its light weight and the cables hanging off the back make it unstable.

But this is not a problem as the MSD600M is likely to become a permanent part of the system very quickly. Its bright, fast, informative display packs a lot of useful stuff into a small space in a way that draws the eye and allows for fast interpretation, making it a helpful tool indeed. ■

**Contact:**  
**DK Audio**  
 Marielundvej 37D,  
 DK-2730 Herlev, Denmark.  
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# Two Compressors with Dynamic EQ



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## OPAL DPR-944 – Dynamic EQ is addictive

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# Grace Design Lunatec V2

These American microphone preamps have been aimed at the studio. But **Tim Goodyer** finds this model delivering quality on location

**M**OVING OUT of the studio and into the field, Grace Design has come up with the Lunatec V2 location mic pre-amplifier. Quality is the name of the game here, as evidenced by a quoted frequency response of 6Hz–250kHz and phase deviation of <math>\lt; 8^\circ</math>. Certainly, there is little doubt that adding the Lunatec to any of the popular location DAT recorders would bring it into line with the performance of a studio-based system. And for that matter, the half-rack Lunatec would serve the studio equally well where rack-readiness is not the primary consideration and where there is a need to strike camp for a session once in a while.



Building on the success of the earlier Model 801 and 201 (*Studio Sound*, September 1997) the twin-channel Lunatec uses the same trans-impedance amplifier technology that serves its sisters so well, and adds an onboard M-S decoding matrix. Two identical channels follow the earlier models' schema, offering individually switched 48V phantom power (or alternatively 12V parallel power); 11-step Gain controls (10dB–60dB in 5dB steps); Trim controls (10dB continuous attenuation); peak LEDs showing green at -14dBu and red at +16dBu; and switchable high-pass filtering. A mains switch, and LEDs indicating power on and low battery condition complete the front panel. The only apparent omission here is a phase reverse switch. Power (at either 6V or 12V) comes either via a wall wart or a battery pack, through a single 4-pin XLR on the rear panel, the rest of which carries balanced input XLRs, balanced output XLRs and unbalanced output phonos that are active simultaneously.

The filters use a transitional Thompson-Butterworth response in 12dB/octave configuration as designer Michael Grace believes this to give the best combination of pass-band flatness and phase accuracy. Each has a 3-position toggle switch on the front panel giving either 50Hz and 100Hz or 75Hz and 125Hz cut-off frequencies as determined by the position of a pair of internal jumpers. Further internal jumpers are used to set the filter slopes to 6dB/octave or 12dB/octave and to enable the M-S decoder.

In operation, the Lunatec feels sturdy without being unnecessarily over engineered or overweight at 1.1kg. The hooding around the front panel offers a useful degree of protection to the front panel controls and also maximises the usefulness of the LEDs by keeping

the direct light falling on the panel to a minimum. You could be forgiven for believing that the use of jumpers is a clever device to draw your attention to the standard of internal construction, but to preset aspects of the preamp's operation keeps the panels clean and operation simple. Admittedly, it presupposes that you will not want to make hurried changes during a session but this is a fair assumption—particularly for location work at which the unit is primarily targeted. Incidentally, access to the jumpers is via four screws in the top panel, and the jumpers themselves can be readily moved with a pair of long-nosed pliers. Although not distinctively marked, even remembering which jumpers are which is fairly easy.

The manual is comprehensive and accessible, if not glossy and glamorous—I know which I would prefer to need to read—and covers everything from gain adjustment through internal jumper settings to M-S operation, and battery life. The review model came with an Eco Charge sealed lead-acid battery capable of giving in excess of 10 hours operation that worked perfectly once charged overnight. It is worth noting that certain prestige location recordists prefer to use separate power supplies for mic phantoms from the rest of their setup on the grounds that audio transients are better handled when the mics are not in competition for current. While the Lunatec does not isolate the power demands of your mics from their preamps it does offer to make the package independent of all other equipment, and is certainly a step in this direction.

In use, the Lunatec V2 exhibits the same clean and open qualities that separated the Model 801 and 201 from the crowd. Noise is very low (-130dB at 60dB gain ref to input quoted) and the transparent quality of the circuit topology lends a sense of ease to the sound. Of course, some preamps are chosen for their 'sound' in particular application and if that's your requirement, you should pass the Lunatec over. In M-S mode, Channel 1 provides the 'sum' signal and so provides the central element of the stereo image and Channel 2 provides the 'difference', thus the Channel 2 Gain control controls the image width—more difference signal to the decoder matrix giving a wider image. Again, the Lunatec could not be easier to use.

While the merits of the Lunatec's performance and the thoroughness of its design speak for themselves, it is worth pointing out that the older Model 201 offers two channels of mic preamplification ideally suited to a studio outboard rack, while the new unit adds M-S decoding, filters, battery operation and knocks some \$400 off the asking price (at \$1495 US). It is still not cheap, but nor does it sound or perform as if it were. ■

## Contact

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Tel: +1 303 443 7454.  
Fax: +1 303 444 4634.  
Net: www.gracedesign.com**

## NEW TECHNOLOGIES



### MOTU Polar

MOTU Digital Performer Version 2.6 adds Polar, a RAM-based audio loop recording feature which creates as many layers in real-time as RAM permits.

Other enhancements include direct audio input from Retro AS-1 and Unity DS-1, a new AudioTap MAS plug-in, and the naming of audio inputs, outputs and buses.

**MOTU, US. Tel: +1 617 576 2760.**

### Prism's new analogue

Prism's acclaimed range of converters is joined by its first multichannel offering, the ADA-8. The unit offers eight channels of 24-bit 96kHz conversion both ways in a single unit, with interfaces for many formats including ADAT, Tascam and Sonic Solutions. A comprehensive range of features includes MR-X word-mapping for recording high-definition audio across multiple tracks of a 16-bit MDM (all the way to stereo 24/96 using all eight tracks); Prism's DRE system for getting 24-bit performance out of 16-bit media; Prism's SNS noise shaping for straight 16-bit recording; selectable 'Overkiller' fast limiting; and flexible patching, monitoring and metering facilities. On the analogue side Prism has introduced the MMA-4 microphone preamp, seen as an ideal front end for the AD-2 stereo A-D convertor. It joins the Maselec Master series of processors and offers four preamps with frequency response from 1Hz to 200kHz, very low noise and distortion, and all the essential features such as 3dB gain steps, bar graph PPMs, switchable phantom, phase reverse and mute.

**Prism, UK. Tel: +44 1223 424 988.**

### Opcode interfaces

Opcode's new line of USB (Universal Serial Bus) ports are beginning to appear, with the first three now shipping. These allow USB-compatible computers running Windows 98 to interface with SPDIF devices (DATport), SPDIF and analogue (SONICport) or Toslink SPDIF and analogue (SONICport optical). 16-bit and 24-bit audio are supported at rates to 48k, and the analogue interface has 20-bit D-A converters. Alongside these are 32, 64 and 128 channel MIDIport interfaces and the STUDIOport AMX audio and MIDI interface, with 2 in/4 out analogue connections, SPDIF I-O and 64 channels of MIDI.

**Opcode, US. Tel: +1 650 812 3382.**



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# Cranesong STC-8

Mixing new ideas and old values, this class-A compressor-peak limiter combines quality and operation. **George Shilling** enjoys

**T**HIS IS A SOPHISTICATED US-built stereo compressor, designed with attention to detail in both function and form. The unit's designer David Hill has taken a scientific approach - the manual is littered with charts and diagrams. But this approach is firmly based on sonic performance. The circuitry is all discrete class-A, with the benefits of second harmonic distortion components, which are more musical than the odd-order harmonics you tend to get with integrated circuit op-amps. One disadvantage is of course a higher price, another is that a significantly greater amount of heat is generated. Indeed, the rear of the STC-8 runs warmer than many valve units. There are external and internal heat sinks, the latter holding hot discrete transistors. With its meshed top panel, extra rack space must be allowed for adequate ventilation above the 2Us that the STC-8 occupies.



This is an extremely well constructed unit with sturdy internal bracing. Connectors are XLR, of course, but there is also a DI3-15 connector for side chain connections and switching, so you will need to get a special lead and switch for this. The metal front panel has a smart arrangement of attractive blue-green knobs, smart black toggle switches and excellent LED-segment metering. If it sounds as good as it looks, this should be some compressor. And it certainly is. The Crane Song STC-8 is surely one of the smoothest compressors I have used. You can make it distort using very short times and winding up the SHAPE control, but it never sounds unpleasant. Although there is a conventional THRESHOLD knob, the SHAPE knob takes the place of most compressors' Ratio controls. Being a soft-knee design, this unit's ratio varies depending on input level (and release times). The STC-8's SHAPE controls the gradient of the compression curve. This is akin to a ratio control but is a much more intuitive way of controlling the 'depth' of compression. The ratio typically reaches only 5:1 with 18dB of gain reduction, and the unit seems to work happily and cleanly with such large amounts of gain reduction. The OUTPUT GAIN knobs have a sensible 14dB range of make-up gain. They also have a pleasant stepped action.

A virtually bullet-proof peak limiter is included. You can set this for overload prevention, say when recording to a digital format, and it sounds remarkably clean and reacts very quickly, reaching a ratio of over 10:1.

A 16-way MODE knob gives different combinations of available compressor modes. Unnecessarily complicated and poorly leg-

ended, I found it difficult to visualise what each setting meant at first, so new users would probably need to spend some time familiarising themselves with this. The Program Dependent Release (PDR) mode prevents unwanted background noise surging up in the gaps, whilst retaining faster release times within normal program level variations. Alternatively, fixed release times can be selected. The Dynamic Attack Modification (A-MOD) mode enables peak limiting to dynamically modify the compressor attack time, so that slow attack times can be combined with peak limiting. In this case, any signal triggering the peak limiter shortens the compressor attack. These two 'on-off' mode choices are offered in all permutations, adding up to the four main regions of the knob. Each of these sections is then subdivided into four settings: three Attack-Release presets - A (for vocals), B (for bass or 'punch') and C (for program), and a Variable setting allowing you to manually set Attack and Release with the knobs. The three presets are achievable in V mode by setting the ATTACK and RELEASE knobs to the values quoted in the manual. The duplication of these settings seems unnecessary and spoils the otherwise excellent layout. Separate 4-way switches would have made preset and mode selection much more straightforward. Due to their variable nature, the Attack and Release knobs are simply calibrated 0-10. Their ranges depend on, and interact with the Shape setting, mode selected, programme material and gain change, giving much more usable ranges than those often encountered.

The intriguingly labelled HARA KI switch sounds intimidating but is explained in the manual as a remarkable function to convert induced 3rd harmonic distortion into more sonically desirable 2nd harmonics in the Ki position. It certainly seemed add a very pleasant, subtle glow to some signals when using powerful and fast compressor settings, but much of the time it is almost or completely inaudible. The switch affects both channels simultaneously, and in the Hara position the signal is left 'transparent'.

This is not going to be your first choice compressor if you want to hear some pumping and grit. Subtly audible gain reduction is what the

Crane Song does best, and it does this exceptionally, despite huge indicated gain reductions on the meters, (which can, incidentally, also display output level or peak reduction). The Crane Song is capable of very fast, almost 'invisible' gain control, as well as smooth slow compression, which can also be remarkably

transparent. That is not to say it sounds bland. I enjoyed it particularly across a whole mix, and it was excellent with acoustic instruments such as piano and guitar. Although thoroughly modern, the STC-8 has a proper 'old school' sound. Recommended. ■

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Email: sales@funky-junk.co.uk**

## NEW TECHNOLOGIES

### WaveFrame paves the way

In preparation for the launch of the recently demoed WaveFrame 7.0, the company is shipping V6.5 software to significantly enhance the power and utility of its DAWs. Support is included for the WaveFrame 7.0 DSP engine as a mixer add-on with plugins from Waves, Wave Mechanics, Q-Sound, Antares, Aphex and VocAlign. Also new is import-export of Broadcast WAVE file format, MIDI time code, recording on 8 tracks for each SCSI bus, and support for the new E-mu sampler card option. New editing features include reversing regions, allowing designated sections to play backwards while the rest still plays forwards.

**WaveFrame, US. Tel: +1 510 654 8300.**

### Yamaha 3-way mixer

Yamaha's EMX680 ST powered mixer goes literally one better than the established EMX640 by adding an extra power amplifier, giving two for FOH and one for monitors. All three are 135W EEEngine designs, and the left and right channels can be bridged to deliver 400W into 4Ω. The F Series professional cabinets are intended for small scale touring, clubs and installations. Features include 12, 15 and 18-inch cast frame LF drivers, built-in fly points and castors and a 1.4kW peak handling capability.

**Yamaha, UK. Tel: +44 1908 366 700.**

### DAS Energy series Amps

Using CAD for electrical and mechanical design, the Energy series amps from DAS use the company's DMAT concept. Discrete Monolithic Amplifier Technology couples a number of self-managed amplification cells with Parallel-Bridge Topology to form a single output. Each cell includes an active limiting circuit and a full set of protection circuits that are claimed to make the amplifier virtually indestructible by voltage oscillations, short circuits, thermal runaway and instantaneous temperature peaks. Four models are available from 125 to 650W rms.

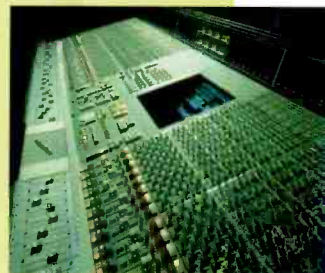
**DAS Audio, Spain. Tel: +34 96 134 0860.**

### SL9000 J Series software

Version 4 of the SL 9000 J software offers new features in several areas. Machine control facilities are extended, with revisions to parallel machine control and automatic identification and configuration for controlling serial machines. Additional project management tools are incorporated, including automatic file version handling and a simplified user interface.

New operational features include additional automation functions time-code masking and offsetting, and increased grouping flexibility, which enhances 4-channel panning, extending the creative control of 5.1 mixes.

**SSL, UK. Tel: +44 1865 842300.**





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SONIC SOLUTIONS



# JoeMeek VC7

A mic preamplifier with the largely forgotten twist of impedance matching is what **Dave Foister** discuss. And it's green.

**T**HERE ARE TWO THINGS associated inextricably with JoeMeek processors: the bright green colour and the likelihood that there will be an optocoupler somewhere inside. JoeMeek means character, summoning up the trademark sound and packaging it for the nineties, and at the core of that character is the compressor. Here, though, is a JoeMeek box that sells just the opposite: the VC7, a precision microphone amplifier with aspirations of top-end neutrality and not a sonic signature in sight.



It is still very green, with the big brash knobs, lights and meters that mark out JoeMeek cosmetics. In fact there are several more indicators than might be expected, unless you have noticed that the VC7 calls itself an impedance matching preamp; this explains one extra rotary switch and a vertical row of orange LEDs.

This is not the first mic pre to acknowledge that not all microphones have the same source impedance, or to offer alternatives to get the best out of the 'non-standard' ones. But it does have the biggest selection I have ever seen, allowing it to accommodate virtually any microphone you care to name without compromise. Thus there are two settings without phantom power at 50Ω and 200Ω, plus three with phantom at 'Low', 200Ω and 600Ω. Of course most modern condenser microphones will be happiest with the 200Ω phantom setting, but some will prefer the higher impedance and some transformerless types the Low. The 50Ω non-phantom position is obviously intended for use with ribbon microphones.

Having made this initial setting, everything else is straightforward, although there is a little more help and flexibility on offer than might be considered standard. Gain is handled by two controls, for input and output, and both are continuous pots rather than switches. There is a high-pass filter, but this has no fewer than four cutoff frequencies (besides an Off setting) from the subtle at 25Hz to the more extreme at 100Hz, all at 12dB per octave.

There is a PHASE REVERSE switch on both channels, with the unusual addition of an indicator LED. This does not just come on when the switch is engaged; it is a bicolour LED that changes from green to red when the switch is in (note

that it is NOT some kind of phase indicator, just a display of where the switch is). Next to it is an overload LED set to +18dBu, augmenting the big VU meters. These are bright and visible, and seem more helpful than some. Internal presets allow the calibration of the 0vu point to be altered from its default

setting of +4dBu. In practice I found that, contrary to what the instructions suggested, I needed the output gain increased from unity in order to feed full-scale signals into my DA-38s without the VC7's overload light coming on too often, but the results were fine.

The rear panel is naturally simple in layout, with XLRs for inputs and outputs and an IEC mains input; there are also two jack sockets with a purpose over and above pure microphone amplification. These reveal the presence of one more very useful feature that

you could easily miss unless you were an avid manual reader like me. Fitted within the VC7 and having no controls (because no controls are needed) is a sum and difference matrix for M-S working. An M-S pair connected to the VC7's two channels will produce left-right stereo at these jacks, the image width being controlled simply by the relative gains of the two microphone signals. Conversely, a straightforward stereo pair will be converted to M-S for delivery at these outputs, allowing later image adjustment. This is such a useful feature in certain applications that I would have expected JoeMeek to have made more of a fuss about it on the front panel.

Its usefulness is partly down to the fact that, despite outlandish appearances, this is a very fine preamplifier worthy of audiophile use. If you expect some sort of character, be it fat, warm, raw, 'vintage' or whatever, you'll be disappointed; if you think that anything that green cannot be a proper mic pre, think again. The VC7 is clean and flat, neutral and quiet, and stands comparison with other top-class outboard preamps. The impedance matching is worth having if there is any kind of variety in the microphone cupboard. I still had some of the ribbon microphones from the recent survey around, and, although some have impedance matching transformers, others retained the characteristic low impedance. Switching over to 50Ω made a distinct and worthwhile difference, increasing the level and opening the sound up noticeably. On straightforward condenser microphones it delivered the kind of transparency that you buy an outboard preamp for, with simple but effective control.

That this is such a departure from a line devoted to a specific sonic signature may count against it with those who are not able to try it for themselves. That would be their loss, as whatever might be said about the other JoeMeek units, there are no gimmicks here, just quality and flexibility at a good price. ■

#### Contact:

**Fletcher-Electroacoustics,**  
Quay House, Quay Road,  
Newton Abbot,  
Devon TQ12 2BU, UK.  
Tel: +44 1626 333948.  
Fax: +44 1626 333157.

## NEW TECHNOLOGIES

### Røde Classic II

Røde's Classic valve microphone has been upgraded to the Classic II. Central is a new edge-terminated 1-inch gold-sputtered diaphragm replacing the centre connection, and a redesigned power supply and microphone circuit design resulting in lower noise. The cable has been replaced with a starquad type, and the mounting arm gives way to a new glass fibre reinforced nylon shockmount. Retained from the original are the hand-selected military spec GE 6072 valve and the Jensen output transformer.

**HBB, UK. Tel: +44 181 962 5000.**

### Kind of Loud surround

SmartPan Pro from Kind of Loud Technologies is a surround sound panning plugin for the Pro Tools platform. It supports all major surround sound formats, including 5.1, 7.1 and LCRS, allowing users to create professional mixes for Dolby Digital, DTS, DVD video, DVD audio and game formats. The designers have taken an innovative approach to surround panning with the implementation of a Polar Joystick, using a circular paradigm for panning, and with SmartKnob, a controller that places sound and controls at its width or spatial extent.

**Kind of Loud Technologies, US.**

**Tel: +1 831 466 3737.**

### Hafler C-Series amplifiers

Hafler has three ranges of amplifiers known collectively as the C-Series and differing in a few application-specific details. CCA contractor amps have 70V and 100V line outputs; CX cinema amps have electronic crossovers that can be customised to the install; and LSA live sound amps are the most basic models, with crossovers available and digital control circuitry in the pipeline. Power outputs go as high as 1200W per channel using switching power supplies, surface mount, and MOSFET.

**Hafler, US. Tel: +1 602 967 3565.**

### Tascam interfaces

Tascam has released a collection of highly affordable fix-it boxes for its digital mixing systems. The series comprises the MA-AD8 8-way A-D converter with twin TDIF outputs and mic preamps; the IF-DA8 8-way D-AC with TDIF input and balanced XLR outputs; and the IF-AES8 8-channel TDIF to AES-EBU format converter with wordclock I-O and SRC.



For the compact TM-D1000, the company has also released the FX-D1000 card that doubles the desk's digital onboard effects with 24-bit reverbs, delays and dynamics. There's also the IF-TD1000 card that adds an extra TDIF I-O and two additional SPDIF and AES-EBU inputs to the desk.

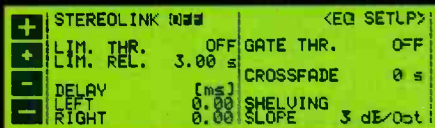
**Tascam, UK. Tel: +44 1923 819630.**



# EVERY PICTURE TELLS A STORY

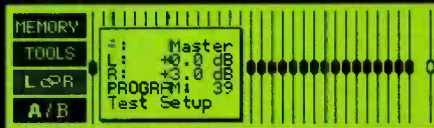
## The new ULTRA-CURVE PRO DSP8024

24-bit dual DSP stereo Mainframe with 31-band Graphic EQ, Real Time Analyzer, Auto-EQ function, Parametric EQ / Notch Filter, Feedback Destroyer, Limiter, Noise Gate, precision Level Meter, high-resolution 24-bit converters, complete MIDI implementation, Delay function with up to 2.5 seconds of delay, optional extra 24-bit AES/EBU interface, and much more ...



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The digital "brickwall" limiter with adjustable threshold and release time reliably protects your set up against overload. The integrated IRC (Interactive Ratio Control) noise gate eliminates unwanted noise and rum during signal pauses. The DSP8024 can also be used to implement a delay line for your live applications.



### DIGITAL STEREO 31-BAND GRAPHIC-EQUALIZER WITH AUTO-Q FUNCTION

The true response characteristic of each filter gives the exact frequency response, which you adjust using the faders. All settings can be stored, copied, compared, added and subtracted. The Auto-Q function allows for a perfect correction curve to match any room's acoustics.

MODE	FREQUENCY	BW/OCT	Q [dB]
AUT	20.000	1/60	+0.00
BGL	20.000	1/60	+0.00
CK	20.000	1/60	+0.00
JFF	20.000	1/60	+0.00
JAR	20.000	1/60	+0.00
JAR	20.000	1/60	+0.00

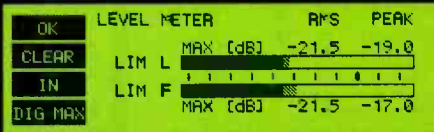
### FEEDBACK DESTROYER / PARAMETRIC EQ

In addition to the graphic EQ the DSP8024 features six fully adjustable parametric filters. Any of these six filters can automatically "seek and destroy" unwanted feedback frequencies. The perfect solution for all feedback problems in your live applications.



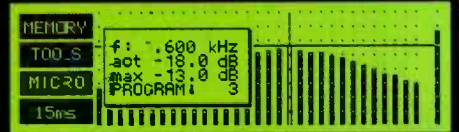
### COMPLETE MIDI IMPLEMENTATION

The ULTRA-CURVE PRO also has a complete MIDI implementation, which allows for remote control via a MIDI sequencer software. In addition to that you can use our free EQ-DESIGN editor software to control the ULTRA-CURVE PRO from your PC.



### INPUT / OUTPUT LEVEL METER

The DSP8024 offers high-precision input/output metering capability. These can of course show R.M.S. or peak to peak values with selectable reference levels. Additionally, the limiter activity is also indicated.



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# Apogee CSM-2

For methodology see *Studio Sound*, April 1998, page 14.  
 See it on the Internet net-site:  
[www.prostudio.com/studiosound/apr198/r\\_tannoy.html](http://www.prostudio.com/studiosound/apr198/r_tannoy.html)

*Studio Sound's* 'bench test' loudspeaker reviews continue with the CSM-2. **Keith Holland** reports

**T**HE APOGEE CSM-2 is a 3-way passive loudspeaker that comprises of a 270mm woofer, a 150mm mid-range and a 25mm metal-domed tweeter. The cabinet is a ported, stepped-baffle design with the mid-range driver mounted (in what looks like a separate cabinet) some 110mm behind the front of the woofer with the tweeter some 45mm behind this; the drivers are all vertically in-line. The steps in the front baffle are tapered and covered in sound absorbent pads of approximately 15mm thickness. The rear panel is fitted with a pair of screw terminals and there are threaded mounting plates on each side of the cabinet for flying and so on. The overall dimensions of the loudspeaker are approximately 665mm high by 355mm wide by 450mm deep. No documentation was supplied with the review loudspeaker, so power handling specifications and mounting guidelines and so on were not available.

Fig.1 shows the on-axis frequency response and harmonic distortion for the CSM-2. The frequency response is almost maintained within  $\pm 3\text{dB}$  from 55Hz to 20kHz, with the -10dB point at approximately 30Hz. Some fairly sharp peaks and dips in response are evident in the mid-range of frequencies. The low-frequency roll-off is third-order indicating a damped port design. The harmonic distortion performance is exceptionally good with both 2nd and 3rd harmonics lying below -50dB (0.3%) from 35Hz upwards. These figures represent the lowest distortion figures of any loudspeaker yet tested in this series, although it should be borne in mind

that this loudspeaker is also one of the largest. The horizontal off-axis response is shown in Fig.5 and the vertical in Fig.6. The horizontal directivity is seen to be exceptionally well controlled with near constant-directivity behaviour from about 500Hz upwards. The vertical directivity shows a cancellation notch at about 3kHz, but is otherwise reasonable. It is interesting to note that the mid-range on-axis response aberrations seen in Fig.1 also occur in the horizontal off-axis responses so they are unlikely to be due to diffraction from the side edges of the cabinet. The vertical off-axis responses show a different set of peaks and dips however, indicating that the cause could be the steps in the baffle. The time-domain performance of the Apogee CSM-2 is shown in Fig.s 2 to 7 which show the acoustic centre, step response, power cepstrum and waterfall plots respectively. The acoustic centre shows a maximum shift of about 2m behind the loudspeaker at low frequencies which is less than many ported designs, but there is some unevenness in the phase response between 300Hz and 2kHz which corresponds to the peaks and dips in the on-axis frequency response. The waterfall plot shows that this unevenness gives rise to some mild ringing in this frequency range, but that the initial decay of the low frequencies is rapid. The step response shows good time-alignment with some mid-range ringing and the power cepstrum shows some evidence of echoes at about 0.2ms and 0.4ms. Overall, the Apogee CSM-2 is an impressive performer. The harmonic distortion and horizontal off-axis response are excellent, and the time-domain performance is good. The loudspeaker is let down a little by a ragged frequency response that, although within 3dB limits, shows

some fairly sharp aberrations which also affect the time-domain performance. The well-controlled off-axis response should ensure that this loudspeaker performs well under a variety of acoustic conditions, including those that present problems for some other designs.

The CSM-2 is among the largest of the loudspeakers tested in this series (although it is not particularly heavy) and this should be borne in mind when comparing its performance with other loudspeakers, particularly at low frequencies. ■

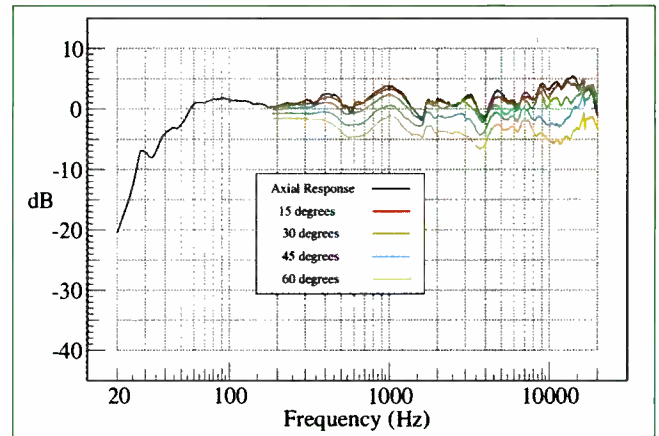


Fig.5: Horizontal directivity

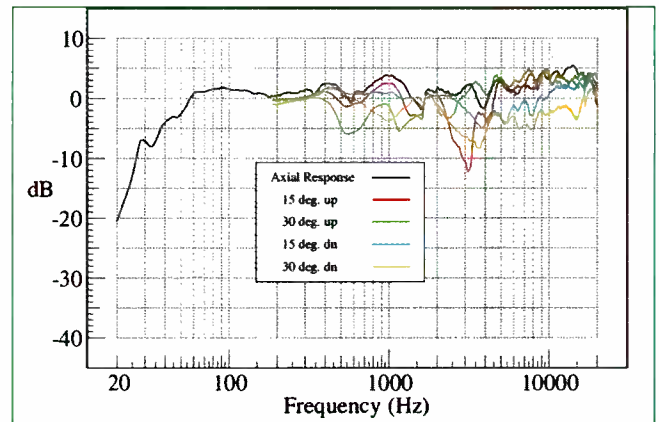


Fig.6: Vertical directivity

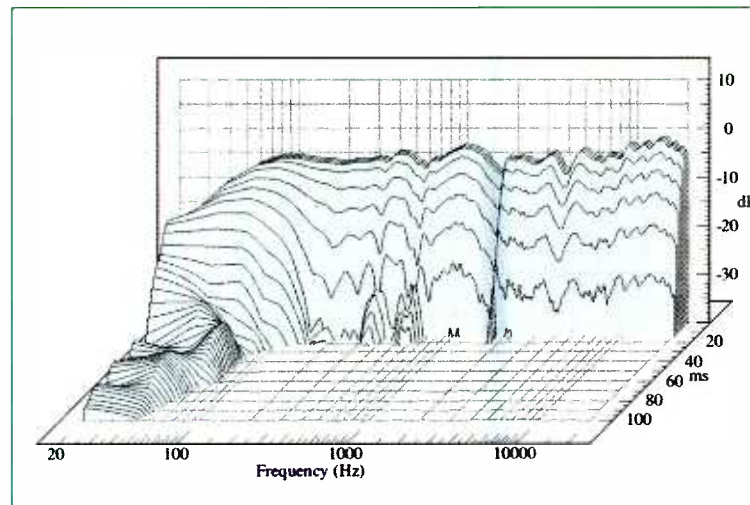


Fig.7: Waterfall chart

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 2180 S. McDowell Boulevard,  
 Petaluma, CA 94954, U.S.  
 Tel: +1 707 778 8887  
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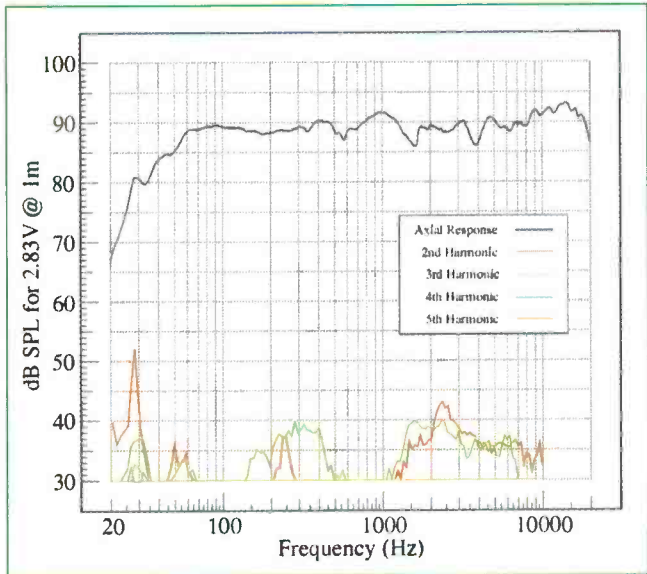


Fig. 1: On-axis response and distortion

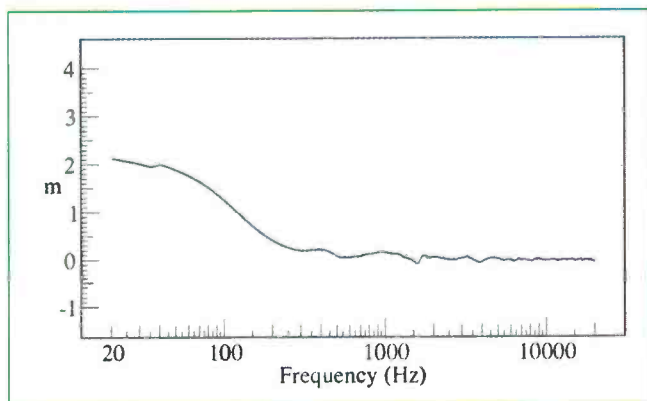


Fig 2: Acoustic centre

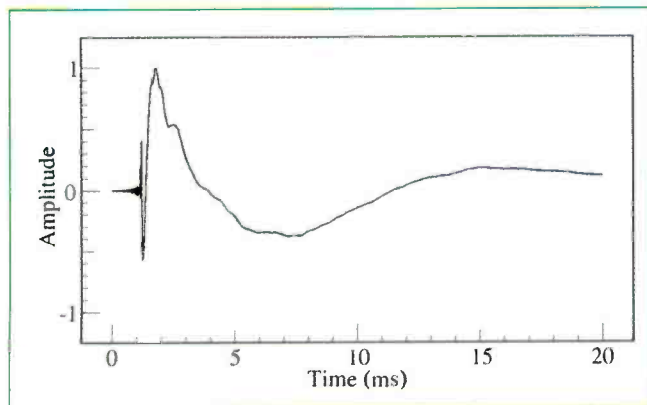


Fig.3: Step response

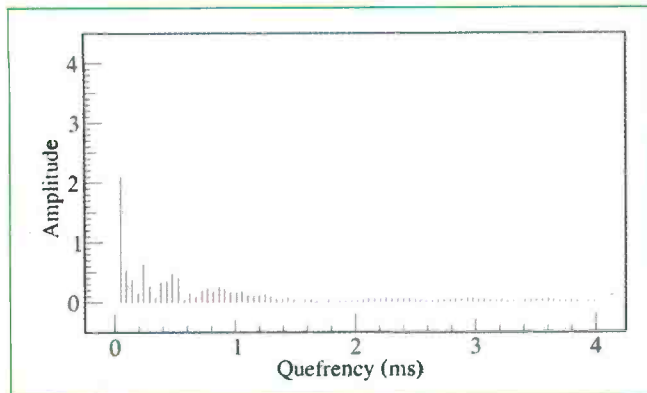
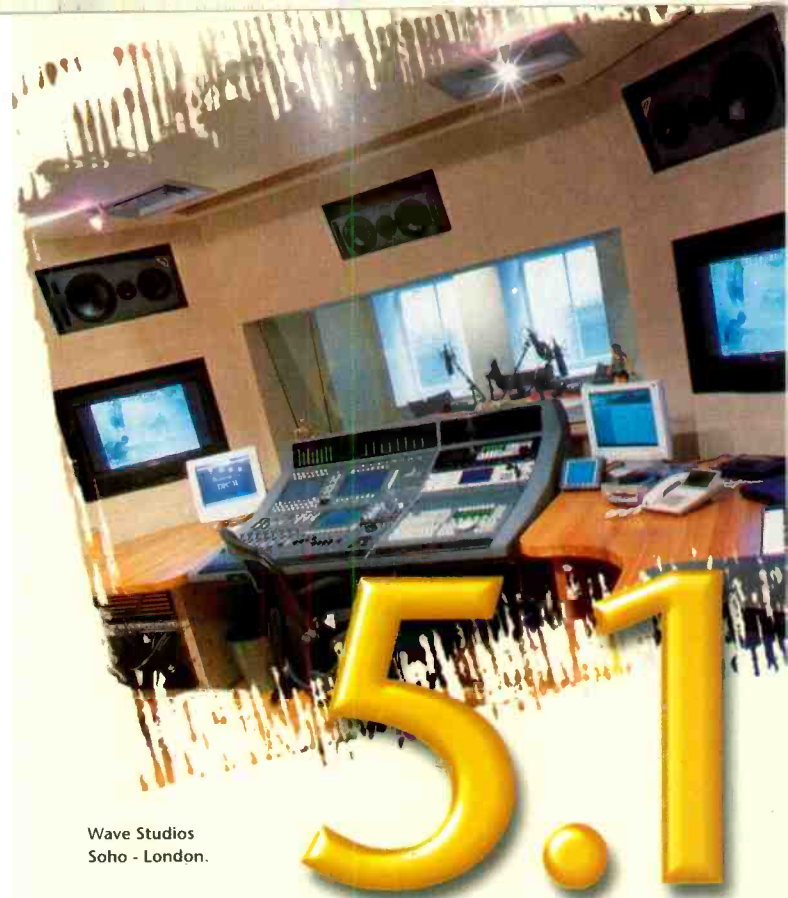


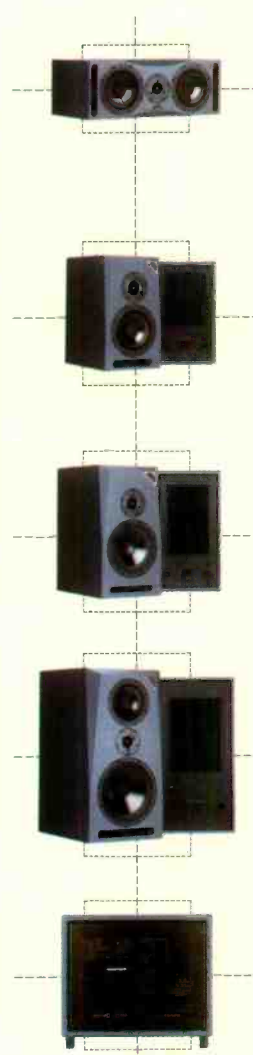
Fig.4: Power cepstrum

Studio Sound August 1999



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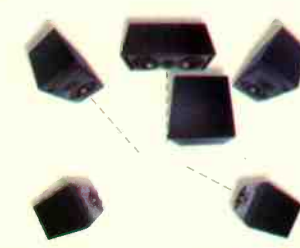
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Left to Right: Michael Semanick,  
Todd Boekelheide, David Parker.  
In the background Edward Norton

# The Sparring Partners

David Fincher's *The Fight Club* is in the heat of postpro, demanding the authentic noises of the fist fight. These may not be to everybody's taste yet are an essential part of the movie. **Richard Buskin** hits the sound crew on their jobs

**T**HE SICK SOUND of a punch. You have heard it thousands of times in countless different ways and in a variety of movie settings, ranging from the brutal in-ring thuds of boxing films such as *Rocky* and *Raging Bull* to the explosive sounds of 'chop-socky' pictures such as the Kung-Fu cycle of the seventies. In practically every case, the audible result is a wild exaggeration of the real thing, conveying the full power, pain and impact of throwing or receiving a blow to the face or body. So, how do you mix things up a little when the director of a new action movie wants his actors' punches to sound different yet equally convincing? Well, there is always the option of smashing some walnuts inside a chicken carcass...

'We've experimented with all sorts of different things,' says Ren Klyce, the sound designer on director David Fincher's latest film, *The Fight Club*, starring Ed Norton, Helena Bonham-Carter and Brad Pitt. 'Shattering chicken carcasses with baseball bats, cracking walnuts inside them, smacking around slabs of meat with pigs' feet, and then processing them... We've done it all, and as a result of this project our 'punch' library has become quite extensive. When you hear the punches in a film like *Rocky* they usually just use one punch over and over again; it's very

muddy and dark, and kind of boxy sounding. David Fincher, however, was much harder to please, and so we had to come up with some very different sounds.'

'Originally we were aiming for the punches to be lifelike,' adds Malcolm Fife, who mixed Foley on the picture. 'Our Foley artist was John Roesch, and, together with Hilda Hodges, he did a bunch of temp tracks with big punches that sounded like they were from a bare-fist fight. In fact, while Mary Jo Laing and Caroline Tapp were taking care of the recording and mixing on the other side of the control room glass, John was just punching himself or some props—heavy bags, leather items and pieces of meat—that had worked well over the years, and it sounded really good, with a real kind of painful, close feeling. However, it didn't marry well with the music and the design low frequencies, so as we went along we started to beef things up. In turn, that caused quite a debate on the mix stage.'

Ren Klyce and Malcolm Fife have both worked with David Fincher before, on his films *The Game* and *Seven*. Together with fellow engineer David Gleeson—who also participated in the pre-mixes, temp mixes and sound design for *The Fight Club*—they co-own Tyrell Studios, a facility in Sausalito, California that

opened in 1997 and now caters to several different pro areas, ranging from feature films and commercials to music projects and design work. Fairlight and Pro Tools systems are based under the same roof, as is surround-sound capability and a Sony MXP 3056 analogue console that has been refitted with API EQ and mic preamps, as well as GML automation.

'A primary motivation for starting our own studio was the fact that our design work was getting so complicated,' explains Fife. 'It would be interwoven with dialogue, music, Foley, and so forth, and Ren would be trying to create these complicated integrated mixes that would fit together. A big problem with a lot of big films is that all of the layers are being developed independently, and no-one really knows what they are going to sound until it's too late. You end up doing a lot of cutting on the sound stage, and so that's why we decided to build our own rooms in which we could hear everything the way it's supposed to be long before time runs out.'

Audio post work on *The Fight Club* began in February 1999, a temp cut being done to the video output of an Avid system in order to provide the director with instant feedback and the Tyrell crew with the opportunity to try out their design ideas. All of which brings us back to the combat sounds that David Fincher was concerned about fitting together.

'On a lot of movies everybody works in their own little world, and then it all comes together at the end and everyone tries to figure out why it's not working.'



says Malcolm Fife. 'In this case, however, we've actually been taking mix stems from the stage at Skywalker, playing them in our own room, adding sweeteners, mixing and getting great results.'

'David Fincher has very strong opinions about what he wants to hear in terms of the Foley, but the problem is that on a project like this there is a wide variety of opinions. You know, what sounds like a really nice, hard, painful punch to one person might sound like cardboard to another. Or it might sound good in one context when you're just listening to the Foley pre-dub, but then when you try to add music and roaring crowds it suddenly sounds really patchy. At the same time, if you listen to it for too long you start to fall in love with your sound, no matter what it is that you're doing, and so sometimes it can be heartbreaking to spend a lot of time on a scene only to find out that the director hates it for the same reasons that you love it. That means you've got to amend your taste a little, and usually you can. It's all about opinions, and there's not really a right and wrong.'

'Typically you sit with the director at the outset of a project and spot the film head to toe, with him or her dictating what he or she wants and where,' adds Ren Klyce. 'However, in David Fincher's case, he won't really sit down and do a traditional spotting session at the outset. Instead he'll sort of spot sporadically throughout the shooting and the editing. He likes to hear material as he's cutting and picture editing, so I would usually send different examples or 2-track composites for him and his picture editor, Jim Haygood, to cut in. What's great about the opportunity to do that is the fact that they get used to hearing material which is either very close to being complete or a facsimile of what they will ultimately hear. That prevents the situation where you get to the mix and they just dislike everything; they dislike the direction of the ambiences, they dislike the direction of the punching sounds... In a way, David Fincher's very smart getting the people to start early.'

Still, is there a flip side to this approach, whereby Ren Klyce is more in the dark at the outset?

'Yes, that is the flip side,' he confirms. 'But it's also good, because the extra time enables me to kind of experiment and try different things. That's what is really, really good about working for David.'

The level of drama in *The Fight Club* varies with each fight, with most of the duels taking the form of blood sports between friendly combatants as opposed to straightforward slugfests between sworn enemies. As a result, the Foley team had to convey a general feeling of fun and excitement in addition to all of the pain. Nevertheless, due to the stylised nature of the movie's more notable fights, their initial quest for audio realism sometimes evolved into audio surrealism.

'I think the chicken carcasses, meat

slabs, pigs' feet and so on sound pretty good,' says Klyce, 'but when we'd get to the editing stage David Fincher would hate everything and we would have to start all over again.'

So, said director's method of spotting throughout the shoot and edit does not always preclude the good old 'scrub it and do it again' routine.

'Well, no, not to mention the fact that he would often still be cutting the film,' says Klyce. 'That was very taxing for the entire crew, and it was very, very difficult to keep up the spirit and momentum of the editing guys without getting fatigued and disheartened. They keep changing the darned film and the sound is linear even though the picture is vertical, so if you have A, B, C and D in terms of the sound and they want to swap A with D you then have to deal with a situation where A used to trail into B. You can tell the director about that sort of thing but he'll just think you're a cry-baby. "Deal with it!" So, you can't complain, but at the same time you're getting pressure from the studio as to why things are going over-budget.'

This having been said, a highlight of *The Fight Club* project for the Foley crew was the opportunity to actually make use of a 3-storey house that had been constructed for filming on the Twentieth Century Fox lot. Creaking wooden floors, 14-foot high ceilings, glass windows and multiple surfaces, together with the kind of acoustics that one would associate with a C19th San Franciscan home, were all made available to Foley, and these were duly capitalised on with a portable DAT machine and Hi-8 playback system.

'We had no synchronisation process,' says Klyce, 'so we'd actually just yell out "three-two-one," snap our fingers in place of a slate and walk around the house and record things. Then, after we edited it, Michael Semanick did a terrific job in the mix. As a result, in the finished film there's a wonderful scene where people are walking all over the house; Helena Bonham-Carter will walk up the stairs and Michael will pan it behind you via the surrounds, and then Brad Pitt will walk in and go up the stairs and she'll walk back down, and there'll be this wonderful circular sound which is in the actual acoustic space.'

'Speaking of which, there are a lot of fights that take place in basements, and for these we tried out all sorts of fancy Lexicon 480 treatments on the punches and also on the yelling, but they didn't

quite work for our mix tech, Jurgen Scharpf. Well, they have this wonderful basement at Skywalker Sound, and so he set up a speaker in there and stereo microphones, and we spent quite a bit of time getting the levels right, and then we'd playback the sounds in the basement and rerecord them. That turned out really great—we call it our "worldizing chamber"—and the funny thing is that once in a while we would hear somebody walk by and we'd laugh among ourselves at how he or she might be freaking out when hearing the sounds of people yelling in agony.'

Meanwhile, in addition to all of the effort spent on the fight sequences, another challenging scene featured a major car accident.

'It's easy for that kind of scene to simply be loud instead of paying attention to detail,' Klyce explains. 'You don't want it to be just one long 20 or 30-second ear-splitting thing. It has to be loud and visceral, but at the same time it also has to be spooky, allowing for slow-motion shots intercut with ones at regular speed, and incorporating the sounds of metal and glass, the exterior rain, Brad Pitt tumbling in slow motion and having his cheeks pressed against the glass, and various other wonderful images. It's hard to achieve that. >

While mixing in Skywalker Mix A. Top to bottom: Todd Boekelheide, David Parker and Michael Semanick



Skywalker sound mix technician Jurgen Scharpf in the 'worldizing' chamber



< 'Surprisingly enough, the most difficult things are often those that nobody notices; subtle things like ambiances and textures. For instance, one of the characters in the film, Marla Singer—played by Helena Bonham-Carter—lives in a tenement in a bad area. Well, how do you convey that without having an establishing shot of the slum? The answer lies in the things that people don't notice while they're just listening to the dialogue; the sound of a baby coming through the wall of the tenement, the sound of a television coming through the



Supervising rerecording mixer David Parker

wall, the sound of downtown transit buses rather than cars. Those are actually the most fun to do but they are also very difficult, because as you cut them in and then you mix them you start paying attention and eventually you become obsessed. There's also the placement of those specific little sounds that no one notices; the sound of someone coughing or—as in a scene set in a hofbrau—people serving cappuccino and setting up tables. We put a lot of effort into recording all of these things in a proper acoustical space.'

While the Foley was recorded on MFX3+ at Warners Hollywood, ADR for *The Fight Club* was recorded on Pro Tools at Disney. The dubbing was done at Skywalker.

'We would have liked to use the MFX3+ for the ADR as well, and we asked to,' says Malcolm Fife, 'but while we had control over the design portion of the project and the Foley, we were also working in conjunction with a big facility and had to go along with what was best suited in that respect.'

'We use the Fairlight for feature films and commercials because we get to take things directly off the Foley stage. Having been in contact with it on a few shows we decided that the Fairlight would also be best for our mix room at Tyrell, and

going from the mix back into the edit room to conform is seamless. There's no special conversion or wave-form generating necessary like there is with Pro Tools, and the MFX3+ is particularly good for Foley and ADR because when you're recording one channel at a time you can put in lots of layers. There again, the picture changed so rapidly on this project that, on a couple of occasions, we actually started on a particular reel and halfway through recording it they chose a new version that was so different that we decided to continue with that version without missing any new scenes. I therefore conformed the Foley on the MFX3+ right there on the Foley stage, and sometimes if you're working with other formats that can be a bit trickier to do. However, the only hassle that we had was making fresh cue sheets before we started.'

'We do a lot of the initial cutting of effects on the Pro Tools at Tyrell, because our libraries are all Pro Tools and there are a lot of plug-ins. However, the Pro Tools is a terrible mix recorder. It's no good for remote punching in and out, it doesn't have a lot of professional features and it's not as reliable as the Fairlight, but it's a very good editing machine for design purposes.'

Tyrell also has a DAD Plus Digital Audio Dubber, and this was transported

back and forth between there and Skywalker to deliver Foley elements during the mix of *The Fight Club*.

'The DAD played back 24 channels of Foley and we mixed that to 8-channel pre-dubs,' says Fife. 'We actually did transfer those pre-dubs so that they could join the rest of the effects and dialogue pre-dubs on MMR-8 at Skywalker, but the Foley elements were retained on the dubber for the mix.'

The final mix for *The Fight Club* was carried out on the Neve Capricorn inside Mix Room A at Skywalker, with Todd Boekelheide taking care

of the Dust Brothers' music score, while Michael Semanick handled the dialogue and David Parker mixed the effects. Richard Hymns was the sound supervisor.

'On a lot of shows no one really cares about the Foley,' says Malcolm Fife. 'They disregard it and you can do pretty much whatever you want, but that isn't the case with David Fincher. He cares a whole lot about Foley and so we've really done a great deal of it on this film, doing several things over and over again to please him, please ourselves and make it all fit. That can be a pain in the butt, but I do like it, because my job would really suck if every project was one of those where no one is concerned with the Foley. It's only fun doing Foley when you're working with people who are really into it, and you can do what you want knowing that if you get it right they'll appreciate it and use it in the movie. As a Foley editor a lot of what you do people don't care about—you do the rubbing of skin and the picking up and putting down of knives and forks, but this film is really about contact between people; often just two of them, no shirts, no shoes, involved in a brawl. In scenes like that you can sweeten things with effects, but if you don't have good Foley the whole thing just won't work.' ■

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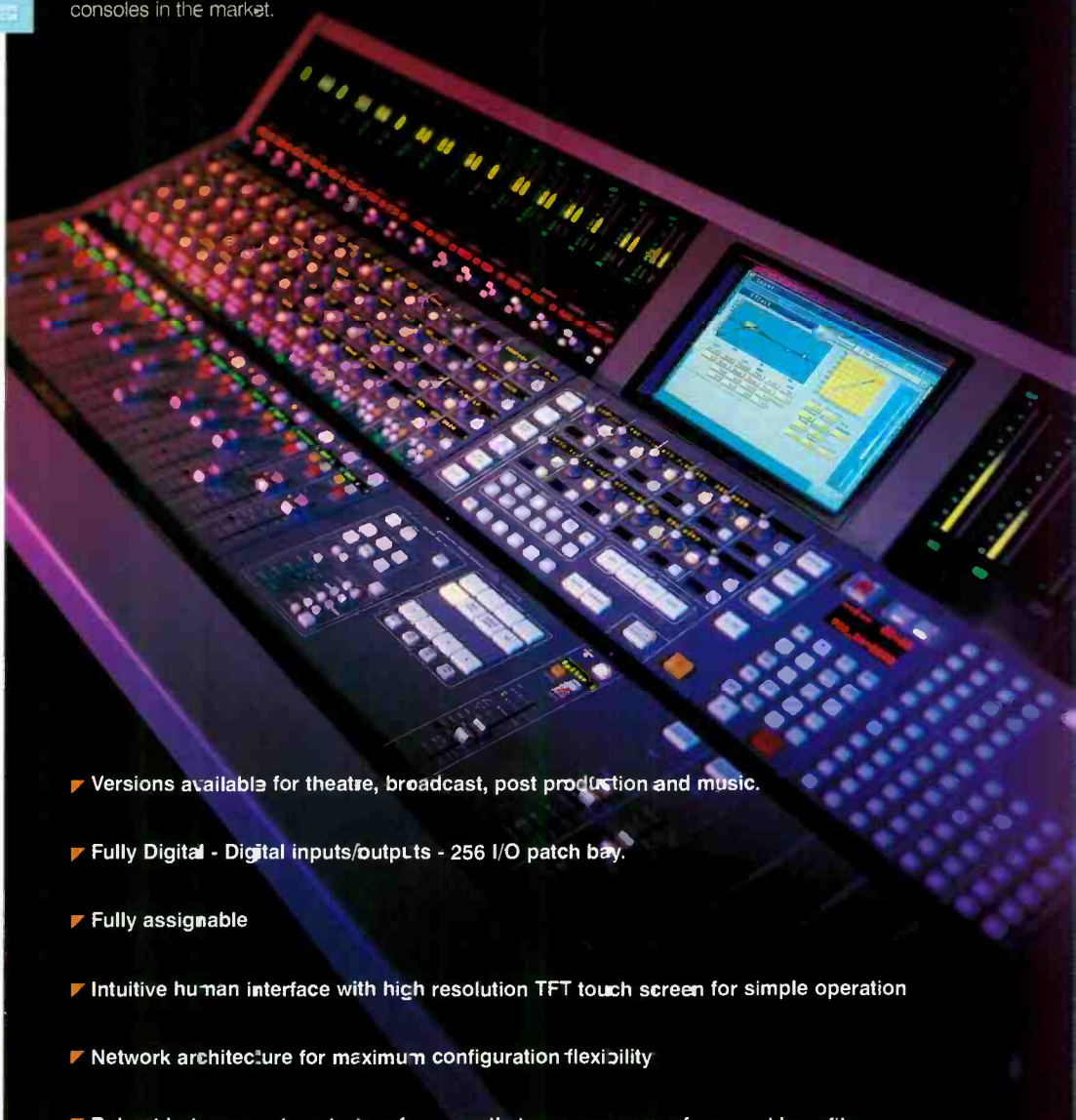
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# Kurlander's Progress

John Kurlander talks about his transition from classical recording to recording film scores and of the differences in required recording techniques. **Richard Buskin** keeps score

**T**HE ONLY NIGHTMARE situations that will come back to haunt you are the ones where, through nobody's fault, there is not enough setup time. There are hundreds of different ways in which to lose that valuable time, and if you don't have enough time or you have to deal with a problem that consumes some of that time, a nightmare can occur and it can happen anywhere. The setup is everything. The sound is the setup and the setup is the sound.

That statement is made in the context of classical recording sessions, and the person making it is an expert in the field. John Kurlander is a Grammy Award-winning all-rounder who has recorded a variety of musical genres, spanning sessions with artists ranging from Plácido Domingo to Paul McCartney, Montserrat Caballé to Mrs Mills, and the members of the Vienna Philharmonic Orchestra to the cast of *Miss Saigon*. Nevertheless, show, classical and, most recently, film soundtrack recordings have been his forte, and while all have benefited from his meticulous preparation and attention to detail, it is the classical sessions that Kurlander asserts are most reliant on a carefully executed setup.

'Your job is to put microphones up in front of the musicians and then at the beginning of the session you retire to the control room,' he says. 'If you're recording a pop artist or rock band that is when your work starts; you balance the console, adjust EQ, adjust echo and set about being creative at the desk while they are performing. However, with orchestral recordings you have to do that before the musicians arrive, because once you start a ten-minute take of a performance you don't want to be adjusting levels, adjusting EQ, and adding echo or taking it away. So, if you think in terms of working on a mix

for two or three hours and then laying it down, the beginning of a classical recording session is laying it down. All of the EQ, echo and focusing of the sound is done in advance and then modified—if at all—right at the start of the session.'

An Abbey Road in-house engineer from 1967 to 1996, John Kurlander started out recording rock, pop and 'easy listening' sessions featuring performers as diverse as Cliff Richard, The Beatles, Henry Mancini and the aforementioned Mrs Mills, before carving out a niche with West End and Broadway show recordings and then becoming the studio's chief classical engineer. As a result, in addition to orchestral credits with Babyface, Boyz II Men, Elton John, Elvis Costello, Michael Jackson, Trisha Yearwood and Celine Dion, Kurlander's resume lists a plethora of cast albums—including *Cabaret*, *Carmen Jones*, *Jesus Christ Superstar* and *Phantom of the Opera*—and legendary classical singers; Domingo, Kiri Te Kanawa and Leontyne Price are just a few of the artists with whom he has worked.

'My first classical assignment was with the Royal Liverpool Philharmonic Orchestra, conducted by Sir Charles Groves,' Kurlander recalls. 'I had already assisted Stuart Eltham on a number of sessions, and he had taught me a lot about recording and mixing,

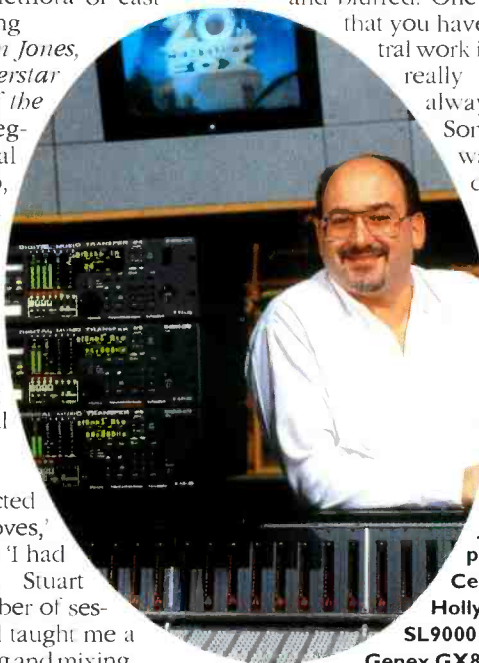
and when he couldn't make this date in Liverpool he gave me all of the information that I needed to do it in his place. Basically, I was to use his setup, because he had used that setup in that hall with that conductor many times, and it was a foregone conclusion that, as long as I didn't start experimenting, it would work.'

'There are different respected miking techniques that can be used based upon the conductor, composer, musicians, acoustics, even the temperature. Everybody's personality makes a contribution to what you hear, and for his part the conductor puts his own interpretation on the composer's work in terms of the tempo, general phrasing and dynamics. So if, for instance, the conductor interprets a piece of music in a very fast and fiery way, the recording has to reflect that. There's no use in it being distant

and blurred. One of the main things that you have to do with orchestral work is to focus the sound really well, but it's not always a tight focus.

Sometimes you might want it to be a little bit diffuse or ambient, and so it's a matter of finding what works and then sticking with it.

'With classical music the first five minutes of a session are vital. You've got to get the setup right, and then if it needs



**John Kurlander,** pictured at 20th Century Fox in Hollywood with the SL9000 j-series console and Genex GX8000 records.

PHOTOGRAPH BY EDWARD COVER



modifying this must be done in the first five minutes. That means you've got to spend a lot of time setting up and thinking about the layout. I've been told that I take a lot of time, deciding where the musicians should sit, whether they should be very close to each other or spread out—and, if they are spread out, whether they should be spread wide or spread deep—and whether or not I should use risers. This all has to be preplanned and pre-executed, and then I'll have the first five minutes or less of the session to hear them play and either say, "Yeah, I've got it" or "This isn't working because..." I don't believe anyone says, "This is the way to do it no matter the room or hall". In fact, on one occasion, when we were recording a Vaughan Williams symphony with the London Philharmonic and Bernard Haitink conducting, I remember it wasn't working because—even though the mics were in the right place, the temperature was right and the musicians were giving a great performance—I had them squashed up too much. I therefore had to go out to the hall and move the rear of the string section back by about four feet and ask everybody else in the orchestra to proportionately use up that four feet. That produced the right sound.

Would it not have been easier to simply reposition the mics instead of the musicians?

'No,' comes the reply. 'If you're using very few mics then it's a case of where the sound blends with the acoustics of the room. If the setup is too tight, then no matter where you put the mics you're still recording the same squashed-up group. On the other hand, if you know how to do it you can actually get whatever you want, and most of that is to do with moving the players or asking the players or the conductor to help you in a particular way.'

Having achieved the desired setup and sound, the engineer then has to capture what John Kurlander describes as 'a sonic photograph of the performance'. As, on a classical session, this could amount to spending the next three days just watching the meters without moving a fader, the words 'redundant job' might spring to mind. However, the situation should really be likened to that of switching a flight to auto-pilot—everything is fine unless an emergency arises. Then it's time to grab the wheel... or, in this case, get the fingers back on the faders.

'You have to keep an audio memory of how it sounded at the beginning, because the thing can drift,' Kurlander says. 'The temperature or humidity can rise and the sound will change, so nothing is necessarily constant.'

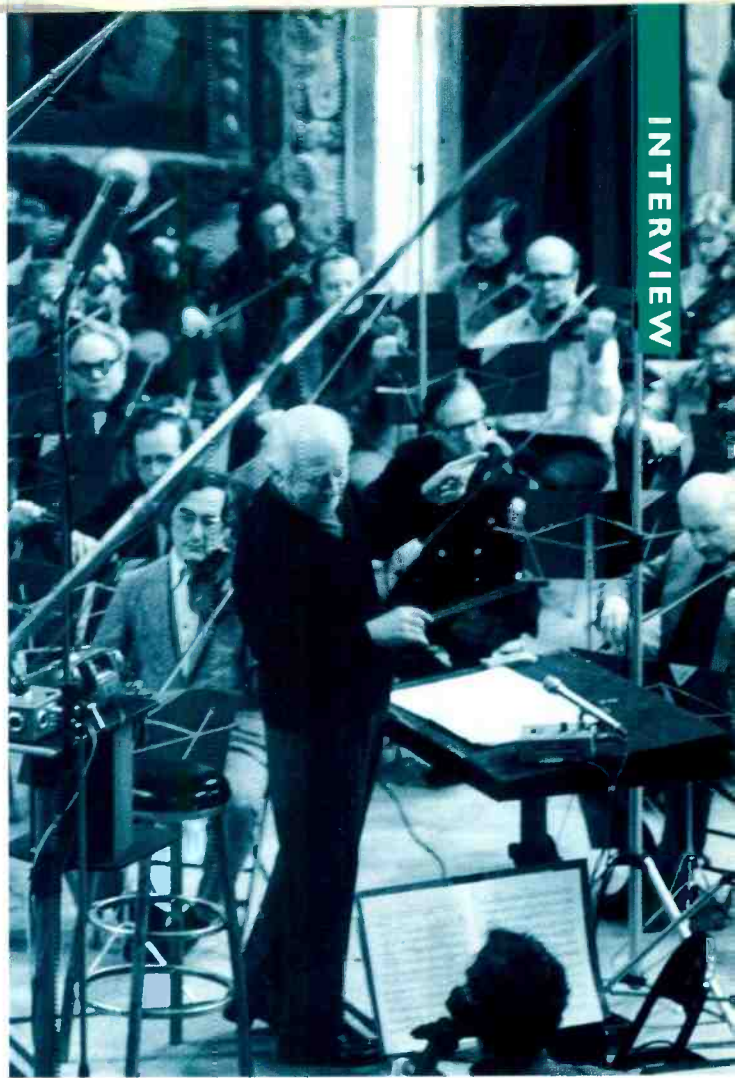
That may be true for a particular session. Yet, even though Kurlander has described how personalities, environment and conditions influence the miking, he also points out that there are

certain rules which can usually be adhered to.

'Generally, the more that the mics are positioned over and into the orchestra, and the more of them that there are, then the more danger there is of the overall sound becoming choked and congested,' he says. 'What tends to work everywhere is miking things from away and in front rather than inside the orchestra, and then the other thing to consider is the hall or the studio in which you're working. The most frightening thing for me is being scheduled to record in a hall or studio that I haven't seen, because in that case it's almost impossible to give an accurate setup over the phone. What I'll do is either take the time to visit a place and check it out first, or give them a rough idea of the setup and then change it when I get to the session. After all, since you're dealing with the way that the sound fills the room, you want to know what's in that room; where the reflectors are, which way they're pointing, whether or not you want to work with those reflections or avoid them, and so on.'

'At somewhere like Abbey Road's Studio One I would have a selection of setups for certain types of recording, and each one would remain the same when we were doing a series. For instance, in terms of classical work there are a lot of cycles, and so having established the tempo for the first piece of, say, a Vaughan Williams cycle, you could use the identical setup time after time within that group of orchestra, conductor, producer, engineer and studio, and virtually record the next one a year later without any balancing time at all. Quite often that's what we would do. We would record one symphony in the series, then come back to do the second one a year later and put the light on at 10 o'clock in the morning.'

I remember working with the Philadelphia Orchestra and, after finishing the recording of one piece, having ten minutes left at the end of the session to do a corrective patch for a violin concerto with Sarah Chang that had been recorded a year earlier. She was there, ready to go, to do an insert of about eight bars, so we took the ten-minute break that is customary in America and I looked at my miking notes and mixer notes. These were significantly different from the other recording that we had been



**Evlene Ormandy conducting The Philadelphia Orchestra in the 'Old MET' Philadelphia 1979**

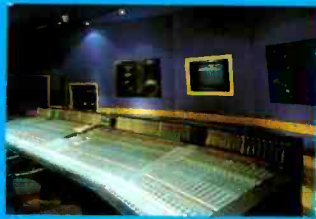
doing—which was a straight symphonic piece—and we were going straight to 2-track and there wasn't any time to listen to the old recording on either side of the insert and certainly no time to listen to it in an A-B situation. So, being that we were using a totally non-automated DDA console, we were just left with the notes and "Kurlander recall". Three weeks later, back in London, the editor told me that the new segment matched in perfectly.

'That's just how I work. I was recently looking at an old layout sheet for a solo cello and piano piece, and I couldn't believe the detail that I'd gone into. I think I'd written down just about every measurement and the relationship of these two people to everything else in the room, not to mention the temperature and humidity. I'd stopped short of writing down what they'd had for breakfast. There again, while I write down the height of a singer's microphone and the distance from mouth to mic, with female singers I've also written down the height of their heels in case they come back in a different pair of shoes.'

While album projects with Toto and Itzhak Perlman have earned Grammy Awards, the work that he has immersed himself in full-time since relocating to Los Angeles has also garnered several Oscar nominations. Namely, movie >



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John Kurlander at the EMITG console, Studio One, Abbey Road, approx 1980.

< soundtracks, which he was already more than familiar with at Abbey Road, and which he has recently gained plaudits for courtesy of his efforts as the scoring mixer on *That Thing You Do*, *Hercules*, *Anastasia*, *Scream 2*, *Analyze This* and *Never Been Kissed* among many others. Also due for release at the time of writing are pictures such as *Bowfinger* and *Brokedown Palace*, and it is interesting to note how, while contemporary film scores are often not even orchestral, those that are differ quite extensively in the recording process to classical works.

'The main difference is in the dynamics,' Kurlander says. 'A classical piece is recorded with the intention of being listened to in its own right, with nothing else going on. Most people will listen to it in a very peaceful environment. On the other hand, most movie scores are written to accompany dialogue, and this was highlighted on my very first film project, *M Butterfly*, which featured an operatic orchestra recorded in Budapest, and which I did with Howard Shore when I was at Abbey Road. He approached me to score the movie and I told him that I hadn't done this before, but he said, "That's fine. I just want you to do what you do." Howard's a great opera buff, and so we discussed the layout and he suggested that, rather than the orchestra being a symphonic one playing along to the action, it should be more akin to an operatic orchestra playing in a pit while the on-screen action relates to the singers on-stage. In line with that we subsequently set up the orchestra as an operatic orchestra instead of a symphony orchestra, and that involved a completely different shape. You see, a standard opera pit layout is to have the first violins on the left, cellos and basses on the left, violas and second violins on the right, and then the brass very wide and not too deep. In the centre is the opera stage, and we felt that this was quite a good way to approach film scoring, because the left and the right speak-

ers carry most of the music while the centre speaker is taken up with the dialogue. The analogy of opera pit, stage and screen actually works, so that's what we still do on Howard's sessions, falling in with the pattern of certain things working with certain composers.

'Ultimately, when the music that you record for a film is being rerecorded in the dub and it works sympathetically with the dialogue, the Foley and the effects, it benefits everybody. It benefits the dubbing crew, the composer and me to deliver something that is going to work dynamically with the scene rather than to deliver a piece of music that they will then have no option to fade up and down accordingly, and sometimes drastically. You can never second-guess it to the nth degree, but it's vitally important to deliver something that is really well composed and well orchestrated for the scene, and recorded so that it sits well in exactly the same way that a rock track needs to sit well with the lead vocal. There are certain ways of miking an orchestra to have everything up front, and there are other ways of tailoring the sound so that it all moulds around the effects and dialogue, and that comprises the basics of where classical recording and film scoring start to diverge.'

'During the last six to seven months I've done a big-band score, *Analyze This*, *Bowfinger*, which is basically a soul score that moulds around a lot of needle-drop material by James Brown and others; *Never Been Kissed*, which is more of a classically orchestrated strings-and-synthesiser score; *Komodo*, which is like a traditional all-action orchestral brass-and-strings score; and *Brokedown Palace*, which is an eclectic mix of Asian sounds and traditional strings and woodwinds. This illustrates the prerequisites for the modern-day scoring mixer, and I would say that the top people now working in the film business have that kind of experience and versatility.' ■



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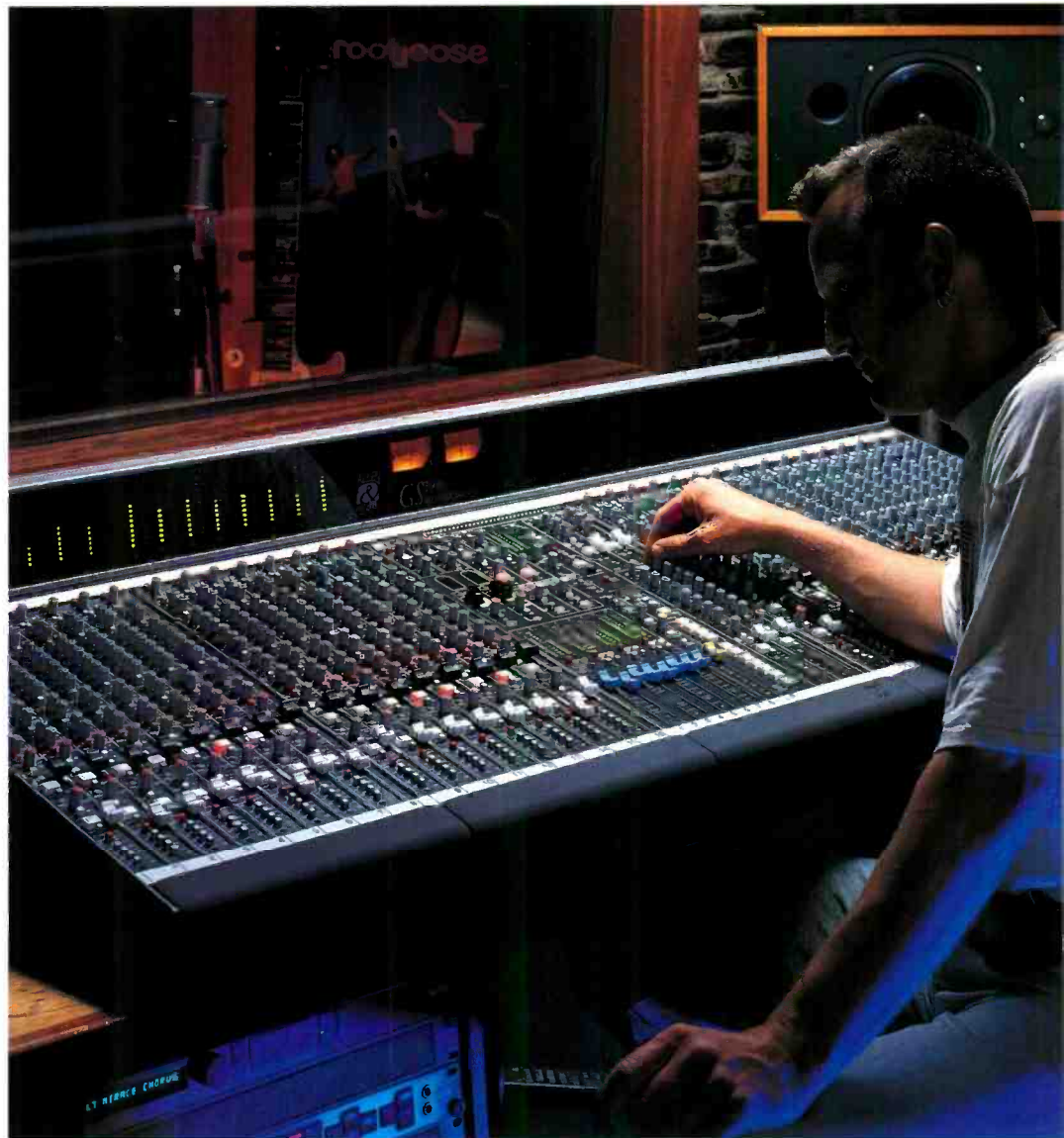
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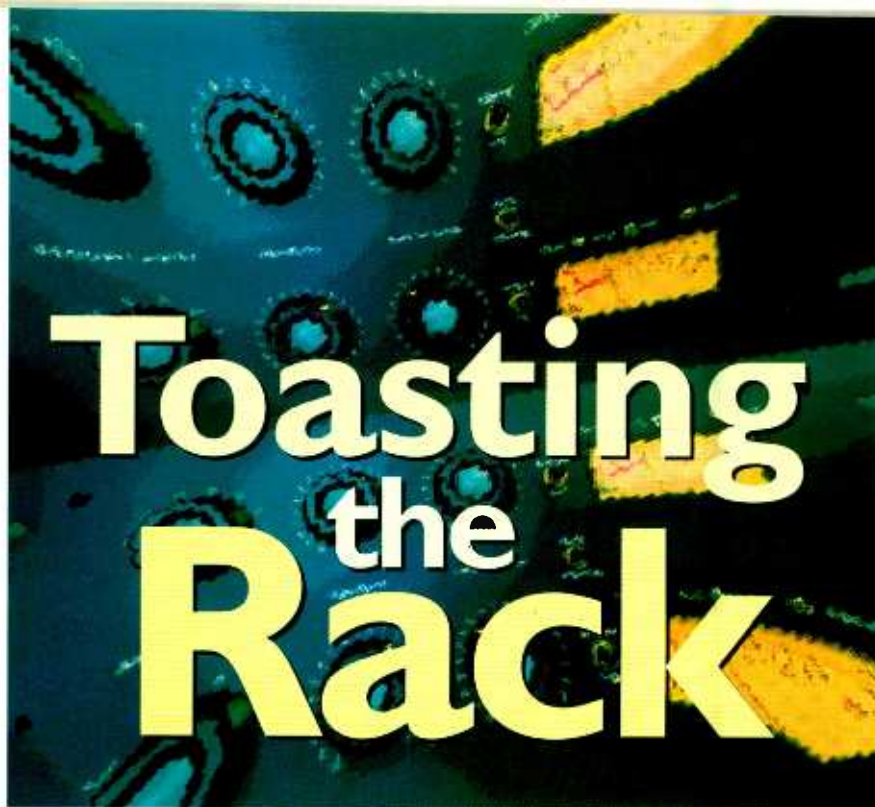
From circumstantial standard to perfect processing, outboard equipment plays a major role in audio. Designer **Richard Salter** spends some time on the rack

**I**N THE EARLY DAYS of the telephone industry, someone made a decision about mounting a row of jack points. At the time it probably seemed to be a trivial decision, but today the 19-inch rack defines the size of a large proportion of all the electronic equipment we use. The standard has lived on long after the engineer in question and the ramifications must be way beyond his imagination at that time.

I have tried to discover who this engineer was, but sadly the name remains hidden. What did emerge from a little research was a plethora of stories, mostly suggesting American origins, many contradictory, surrounding various details of the how where and why behind the design—using the word ‘design’ in its loosest sense. As practical readers will be aware, despite several standards documents purporting to define the 19-inch rack, the actuality is of many, all very slightly differing, variants with only two consistent details: the actual width of the front panel and the ‘U’ of 1.75 inches as a unit of height, which to add to the confusions, seem to be imperial figures that are impossible to translate accurately into the metric system. Inconsistency quickly increases as soon as internal width and depth, mounting hole position, diameter and thread pitch or any of the smaller details are considered.

So if the combined talents of the electronics industry cannot universally agree on the geometry and size of a simple mechanical rack system, why should it be a surprise when the formats for interchange of digital audio files seem so difficult? With all due respects to Douglas Adams’ excellent guide for galactic Hitchhikers, our industry desperately needs a technical equivalent of the Babel fish (a biological universal language translating computer).

It is clear that the first usage of the 19-inch format was for telephone jack points and patching systems. It did not take long, nor require a huge leap of inspiration to conceive of using the same racking scheme as the basis for packaging all sorts of electrical and electronic circuitry, it probably happened by accident because the rack space was there. There were then and even now a few other modular packaging systems around, most of which boasted more convenient ratios of width, length, and depth, but none with the universality



of the telephone rack. In a regrettable manner similar to the later domestic video format shake-out, the poorest technical choice often becomes the *de facto* standard.

The universality of the 19-inch rack system is such that unless there is an overwhelming operational or functional reason to package anything in a different shape, such as a microphone or a mixing console, it will have to be packaged into a 19-inch rack module. The same is true of most areas of industrial and professional electronics. So almost everything revolves around fitting the contents into a particular height of module or getting the required number of modules into a given rack, an industry-wide quest, often for the unattainable. Early examples of a particular function or technology may start out in 2U or 3U sizes, only to be squeezed into either 1U or 2U at the earliest opportunity.

There is one area where the 19-inch no longer rules the shapes, mass-scale consumer manufacturing, where the product size is most likely to be based upon a convenient sub-multiple of the standard forklift pallet with a reduction dependant on the minimum survivable packing thickness. The last few years have seen some audio products emerge from this arena, particularly computer-based systems, but the small size of the non-consumer audio market will preclude any radical departure from the rack standard.

Like the menu choice at Alice’s Restaurant, you can have almost anything you want in 19-inch module form, from mains power distribution and light panels to the most exotic special functions, and some of them even look good...

The early use of modules in the studio was to supply functions which were not available on the mixing console, the common functions of equalisation,

dynamics, amplification and special effects. The range of processing available has been linked closely to the development of various elements of technology, each new step provided more variety. The CCD—Charged Coupled Device—before younger readers are confused the CCD used to be an analogue delay line memory device and not the sensor in a video camera system. The CCD begat various phasing and flanging devices, although most were somewhat noisy processes. I remember one particularly weird module from this era—the Marshall Time Modulator. This module contained two large encapsulated modules the size of Walkmans with the CCD arrays inside which were so sensitive to static that it seemed they could be damaged just by being looked at for too long. The Time Modulator was capable of performing some amazing twists to sound, even if it did add a little noise by post CD expectations.

The high quality VCA—Voltage Controlled Amplifier—both discrete component and integrated versions, triggered a variety of level dependant processing, both further effects and noise-reduction systems for analogue tape. One that seemed to spring from nowhere to ubiquity in weeks was the Aphex Aural Exciter: I saw an original one in a London studio only a couple of weeks back, truly a long life for an effects module.

The advent of digital techniques obsoleted most of the analogue time dependant processing and also led to the first rack-mounted reverberation and delay systems worthy of the description. These same advances moved digital tape systems away from the expensive stand-alone products into a small rack-mount modules with up to eight channels of very affordable storage in few U of rack space at only a couple of >



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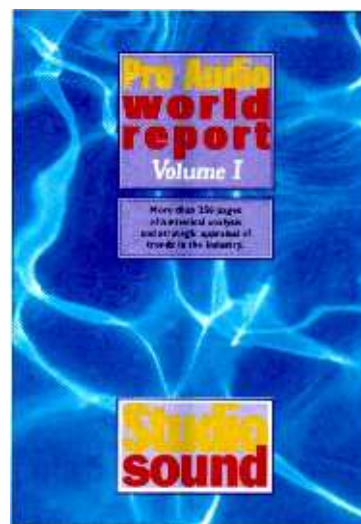
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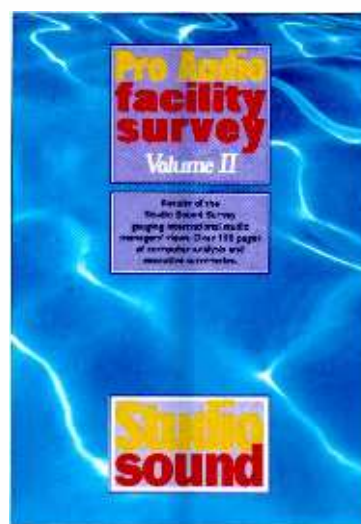


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< hundred dollars per channel.

Digital technology and automated production techniques with surface mount components have affected all module product pricing. The balance of costs has changed: digital modules usually cost more in development time and money and less in unit production costs than analogue designs, particularly so with designs involving significant software content. This makes the overall product budget planning more dependent on volume production to amortise the design costs over a larger number of units. To achieve these larger production volumes requires pricing sufficiently attractive to appeal to customers well beyond and below the budgets of the traditional studio market, to home studios and individual musicians, both professional and amateur.

Another aspect of digital modules is that we all expect them to do more. Within reason adding more features usually only adds to the design costs and does not increase the production cost, therefore this is an incentive for a manufacturer to add features to the product to make it look more attractive than the others. This is a mixed blessing for the user. Yes, the additional features are good to have for free, if they are really of any use, but all too often this leads to controls that are a nightmare to operate, with multiple menu structures and limited visual feedback through a small LCD. When confronting these modules, I wonder if a little feature restraint would go a long way towards making better modules.

The lowering of the base line of costs and prices for modules is not the whole story, there is still a healthy selection of products at higher price and quality levels, addressing another reason for using modules—providing a different or higher quality signal path than is provided by the console for a few of the critical signal paths. For example the engineer may prefer to use his favourite mic amp, EQ or dynamics on the vocal signal, or by using a few outboard signal paths for the critical signals and can dramatically increase the overall quality of the whole recording.

These ideas are also not new, one of the earliest modules I can find is the repackaging of a pair of Neve console input modules. There are literally dozens of such quality and specialist modules offering these basic functions to an exceptional level by a wide variety of philosophical approaches, some even deliberately replicating examples of circuits from equipment no longer available. It almost does not matter what form of engineering you feel is the best, it is probably available in a module. If you insist that EQ sounds better when the op amps are lovingly woven from the hair of Peruvian virgins... May I suggest a word of reassurance here—if when reading through some of the

product literature for these you conclude that all sense of engineering rational has disappeared, and that the laws of physics have been suspended, don't be concerned: it and they have not. The real world is probably much the same as it was when you woke up.

Competition is good for industry and this is certainly the case with modules at all price ranges. At the more economic end there have been a succession of particular products which have in their turn set a benchmark for value: creating a standard that others must observe to compete, until an innovation takes the benchmark's place. The Yamaha Rev 7 is such an example, it rewrote the performance, features and expectations for a reverb unit at an economical price. It enjoyed good business and sales for a long window for such a product and formed the basis for a succession of fur-

ther improvements in reverb modules from Yamaha and their competitors, certainly to the benefit of those who purchased and use such modules.

At the higher end of the module market other tricks have been used and the most obvious of these in the last decade has been attention to industrial design—not just a handsome box, but clever ergonomics, effective production and packaging engineering, as well as novel cost-saving techniques in the production assembly. The Focusrite Red range and the relaunch of their Blue range did rewrite the visual standards for module products. Since these made their way into the marketplace all new modules have been forced to consider the visual effects of the box and panel design with detail once unknown. Yet visual design can be a mere trick to catch the customer's attention to the point that he >

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< stops wandering the trade show and pays attention to the product, giving the sales staff an opening to close a deal. It is rather flattering to see so many copies of these two styles, to date I count seven direct copies—flattering but sad that the managers concerned did not have the imagination nor the sense of fun to find something equally good but different for their products.

It is difficult to consider any technical product in depth without sooner rather than later running into some piece of European Community legislation, that all too often appears to be specifically written to restrict trade or hammer the smaller companies. The module industry did not have a good reputation in the seventies and eighties for EMC—Electro Magnetic Compatibility. There were plenty of difficulties created by one digital module causing interference with an adjacent rack-mounted analogue module. This type of incompatibility is often caused by engineering mistakes at a stupid level; for example the error of a transformer designed for a 60Hz market being fitted to a module intended for world distribution and then not working properly in a 50Hz area (which needs a transformer with approximately 20% more iron). The EMC Directives hit the audio industry, including all involved with making modules, with clouds of gloom and predictions of industry disaster in

the mid-nineties. As it has transpired the regulations have not been as bad as the predictions and in the main the regulations have actually worked as they were intended to, and therefore for the good of us all, by raising the EMC engineering and removing the worst offending products from the market place. However I do subscribe to the view that the regulations are over the top with the penalties and the enforcement regimes.

For those among you who have the task of naming modules on their desks, may I suggest that you take time out to read TS Elliot's poem 'The Naming of Cats' (*Old Possum's Book of Practical Cats*). This may not make much direct sense, but it might avoid the pitfalls of model numbers with excess digits and the careless use of TLAs (Three Letter Acronyms). There have been some contrived names that even the manufacturers have difficulty recalling. Good manners prevents mention of some of the more spectacular examples from Japan, but here are a couple of oddities from the UK.

Fairy Dust Trolley—to describe a rack of outboard modules does seem a little on the extreme side of bizarre even for the audio industry. And another from the BBC—RSA—Response Selection Amplifier, to the whole of the rest of the world, an equaliser. From the early Focusrite range—ISA—rumoured to stand for Input Signal Amplifier, but as

with all acronyms soon misused and applied to many types of module from microphone preamps through equalisers to compressors, where the links becomes rather obscure. While I would be the first to admit that my own contributions of Red 1, Red 2, and so on, could be considered to have erred towards the other extreme, they are simple and memorable enough names, which after all is the propose of naming these devices. To provide some balance, the name Rev 7 worked rather well for Yamaha.

So where will it all end? The module market and the designs therein are forever changing to suit the latest working methods. There has been an increase in the use of modules as a means of bypassing, or sometimes avoiding altogether the console, with the mixing functions migrating onto a workstation or some other digital platform system. This very extension of digital environments for the processing of audio could also cause some decline in module usage: the advance of plug-ins. Recent years have seen a huge increase in the variety of processing available in plug-in form and some companies now offer their processing in both hardware and plug-in forms. So why buy the hardware version? I doubt very much that we will be as dependant on the 19-inch rack quite as much 40 years hence as we are now or have been. ■

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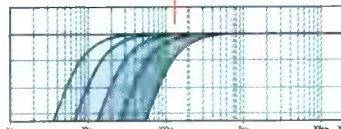
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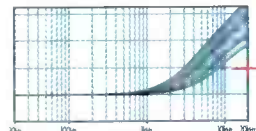


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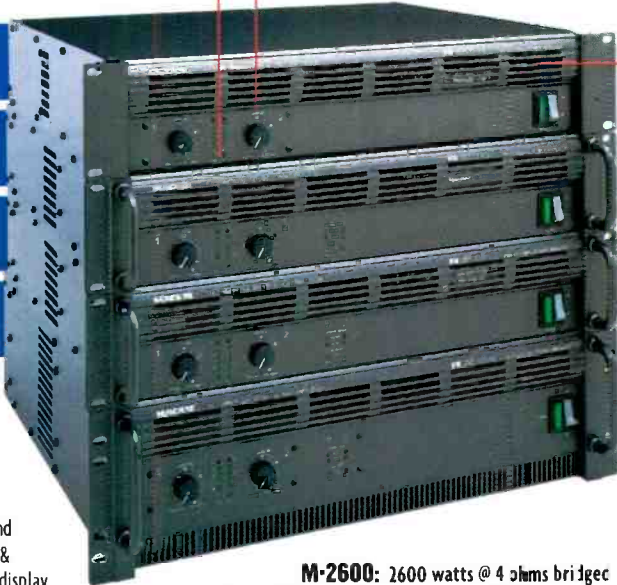
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Studio A

Having established itself in the habits of the viewing public, Sky has recently completed a significant improvement at its broadcast studios

**Kevin Hilton** tunes in

**T**HE NAME OF A TELEVISION station can embody what the broadcaster stands for. Its identity is bound up with the kind of programmes it shows and the style of presentation. When it went on air in 1989, Sky TV was synonymous with junk programming; its notoriety was not helped by the high profile of founding father Rupert Murdoch, whose ruthless business acumen turned a shaky launch into a hugely successful operation.

Of course, the perceived image of a broadcaster does not always tally with the truth. It is true that there is much populist, bought-in programming on the various Sky channels but attitudes have altered over the years. Sky News in particular is now highly regarded, as it often scoops both ITN and the BBC to top stories and has even challenged CNN for supremacy in the cable and satellite rolling-news stakes.

Sky TV launched as a satellite-delivered direct-to-home (DTH) service on

5th February 1989, beamed, as it is still, from the Astra satellite. The general entertainment channel, Sky One, was at the forefront of Murdoch's bid for the eyes and minds of the British viewing public. The package was completed by a sports channel and Sky Movies. Murdoch was continually looking to expand the number of channels; one of the earliest attempts was a link-up with the Disney organisation, which ended acrimoniously before it started, amid threats of legal action.

Sky finally got the extra channels it craved when it merged with its only rival for the UK DTH market, British Satellite Broadcasting (BSB). This operation broadcast from the Marcopolo satellite, which went into orbit in August 1989, although the start of the five BSB services was delayed until April 1990. Whereas Sky stuck with the PAL transmission system, BSB made a bold decision to go with MAC, which gave better quality sound and vision. Another difference between the two was the receiving medium: Sky chose the now familiar dish, while BSB was ridiculed for its Squarial.

Both services were losing money but Sky had the advantage of being bankrolled by parent group News International, which includes Murdoch's successful daily newspapers in the UK. At the time, Sky was costing an estimated £2m to £3m a week to run and had run up debts of £4.3m. When

the two merged, BSB had already spent £700m of a £1.3bn investment fund. Despite going against all the guidelines of the then regulator, the deal went through, creating British Sky Broadcasting (BSkyB), a 5-channel service transmitted solely from Astra.

Five years later, BSkyB was declaring six monthly profits in excess £50m, making it possible for the station to pay back the original investment. Part of its success has been to secure the first British screening rights of such hits as *ER*, *Friends* and *The Simpsons*. In October 1998, BSkyB launched one of the UK's first digital TV services, SkyDigital. This gives the choice of 10 documentary channels, five sports channels, up to five different movies every hour, Sky One, Sky Sports 1, 2 and 3, Sky News, MUTV (a channel dedicated to Manchester United Football Club), dotTV (technology), Discovery, the History Channel and various affiliated services, including Bravo and Disney. Also offered are all the BBC services, Channel 4 and Channel 5.

As a major publisher-broadcaster, the perception could be that BSkyB has little need for its own studio and post-production facilities, with the obvious exception of the sports and news channels. This is a misconception, as the broadcaster has an active promotions department and needs to quickly prepare trailers for the shows on Sky One and the many movies it screens. Sound



is often a major element in these short-form packages, mixing dialogue from the programme, a voice-over and, usually, an appropriately witty or clever music bed. BSKyB now has five audio post suites at its sprawling site on the edges of West London and is planning a sixth for the end of this year.

The oldest of these are based around Amek Angela consoles; another features a Yamaha 02R and the most recent are both equipped with Soundtracs DPC-II digital desks. All use DAR SoundStations as the audio editing platform and are also fitted with common synchronisation and Sony DigiBeta and Beta SP video tape machines. Digital audio consoles are now increasingly used in post-production, a trend that Sky found it could not ignore for a variety of reasons. 'We needed to go digital in these suites,' explains Tim Field, sound dubbing supervisor, 'because all our video edit rooms were moving completely towards DigiBeta. When these two new dubbing studios were being planned, we looked at other desks, including the 02R, but it didn't have the capabilities we were looking for, even if we cascaded two 02Rs.'

In February of last year, Field and his colleagues approached Soundtracs with a view to buying the Virtua console. 'The problem was that we felt the Virtua was not a significant step forward from the 02R,' says Field, 'because it didn't meet our requirements for the number of inputs. But Soundtracs said they were developing a new desk, which was a larger format and matched the kind of price we had in mind.' The first DPC-II suite was completed in November 1998, the second came into use in May this year. 'It's a pretty simple desk to use,' comments Field, 'and there was a fairly relaxed installation programme. After that we held a series of training sessions to introduce all the dubbing engineers, including the freelancers we use, to the desk.'

Field agrees that the bulk of the work passing through these suites is from the trailers department but says there is the potential for longer-form work in the future. 'By far the greatest usage is for promotions and other short-form material,' he says. 'Sky is a very marketing-led station and has a strong promotions department. But, aside from that, Sky has recognised the short-fall in television investment and is heavily involved in financing or part-financing movies with modest (\$25m) budgets. There are also more partnerships with independent production companies and this will increase in the future.'

An obvious example of this is the *Uncovered* series, which began with *Ibiza Uncovered* and has continued with other glamorous, sexy locations. These shows were post-produced at the London Studios, but Field says that moves are being made to attract out-

side work like this to Sky's post facilities. 'There are plans to trade out these studios,' he explains. 'It wouldn't be all the time, because in-house work still accounts for the majority of our bookings, but it would be good to attract more on some occasions. It may be that we cut a deal with production companies making programmes for us, so that they use our facilities.'

Aside from promotions, a large proportion of audio posting is for the news and sport departments. A recent example is the Cricket World Cup, for which Sky was the primary host broadcaster (with the BBC handling a smaller proportion of the matches). While the DPC-II and Angela suites share the more involved projects, the 02R room is used for less complicated work. 'The capacity of the 02R is insufficient for some of our needs,' comments Field, 'but we are still very happy with it as a tool and a piece of technology. There's no way that it should be over-looked in comparison to our other suites. It is used for similar work as the Angela and DPC rooms but usually these projects are simpler to put together. It only has an 8-track SoundStation, although it does have a DA-88. The suite is still used for promos but it is not quite the same specification as the others.'

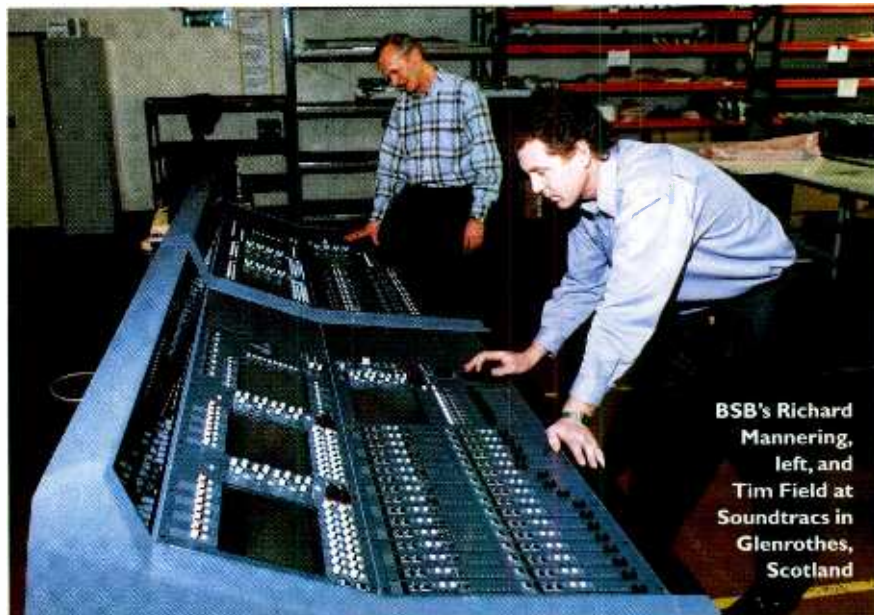
The DPC suites feature two 56-input MADI racks, which Field agrees could be seen as over-the-top. 'When we drew up the specification, we built in a degree of redundancy,' he says. 'There is an analogue and a digital output from most machines, both of which feed into the desk. As well as this there is an analogue patch-bay. I was quite pleasantly surprised the way the whole digital wiring turned out: we take either an analogue or digital source into the Krone signal distribution frame, then onto the patch-bay jacks and back, via the Krone frame, into the desk racks.'

The DPC-II can be configured with a

maximum of 160-channels—80 channels on the upper 'level' and 80 on the 'lower'—with the ability to view up to 224 inputs in four racks. Field says that the Sky dubbing mixers would not be using 160 channels at any one time, explaining, 'With short-form work, you may have six to eight tracks as a lay-up from the DigiBeta machine, giving, say, six different versions of a voice-over. Then there are the sound effects to take into consideration, so we need a fairly healthy number of channels, not just something like 56 but not as many as 160. The 160-channels enables us to build the kind of configuration we need for particular jobs.' Such flexibility is needed because the dubbing suites are also used for sports work: they are tied-in to the master control room, enabling live feeds and commentary to be synched to picture. This is for situations when, for example, football coverage is coming from an international host broadcaster, featuring only mono effects, and an English-language commentary has to be added.

The DPC-II's recall and automation functions are controlled by an onboard Pentium computer, which runs on the Windows 3.11 operating platform. This controls the entire range of the desk's functions, including the equalisation, which is nominally a 6-band system. 'Two of these are filters,' explains Field, 'so they can be assigned for dynamic side-chain processing. This means the EQ is effectively 4-band, but it is easily meets our requirements.' Field adds that any function can be automated, with the ability to link one channel to another part of the desk.

A criticism of digital consoles has been that, because there can be many layers and a lot of assignability, there is not the opportunity to instantly change a setting by reaching out for the controls. 'Nothing is hidden under menus,' responds Field, 'so it is about as close >



BSB's Richard Mannering, left, and Tim Field at Soundtracs in Glenrothes, Scotland





Studio B

◀ as you can get to grabbing a knob and changing parameters. By touching a fader, you get access to the EQ, so it's really a 2-button operation. After setting up the compressor or gate, the only variable is the threshold, which is why it is controlled by a big knob on the desk that you can't miss. Once we've set the parameters, all we have to do is tweak the threshold.'

Broadcasters have different needs, often idiosyncratic, from recording and other postproduction houses. BSkyB is no different. 'We don't use a traditional solo bus,' Field observes, 'we use PFL [pre-fade listen] instead and we need that to come out of a separate loudspeaker. It is important to cut the commentator's mic and talk to them off air.

We when first took delivery of the desk, the PFL function had been taken out and the new version of the software was unstable. We asked for the PFL to be restored, so in that way, and others, we have been contributing to the development of the DPC-II project.'

Aside from this initial set-back, Field says there have been no problems with desk reliability. This is important as the suites can work long hours, although they are maintained on a regular basis. The studios also feature Tascam DA-88s, MiniDisc, DAR CD Advance (as well as conventional CD machines), tc electronics M5000s, Sony V77s, Focusrite Red 7s for the front-end and Blue 230s for analogue compression. All equipment is hooked together using Colin

Broad synchronisation; monitoring is on Genelec S30Cs.

The current DAR SoundStation systems (with the exception of the 02R room) are 16-track versions. The new dubbing suite will be fitted with the SoundStation 32-track STORM platform and Field is considering a general upgrade for the existing SoundStations by the end of the year. But it has been decided to install the d-net networking system sometime next year (currently projects are interchanged on 2.6Gb magneto-optical drives).

The new dubbing suite will also feature a Soundtracs DPC-II and although BSkyB was not the first UK broadcaster to install the console, its commitment cannot be questioned. ■

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# Mike Hedges



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**BASF**



# Digital and the Bigger screen

Lucasfilm's *Star Wars Episode I: The Phantom Menace* receives a multiscreen debut, with breakthrough projection technology from Texas Instruments and Hughes-JVC. **Mel Lambert** knows the stage is surrounded

**L**ARGE-SCREEN electronic projection is not a new phenomenon. Many sports arenas around the world make use of such systems to display scores and statistics, team lineup changes, instant replays. An increasing number of concert halls are supplementing staged events with either simultaneous video projection, or redefining the auditorium as a venue for close-circuit sports, music shows televised from remote venues, sales seminars and other related gatherings. But there is one area of the entertainment industry where electronic projection of a high-quality video signal would literally revolutionise the way we enjoy a mainstream form of visual media—the movies. Hollywood in particular has been feverishly working behind the scenes to develop and perfect video-based projection systems that rival the look and feel of conventional 35mm film. The challenge facing contemporary theatre owners is to make the movie-going experience memorable,

and one that stands up to increased competition from digital and high-definition television.

Aside from dramatic and ongoing quality improvements—film being run through industry-standard platter systems can receive a lot of edge and surface damage during a normal run within a multiscreen cinema—there are additional savings to be made from electric cinema. It is estimated that Hollywood's major studios spend approximately \$1bn a year on the preparation and distribution of film prints. (Each print costs around \$1,200–\$2,000.) Video pictures being shown in electronic cinemas around the world are first-generation images that are immune to physical contamination, ensuring that picture quality remains constant regardless of whether the audience is seeing the film on its first day of release, or weeks later. To say nothing of the \$2bn piracy problem currently facing Hollywood studios. (End-to-end encryption is designed to reduce unauthorised access.)

Digitised images and soundtracks can be delivered via a variety of media, including high-capacity removable hard disks, fibre-optic links, broad-band cable or satellite, which can be dramatically lower than current printing costs. And with today's trend towards new construction and remodelling of theatres into multiscreen complexes, the cost of distributing additional prints for the same number of available seats is rising. Also, a multiplex does not show 20 or 30 different programs; instead, it exhibits popular films on more than one screen, with offset start times. (But it must be acknowledged that, at a reported price of between \$60,000 and \$140,000 per digital-ready screen, exhibitors are naturally concerned at making the right decision at the right time, and securing

a return in their investment.)

Electronic cinema offers many creative possibilities. For example, several different picture tracks might be developed to support multiple-language releases for opening-closing credits and so on, with real-time edits being made in the digital domain. Sound and image tracks do not have to be tied together. Different foreign-language audio tracks could be supplied, and synchronised during presentation, without the need for multiple image copies. Different 5.1-channel, 7.1-channel, stereo, even mono audio mixes could be supplied to theatres equipped with varying replay capabilities, without the need for multiple inventories.

As will be obvious to even the most casual observer of the film industry, George Lucas has never been one to accept the ordinary. For years he and his visionary company, Lucasfilm, plus its sound and picture subsidiaries, have been making dramatic advances in movie production and presentation. Today, Lucas' billion-dollar organisation consists of Lucasfilm Ltd, which handles all feature film and TV activities, as well as business activities of the THX Group and Licensing; LucasArts Entertainment; Lucas Learning Ltd; and Lucas Digital Ltd, which comprises Industrial Light & Magic and Skywalker Sound.

Recently, the THX Division of Lucasfilm was hired by CineComm Digital Cinema and Texas Instruments to ensure that a series of digital screenings for *The Phantom Menace* looked and sounded its best. Drawing upon years of experience with high-quality film transfers and film presentation, THX oversaw creation of the digital film masters, and aligned each of the four US theatres showing the film in limited-run showcase presentations.





And there are reported plans to repeat the experiment in Europe and Asia within the coming year.

CineComm and TI provided digital-projector technology for the one-month presentation of *The Phantom Menace* on two screens in Los Angeles, and two in New York, starting on the 18th June. In Los Angeles, CineComm's digital presentation was held at Pacific's Winnetka Theatre, while Texas Instruments' presentation was at AMC's Burbank 14 Theatre. In the New York area, CineComm showed at Loews' Route 4 Paramus, and TI at Loews' Meadows 6, Secaucus, New Jersey.

'We are proud that *The Phantom Menace* will be the first movie digitally projected for movie-goers', commented Lucasfilm president Gordon Radley. 'Digital projection is a tremendous breakthrough for the motion-picture industry and, by choosing to use our movie to showcase this technology, we seek to escalate the wide-scale introduction of digital projection for everyone's benefit—the studios, the theatres, film-makers and the public.'

As Rick McCallum, producer of *The Phantom Menace*, stated: 'For the first time, a film-maker can be certain that the audience will see and hear the film in the way the film-maker intended it to be seen and heard. Like the introduction of sound and colour, these digital screenings represent the beginning of a new era in film presentation. Electronic projection guarantees a perfect print with each and every screening for the full life of the film, and for every copy that is made. All any film-maker wants is to be able to show a film that is free of scratches and [with] the qualities of image brightness, focus and colour that everyone has struggled and spent so much time and effort to create'.

CineComm Digital Cinema is working closely with Hughes-JVC Technology (a subsidiary of Japan Victor Corp) to develop high-quality projection, and Qualcomm Inc. to develop data-compression and encryption techniques for delivering video signals via satellite and other broadband delivery systems. The Hughes-JVC Image Light Amplifier Technology ILA-12K uses a liquid crystal light-valve coupled to three analogue CRTs. CineComm will offer theatre owners a complete service from film print, digitisation and distribution to theatres via satellite. CineComm says that the retrofit costs for theatres will be offset by charging fees to distributors and theatres each time a movie is shown. The firm's satellite technology will also allow theatres to explore

other types of events, such as fashion shows and corporate presentations.

Texas Instruments, on the other hand, is focusing its attention on semiconductor and DSP solutions, developing suitable components that could be licensed to OEM projector manufacturers. TI's prototype electronic cinema projector uses a custom-developed Digital Light Processing (DLP) assembly fitted with more than a million tiny mirrors that move to deflect a light beam in one of three primary colours onto the screen. One reported benefit of the TI design is that it is relatively compact, and displays an image from a single lens. By the way, TI supplies DLP subsystems to more than 25 of the world's leading projector manufacturers. A DLP-based projector recently won an Emmy from the American Academy of Television Arts & Sciences.

For the recent series of showcase presentations on the East and West Coast, a Pluto Technologies Hyperspace high-definition video server, that emulates a Panasonic D-5 HD VCR, was used to store and playback a 1,920 pixel x 1,080-line, interlaced picture that had been data-compressed at a 4:1 ratio. The high-definition video server was linked via time code to a Tascam MMR-8 holding a 6-track, uncompressed clone of the final 5.1-channel SRD-DTS dubbing master. *The Phantom Menace* was also released in Dolby Digital-Surround EX (*Studio Sound*, July 1999), which uses separate speakers to replay rear-centre information, while left and right surround data is reproduced via the normal side speakers. This discrete information is carried through matrix-encoding on the Ls and Rs channels, much as centre-channel data is carried within a Dolby Stereo LtRt signal.

To my mind, the only problem with the West Coast screenings resulted

from an annoying 1-2 frame offset between sound and picture—audio leading—which one can only suppose was caused by an engineer checking synchronisation of the MMR-8 to the Pluto server in a small-format transfer room, without taking into account the normal audience-to-screen distance that requires at least a film-frame offset being introduced onto an on-screen synchronised picture.

As Lucasfilm insiders explain, THX involvement in these presentations will help maximise the full potential of electronic cinema presentations in several ways. The company plans to certify electronic masters and develop standards for digital transmission schemes. It recently announced a specification for electronic cinema projectors as part of the THX Theatre Program.

'The commercial inauguration of electronic cinema is not immediately imminent,' says Monica Dashwood, Lucasfilm THX general manager. 'But development of a projector specification and our ongoing research into other areas of electronic cinema make it clear that THX is committed to lead rather than follow in exploring new technologies.'

There are currently more than 2,000 THX-certified theatres around the world; each comprising a unique combination of certified loudspeakers and electronics integrated with specific room design and acoustics performance criteria. The THX Theatre Alignment Program (TAP) provides review of 35mm and 70mm film prints before release; technical alignments of projection and sound equipment at theatres; and on-site evaluations during regular public screenings.

'Lucasfilm THX's mandate is to assure the highest quality of picture and sound wherever movies are presented,' Dashwood continues. 'Just as our Theatre Program creates the ultimate film experience by designing great cinemas, mixing and screening rooms, several other THX services for film-makers, studios and home video manufacturers maintain a premium standard of quality for all theatrical and home releases.'

'The technical hurdles electronic projectors once faced have been overcome, but it's a complex technology with plenty of opportunities for image quality to be compromised,' says Dave Schnuelle, a consultant to THX, and the engineer that directed the company's electronic cinema research. 'The overriding goal with the THX electronic cinema specification is to deliver image and sound quality that exceeds the best that 35mm >





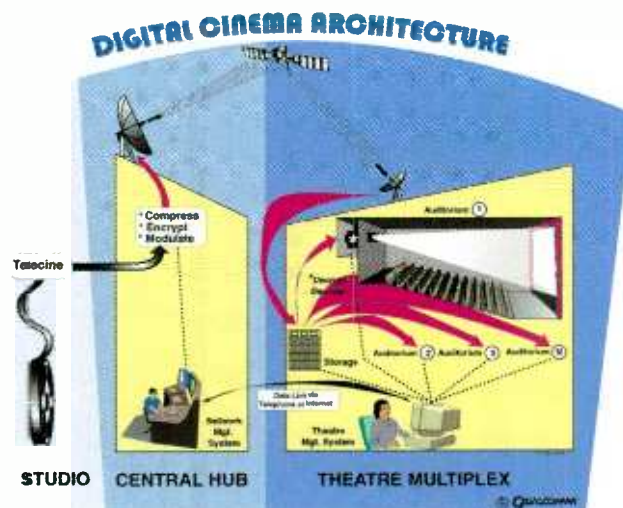




—the Digital Micromirror Device (DMD)—which features a large array of 1,300,000 mirrors (1,280 x 1,024). These tiny mirrors operate as high-speed optical switches to create a high-resolution, full-colour image. By rapidly switching on and off more than 5,000 times per second according to directions from the image's code, a light beam is reflected off the DMD's surface. Filters deposited on the surface of a prism split light into red, green and blue components. Each primary colour is assigned to its own DMD, that reflects monochromatic light back into the prism where it is recombined and projected onto a screen. TI's DLP Cinema prototype is designed to work with standard theatrical lamp houses, xenon lamps and associated power supplies. A new reflector is used within an existing lamp house to match the optical characteristics of the DLP Cinema System.

But Hughes-JVC and Texas Instruments systems, albeit first to bat in the current round of electronic cinema developments, are just the beginning. As will be appreciated, major studios are closely examining the potential for releasing films in a totally different way than currently available with conventional projections. And a number of manufacturers are looking to secure a foothold in the burgeoning hardware and delivery-system markets.

One such potential player is Soundelux Entertainment Group, which recently merged with Media Technology Source (TMS), one of the largest theatre designers and suppliers of cinema technologies. With interests not only in film postproduction (via its Soundelux Hollywood, Modern Music editorial, Signet Soundelux and Soundelux Vine Street Studios), Soundelux Showworks produces con-



tent and designs systems for a number of themed entertainment venues (including the Universal Studios' Terminator 2-3D attractions at Orlando and Los Angeles).

As Curt Behlmer, Soundelux Entertainment Group's senior vice-president of technology, explains: 'We are researching the exciting potential offered by the next generation of cinema experience, and have given a lot of thought to the ways in which we can enhance that experience in terms of sound and picture. Whether we act as consultant, supplier, integrator or service provider, our goal is to educate, provide superior customer service and technologically sound solutions.' SEG is acting as a consultant to several of Hollywood's leading information providers, and investigating enhanced techniques for high-definition telecine, digital audio transfers from workstation to delivery media, and a cornucopia of other developments. SEG-MTS also continues to provide technical support services to CineComm, Texas Instruments and Hughes-JVC.

'With different aspect ratios and colourimetry required for the current electric cinema systems, there is lot to

learn about the various options available to the film industry. As we are discovering, cinema owners need help in sorting out their options. Currently, there are no standards for mastering and playing back these images.' Behlmer is currently participating in a SMPTE task force to do just that.

'In addition, our own Soundelux Showworks and MTS divisions are looking at a spectrum of options available for projection, data compression [of visual images and soundtracks] as well as encryption schemes that will prevent unauthorised access to these valuable assets.'

'Lucasfilm has taken a bold step [by working with CineComm and TI to develop the showcase presentation for *The Phantom Menace*] and dramatically moved up the timetable for Electronic Cinema. There is a lot of interest in its potential; the next 12 months will see additional developments from other producers and film studios.'

Sony Electronics is reported to be finalising the development of a high-definition digital camera for use by George Lucas, who is currently in pre-production for *Star Wars: Episode Two*, which will be edited in HD video and shot back to film for international release. Such a development will also simplify the incorporation of computer developed and/or enhanced images, as well as streamline delivery to digital capable movie houses. And with far less hullabaloo than *The Phantom Menace*, Miramax has been showing *An Ideal Husband* in Los Angeles, New York and New Jersey using the Hughes-JVC projection system. Both Dolby AC-3-encoded audio and video were replayed from a Panasonic D-5 High-Definition VCR. ■

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ASIO. The company has also developed its own fusion:EFFECS VST effects range, currently consisting of fusion:Filter, fusion:VINYL, and fusion:VOCODE.

With EZ Vision, Opcode introduced an inexpensive and accessible MIDI sequencer to the market. But perhaps EZ Vision's most significant contribution was its introduction of colour to the user-interface in an otherwise monochrome MIDI sequencer world, and its clever use of colour coding to make the layout and information more immediately and intuitively accessible. The more up-market Vision subsequently gained a full-colour interface with its v2.0 release—an example of innovation rising from the low end. Opcode went on to release Musicshop, an upgraded version of EZ Vision that added notation functions, and the program survives to this day as the company's entry-level MIDI sequencing option for Mac and PC.

Another program that has lasted in Opcode's product range, perhaps surprisingly, is the MAX music and multimedia graphical programming software. MAX originated in the rarefied academic environment of IRCAM before being taken on by Opcode, and it is to the company's credit that it not only made MAX more widely available but has kept the program in its product portfolio.

In contrast, the notation package Overture was more short-lived. Introduced by Opcode in 1994, it was dropped three years later by the company, which said that it would be integrating professional notation capabilities into its core products and introducing other stand-alone notation software for Mac and PC—software that is yet to emerge, however. Galaxy and Galaxy Plus Editors, the company's patch librarian and editor-librarian programs which integrate with the Vision range via OMS, were not listed on the Products page at Opcode's web-site as at writing. However, recent rumours to the contrary, Opcode says it is not ditching the products, but has 'as yet unfinalised' plans for them which will be announced in due course. At present, Galaxy comes bundled with Vision DSP and Studio Vision Pro, providing a useful extension of the MIDI aspect of the MIDI + Audio programs, nicely integrated through OMS and the Name Manager, so that for instance you can select patches by name and view them by Group within the sequencers. One option for Opcode might be simply to fold Galaxy's functionality into the main programs.

Opcode's core software products today are the Studio Vision Pro and Vision DSP. The latter was introduced last year as a mid-range offering impressive features. In contrast, Studio Vision Pro trail-blazed the integration of digital audio recording and MIDI sequenc-

ing back in 1991, and has remained Opcode's flagship product ever since. In the mid-nineties the company introduced its innovative Audio-To-MIDI and MIDI-to-Audio technology in Studio Vision Pro. In essence, the Audio-to-MIDI process takes a digital audio recording of a single line such as a solo vocal or a guitar solo and converts it into a MIDI track that includes the pitch, timing and dynamics of the original part, represented in MIDI form. This MIDI data can then be edited as with any other MIDI track, the results can then be converted back into a digital audio track that reflects all the changes—most impressive. Opcode was granted a patent on its technology by the US Patent Office in 1998. While the Audio-to-MIDI and MIDI-to-Audio features have remained exclusive to Studio Vision Pro, along with Digidesign TDM support, Vision DSP actually had some features that for a while were in advance of the flagship, as it was the first product to use Opcode's new Acadia audio engine. Thus Vision DSP introduced VST and ASIO support to the Opcode product line and was the first Opcode product to feature the company's new studio-quality parametric EQs. At the same time, it included the latest interface and editing enhancements from Studio Vision Pro 4.0, along with many of the DSP processing functions previously only available in the 'top of the line' products, such as TruTone pitch shifting, Formant shifting, and Time-scale compression and expansion. Opcode added the Acadia engine to its flagship product with the subsequent release of Studio Vision Pro 4.2. Both Studio Vision Pro and Vision DSP support 24-bit/96kHz audio production—a fact that makes the latest pricing on Vision DSP even more appealing.

The Acadia audio engine provides four bands of real-time EQ, four VST plug-ins, and four sends (routable to outputs or buses) per audio mixer channel, plus 16 nameable audio buses for sub-mixes and routeings. Acadia supports up to 24 hardware outputs. ASIO support means that a range of ASIO-compliant PCI audio cards can be used with Studio Vision Pro and Vision DSP. Internally, both programs support up to 24-bit recording, DSP and playback using Acadia, which can also record 20-bit input as 24-bit with the top four bits ignored. To get the full resolution from ASIO hardware which supports 20-bit or 24-bit A-D, ASIO software drivers have to provide support for these bit resolutions as well. Acadia can also import 8-bit, 16-bit and 24-bit audio files, and allows files with different resolutions to be played at the same time. Sample rate, however, must be set per Session (common to all the audio files in a Sequence).

In the Vision method of organisation, Audio Files are the raw audio material,

and Audio Events consist of pointers which define sections of that material. An Audio Event is assigned to an Audio Instrument, which is assigned a single playback voice by the software and can be user-assigned to any one of the available audio hardware outputs. Up to 128 Audio Instruments can be created. The software lets you use up to 96 mixer channels, defined as 4 x 24-channel Console Windows, and each of these channels can be assigned any one of the Audio Instruments or any one of the 16 buses as an input source. As each channel's output can also be assigned to any one of the 16 buses, it's possible to group any selection and number of channels, and route them into a mixer channel that can in turn be routed into another channel via another of the buses, so there's plenty of flexibility for grouping and effecting. As always, the number of simultaneous audio tracks you can actually run and the number of effects you can actually use simultaneously are constrained by the processing power of the computer, the amount of RAM installed and assigned to the program, the speed of the peripherals bus, and the speed and size of the hard disk. But it hardly needs saying that computers will continue to increase in power. The next generation of Apple desktop machines, the G4 Power Macs, which are due later this year, promise significant power boosts, not just with faster processors, data bus and floating point processor, but also with the introduction of the supporting AltiVec parallel processing chip, which should give a major boost to the G4's media processing power; meanwhile, FireWire will gradually take over from SCSI for high-speed data transfer, with speed enhancements to 800Mbps from the current 400Mbps support.

Like other Mac MIDI + Audio companies, Opcode has traditionally employed support for Digidesign cards and systems via the DAE (Digidesign Audio Engine). Vision DSP's DAE implementation provides support only for the Audiomeia II-III Nubus and PCI cards; however, with Acadia and Opcode's new proprietary Digidesign DirectIO driver along with Digidesign's DigiSystem INIT 3.4 or later installed, Vision DSP users can use other Digidesign PCI cards and take advantage of all the >





< Acadia audio features. But for full Digidesign use, including TDM and 24-bit Pro Tools, Studio Vision Pro with DAE is required. Opcode's flagship gives TDM users complete routing access to all TDM plug-ins, processors and cards, supports mono, stereo, and mono-in/stereo-out TDM modules, and contains 16 internal audio buses for TDM that can be used as Audio Instrument outputs or Audio Send destinations; the outputs from a TDM-based SampleCell card can be routed into the inputs of Studio Vision Pro's Console Window for processing and mixing within the program's MIDI + Audio environment.

Studio Vision Pro and Vision DSP both recently had big price cuts of 60%, taking the former to \$399.95 and the latter to \$199.95, in what Opcode called 'a radical new pricing strategy'. But

perhaps in the most radical step of all, the company has taken advantage of Internet-based online distribution to offer the program as an electronic download for the very low price of \$59.95. The download is a full version of Vision DSP including OMS, but comes with only PDF software manuals and has none of the added extras bundled with the boxed, in-store version (such as Galaxy and BIAS Peak SE). Furthermore, it is sold without any technical support. Strangely, given the essentially borderless nature of cyberspace, the download is only available to customers who live in the US. As of writing, there was no news on whether the download option would be made more widely available; obviously there are ramifications for distributors.

Another limiting factor is that at 13Mb it is a heavy-duty download for anyone



who does not have access to something more than a regular dialup connection. Still, with the ongoing rollout of DSL and cable modem broadband access technologies (see 'The Musical Internet', *Studio Sound*, March 1999) this will gradually become less of a problem. In fact, Internet-based distribution is a reality that the music and audio software companies have to deal with.

Commenting on the web download version when it was introduced, Tom Sherman, VP of development at Opcode, said: 'We feel there's a growing opportunity in the high volume 'shareware-like' software area. The Internet is exploding with new concepts of software distribution and support. We see this as an inflection point for the entire industry, and we're proud to be aggressively embracing these changes.'

Also available for purchase from Opcode's web-site is an upgrade package for \$99.95 that imparts buyers of the download version the paper manuals and the extras that come with the boxed version, with a year of technical support—representing an overall saving of \$40 on the boxed price. Looked at in this light, the download strategy would seem to offer method behind what some might see as madness, that is to lower the entry barrier to encourage more people to use the software, so building a larger user-base, then hope to convert a satisfactory percentage of the downloads into upgrades. Web downloading is also a useful way to gather user-details, as people have to fill in a form before downloading the software. A realist may say that charging \$59.95 is a way to encourage buying in place of piracy. On the other hand, some may say that such a low price devalues the software and so discourages potential users. The company may also run the risk of alienating its distributors.

But selling via Internet downloads yields the company a global reach. It is fair to say that Opcode (along with its compatriot, MOTU) has never had the profile in Europe enjoyed by Emagic and Steinberg. This is a shame, because Vision DSP and Studio Vision Pro are classy, powerful yet accessible programs which deserve wide exposure. ■

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# Ash Howes

Photo: Chris Hook Studio: Battery Studios, London



## on **BASF** tape

**"I use BASF SM 900 maxima because of the sound – it is so punchy, the output is so high and the noise levels so low. A modern analogue tape like SM 900 gives me all the things I want: warmth, compression, etc., without losing that sound."**

Ash Howes's credits include recordings with **Texas, All Saints, Bryan Ferry, Alisha's Attic, Astrid, Another Level, Montrose Avenue, Hillman Minx, Rare, Roddy Frame and The Other Two, Seafruit and Jimmy Sommerville.**



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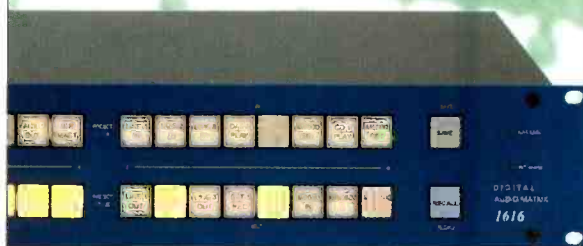
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Israel's latest studio is the first element in the reinvention of its film and recording business.

**Tim Goodyer** listens to movie history and its projected future.

ONCE RENOWNED for its place in the diamond trade, Tel Aviv now finds greater favor in software development. This move from the hardest of hardware to the soft edge of modern technology is broadly reflected in the streets—the shops offer the latest in hi-tech home entertainment to passers-by too preoccupied with their mobile phones to notice. And there's plenty to preoccupy them; the birthday of the state, changes in government...

Most recently, Israel has made an opening bid to put itself on the international recording map. The opening of The Mixroom marks the territory ready to meet the rest of the world on its own terms over audio facilities and standards. And in a setting that makes a visit more of a holiday than a chore, combined with lower facility rates than the rest of Europe and the US, it makes the proposition difficult to ignore.

The Mixroom project began almost two years ago when a prominent Israeli music producer joined forces with a film sound mixer, found a benevolent backer and a local distributor with its eyes on the world market, and began to plan. From the outset their plans looked different—the new facility had to accommodate recording and movies, so it had to work equally well whether configured for conventional stereo or surround-sound working. It would take time to build an international profile, so it had to survive on local work at the beginning—and be funded accordingly. There were to be no shortcuts.

'I do records and Israel does movies,' says Luis Lahav confirmation, 'that's why this hybrid in room came about. We decided we wanted to do both jobs and I wanted this and this, and he wanted that and that.'

The studio occupies part of Tel Aviv's Cinema Factory complex containing mastering rooms, some lesser recording facilities, and Lightworks and Avid-equipped film facilities. Although independent from the complex, it shares some ownership ties and enjoys a symbiotic relationship with other facilities. The Mixroom itself is centred on a 56-fader Euphonix console and Cube routing system with a cinema screen and Foley area out in front and projector behind. Differing outboard requirements mean that the racks hold an unusual selection of equipment; although the Euphonix internal processing makes them relatively lightly populated. And while music goes to 48 tracks of analogue tape at present, Euphonix' R1 is expected to make the process digital in due course. Two complete and separate monitoring systems cater for the contrasting requirements of music and film—a pair of Dynaudio M4s for the former, a THX-certified cinema surround system for the latter. The conflicting demands of the main music stereo pair and the front surrounds mean that the M4s have to be moved into position when they are required—the only aspect of the setup that contains any hint of compromise.

'We had to accommodate a screen and apply THX standards for film and we

also had to fit into rock 'n' roll standards that involve far-field monitors that sit in your field of view,' film mixer Israel David says. 'We worked out a configuration that meant that the acousticians didn't have to compensate and the only compensation left for us is that we have to move the main monitors. What we didn't get was a system to move the speakers for us, so at the moment we have to line them up by hand and check the phase every time.'

Construction of The Mixroom proved to be trying as Israel is short of builders with an understanding of acoustic issues. 'There is no knowledge here of acoustics, of construction of studios,' David confirms. 'This country doesn't even manufacture wood—it's all imported—so there is no knowledge of carpentry. Explaining what we wanted and why we wanted it when we were only going to cover it in fabric was not easy. Also air conditioning is a problem; this is a hot country and you need silent air conditioning. Some of the things we've been able to get abroad, for other things we have had to develop systems for ourselves.'

The studio's design was the work of Roger D'Arcy's AAA Group and the equipment was sourced and supplied by Prosys Technologies who regard The Mixroom as just one step in its plan to gain international recognition for Israel. 'We knew that in order to bring the first Euphonix into Israel we had to find something special,' says Prosys' general manager David Raviv, 'so we worked for a year to make a joint venture >





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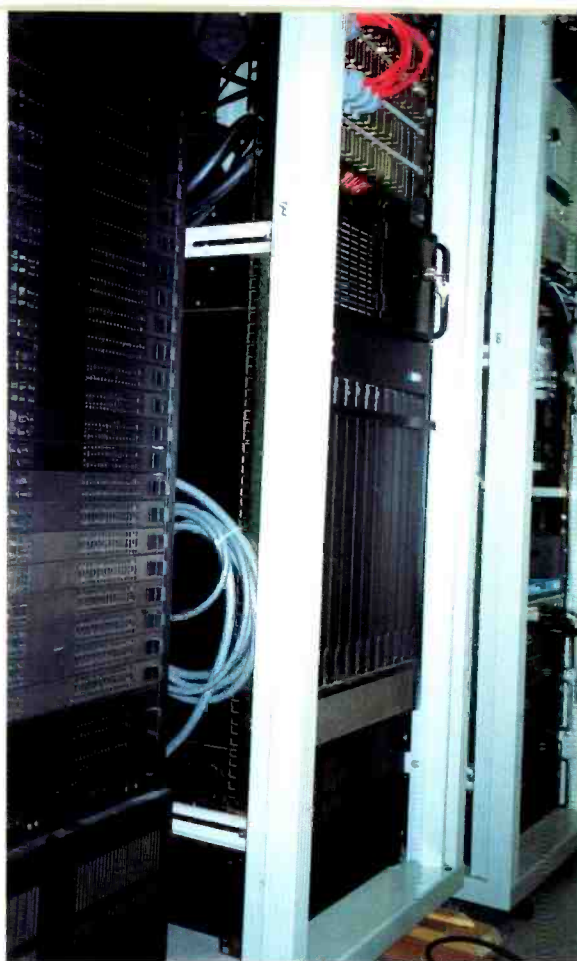
< between somebody with money to invest and people who could bring work to a facility. We found the two top producers and with the money people they built The Mixroom.'

'Until now the audio for the films made in Israel was finished in Europe,' says partner Dovi Engler. 'It was never done in Israel because there wasn't a suitable facility. Mixroom is the first and only place that you can sit in front of a big screen with a surround setup and finish a film.'

'We know it will take a few years for people to start to come over here to make their records,' Engler continues. 'but we will have studios over here to compete with London and we will have the weather, all the extra things we have to offer, and in that situation, your creativity can be higher. I know there are a

lot of artists in Europe who are prepared to travel to make a record, but they have to be sure that our facilities are good enough and that they will enjoy being here. The best way to convince people is to show them that it can be done. The first one is the toughest one—but now we have the first modern console, the first surround facility, the first overseas project...'

Already there is interest from the American film industry in the form of Saban ('Our target is American movies



under \$6m,' says David), and there are considerable opportunities in dubbing children's cartoons and Disney films into Hebrew.

Having worked in New York with Blood Sweat & Tears and Melanie as well as on Bruce Springsteen's first three albums, Lahav moved back to Israel to concentrate on the home market. He has recently recorded and mixed a double album project for Israel's most successful female singer, Rita. The sessions saw the Euphonix at full stretch with







over 100 inputs from the analogue machines, additional digital machines and 'live' MIDI gear. Although the initial release will be stereo, Lahav has completed a full surround version using the Mixroom's cinema system, allowing him to make a useful assessment of the room's acoustic.

'It is amazing,' Lahav says with enthusiasm. 'Normally I engineer my own projects as well as producing them, and I usually find there is a discrepancy between what another engineer does for me and what I would do with my own hands. I used an engineer on this project, and, because of the acoustic and the resolution of the room, it was easy to communicate. Also because the resolution is so high we haven't compressed the vocal on the mix. We loved

the dynamic range of the singer. Although now at home I find that a little trying because you have to participate in her performance more, so I may limit that at the mastering stage, but it goes to show how much resolution there is in the room.'

The next moves for the facility will involve expanding the console and building a network to allow movement of pictures and audio around the complex. There is also talk of building a dedicated recording area. 'We should have the R1 within three months,' David says. 'We tried several different systems and it's the one that best fits our needs as well as being able to keep the music people happy because it's 24-bit, 96kHz and it's operated fully from the console. Then we want to expand the console

and the Cube because we're already getting more projects that want to use 5.1.'

While building expertise may be rare and experienced audio engineers a precious resource, Israel is well served by musicians. 'There is a good state-of-the-art orchestra here, the Israeli Philharmonic,' David says, 'and there's another in Jerusalem that is as good. We have the talent, we've been working for more than a year with higher than 16-bit recording, and we charge more or less the same as they do in Eastern Europe.'

For Raviv and Engler, the future picture is larger, but 'The Mixroom is an essential element. We think that Mixroom is a special case,' Engler insists. 'If we can show people in Israel that people will come from Europe to work here, then it will push up the industry in Israel.' >

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< At present, there are few studios serving the professional market, two running G-series SSL desks that are 15 to 20 years old, a third running two very old Neves and others with old Tridents or Ameks. 'We have a very good relationship with all the studios and they are waiting to see what will happen here,' continues Raviv. 'At least one of them is a serious potential customer for a Euphonix. They have to decide whether they want to be one of the top studios, or close down, take the money and do something else.'

In the meantime, broadcasters are the focus of the Prosys team as Israeli radio stations are a long way behind their European and American counterparts. 'We have managed to convince the Israeli army—that runs a radio station called IDF which is the most popular in Israel—to purchase a Euphonix console for a new mobile,' Raviv says. 'It's being built in the United States and will be the best mobile in the area. First of all, broadcasters here do not have much money. Second, the army has special budgets because of American support.'

'IDF is like MTV but in radio,' Engler says. 'They were our second target because they were the only radio station that would have a proper budget. It will be the only properly equipped mobile in the country, and probably the biggest in the Middle East right now. The potential is great, especially if you consider things like Eurovision.'

Even without Eurovision—which Israel failed to win for a second consecutive year—the potential for Israel is great and

the timing good. They say that if you visit the place once, you'll have to come back. With an assurance like that and a studio like The Mixroom, how can it be otherwise? ■

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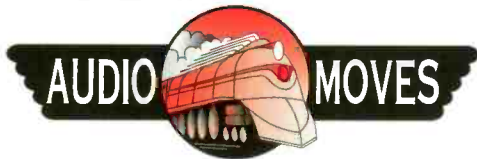
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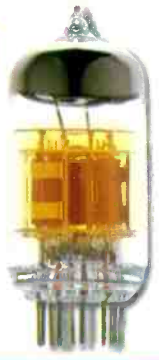
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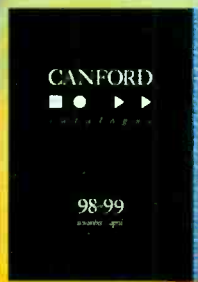
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## US: To our credit

The insidious claws of the credit industry are catching at ever greater aspects of the audio and musicians' markets writes **Dan Daley**

**W**HEN IT COMES to capital availability in the UK, I don't know how it is—the adverts I see in the *Mail* and the *Times* present interest rates that approach and at times exceed double digits. Contrast that with the deal in the US, where banks and other lenders are tripping over their nether members trying to get people to borrow money at rates as low as 3%—that is not a typo. Three per cent. Some of the come-ons that anyone with a live brain stem (and some who are completely brain-dead) get in the mail on an almost daily basis use the old decimal trick and call it 2.9%. Lending money in the States is a massive business, and thanks to our 8-year booming stock market, there's plenty of capital lying about to lend out. So much so that the offers are getting quite ridiculous, including deferment of any interest for the first three or six months. The market has become so competitive that high-schoolers routinely receive preapproved credit lines and cards, and once you realise that the average botany-illiterate 16-year-old perceives money as the sort of flora that actually does grow on trees, the credit industry begins to look actually desperate.

Which it is. Not surprisingly, doling out

all that credit has a downside, manifest in the US with a personal bankruptcy rate that has set records for the last three years running, with over 1.5 individuals seeking court protection from debts each year. Many are the same ones who failed to read the really, really fine print at the bottom of those sultry credit come-ons that tell you that, after the honeymoon period of 3%, the rate can shoot up to a stratospheric 24% in some states. As a matter of fact, many lenders have purposely set up shop in some of the more out-of-the-way states, like Delaware and South Dakota, that have very high or no ceilings on usury rates. Thus, many Americans get a lesson in geography on their way to the poorhouse.

This has plenty to do with recording studios. Lots of people have heard the stories about how certain musicians used credit cards to finance their first recordings and were subsequently launched into the upper reaches of success. Pete Anderson, producer for Dwight Yoakam, told me exactly that same story about making Yoakam's first EP, for which he used a borrowed credit card, pried from a friend's grasp after the friend went to see Yoakam play at the Palomino Club in LA and thought the crowd

was there to see him, instead of headliners Cowboy Junkies. It's exactly this kind of tale that encourages the use of credit to further music careers.

Studios have been doing the same, and the situation is becoming alarming. The impetus is certainly there to spend: conventional studios need to constantly upgrade equipment to differentiate themselves from competitors below in the home studio ranks, where what used to cost \$200,000 five years ago now costs \$20,000—and includes version 2.0. Home studios, often owned and operated by gear-heads who are as addicted to technology as an alcoholic is to gin, are running similar risks with capital, expanding their studios constantly, and often just to keep up with the seemingly never-ending slew of new systems and gadgets that the pro-audio industry is churning out. The need is there (perceived or real) and the money is readily available, at very attractive rates. This is either the stuff of dreams or else a cabal of matches and very, very dry kindling.

Businesses need to expand at times, and studios of all types are businesses, and going out on credit is a normal, controlled risk of operating a business. But few studio owners are graduates of business colleges, and the results of overborrowing often produce the former scenario instead of the latter. There's such a thing as too much of good thing; some pro-audio dealers are actually offering branded credit cards—music equipment superstore MARS,

## Europe: Book the future

New audio formats offer far more than their obvious potential

—if we are able to embrace it writes **Barry Fox**

**S**ONY HAS NOW confirmed that, although the Super Audio CD standard leaves room for multichannel surround, the first players cannot be upgraded from stereo. More manufacturers, such as Yamaha, are now following Pioneer's lead and putting 24-bit/96kHz digital audio outputs on their DVD Video players. This lets them connect to an out-board D-A convertor and exploit the full potential of any discs that hold sound in this format.

So neither SA-CD nor DVD-Audio offers any real benefit to the user over DVD Video. The danger is that consumers will not be interested in either while they compete as incompatible formats. In their present form, both look doomed to failure. There is even confusion inside the audio industry. Chesky Records recently produced a promotional DVD Video disc for Panasonic-Technics (Chuck Mangione, *The Feeling's Back*) with 24-96 soundtrack. This is labelled Super Audio Disc.

I have been trying to tell anyone who will listen that the only way forward is a Universal player that handles either system. I have also been suggesting that the 'killer application' for any new audio format is the long-playing, FM quality Talking

Book or spoken word recording. The DVD-Audio standard has the option buried in the small print, but no-one is promoting it. Now I have high hopes that the Audio Engineering Society may pick up on this idea. Go into any record shop or bookstore and look at the racks of speech recordings. They are bought by drivers for traffic jam listening and by travellers for long-haul flights. The many people with failing eyes or arthritic fingers rely on Talking Books. Invalids and convalescents like to listen when they do not feel up to reading. It's big business, and it's getting bigger, despite the fact that the spoken word industry remains rooted in the audio Stone Age, using flip-over cassettes.

Abridged books require two or three cassettes, unabridged versions can run to nine. There is no easy book marking system to let the listener find a favourite page or passage. Rewinding is a pain.

Cassette duplication is slow and cumbersome compared to popping discs off a press at a few pence a time. But a Red Book CD runs only for 75 minutes, less than a C90 cassette. CD-ROMs can give longer playing time, but no-one wants to fire up a Windows PC to listen to a book at bedtime. CD-i could have done the same, but

the interactive format was a flop.

The massive capacity of DVD would be more than enough for a full, unabridged book, perhaps with expurgated and unexpurgated versions on the same disc, protected by password. Alternatively, one disc could hold one book for one price, with

I have been trying to tell anyone who will listen that the only way forward is a Universal player that handles either system.

I have also been suggesting that the 'killer application' for any new audio format is the long-playing, FM quality Talking Book or spoken word recording

the sequel available by entering an access code, available by telephone for a fee. A single 8cm DVD would usually have enough capacity and sit neatly in a portable or car player.

When I raised this at an AES meeting recently, an interesting suggestion came



where you can buy upscale signal processing equipment and digital audio workstations, offers its own credit card about which the recorded announcement suggests 'apply today, play tonight'.

Some studios are wary of the whole credit morass, and have found that pennies saved are indeed pennies earned in a studio rate environment such as this one. In Nashville, where several major studios have shuttered their doors in recent months, a few studios are benefiting far more from being mean and pinched than they might have wading through the credit offers in the mail. Emerald Studios was able to pick up the bankrupt Masterfonics relatively cheaply because Emerald had held back on participating in the studio arms race that had engulfed the city for the previous four years. And even as others close, Sound Kitchen has expanded from two rooms to six, with a seventh projected, because its debt-to-equity ratio is 60% lower than average for major facilities.

Sometimes you simply have to borrow money, and if you do, there has never been a better time than now. But recording studios are just as vulnerable to the siren song of the lender as anyone else. And when the string gets pulled tighter—and it always will be because the good times never last forever—there will be more than a few studios that will find that the last seat in this game of musical chairs has already been taken. By the bank.

up. To be of real use the system will need a standard bookmark. This could be a memory chip inside the player, as already used to store level achievements in a video games console, or favourite track numbers on a CD. But the mark could also be stored by the disc.

Panasonic has already patented the idea of a disc—either CD or DVD—with a magnetic ring round the central hole. Panasonic has also talked of a hybrid disc, part pressed DVD and part DVD RAM recordable. This would be ideal for spoken word bookmarks.

It needs someone to pull this thing together and stop Sony, Philips, Panasonic and the DVD Forum pretending that the consumer wants a new super hi-fi system, and talk instead to spoken word publishers and the bodies that represent the blind. The AES is probably the only organisation that has the means and motivation to act as co-ordinator. AES members do not want to see DVD-Audio and SA-CD go down the pan, and the AES Secretariat has no special allegiance to either system.

A DVD-Video player already handles DVD Video, 24-96 audio only discs, CD audio and Video CD. It is only corporate ego, nursery politics and blinkered marketing that blocks the launch of a 'Universal' player which plays anything round and shiny, including DVD-A and SA-CD, either 12cm or 8cm, and with a bookmark system and access code control for super long play spoken word recordings.

## That migrant sport

Fans with an insatiable appetite for populist sport are being used to rescue waning ratings on tired TV, writes **Kevin Hilton**

**A**NYONE WHO KNOWS ME will tell you—I am not one of nature's sportsmen. Get me to explain the off-side rule in football or have me throw a ball to someone. Either will prove the point. So it has caused some hilarity that I have spent a lot of time in the past few years writing about the broadcast coverage of sporting events. One wag and so-called friend was so amused by all this that he rang me and asked for *Studio Sound's* sports correspondent. It was like a joke, only smaller and not as funny.

What this emphasises is the importance of sport to broadcasters. It would be naive to suggest that there is more sport on TV today, but it is the case that there are more channels, therefore more air-time to fill and a growing audience with an unseemly and insatiable appetite for anything that involves catching, kicking or hitting a ball.

A common maxim in TV today is that sport sells. When the UK's Channel 5 first went on air three years ago, it was derided for its cheap, tacky, populist programming. It was not attracting viewers, until it bought the rights to televise a number of important European football matches, plus some international rugby union fixtures. It did not deflect the criticism—the satellite transmission of an England rugby match in Argentina was almost unwatchable, and one of C5's chosen football commentators, Jonathan Pierce, has been condemned for his yobbish élan—but the move into sport attracted viewers and pretty much saved the station.

BSkyB also built much of its reputation on sport. The broadcaster is seen as a pariah because it has the financial might of the Murdoch organisation to out-bid its terrestrial rivals for the big sporting occasions, as it did with live Premiership football coverage. This left the BBC, previously the home of sport in the UK, with only recorded highlights; although it retained the rights to live coverage of the FA Cup Final. The Five Nations rugby union tournament has also partly capitulated to Sky; while the French, Irish, Scottish and Welsh unions have stuck with their respective terrestrial broadcasters, the English board signed up with the satellite service, something that nearly tore the competition apart. Now there is the situation of England home games being screened live on Sky, with a later terrestrial showing (on ITV).

What this has meant is an increase, often begrudging, in subscriptions among sports fans and rising profits for brewers, which

have installed big screens to accommodate the fans who have not signed up to Sky at home. While the BBC has been the biggest loser in the fight for TV sports rights—largely due to its limited resources—Sky has not been the only winner. The ITV Network has taken the Formula 1 Grand Prix season, as well as some of the Five Nations, while Channel 4 has recently started broadcasting Test Match cricket, previously another bastion of the BBC.

C4 is an unusual player in the UK TV sports game. Established as a minority channel, it made its name with less mainstream drama, music and films. Sport has long been a part of the C4 schedule, but in specialist areas: Sumo wrestling and such Irish games as hurling and Gaelic football. A shift into the mainstream came with coverage of the Tour de France and, most successfully, of Italy's Serie A football season.

As Sky has proved, sports is crucial for cable, satellite and, now, digital channels.

A common maxim in TV today is that sport sells. When the UK's Channel 5 first went on air it was not attracting viewers, until it bought the rights to televise a number of important European football matches

Chief among these is the digital coverage of Grand Prix, produced by a division of the sport's governing body, the FIA. Such channels as Canal+ in Germany offer the whole event (the warm-up day as well as the qualifying sessions and the race itself), with surround sound and the potential for viewers to interact and select camera angles. This description sounds vague, but that is only because the FIA will not talk about what it is doing. I know, I've tried

to talk to them.

Two reasons are given. The first is that, because of the sponsorship deals associated with the sport, the FIA does not like to be connected with other manufacturer's brands. This means it does not talk about the equipment it is using. The second is that it sees itself as being ahead of other broadcasters and feels that to open up will mean it losing out to competitors. Because sport, and TV sport in particular, is all about competition, this attitude is understandable, albeit frustrating.

The market for TV sport is there, there is no doubt. Between 15th and 19th June last year, 160 hours of sport were broadcast on British television. During the 1998 World Cup, 26 million people watched Argentina beat England on penalties. All of which makes me wish that the terrestrial channels would lose out even more to satellite so that the viewing habits of non-sports people are not disrupted. Here we are in the middle of the summer without *Buffy the Vampire Slayer* on terrestrial. I simply can't cope.



# Topping 20k

Philip Newell's recent thoughts on the sampling rate and bandwidth debate have prompted much constructive comment. **John Watkinson** presents a response

**M**Y INITIAL REACTION to Philip Newell's well reasoned article is one of complete delight (*Studio Sound*, June 1999). How refreshing it is to see references to reality, scientific method and research. If I didn't know Philip I could be forgiven for thinking he wasn't in the audio industry. And no, I'm not upset by the gentle digs. I've thrown enough rocks to know that some get thrown back. In any case Philip and I are united in the common goal of seeking the truth, and this is above personality issues.

Actually we have more in common than that. I have argued before that the aviation industry managed the transition to the jet engine better than the audio industry managed the transition to digital. This is because in aviation the consequences of getting it wrong are more severe. Philip and I are both pilots, and some of the discipline of aviation has inevitably rubbed off on both of us.

We are not alone in that view. The philosopher Arthur Young, whose book *The Reflexive Universe* is highly regarded, became interested in helicopters because they were complicated and would teach him how to think. His research led to the Bell 47. My interest in helicopters is for the same reason: they taught me how to think because they make error correction and Fourier transforms look simple.

So what did I learn? Firstly respect for scientific method. True science belongs to everyone and anyone can put forward a theory. If that theory is supported by the results of a repeatable experiment that is rigorously designed to avoid bias, then the theory becomes accepted. However, if a repeatable rigorous experiment results in something other than what the theory predicts, then the theory has to be withdrawn. That rigour has helped me to hold the high ground in the sampling rate debate.

However, the high ground doesn't really belong to me. I'm just the caretaker

so to speak. The high ground really belongs to countless psychoacousticians who have designed and performed experiments on human hearing, carried out research, written papers and had them peer reviewed and finally had their work accepted as scientific. The scientifically accepted consensus is that 20kHz is enough for audio reproduction and if something else is the case then an awful lot of qualified people have to be wrong. All I'm doing is to point out that it's unlikely. There is a small possibility that experiments are not well designed and the results are then suspect, and I will consider that point presently.

I have one very small correction to make to what Philip says about me, which is that I 'believe' that 20kHz is all we need. This isn't the case, and true to my reputation as a pedant I have never said that. My declared position is that I genuinely doubt whether more than 20kHz is necessary. As a philosopher I don't 'believe' anything. To believe is to accept without question. Everything I accept is after a lot of questions. If I am expected to accept that more than 20kHz bandwidth is needed, I am going to need some reasons. If the reasons I am given contradict accepted science I am going to suspect the reasons. So far none of the reasons I have seen for more than 20kHz stand scrutiny. It has given me great pleasure to blow some of this pseudoscience sky high using nothing more than my library of references and I am eternally grateful to Tim and Zen for indulging the spectacle. In the intervening period, none of the proponents of these bizarre theories have come back to explain why I am wrong, but have stayed below the 24-bit noise floor.

Another area in which I find myself in total agreement with Philip is in the need for better monitoring speakers. I have long argued that without very accurate monitoring it is impossible to assess the quality of any preceding item in the

audio chain. I know beyond any shadow of doubt that today's monitoring loudspeakers just aren't good enough. I can explain it based on the laws of physics, I can point to endless learned papers showing what is wrong with the current generation of speakers and I can perform repeatable experiments that demonstrate the shortcomings.

The widespread adoption of lossy audio compression is partly due to listening tests which were carried out on inadequate loudspeakers which failed to reveal the compression artefacts. People thought the speakers were testing the compressor, whereas the compressor was testing the speakers. This isn't science. As information passes through a loudspeaker, it is perfectly justifiable to treat a speaker as an information or data channel and to measure its effective bit rate. I have found a way of doing that and the measured results on typical loudspeakers are appalling at about one tenth the bit rate of a CD. No wonder lossy compression can't be heard with speakers as bad as that.

As Philip says, wouldn't it be a nice twist if that better monitoring, when it becomes available, revealed that I am wrong about audio bandwidth requirements? In fact there's an even bigger twist, because I'm actually in the middle of designing the loudspeaker which will allow people to find out if I'm wrong. A consequence of holding the high ground on how the human hearing system works is that it allows the specification of what a loudspeaker has to do in the frequency, time and spatial domains. By finding ways to meet that specification, one then captures the high ground of loudspeaker design.

Philip suggests that some research needs to be done to settle the matter definitively. I agree wholeheartedly and will support any such effort. The suggestion of the ISVR at Southampton is a good one, but I'm biased as I did my Sound and Vibration degree there. ■



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# Magnetism

The audio industry relies on magnetic devices, yet magnetism is largely taken for granted.

**John Watkinson** argues that such pivotal technology needs to be better understood

**W**ITHOUT MAGNETISM the audio industry would be in a sorry state. A quick look at an average audio installation soon results in a long list of devices that depend on magnetism—analogue and digital audio and video recorders, disk drives, microphones, loudspeakers, motorised faders, audio and power transformers, television sets; the list goes on.

An understanding of magnetism in the

(non-magnetic) or paramagnetic (magnetic characteristics are possible). Diamagnetic materials have an even number of electrons in each orbit where half of them spin in each direction cancelling any resultant magnetic moment. Fortunately the transition elements have an odd number of electrons in certain orbits and the magnetic moment due to electronic spin is not cancelled out. In ferromagnetic materials such as iron,

cobalt or nickel, the resultant electron spins can be aligned and the most powerful magnetic behaviour is obtained.

It is not immediately clear how a material in which electron spins are parallel could ever exist in an unmagnetised state or how it could be partially magnetised by a relatively small external field. The theory of

magnetic domains has been developed to explain it. Fig. 1a shows a ferromagnetic bar that is demagnetised. It has no net magnetic moment because it is divided into domains or volumes, which have equal, and opposite moments. Ferromagnetic material divides into domains in order to reduce its magnetostatic energy. Within a domain wall, which is around  $0.1\mu\text{m}$  thick, the axis of spin gradually rotates from one state to another. An external field is capable of disturbing the equilibrium of the domain wall by favouring one axis of spin over the other. The result is that the domain wall moves and one domain becomes larger at the expense of another. In this way the net magnetic moment of the bar is no longer zero as shown in Fig. 1b.

For small distances, the domain wall motion is linear and reversible if the

change in the applied field is reversed. However, larger movements are irreversible because heat is dissipated as the wall jumps to reduce its energy. Following such a domain wall jump, the material remains magnetised after the external field is removed and an opposing external field must be applied

which must do further work to bring the domain wall back again. This is a process of hysteresis where work must be done to move each way.

Hysteresis is good news and bad news. In tape heads and transformers, hysteresis causes losses and distortion, but were it not for this nonlinear mechanism permanent magnets would not exist and magnetic recording would be impossible. This article would be also be a lot shorter.

Fig. 2 shows a hysteresis loop that is obtained by plotting the magnetisation (B) when the external field (H) is swept to and fro. On the macroscopic scale, the loop appears to be a smooth curve, whereas on a small scale it is in fact composed of a large number of small jumps. These were first discovered by Barkhausen. Starting from the unmagnetised state at the origin, as an external field is applied, the response is initially linear and the slope is given by the susceptibility. As the applied field is increased a point is reached where the magnetisation ceases to increase. This is the saturation magnetisation,  $B_s$ . If the applied field is removed, the magnetisation falls, not to zero, but the remnant magnetisation  $B_r$  which makes permanent magnets possible. The ratio of  $B_r$  to  $B_s$  is called the squareness ratio. In permanent magnets squareness is beneficial as it increases the remnant magnetisation, whereas in transformer cores and motor armatures it's definitely not hip to be square.

If an increasing external field is applied in the opposite direction, the curve continues to the point where the magnetisation is zero. The field required to achieve this is called the intrinsic coercive force  $mH_c$ . This corner of the hysteresis curve is the most important area for permanent magnets and is known as the demagnetisation curve.

As the external field (H) is swept to and fro, the magnetisation describes a major hysteresis loop. Domain wall transit causes heat to be dissipated on every cycle around the loop and the dissipation is proportional to the loop area. This is why erase heads on analogue recorders get hot because the high erase frequency takes the head around many loops. For a recording medium, a large loop is beneficial because the replay signal is a function of the remanence and high coercivity resists erasure. The same is true for a permanent magnet. Heating is not an issue in either of these.

For a device such as a tape head, a small loop is beneficial. Fig. 3a shows the

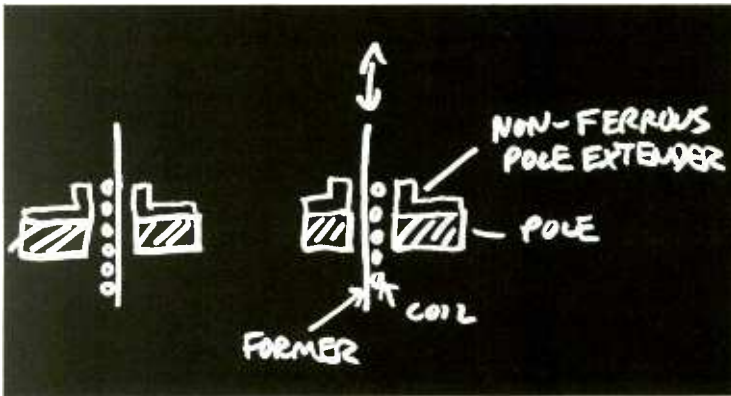


Fig. 1: Most heat is lost by radiation to poles

audio signal path is essential to obtain high quality. When the magnetism is outside the signal path, such as in a power transformer, lack of understanding shows up as poor efficiency, noise or heat or interference with audio signals.

A magnetic field can be created by passing a current through a solenoid, which is no more than a coil of wire, and this is exactly what happens in tape heads, transformers and motors. When the current ceases, the magnetism disappears. However, many materials, some quite common, display a permanent magnetic field with no apparent power source.

Magnetism results from the orbiting of electrons within atoms. Different orbits can hold a different number of electrons. The distribution of electrons determines whether the element is diamagnetic

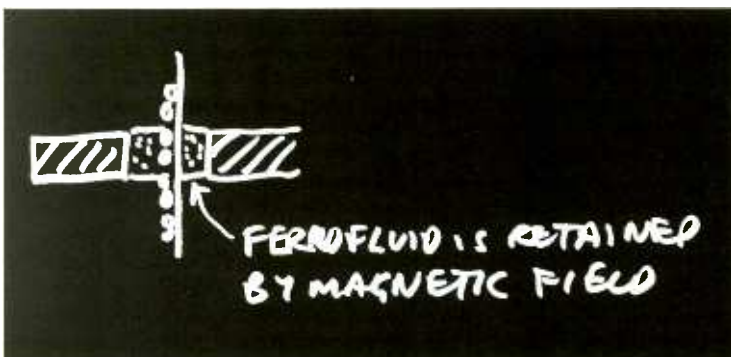


Fig. 2: Ferrofluid acts as heat conductive path to pole



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Permanent magnets are ubiquitous and they have been steadily improved as the technology has advanced. Generally if a given magnetic field is required in a given volume, the designer will prefer a magnetic material that does this with the least size and weight, provided the cost is reasonable. Permanent magnetic materials are compared using their energy density, which is the amount of magnetic energy they contain per unit volume.

Fig.4 shows some demagnetisation curves for cheap ferrite materials and more recent rare earths. Top right of the curve is the short circuit flux/unit area which would be available if a mythical zero reluctance material bridged the poles. Bottom left is the open circuit MMF/unit length that would be available if the magnet were immersed in an equally mythical magnetic insulator. There is a lot of similarity here with an electrical cell having an internal resistance. Maximum power transfer (V<sub>max</sub>) is when the load and internal resistances are equal. In a magnetic circuit the greatest efficiency (B<sub>hmax</sub>) is where the external reluctance matches the internal reluctance. Working at some other point requires a larger and more

expensive magnet. In a moving-coil loudspeaker, the load reluctance is dominated by that of the air gap where the coil operates because the air is much less willing to pass flux than anything else in the circuit. In a practical speaker magnet not all of the available flux passes through the air gap because the air in the gap doesn't differ from the air elsewhere around the magnet and the flux is happy to take a shorter route home via a leakage path. Cheap ferrite has such poor B<sub>r</sub> that a large area magnet is needed. This has to go outside the coil, creating a large leakage area. Consequently ferrite loudspeakers stick to anything ferrous nearby and distort the picture on CRTs. To avoid this, designers use a high-energy magnetic material such as Neodymium Iron Boron. In this case a small cross-section magnet is needed, that will fit inside the coil. This has a shorter perimeter and less leakage. Thus, although rare earth magnets are more expensive, the cost is offset by the fact that in a practical design more of the flux goes through the gap. Unless a rare earth magnet design is very bad, no screening for stray flux is needed at all. ■

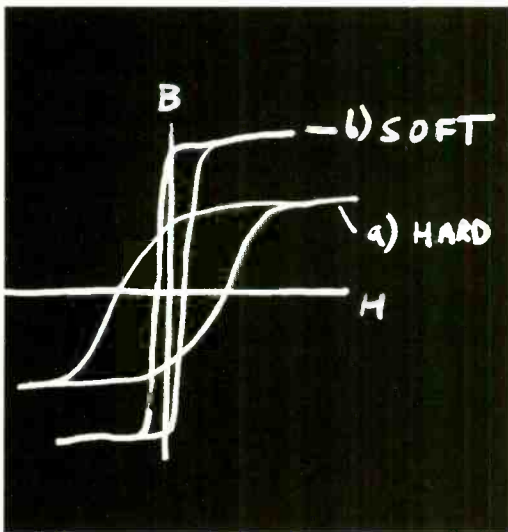


Fig.3: Hysteresis loops

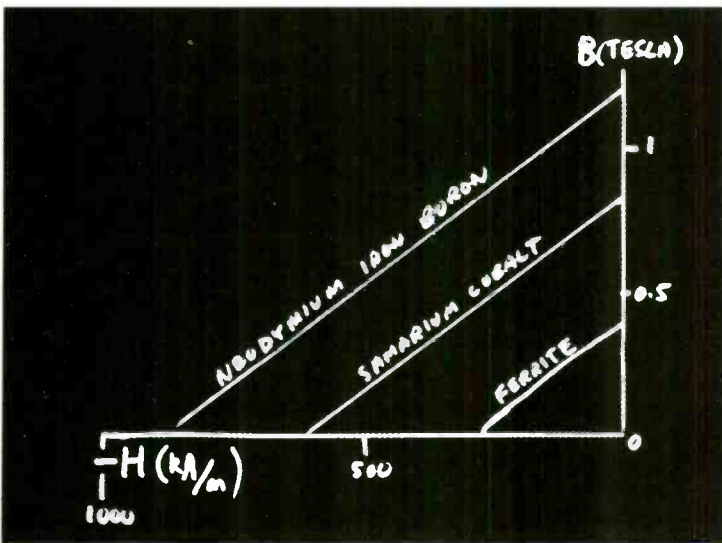


Fig.4: Demagnetisation curves for various ferrite materials

large loop of a hard magnetic material used for recording media and for permanent magnets. Fig.3b shows the small loop of a soft magnetic material that is used for recording heads and transformers.

According to the Nyquist noise theorem, anything that dissipates energy when electrical power is supplied must generate a noise voltage when in thermal equilibrium. Thus magnetic recording heads have a noise mechanism that is due to their hysteretic behaviour. The smaller the loop, the less the hysteretic noise. In conventional heads, there are a large number of domains and many small domain wall jumps. In thin film heads there are fewer domains and the jumps must be larger. The noise this causes is known as Barkhausen noise, but as the same mechanism is responsible it is not possible to say at what point hysteresis noise should be called Barkhausen noise.

This is the reason why DAT machines outperform Compact Cassettes. As magnetic recorders get smaller, the noise goes up. In analogue systems the noise is added to the audio, whereas in digital systems it isn't.

# Clip hard, sound loud

When is professional not professional? **Ben Duncan** discovers a line of 'professional' mastering equipment intended to create gross sonic distortion

**W**HEN DIGITAL AUDIO arrived, users were assured that 'bits were bits'—as long as those ones and zeros were recovered, sonic degradation could not occur. The aural experience was another matter. As much as ten years later, users and even equipment designers were informed that timing instabilities and infidelities known collectively as jitter could cause varying kinds of sonic degradation, some every bit as subtle as the maladies of analogue. In those cases where designers have been aware of these issues, digital audio—for the most part the 16-bit CD medium—used with due care and given 'the right kind' of recording and mastering, has come to be acceptable even to critical listeners.

The need for care and 'the right kind' of engineering is made clear in a letter in a recent issue of *Elektron*<sup>1</sup>. The publication of such a whistle-blowing letter shows the value of an audio and electronics press that does not have to look over its shoulder when the dirty deeds of business are under discussion. In the letter, David Torrey, a West Coast mastering engineer<sup>2</sup> outlines the purpose and use of some controls on CD mastering equipment. His letter was triggered by seeing a DIY design in the magazine to detect (already) clipped portions of signals—not the same as a clipping detector which aims to prevent or curtail the event.

Torrey states that clipping of the digital signal at the mastering stage is common on all styles of recording, but, naturally, it is most widespread in popular recordings. Widely used, seemingly ill-conceived equipment of Oriental origin, that's been in use since CD was launched, has an 'over' (sic) indicator.

This may be euphemistic; or just a sign the Japanese do not know the word 'clip', and that an organisation of that size and professionalism is nonetheless incapable of translating the manuals of products that will be in wide use in English-speaking countries, into English. Moreover, this indicator is intended to light up when a given, user-selectable number (say 4 or as many as 16) consecutive samples hit the positive or negative limits. Unsurprisingly, the higher settings create the aggressive sound (called harsh, brittle or fatiguing by others) on the finished disc that jaded professional ears might appear to crave—but surely not serious professional operators—nor the music-lover?

The suggested reason for this practice is that clipped signals sound louder. In exchange, the mass archive of late 20th Century music has been sold with unnecessary and damage to its information content. You cannot recover a clipped signal—it does not 'map back'. The same clipped signals may also be the cause of future lawsuits from children today deprived of optimal hearing because of the damage that the clipping—and subsequent listening fatigue—did to their ears. Similar lawsuits may equally be directed at makers of personal stereos who ignore the fact that their output stages readily (yet again needlessly) clip, redoubling the stress, particularly on young ears. As an ironic twist, the 'clip happy' equipment makers may well be one and the same organism. It is incredible that 'professional' CD mastering has been open to such crude processing, while the rest of the industry pays for civilised ways—compressing, limiting and levelling—to handle SPL heads and also for making

sounds seem louder than they otherwise would be.

It should not be necessary to mention in a professional publication that clipping is anathema in a PA system or a studio when monitoring, as more than so much duty cycle, or so many milliseconds of directly applied clipping will prematurely decay or over-excite the high-frequency drivers, sooner or later causing expensive damage. The extent that a clipped CD may damage to HF loudspeaker drivers will depend on the spectral distribution of the clipped energy. Any above 20kHz is deeply attenuated by 16-bit CDs anti-aliasing. This still leaves the extra distorted energy below 20kHz to irritate the ear and weaken tweeter components. Then again, with the wider bandwidth of SA-CD and DVD the windows will be thrown open for the high energy above 20kHz, commonly created by signal clipping. Then any prolonged or repetitive clipping of mastered signals will be a much riskier affair and the consequences of many domestic tweeters being fried, will put the consumer press on the scent of the culprits. Meanwhile, the existence of (likely) asymmetric clipping on recordings may upset lesser circuits, in particular those using coupling caps. There are wide variations in the abilities of different circuits to handle asymmetrical clipped music envelopes. In turn, this may explain why some circuits and gear, reliably made with reduced DC blocking, can deliver better sonics on many recordings, but less on some than others. I should have guessed. ■

1. *Elektron Electronics*, April 1999.

2. DRT Mastering site: [www.drmmastering.com](http://www.drmmastering.com)

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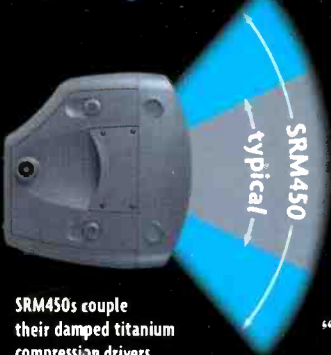
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