

September 1998 \$7.20 £3.75

Studio Sound

THE INTERNATIONAL PROFESSIONAL AUDIO MAGAZINE
FOR RECORDING, POSTPRODUCTION AND BROADCAST

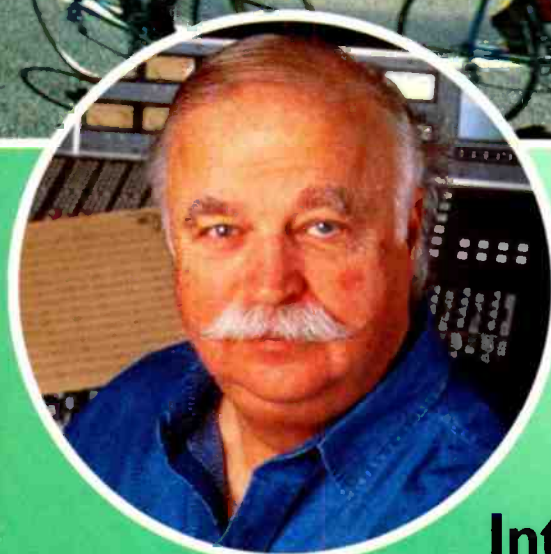


EXCLUSIVES

Audio Technica AT4060
Crookwood Mastering Bricks
Digigram Xtrack; PCX440np
Thermionic Culture Vulture
tc electronic Gold Channel
CLM Dynamics DB200S
Yamaha DSP Factory
Lab Gruppen DSP24
tc electronic Unity
Micron 570 SDR
Spendor SA300
dbx DDP

TOUR DE FRANCE

On the road and on the air



LA'S VILLAGE RECORDER; PARIS' EUROPE 1; ATHENS' MEGARON
BROADCASTING THE OPERA FROM GLYNDEBOURNE
CRACKING DOWN ON CRACKED SOFTWARE
POSTING GERRY ANDERSON'S LATEST

The BRUCE SWEDIEN

Interview



Live Designed for broadcast

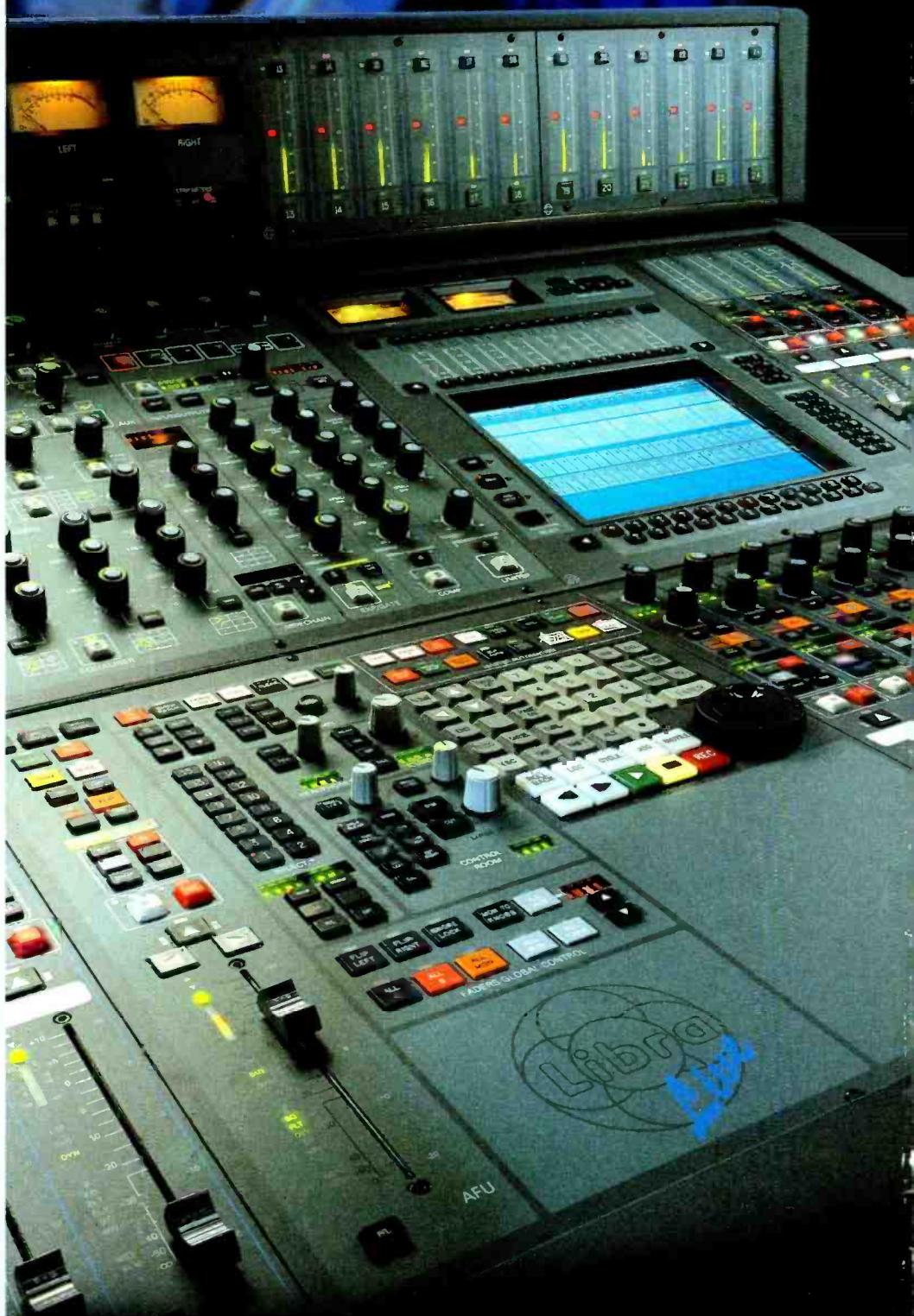
Libra Live is designed for versatile operation in a broadcast production environment.

It provides all the advantages of digital control and a digital signal path with the ease of use of a conventional analogue console.

- Full processing on all channels
- Soft configurations for user/application
 - Built-in I/O router
 - 12-48 faders, 12-96 inputs
- Mix-minus/IFB output, including talkback and AFL on every fader
 - Full surround sound capability
 - Snapshot reset
- Up to 16 mono or stereo auxes
 - Up to 8 mono or stereo sub-groups
 - Up to 4 mono or stereo main outputs
 - Redundant PSUs

Libra Live users include:

ABC, All Mobile, Astro, CBS, Central TV, Cinetel, France 2, King TV, Korean Broadcasting System, MSNBC, Nickelodeon, Nihon TV, NTV, Radio & TV Hong Kong, YTV



First



HEAD OFFICE – AMS Neve plc · Billington Road · Burnley · Lancs BB11 5UB · England · Tel: +44 (0) 1282 457011
Fax: +44 (0) 1282 417282 · **LONDON** – Tel: 0171 916 2828 · Fax: 0171 916 2827

GERMANY – Tel: 61 31 9 42 520 · Fax: 61 31 9 42 5210 · **NEW YORK** – Tel: (212) 965 1400 · Fax: (212) 965 3739

HOLLYWOOD – Tel: (818) 753 8789 · Fax: (818) 625 4839 · **TORONTO** – Tel: (416) 365 3363 · Fax: (416) 365 1044

e-mail: enquiry@ams-neve.com – <http://www.ams-neve.com>

- 4 Editorial**
On living space and the value of investment
- 6 Soundings**
News from professional audio, post and broadcast
- 8 World Events**
The latest pro-audio show calendar
- 10 Letters**
Your chance to comment on audio and us

REVIEWS

- 12 Digigram Xtrack Software; PCX440np**
Exclusive: French DAW
- 16 Yamaha DSP Factory** Exclusive: Japanese mixer strategies
- 22 Lab Gruppen DSP24** Exclusive: Swedish amplifier topologies
- 26 Micron 570 SDR** Exclusive: next generation radio mics
- 30 Crookwood Mastering Bricks** Exclusive: mastering plan
- 34 tc electronic Gold Channel** Exclusive: voice-channel
- 38 Spendor SA300** The definitive loud-speaker review
- 41 dbx DDP** Exclusive: dbx moves into digital processing
- 42 Alesis LX20** Completing the ADAT's all-round appeal
- 44 CLM Dynamics DB200S** Exclusive: mic pre
- 46 tc electronic Unity** Exclusive: plug-in culture reaches the O2R
- 48 Roland VS840** Extending the appeal of the workstation
- 50 Thermionic Culture Vulture** Exclusive: getting gritty with valves
- 52 Audio Technica AT4060** Exclusive: valve mic
- 54 Bellari LA120; MPI10** Valve outboard processing for the masses

FEATURES

- 57 Broadcast: Location mixers**
Surveying the options
- 62 Interview: Bruce Swedien**
A life set to music
- 73 Horizons: Pirate software**
The dangers of 'warez'
- 77 Interview: Craig Leon**
Back with Blondie
- 85 Postproduction: Lavender Castle**
The latest puppet space saga
- 91 Horizons: Networks 2**
Proprietary solutions
- 99 Broadcast: Tour de France**
From cycle to scandal
- 103 Broadcast: Digital Radio**
Up to speed with DAB
- 105 Broadcast: Glyndebourne**
Opera breaks new ground
- 108 Facility: Megaron**
Athens' concert hall reborn

- 113 Horizons: Computer Games**
Charting the Mac-PC war
- 116 Facility: Europe I**
Challenging digital radio
- 118 Facility: Village Recorder**
30 years of rock 'n' roll

COMMENT

- 128 Comment**
From our UK and US correspondents
- 129 Broadcast**
Wide-screen TV
- 138 Open mic**
Seeking a sense of balance in audio

TECHNOLOGY

- 130 Multichannel basics**
The fundamentals of stereo
- 133 Multichannel mixing**
Multichannel environments
- 136 Dr John**
Radio microphones



105



16



118



77

FRONT COVER, MAIN PHOTO: GRAHAM WATSON

www.prostudio.com/studiosound

Space at home

THE EVOLUTION OF MANKIND has also influenced the evolution of the environment in which it lives. In the same way that our ears have settled roughly in the same repeatable position on our heads in order to best identify the direction of that charging mammoth or taxi, and the placement of our eyes has happily coincided with the direction in which we walk, so too we have happened upon a character of acceptable living space.

A house move has caused me to experience a variety of prospective different abodes and I am convinced that the first acoustic impression of rooms is the biggest contributing factor to making a place feel good, followed, it has to be said, by sympathetic light and the lack of offensive smells.

For the most part these rooms have been empty and I have been surprised at just how nice perfectly plain houses can sound. Our last house stripped to a bare shell of all furniture and fittings reminded me of why we had liked it so much all those years ago.

The trouble is that you can't live in an empty room and a life's baggage and paraphernalia soon clamps a room's response down to undistinguished and inflexible. Which is all the more pity given that the acoustic demands that are about to be placed upon the average living space through the reproduction of multichannel domestic formats are orders of magnitude greater than the obstacles placed in the way of stereo reproduction.

The TV and the stereo invaded living rooms, but the progress of entertainment media has taken it to the very limit of what that space can comfortably absorb. Perhaps we are approaching a time where an entertainment zone in a house will become as much a consideration to architects as multiple phone points, storage space and an extra downstairs cloakroom. I can't see any better evolutionary route to the problem.

Zenon Schoepe, executive editor

The price of progress

IT USED TO GIVE US PLEASURE to hear the sophistication of professional audio equipment compared to that of the space programme. After all, we'd all rather be sporting a Purdey than a Rossi, and driving a Ferrari than a Trabant. But after a disturbing conversation with a tame mathematician—who reluctantly concedes that he would rather work in applied than pure circles—I wonder how long we can hope to hold on to the accolade.

His specific concern was over the commercial sector's reluctance to recognise that commercially valuable research comes at the cost of plenty that isn't. The incentive to those with research grants to allocate is that someone, somewhere makes good at some time, but that it's impossible to be sure who, where or when. To play the research game is a bit like doing the lottery—or riding in aeroplanes. As a New Zealander currently on his way to an academic post in Toronto via Cambridge, England, my mathematician has some insight into the differing research climates around the world. His experience is reflected in the research efforts of pro-audio companies who are increasingly dependent on other areas of business for their technological progress.

While it is fashionable to point out that the early recording studio business was driven by personal passions rather than business plans, there's no doubt that those passions were directly responsible for much of the progress that was made and the experience we now possess. Had the early private studio owners taken their case to any reasonable financial backer, we might still be recording on metal wire in stairwells since the acceptance of the general rules of business inevitably brings with it a tempering of what we might achieve—technically if not artistically.

Perhaps the recent award of Fields Medals to two Cambridge mathematicians, and the return of the inspirational John Forbes Nash from the brink of insanity will help mathematicians recover the glamorous mystique that attracts investment of all kinds. It's the same quality that once fuelled music recording, and we could do with a fresh delivery.

Tim Goodyer, editor

Studio Sound

Incorporating Broadcast Engineering
September 1998, Vol 40, No 9, ISSN 0144 5944

Miller Freeman UK Ltd, 4th Floor, 8 Montague Close, London Bridge, London SE1 9UR, UK.

Tel: +44 171 620 3636.

Fax: +44 171 401 8036.

Email: mfpag0001@mfpag001.demon.co.uk

Net: www.prostudio.com/studiosound

Editorial

Executive Editor: **Zenon Schoepe**

Editor: **Tim Goodyer**

Production Editor: **Peter Stanbury**

Secretary: **Eileen Sullivan**

Consultants: **Francis Rumsey;**

John Watkinson

Columnists: **Dan Daley; Barry Fox;**

Kevin Hilton

Design Consultant: **Ben Mallalieu**

Regular Contributors: **Jim Betteridge;**

Richard Buskin; Simon Croft; Ben Duncan;

Dave Foister; Bill Foster; Tim Frost;

Yasmin Hashmi; Rob James; Caroline

Moss; Philip Newell; Terry Nelson;

Stella Plumbridge; Martin Polon; George

Shilling; Patrick Stapley; Simon Trask

Publishing Editor: **Joe Hosken**

Circulation Manager: **Caroline Sharpe**

Advertisement Sales

Group Sales Manager: **Chris Baillie**

Deputy Ad Manager: **Phil Bourne**

US Representative: **Debra Pagan**

Classified Ad Manager: **Phil Stratton**

Advertisement Production: **Carmen Herbert**

PA to the Publisher: **Lianne Davey**

Managing Director: **Doug Shuard**

Publisher: **Steve Haysom**

© Miller Freeman UK Ltd 1998 All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording or any information storage or retrieval system without the express prior written consent of the publisher. The contents of Studio Sound and Broadcast Engineering are subject to reproduction in information storage and retrieval systems. Studio Sound and Broadcast Engineering incorporates Sound International and Beat Instrumental. Studio Sound and Broadcast Engineering is published monthly. The magazine is available on a rigidly controlled requested basis, only to qualified personnel. The publisher may pass suitable reader addresses to other relevant suppliers. If you do not wish to receive sales information from other companies, please write to Circulation and subscription at the address below.

Subscription Rates. UK annual: £45.00. Europe: £60.00. Rest

of the World: US\$116.00. Refunds on cancelled subscriptions will

only be provided at the publishers discretion unless specifically guaranteed within the terms of the subscription offer. Circulation and subscription

UK: Miller Freeman UK Ltd, 109 Station Road, Sidcup, Kent

DA15 7ET, UK. Controlled Circulation

Tel: +44 181 309 3617 Fax: +44 181

309 3681 Paid Subscriptions Tel: +44

181 309 3842 Fax: +44 181 309 3661

US: Studio Sound and Broadcast Engineering Magazine, 2 Park Avenue, 18th

Floor, New York, NY 10016 US Postmaster: Please send address corrections to

Studio Sound and Broadcast Engineering Magazine c/o Mercury Airfreight

International Ltd Inc, 2323 Randolph Avenue, Avenel, New Jersey NJ 07001

US second class periodicals postage paid at Rahway, NJ. Origination by Craftsman

Colour Reproductions Ltd, Unit 1, James Street, Maidstone, Kent ME14 2UR, UK.

Printed in the UK by I T Heron The Ben

tall Complex, Colchester Road, Heybridge, Maldon, Essex CM9 4NW, UK.

Newstrade Distribution (UK) UMD

1, Benwell Road, London N7 7AX, UK.

Tel: 0171-700-4600 Fax: 0171-607-3352



Total average international circulation
21,875
Jul-Dec 1997
BPA audited

Miller Freeman
A United News & Media publication

September 1998 **Studio Sound**

Born to Broadcast ...

and On Air Around the World.



Digital broadcasting brings many new challenges, not least in ensuring operational staff are trained to fully maximise the advantages on offer. For broadcasters seeking to ease the transition to digital, Aysis Air offers the unique SSL combination of advanced signal processing and a familiar and intuitive control surface.

Solid State Logic's Real Time Resource Processing means that all the controls on every channel are always available, while superb ergonomics also provide instant access to such broadcast essentials as dedicated AFL/PFL and mix-minus systems, loudspeaker muting, red light signalling and remote machine starts.

Multiple outputs, dedicated subgroups, full surround sound capability, selectable snapshot reset and integrated routing, for over 400 input/outputs, make Aysis Air the only realistic choice for broadcast production and transmission facilities into the next millennium.



"Aysis Air looks like an analogue console, so it's easy for freelancers to operate."

Stig Nordahl, Sound Technician, TV2, Norway

Solid State Logic

International Headquarters

Begbroke Oxford OX5 1RU England

Tel: +44 (1865) 842300

Fax: +44 (1865) 842118

Email: sales@solid-state-logic.com

<http://www.solid-state-logic.com>

New York

+1 (212) 315 1111

Los Angeles

+1 (213) 463 4444

Tokyo

+81 (3) 5474 1144

Paris

+33 (1) 3460 4666

Milan

+39 (2) 2622 4956

Toronto

+1 (416) 431 9131

Singapore

+65 285 9300



◀ **US:** A newly formed coalition of high end, independent audio manufacturers has banded together to promote Excellence in Audio at AES, San Francisco. The so-called Audio Underground Coalition, believes in delivering custom hand-built quality products and, free from corporate bondage, states its intent to meet and exceed user needs rather than appease a

board of directors spearheading the Coalition are Manley Laboratories, Drawmer, Brauner and SoundField USA (Transamerica Audio Group) and API. Others included are Esoteric Audio Research, Purple Audio, Empirical Labs, D.W. Fearn, Earthworks, Crane Song, Ltd, Soundelux Microphones and Proaudiosearch.com (the pro audio internet information source). 'Every one of these companies is unique,' said Brad Lunde of Transamerica. 'The Coalition brings personally run, customer committed companies with unusually high performance products together to help each company reach more people than any one company could alone.' The Audio Underground Coalition can be found at AES Booths 575 and 676.

Analogue Town Hall

The forthcoming San Francisco AES Convention will provide the setting for a Town Hall meeting to discuss the future of analogue recording. The meeting is open to producers, engineers, studios and suppliers, and is sponsored by Studer, Quantegy and Emtec. Discussion topics are likely to include demand for analogue

recording, equipment maintenance costs and recording hardware availability—coordinator Bruce Borgerson being anxious to draw attention to the fact that only one professional recorder manufacturer is still supporting analogue technology. The meeting is scheduled for Monday, 28th September at the ANA Hotel. **Bruce Borgerson,**
Tel: +1 541 488 5542;
Email: bbwaveompuserve.com



◀ **US:** BASF has given its Master Award to nortena group Los Tigres del Norte for their 1997 Billboard No.1 album, *Jeffe de Jeffes*. Recorded at Menlo Park's Music Annex, the Album was coproduced and engineered by Jim Dean who returned to the scene of the crime to accept the Award from Emtec's Kim McKenzie along with Music Annex marketing coordinator Goia Ingram. In another incident, the BASF DM931 loaded onto a pair of Sony PCM3324 digital multitracks survived temperatures in excess of 95° when Florida fires burned around the premiere of Disney's *Armageddon* at the Kennedy Space Centre. Emtec, US. Tel: +1 805 295 5551

▼ **UK:** European independent postproduction operation Resound has opened a new facility in London's Soho called Resound. Based around an Avid AudioVision-Digidesign Pro Tools pairing, Resound offers a wide-screen, surround-sound facility set in a naturally-lit environment with on-line visual effects working. The inclusion of Pro Tools allows Resound to pitch for detailed sound work and audio restoration projects. Resound, UK. Tel: +44 171 437 1336



▲ **UK:** Along with *Whistle Down the Wind*, *Doctor Dolittle* has just opened in London with Cadac consoles serving the front of house. The production employs a 40-input F-type for the band, a 50-input J-type console for vocals and 35 DPA Type 4060 miniature mics feeding Sennheiser SK50-1046 transmitter-receiver pairings for the Doctor and male members of the cast. *Whistle Down the Wind* sees Jim Steinman's lyrics set to Lloyd-Webber's music, while *Doctor Dolittle* is notable for its use of animatronics from Jim Henson's Creature Shop.

Training places

The world of training schools and courses saw the launch of Oxford Audio Training recently. Set up by John Gallen on the strength of some 20 years in production and engineering, OAT also draws on the expertise of Brian Gaylor, with his 15 years in pro-audio, and LA-based producer-engineer Mark Dearnley to offer training in all aspects of sound recording.

BBC's Centre for Broadcast Skills, meanwhile, will unveil new courses at the forthcoming IBC. These will include the flagship 5-day Digital Terrestrial Television for technical staff and broadcast engineers involving lectures and practical demonstrations addressing all elements of the digital broadcast chain.

In the interests of validating the growing number of training courses, the British-based APRS

has announced its initiative for industrial accreditation of professional audio training courses and the first courses to carry it—Surrey University, the Gateway School of Audio Engineering, Music Technology and Music Business Studies (Kingston University), the University of Westminster, and the Liverpool Institute for the Performing Arts.

The scheme is the result of 18 months work which involved 'pilot schemes' and a team of assessors that included Dave Harries (Munro Associates), Pete Fielder (CTS-Lansdowne Studios), Simon van Swanenberg (SSL), and Joe Hosken (*Studio Sound/Pro Sound News Europe*).

Oxford Audio Training.
Tel: +44 1491 614695. Email: Oxfordaudio@btinternet.com
BBC CBST. Tel: +44 1386 420216.
Email: cbst.admin@bbc.co.uk
APRS. Tel: +44 118 975 6218.
Email: info@aprs.co.uk

Tomorrow's TV schedule

Formalising their longstanding relationship, Japanese electronics exponent Matsushita and US software giant Microsoft are to jointly focus on 'development of digital television technologies for next-generation PCs, including support for the reception and display of digital TV broadcast signals and associated interactive programs.

In addition, Matsushita plans to deploy analogue Web TV terminals in Japan targeted at the 1998

winter-selling season, and the two companies will collaborate on the development of digital cable advanced set-top boxes for public network and retail customers.

The agreement demonstrates the companies' intention to encourage the convergence of digital AV technology and the PC and falls into four key areas—the PC's ability to handle digital television broadcasts, Web television, porting Windows CE to Matsushita's AM33 chip for forthcoming AV equipment, and licensing Windows CE for Matsushita's use in AV computer products.



▲ UK: The acoustic hood in Birmingham's prestigious Symphony Hall has been improved in order to accommodate the increasing demands made on it by additional audio and lighting rigging. The 35-tonne hood that provides the principle means of controlling the auditorium acoustic is now suspended from 28 new cable assemblies designed by Midlands-based PCM, that incorporate strain gauged load link transformer capable of monitoring the load on the hood and an alarm facility. PCM, UK. Tel: +44 1226 864444

■ Hollywood's The Post Office has installed a Fairlight MFX3 digital audio workstation to pursue its niche approach to postproduction services. Its brief includes cable TV and home video post-production as well as more mainstream work for the likes of The Disney Channel. Culver City's 20th Century Fox is set to reopen the Darryl F Zanuck dubbing theatre complete with 2 BGW M2200 active subwoofer systems, bringing it into line with various of the studio's screening rooms.

20th Century Fox, US.

Tel: +1 310 369 2873.

Fairlight, US. Tel: +1 310 287 1400

BGW, US. Tel: +1 800 468 2677.

■ The Latvian Radio SWH Group has purchased an Orban Audicity workstation as part of the relaunch of its contemporary music station. One of three stations in the group, Radio SWH is the territory's leading commercial station reaching around 2m people with its 24-hour cocktail of music, news, current affairs and magazine programming.

Radio SWH, Latvia.

Tel: +371 731 3286.

Orban, US. Tel: +1 501 351 3500.

■ London specialist recording studio, Bunk Junk and Genius has upgraded its Dynaudio Acoustics M4M monitors with a pair of XTA DP200 digital system controllers.

BJG, UK. Tel: +44 171 381 6298.

Munro Associates, UK.

Tel: +44 171 403 3808.

■ Chinese TV station, TVB, has installed 6 Jünger d05 digital dynamics processors with adaptive pre-emphasis for processing of its transmissions. Along with New York's ABC Networks, TVB is the first broadcaster to employ the updated processors. Across the border in Hong Kong, DK Audio's Master Stereo Display digital meters have found favour with a number of broadcasters including Wharf Cable, Star TV, Media Watcher and TVB with a number of 8-channel surround units.

Jünger, Germany.

Tel: +49 30 677721 0.

DK Audio, Denmark.

Tel: +45 44 53 0255.

■ Montreal-based post facility AstralTech is to install a Soundtracs DPC-II digital console in a new digital film dubbing stage currently under construction. The 96-fader desk will be used in conjunction with a 48-track Augan Master Recorder and a 64x8 Adgil programmable surround monitor routing system.

AstralTech, Canada.

Tel: +1 514 939 5060.

Soundtracs, UK.

Tel: +44 181 388 5000.

Augan, Netherlands. Tel: +33 ??

■ New Delhi Television has purchased 9 Micron UHF radio microphone systems for its ENG teams. Each system is comprised of a TX501 belt transmitter and SDR570 miniature diversity receiver. NDTV is India's largest news and current affairs production service, broadcasting to over 50 countries within Asia and providing all news programming for Star Plus.

NDTV, India. Tel: +91 11 621 8620.

Audio Engineering, UK.

Tel: +44 181 341 3500.

■ Manchester is home to a new TV facility being billed as the UK's largest outside London. Complete Television is part of Andrew Sumner Associates recent £2m expansion and includes 5 on-line suites and a broadcast studio. ASA's portfolio of clients includes the BBC, Channel 4, Yorkshire TV and Granada.

ASA, UK. Tel: +44 161 228 0330.

■ Brazil's Teatro Saõ Pedro has installed a Stage Accompany SR system as part of a complete restoration. The installation in-

cludes 8 Performer P27, 8 B15 and 4 Entertainer E24 cabinets; PR3, PPA1200 and SA1600 amplifiers; and 4 SA2310 graphic EQs. Founded in 1917, the theatre is Saõ Paulo's second oldest and reopened with a production of Rossini's La Cenerentola earlier this year.

Stage Accompany, The Netherlands.

Tel: +31 229 282930.

■ Hire companies' recent activities include British-based Cinevideo's acquisition of Sennheiser EM1046 radio mic systems which have already been seen with OB provider Telegenic; nonlinear hire specialist Salon's 2 PCI AudioVisions and Pro Tools systems. Bristol PA company South West Audio's inaugural use of the Crest 8002 amplifier at the Glastonbury festival; and Yorkshire's Desirable Sound purchasing an A&H GL3300 desk, 4 Nexo PS15 speakers and 2 Nexo LS1200s. Gearhouse Broadcast's preparations for the Malaysian Commonwealth Games in Kuala Lumpur include 22 Audioionics SC1 soundcheck monitor units for audio monitoring in the Tech Ops cabins at each of the event's 22 venues.

Cinevideo, UK.

Tel: +44 181 743 6762.

South West Audio, UK.

Tel: +44 1454 633635.

Desirable Sound, UK.

Tel: +44 1226 380817.

Audioionics, UK.

Tel: +44 114 242 2333.

■ London-based Black & White TV Mobiles is to install a second Calrec S-series console in its new £13.6m OB Unit 5. The 48-channel desk will be used for music productions and keeps the company of the earlier S-series which is in use on sports and music assignments.

Black & White, UK.

Tel: +44 1222 590595

Calrec Audio, UK.

Tel: +44 1442 842159.

■ Sydney branch of the School of Audio Engineering has equipped a new 24-track studio with a 32-channel Mackie desk, Studer 827 multitrack machine. A new 16-track room houses a Yamaha 02R desk and ADAT XT20 MDM machines while the multimedia department has added 13 Apple Mac 7600-200 computers and 2 Silicon Graphics Indigo systems running Softimage software. In Auckland, recent purchases include Fostex D5 DAT, Focusrite Green comp-lim and a selection of AKG microphones.

SAE, The Netherlands.

Tel: +31 20 421 7575.

■ London audio broadcast specialist 2nd Sense has chosen HHB's CDR800 CD recorder for use on its sound design for a variety of TV and radio projects including *Top of the Pops* and *TOTP2* for television, and a special commission for digital radio, *Fly You to the Moon*. Future digital programming prompted the selection.

London post activities include Offline Editing's purchase of Pro Tools and AudioVision systems, and TVI's 2 AudioVisions.

2nd Sense, UK. Tel: +44 1923 492761.

HHB, UK. Tel: +44 181 962 5021.

■ Europe's cinemas have benefited from heavyweight sound systems in recent months. The Dutch Pathé group has chosen Stage Accompany S26, S7 and S45 Screen Series loudspeakers to be driven by the new model ES20 amplifier. Pathé Eindhoven joins the chain's multiplexes in Maastricht, Groningen and Rotterdam in this selection. Belgium's Kinepolis group, meanwhile, has opted to install BGW Performance Senes 3 amplifiers in its cinemas in Madrid and on the island of Martinique, as well as others across Europe.

Stage Accompany, The Netherlands.

Tel: +31 229 282930.

BGW, US. Tel: +1 800 468 2677.

September 11

6-9

PLASA 1998Earls Court 1, London, UK.
Tel: +44 171 370 8229.

11-15

IBC 1998RAI Exhibition and conference centre, Amsterdam, The Netherlands
Tel: +44 171 240 3839.
Fax: +44 171 240 3724.
Email: show@ibc.org.uk
Net: www.ibc.org.uk/ibc/

16-19

Duplitech 98**Duplication and Replication Equipment & Technology for****Magnetic and Optical Media**Beijing International Conference Centre, Beijing, China.
Contact: China Exhibitions
Tel: +44 171 546 8775.
Fax: +44 171 546 8570.
Email: info@chinex.com

19-21

2nd Cinec 98**International Trade Fair for Motion Picture Technology and Postproduction**Munich, Germany
Contact: Messe München GmbH
Tel: +89 9 49 01.
Fax: +89 9 49 09
Email: info@messe-muenchen.de
Net: www.cinec.de

26-29

105th AES ConventionMoscone Convention Centre, San Francisco, California, US.
Tel: +1 415 558 0200.
Fax: +1 415 558 0144.
Email: 105th-chairman@aes.org
Net: www.aes.org

October 12

-November 6

ITU Plenipotentiary ConferenceMinneapolis, Minnesota, US.
Tel: +41 22 730 5969.

October 14-18

2nd Expomusica 98Fisa Maipú, Santiago, Chile.
Contact: Juan F Moreno, Puntodiez SA.
Tel: +56 2 231 6515.
Fax: +56 2 233 4981.
Net: www.puntodiez.cl

20-24

Tele-, Kino-, Radio TechnologiesExhibition Centre, Sokolnik, Moscow, Russia.
Contact: Ekaterina Zotova
Email: main@admt.ru

22-25

Reproduced Sound 14**'Surrounded by Sound'**
Hydro Hotel, Windemere, UK.
Contact: Institute of Acoustics
Tel: +44 1727 848195.
Fax: +44 1727 850553.
Email: Acoustics@cius1.ulcc.ac.uk
Net: ioa.essex.ac.uk/ioa/

27-31

Broadcast India 98World Trade Centre, Mumbai (Bombay), India.
Contact: Kavita Meer, Saicom Trade Fairs & Exhibitions.
Tel: +91 22 215 1396.
Fax: +91 22 215 1269.
Email: saicom@bom2.vsnl.net.in
Net: www.saicom.com/broadcastindia

31-November 2

15th International AES Conference 'Audio, Acoustics, and Small Spaces'Scanticon Conference Centre, Snekersten, Copenhagen, Denmark.
Contact: Jan Voetmann, Delta Acoustics & Vibration.
Tel: +45 45 93 12 11.
Fax: +45 45 93 19 90.
Email: aes15@delta.dk
Net: www.aes.org

November 4-5

23rd Sound Broadcasting Equipment Show (SBES)Hall 19, National Exhibition Centre, Birmingham, UK.
Tel: +44 1491 838575.
Fax: +44 1491 832575.
Email: dmcv@pointproms.co.uk
Net: www.i-way.co.uk/~dmcv/sbes.htm

4-8

News World 98Fira Palace Hotel, Barcelona, Spain.
Contact: News World Ltd
Tel: +44 171 491 0880.
Fax: +44 171 491 0990.
Net: www.newsworld.co.uk

3-6

SATIS 98Paris-Expo, Porte de Versailles, Paris, France.
Contact: Alexandra Tholance Conseil.
Tel: +33 1 45 45 65 25.
Fax: +33 1 45 45 65 35.

17-19

Digital Media World 98Wembley Exhibition and Conference Complex, London, UK.
Contact: Digital Media International
Tel: +44 181 995 3632.
Email: digmedia@atlas.co.uk

20-23

20th Tonmeister ConventionMunicipal Hall, Karlsruhe, Germany.
Contact: Ernst Rothe, Bilungswerk des VDT
Tel: +49 2204 23595.
Email: vdt@tonmeister.de

25-28

Apple Expo 98,**Total Design Technology**
Olympia, London, UK.
Contact: Liz Scriven, Showcase Communications
Tel: +44 171 381 2442.
Email: appledtpr@aol.com
Net: www.apple-expo.com

December 11

9-11

5th Broadcast Cable & Satellite India 98**6th Comms India 98**
Pragati Maidan, New Delhi, India.
Contact: Mr Bhavuk Kaul, Exhibitions India
Tel: +91 11 463 8680.
Email: exhibind@nda.vsnl.net.in
Net: www.exhibitionsindia.com

9-11

Cable & Satellite Asia 98International Convention & Exhibition Centre, Level 4, Suntec City, Singapore.
Contact: Reed Exhibitions
Tel: +65 434 3675.
Email: chuilan.chia@reedexpo.com.sg

March 11

3-7

MusikMesse**Prolight & Sound**
Frankfurt, Germany
Contact: Messe Frankfurt.
Tel: +49 69 7575 6130
Fax: +49 69 7575 6613
Net: www.messefrankfurt.de

April 11

10-12

16th International**AES Conference****'Spacial Sound Reproduction'**
Arktikum, Rovaniemi, Finland.
Contact: Juha Backman, Nokia Mobile Phones.
Tel: +358 10505 9140.
Fax: +358 10505 5738.
Email: aes16@acoustics.hut.fi
Net: www.aes.org

13-15

PLASA Light and Sound ShanghaiIntex Shanghai, 88 Loushanguan Road, Shanghai, China.
Contact: Marcus Bernie, P&O Events.
Tel: +44 171 370 8231.
Fax: +44 171 370 8143

16-18

8-11

106th AES ConventionMOC Centre, Munich, Germany
Contact: Martin Woehr, Bayerischer Rundfunk Studioproduktion.
Tel: +49 89 59002434.
Email: 106th-chairman@aes.org
Net: www.aes.orgDigidesign
Worldwide Distribution**ASIA (JAPAN)** Digidesign, a division of Avid Technology
Tel: 3575 7963**AUSTRALIA** Digidesign, a division of Avid Technology
Tel: 9957 1800**AUSTRIA**
Fritz Pro Division GmbH Tel: 3957 49801**BELGIUM (NETHERLANDS)**
Digidesign, a division of Avid Technology
Tel: 668 8080**BULGARIA**
AG Corporation 359 32 235 678
P.O. Box 52 600172**CROATIA**
Garmen 385 1 398 5565**C.S.**
Istanbul A&T Trade 371 257 2141
Moscow A&T Trade 7 095 292 5325
Ukraine A&T Trade 380 44 269 2176**DENMARK**
New Musik 45 86 190899**EGYPT**
Delta Audio 202 245 6198**FINLAND**
SoundData Oy 358 9 454 2422**FRANCE** Digidesign, a division of Avid Technology
Tel: 1 41 49 40 10**GERMANY: INC. POLAND: CZ & SLOVAKIA**
Digidesign, a division of Avid Technology GmbH
Tel: 811 55200**GREECE**
Mellon 301 384 6501**HUNGARY**
Digital Pro 36 1383 2461
MidiSoft 36 1 270 2255
Merong 36 1 270 4591**IRELAND**
Shufan 354 525 5060**ISRAEL**
RBX Digital Systems Ltd. 972 3 516 4851**ITALY** Digidesign, a division of Avid Technology srl
Tel: 39 2 57 511799**LEBANON**
Electra 961 120 0634**NORWAY**
Fritzpatrick Import Group Tel: 2211 4054**PORTUGAL**
Audiopro 351 1353 8331**SAUDI ARABIA**
Mawani Audio 966 2 669 1252**SLOVENIA**
Desktop 386 61 152 2035**SOUTH AFRICA**
Eltron 27 11 787 0355**SPAIN**
Ventamatic 34 3 430 9790**SWEDEN**
Fritzpatrick Import Group Tel: 8 732 4995**SWITZERLAND**
Giant Electronics 41 32 322 5274**TURKEY**
Compel 90 212 224 3201
Erdemir 90 212 286 3429If you have any further questions, or should have difficulty contacting your distributor, or live in a country not listed, contact USA Digidesign, a division of Avid Technology Inc.
Tel: 650 842 7900 Fax: 650 842 7999



THE
FUTURE OF
 MIXING
 HAS
 ARRIVED

It's not another million dollar mixing console. And it's not the impossible dream. ProControl is, quite simply, the most powerful tactile control surface for the world's leading digital audio production environment — Pro Tools.®

Anything you can do with your Pro Tools TDM system, you can do from ProControl. Record, mix, edit, and automate everything — including mutes, sends, volume, panning, and all Plug-In parameters — with instant and total recall. Access all the tracks in your session from the ProControl Main unit, or add Fader Expansion Packs (in eight-channel increments) for up to 32 faders. ProControl even has a



comprehensive monitoring section, so it's the only mix controller you'll need in your studio.

We could go on and on about ProControl's patented DigiFader touch-sensitive moving faders, the unique Channel Matrix, and other powerful features, but here's the bottom line: a Pro Tools/ProControl system runs circles around consoles and recorders costing 5 or 10 times more. So what are you waiting for? Put the future of mixing in your hands today.

Call Digidesign at **01753 653 322 ext. 446** for a full-color brochure or to schedule a personal demo with an authorised ProControl Dealer.

DAT **0181 450 5665**
Music Lab **0171 388 5392**

Syco **0171 625 6070**
Tyrell **0171 343 5500**

www.avid.com
www.digidesign.com

digidesign®

A division of **Avid**

©1998 Digidesign, a division of Avid Technology, Inc. DigiFader, ProControl, and Pro Tools are trademarks or registered trademark of Digidesign. All trademarks are the property of their respective holders. Studio photo courtesy of DubeyTunes Studios, San Francisco.

The Freedom principle

It was good to see the excellent article on the Freedom Series wireless microphones written by Neil Hillman (*Studio Sound*, May 1998). It's great to see someone who is at the heart of the sound recording profession carrying out such rigorous tests and concluding with such accolade.

Could I clarify a couple of points in order to enthuse your readers even further about Freedom Series? The ECM-77BMP is the version of lapel mic designed for use with the Freedom Series and the ECM-301 referred to in your article should have read ECM-310BMP, a head-set mic also designed specifically for these transmitters. There is no Sony option to fit a Hirose connector to the Freedom Series transmitter WRT-805A. (Hirose manufacture the connector used on our professional WL-800 Series).

Neil Hillman mentions 'the fiddly plastic slider switches' which operate phase reversal and input level. These are intentionally small to avoid accidental misoperation by the user; imagine the effect of an accidental extra 20dB during the latest conference on 'The History of the Ancient Greenfly in Medieval Mesopotamia'—it might wake someone up!

While I can understand Neil's test suggested a reduced operating range from Freedom Series, wireless mic operating range can be adversely affected by anything from body absorption of RF to the number of railway lines running nearby. If you want greater range we will happily provide any existing user with a new wave whip antenna if they get in touch. Freedom products were never meant to replace the existing, and very successful, WL-800 Series wireless mic systems from Sony. Freedom wireless mics are an extension to the range—a more affordable alternative for users in environments that are not as demanding as professional broadcast.

In breaking new ground with such

an attractively priced wireless mic system, there is always going to be debate about quality versus price. At around £800 (UK) per channel, the Pantechnicons are on their way.

Ciaran Doran, Professional Audio Marketing, Sony Broadcast & Professional Europe.

Standard issue

With great pleasure and satisfaction I have read the comments and statements made by David Bell and Scott Dorsey on surround sound principles and common standards for practice (*Studio Sound*, July 1998).

Allow me to give two answers:

Just this need was the reason to establish the open working group, Surround Sound Forum (SSF), during the 1996 Tonmiestertagung in Germany. It was recognised that the high standards of EBU, ITU and other international broadcasting standardisation organisations need more background and/or comments for the audio community to transform the techno-acoustical rules into the daily practice for the reference basis. During the last two years the (SSF) has prepared two recommendations which should be finalised before the next Tonmeister (Karlsruhe, 20th–23rd November, 1998). These are SSF-01, Listening conditions (Requirements of soundfield, monitor loudspeaker, listening room, and so on) and SSF-02 Multi-channel Sound Recording in the 3/2 format. The present interim status—unfortunately only in German language—can be found on the internet and we are thankful for any comment. (www.tonmeister.de/foren/surround-sound@tonmeister.de)

The SSF cannot give final answers to any problem concerning 'surround sound' but is on the way to support the work and to help within the variety of confusing formats (formats for recording, reproduction, delivery-coding, and so on) and recording methods (here you also can find basic requirements for control rooms

and for monitor loudspeakers).

At this time the SSF consists of more than 60 colleagues in Germany, Switzerland, Finland, Denmark, Austria—and the aim is to publish the documents in English. We shall inform you on the progress of work of the SSF at the coming Tonmeister.

I have been working in the audio field since 1947—sound engineer, R&D in audio broadcasting labs (Telekom) and now as audio consultant, working in the international standardisation bodies since 1955 OIRT, ITU-CCIR, AES, ISO-MPEG etc). I am also engaged in multichannel stereophony. Starting in this domain in about 1960, we developed (in Berlin) one of the first 4-channel systems 'stereo-ambiophony' (see 100th AES Convention, Preprint No.4286, 1996 Copenhagen: *Surround Sound—The New Phase. An Overview*), but there was no recording medium for the home application. I may say we have collected a lot of experiences (good and bad) which we now can use in this discussion when we work with the common 3/2 standard reproduction format of ITU-SMPTE (with or without picture, with or without any perceptual coding for recording, delivery). The 5.1 format I feel is useful only for cinema productions. When we (my colleagues and myself of the broadcasting labs) worked with 2-channel and 4-channel stereophony (note: a large difference for us to the misunderstanding of quadrphony in the seventies) we gained also experiences with multichannel control rooms. But we will not forget that: such experiences were also made by BBC Research (David Meares and team) too, and published.

You see, your 'call for discussion in surround sound' is falling on fertile ground everywhere and with the help of your readers maybe we can compile the best ideas of all to such practice standards to be updated if necessary.

Gerhard Steinke, Surround Sound Forum, Berlin

EVERY METER TELLS A STORY...

DPM101 digital audio meter combines the clarity of a bargraph with the detail of a numeric display to tell you the whole story.

Genesis pro Systems



UK Distribution by:
ASPEN MEDIA LIMITED
222 Maylands Avenue,
Hemel Hempstead
Hertfordshire,
HP2 7TD

Tel: +44 (0) 1442 255405
Fax: +44 (0) 1442 399944
email: aspenmedia@compuserve.com

THE GENESIS PRO SYSTEMS DPM101 TELLS THE TRUTH

ONE LISTEN... YOU'LL GET IT.

the DRAWMER MX50

THE MIX Alan Branch:

"Comping some backing vocals in the computer and printing them on to multi-track, they were a little bit sibilant, so were processed with the MX50. With a few seconds fiddling they sounded much more natural. It's an excellent tool for recording or mixing. This box can reduce anything that is up in the sibilant range, from the fret string noise or twang of an acoustic guitar to a hi-hat within a loop. When looking for the final polish to problem vocals this should be in your rack."

SOUND ON SOUND Paul White:

"Not only is the MX50 a very good dedicated de-esser, it is also affordable when you look at what other manufacturers are charging for a comparable product...there can be few de-essers that work as smoothly and unobtrusively as the MX50, and which are so straightforward to operate. The floating threshold system is also extremely clever, as the input signal can vary over a wide range and still be treated effectively. If you suffer from sibilance problems, this is probably the best budget solution around."

AUDIO MEDIA David Mellor:

"The MX50 is very simple and to the point. All you have to do is find the frequency at which the offending ess sounds are at their worst, and dial in the amount of reduction you require. There is a definite need for a standalone de-esser, and the MX50 fulfils that need admirably, and it has two channels for when you are really having a bad ess day."

The Drawmer MX50

'Vocal' De-Esser £245 (EX. VAT)

MX Series products:



MX30 Gated/Comp/Limiter £225 (EX. VAT)

The MX30 has blown away all competition to become the best sounding budget-minded Gate/Compressor/Limiter available anywhere.



MX40 Punch Gate £325 (EX. VAT)

4 Drawmer Gates in 1U with added Peak Punch™ for Killer drums.

Drawmer Ltd. • Charlotte Street Business Centre

Wakefield • West Yorkshire • WF1 1UH • England

Tel +44 (0)1924 378669 • Fax +44 (0)1924 290460

e-mail: sales@drawmer.co.uk

www.proaudio.co.uk/drawmer.htm

DRAWMER



FREQUENCY

Sets the Frequency band in which the de-esser operates. In SPLIT BAND mode this determines the frequency split-point above which de-essing takes place. Continuously variable from 800Hz to 8KHz covering the full sibilant range.

SPLIT BAND DE-ESS

Reduces only the level of frequencies above the value set by the FREQUENCY control. This eliminates the ESSES and leaves the rest of the frequency range intact. With AIR activated this offers the most transparent mode of operation.

LINK FOR STEREO OPERATION

Sets an average left/right signal level which is used as the FLOATING THRESHOLD.

BYPASS

Routes input signal to the output with no processing, useful for before and after comparisons.



DE-ESS

Sets the amount of gain reduction that occurs when an ESS is detected. This control works using Drawmer's Intelligent FLOATING THRESHOLD system that adapts to the dynamics and level of the incoming signal so there's no need for a manual THRESHOLD.

FULL BAND DE-ESS

Reduces total signal level in response to signals in the selected frequency band as set on the FREQUENCY control.

DE-ESS GAIN REDUCTION DISPLAY

Shows how much gain reduction is being applied up to a maximum of 20dB. In FULL BAND mode gain reduction is applied to the whole signal, whilst in SPLIT BAND mode only frequencies above the value set on the FREQUENCY control are subject to gain reduction.

AIR

Adds back high frequency gloss in excess of 12KHz which preserves upper harmonics and increases transparency of the de-essing process.

Digigram Xtrack; PCX440np

Like many French companies, Digigram has achieved consistent success but not the high profile of its US or UK rivals. **Rob James** looks at its processing card and recorder-editor software

THE FRENCH HAVE always had a reputation for going their own way. Their gastronomy and viculture are legendary, as is their art and their music, but French engineering has always seemed, well, slightly wacky to the rest of the world. What, you may well ask, is the relevance of all this to pro-audio? Simply that everything I have ever encountered from a French designer has the same blend of elegance and perversity, simplicity and complexity. If the card and software under consideration here are anything to go by, Digigram is no exception.

The company was founded in 1985 by engineers, Phillippe Girard-Buttoz and Marian Marinescu. In 1989 they introduced the first professional PC audio board to utilise compression, the PCX3. Later products incorporated ISO-MPEG standard Layers 1 and II. 1995 saw the introduction of a new range of boards which allow real-time coding-decoding or mixing of several tracks in MPEG audio and PCM (linear) modes. Last year PCX pocket arrived.

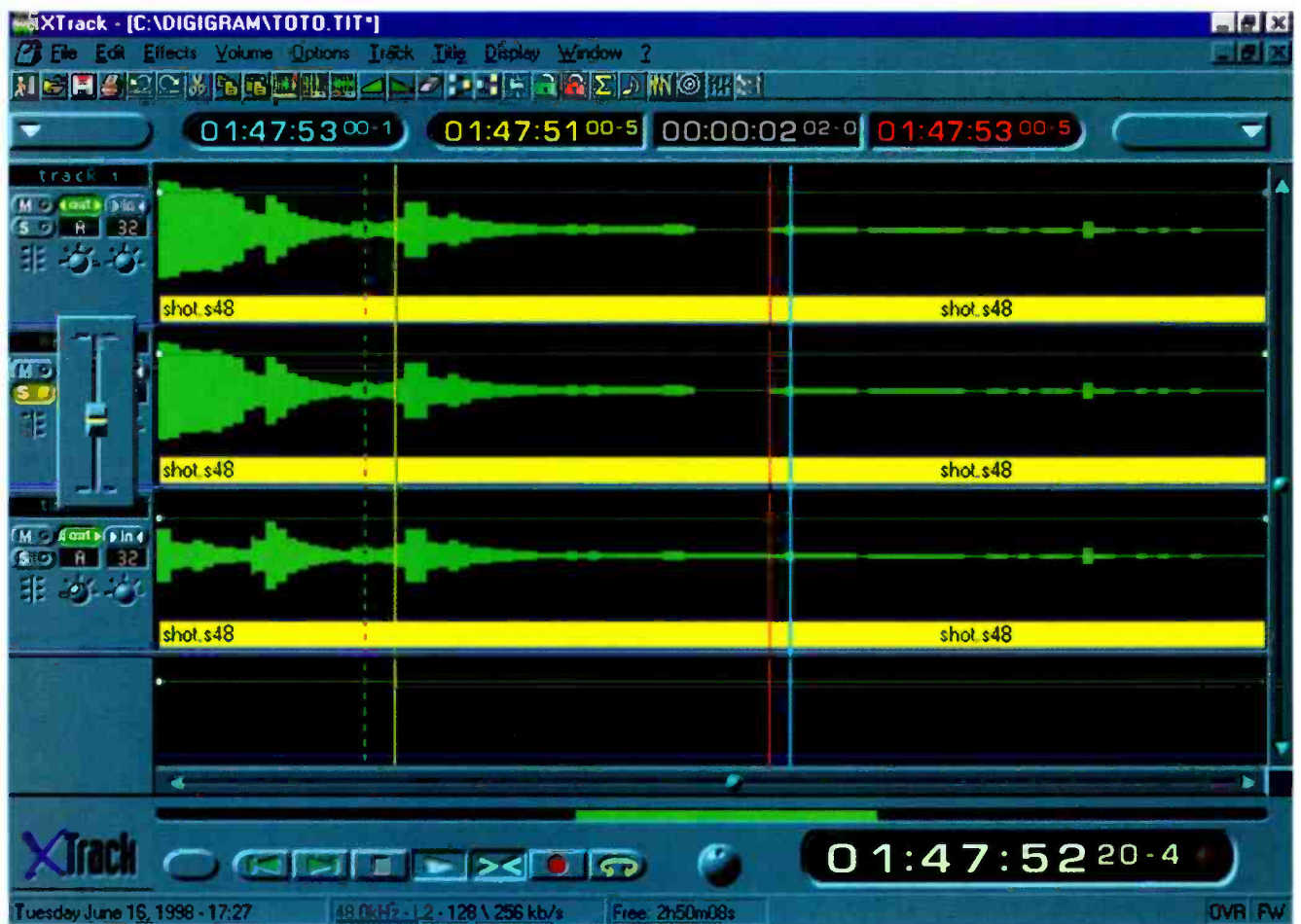
This was the first Type 11 PC card (PCMCIA) enabling professional sound recording and editing on laptop PCs.

The PCXnp range is the latest introduction together with two cost-effective LCM cards. The complete range is now huge with around 13 audio boards and a couple of sync boards. Software offerings are, thankfully, less prolific. Digigram offers Xtrack as a multipurpose multitrack editing package with some interesting additions. The cards have found a considerable following in the OEM market and Digigram supplies drivers and comprehensive software tool-kits to aid system integrators.

The list of OEM partners is approaching 100 worldwide with names such as Studer, Orban and Siemens joined by a host of less well known, vertical market companies. Applications are mostly of interest to the radio fraternity, but there are some interesting tangential products. Gervasi Elettronica makes the Cinetrack editor and recorder that, as the name implies, is aimed at sound for picture. IDMS offers a Digital Voice

Announcement system for airports, bus stations and the like, and Multim has a complete control system for sound and light shows. Soitorasia even produces a musak system using the Digigram boards. The radio applications are too numerous to detail here, but everything is covered from 'on the road' acquisition through editing, asset management, playout and full networked news systems. One area worthy of note is ISDN, increasingly used in radio. Maycom has developed a PC-based ISDN codec based on a Digigram board.

Despite all this Digigram is not terribly well known in the UK. I can remember seeing a stand at trade shows and dismissing it because of the emphasis on compressed audio. I know I am not the only one with this antipathy to any form of compression for production purposes. The reason I believe it is imprudent to originate material in this way is due to the probability of the recording being passed through subsequent compression codecs of unknown type which may have unpredictable



effects on a previously compressed recording. For example good-old Nicam, familiar as the delivery format for stereo audio in UK broadcast TV, can react badly in conjunction with various types of compression. I have heard it and it is not at all nice. However, this is a rather unfair prejudice since Digigram's current line works with linear PCM as well as MPEG and will export Real Audio for Internet delivery.

The PCXnp (new performance) series is a family of boards with Motorola 56301 DSP chips providing the processing horsepower. The various models cover 4 to 8 outputs and 2 to 4 inputs in analogue or digital flavours. If required, and if you have the budget, not to mention sufficient free slots, several boards can be installed and synchronised. The standard PCX440np model has 20-bit converters and is analogue only. AES-EBU I-O is optional as is a small daughterboard for SMPTE LTC time-code input and MIDI. This uses real estate on the computer's rear panel, but mercifully does not require a slot.

The card is a full-length PCI type with a deep cutaway to miss the ram banks on some motherboards. It went into my ATX-based machine with no problems. In fact, I really liked the 'board on both sides' construction which keeps the card looking clean and avoids cables snagging on components. The top board is neatly silk screened with the pin outs of the breakout connector. The breakout cable attaches to the card via a massive 62-pin sub D-connector. This connector is beautifully designed with three separate cable exits for analogue, digital and wordclock. It may well be an in-house item since it is embossed 'Digigram'. The cables are short and terminate in XLRs for analogue and the optional AES-EBU I-O with a BNC for wordclock input.

I wish I could say driver installation was as painless as the hardware. Drivers are supplied for Windows 95 and NT4. I elected to use Windows 95. Unfortunately the install wizard is convinced you will have the drivers on diskette. Mine arrived on CD-R and, despite repeatedly informing the wizard of this fact I had to manually locate the files for it and even manually decompress the WAVE driver with Winzip. Once all this had been accomplished everything was just fine. Just for once plug-and-play actually managed to configure the card without any conflicts and the Xtrack software installed without fuss. However, much to my disgust, Xtrack requires a dongle. These odious devices really do not have any place in a professional installation. There are other, highly effective, methods of protecting intellectual property without resorting to an (easily stolen) hardware excrescence.

The manual for Xtrack is now only supplied as on-line help. This is all very well, but I really feel a professional



product should come with a full printed manual in addition to the 'help'. Some of the nomenclature is unfamiliar, but no more so than with some of the other long established DAW manufacturers. A project in Xtrack speak is a Title with a .TIT file extension. A variety of other file extensions identify the type of sound file or waveform file. These take the form of first letter equals type, subsequent numbers equal sampling rate.

The screen is remarkably clean and uncluttered, and the 3D graphics on buttons and faders are sharp and elegant in an unusually satisfying way. The main screen follows the now familiar model of horizontal track display with transport controls at the bottom and a floating window containing meters and I-O faders. This has tabs to switch between the various analogue and digital ins and outs and the monitor outs when recording. Alternatively this window displays 'professional vu meters' for ins or outs.

TRACKS MAY be mono or stereo and each is equipped with LEVEL, PAN and BALANCE controls. Buttons SELECT MUTE, SOLO, RECORD SOURCE and PLAYBACK DESTINATION. The track title is used to select the track. Multiple tracks are selected for simultaneous attention using the CONTROL key. Depending on the underlying PC system you should get around 10 stereo tracks of linear PCM or up to 14 MPEG encoded. Stereo and mono material can be placed on the same tracks as can any of the supported audio formats. The card performs real-time format, and rate conversion with compression and de-compression as required.

Editing is performed by drag-and-drop, but before this is possible the Block has to be defined with markers. At the top of the screen, below the pull-down menus are a row of time displays. Yellow shows the position of the first marker, red, the second marker and, if

selected, blue shows the position of the insert marker. A further, white display shows the difference between the first and second markers and also gives access to positioning the (playback) head position. The markers are placed by clicking with the mouse or the values in the display can be edited. I initially found this somewhat counter-intuitive. Most PC-based DAWs allow blocks to be highlighted by clicking and dragging. However, after a while, this way of doing things becomes just as natural. Similarly, it took me a while to get used to positioning the 'play head'.

The Track display allows for fixed head with scrolling tracks or vice-versa. On a Pentium 233 the scrolling is commendably smooth. The usual transport keys are supplemented by a PERFORMANCE key. Three buttons in the toolbar determine the action of this. The options are CUE BETWEEN which plays the cue between the yellow and red markers, CUE OUTSIDE which skips the marked area and CUE REVERSE. This plays a snatch of audio up to the second mark then after the first. Rudimentary dynamic automation is achieved by choosing Draw mode. Once this is selected, a continuous envelope, which appears as a black line on the track display, defines the level at various points in time. Nodes are added by pressing the I key or clicking with either the Head or Insert markers attached to the mouse pointer. Once a point is defined it can be dragged up or down to produce a change in level. Fades, in and out are made by marking the area of the intended fade and clicking the appropriate icon. Crossfades are similarly achieved by defining the area of the fade, selecting the track(s) to fade in, and hitting the button then selecting the track(s) to fade out and repeating the exercise without changing the markers. A bit cumbersome and cross-fading overlapping material on the >

<same track is not possible. A right mouse click over any of the virtual faders in Xtrack restores the setting to unity, a very nice touch.

With a Motorola 56301 on board the card you would expect some time-domain effects and the Digigram does not disappoint. Time stretch, pitch shift and sample-rate conversion are all offered as off-line processes. The resultant audio files either replace the existing or are put on the clipboard where they may be inserted wherever you wish. Other processes included are a broad-band, noise print modelling, dynamic noise reducer and a noise gate that will break up speech into discrete blocks without user-intervention. For each of these processes there are enough controls to enable worthwhile results to be achieved with a variety of material.

THE SOFTWARE also supports Activemovie (Direct X) plug-ins. Much to my amazement and delight all my Sonic Foundry and Waves plug-ins appeared on the menu without any intervention from me. This delight turned to frustration when I could see audio on the meters of the plug-ins, but not hear it when previewing effects. After ransacking the on-line documentation and much head scratching and playing about I tried enabling the card as the default in the multimedia section of Windows Control Panel. Lo and behold—preview audio.

This is the fulfilment of everything open platform plug-ins promise. Anyone writing software with the right hooks can take advantage of any correctly written plug-ins. It is just a shame the on-line manual does not tell you how to get the preview working. Xtrack includes a rather nice 4-band parametric EQ, just to get you going. As with the other effects, the results of any of these processes either replace the existing files or go to the clipboard.

Xtrack also includes some nifty applets in support of the main functions. Catalogue or CATS is a sound database that allows dragging and dropping of audio into Xtrack. It enables you to keep track of a vast library or libraries of sounds across many local or network devices. Sounds are playable from within Catalogue for auditioning purposes. This includes audio CDs, but via the audio output of the drive. The CATS manages to read the TOC (Table of Contents) and use the information in the database. In theory it would appear to be possible to drag-and-drop CD tracks into the editor; although I did not manage to divine how to actually get the audio from the on-line help. I have a suspicion this is only possible via an audio connection from the CD drive since this is the way it seems to work. I would be happy to be proved wrong

since audio extraction from CD-Rom drives usually works well and is faster than real time. If the software can read the TOC why not the audio? Cats keeps track of CD changes and updates the display accordingly.

Search facilities are more than adequate to keep track of a large library.

The second applet, Purge, removes sound files unused in the current Title. It does this in an intelligent manner and allows 'dry runs'. It will also generate reports on what it has done.

Text EDL management is also dealt with via an applet and another one, Synchro, manages synchronisation of an Xtrack workstation when equipped with one of the optional sync boards. The sync board manages the synchronisation of all installed audio boards and provides a variety of options including RS 422 (Sony P2 protocol) 9-pin.

The PCX440np card is a good performer with all the features required to integrate easily in a professional environment. The rest of the Digigram range has enough building blocks to produce a very serious DAW—if you can afford it. The real caveat is that the cards look expensive when compared with the competition and do not offer sampling rates beyond 48kHz. Perhaps this is not unrelated to the emphasis on MPEG. At the time Digigram started production hard disks were extremely expensive. Now they are virtually given away with packets of cornflakes, and I do not believe the complexities and risks of compression are worth the candle on a serious DAW.

In view of all this I cannot see the Digigram boards appealing to a mass audience. Where the company will continue to succeed is in the vertical market integration field. Radio, in particular, requires a range of dedicated solutions to problems not easily addressed by general purpose products. The catalogue of building blocks and the various software development packages all aid in this. Digigram are clearly geared to supporting this kind of endeavour and do it well. The relatively high cost of the

boards disappears into the overall cost of the complete solution. In fact, the use of 'off the shelf' boards and high level development tools will tend to reduce costs in these applications. This is really just an extension of the idea of using a PC for audio—why re-invent the wheel?

The Xtrack software is robust and obviously the product of considerable development and refinement after extensive experience in the field. The price is thoroughly reasonable for what is on offer. Once I became accustomed to the Xtrack way of doing things it became possible to work quickly and accurately and it still manages to exude Gallic charm. I shall miss it. ■

CONTACT

Digigram,
Parc de Pré Milliet
38330 Montbonnot,
France.
Tel: +33 76 52 4747.
Fax: +33 76 52 1844.
Web: Digigram.com

t.c. electronic
ULTIMATE SOUND MACHINES

International Head Office

Sindalsvej 34, 8240 Risskov, Denmark

Phone: (+45) 86 21 75 99

Fax: (+45) 86 21 75 98

E-mail: info@tcelectronic.com

http://www.tcelectronic.com

GERMANY: TC Electronic GmbH, 5310 8399

U.S.A.: TC Electronic Inc., (805) 373 1828

ASIA: TC Electronic Asia, (+813) 5456 4071

ARGENTINA: 1 774 7222

AUSTRALIA: 2 9975 1211

AUSTRIA: 1 601 17

BELGIUM: 11 28 1458

BRAZIL: 11604 8339

BULGARIA: 52 600 172

CANADA: (805) 373 1828

CHILE: 2 2312356

CHINA: 02 191 3660

CYPRUS: 5 36 7985

CZECH REPUBLIC: 455 622 591/6

ESTONIA: 6418 006

FINLAND: 5123 530

FRANCE: 1 4863 2211

GREECE: 1 8837 629/30

HOLLAND: 302 414 500

HONG KONG: 02 191 3660

HUNGARY: 22 328 990

ICELAND: 588 5010

INDIA: 22 633 5450

INDONESIA: 21 829 2202

ISRAEL: 3 562 2361

ITALY: 51 766 648

JAPAN: (03) 5456-4071

LATVIA: 2 296828

LITHUANIA: 722 3288

LEBANON: 1 581188

MALTA: 554195

NEW ZEALAND: 09 279 7206

NORWAY: 22 710 710

PHILIPPINES: 819 1243

POLAND: 58 5104 70

PORTUGAL: 1 4754 348

RUSSIA: 503 956 1826

SINGAPORE: 748 9333

SLOVAKIA: 7 214 051

SOUTH AFRICA: 11 482 4470

SOUTH KOREA: 02 565 3565

SPAIN: 335 177 62

SWEDEN: 46 320 370

SWITZERLAND: 56 450 2170

TAIWAN: 2 719 2388

2 2369 5119

THAILAND: 2 373 2722

940 9700

TURKEY: 212 224 3201

U.A.E.: 4 626683

UK: 181 800 8288

TC UNIT·Y

SIGNAL PROCESSING ENGINE

PLUG-IN CARDS FOR YAMAHA

O2R

DIGITAL RECORDING CONSOLE



01:00:00:00

PHOTO COURTESY NOVA STAR DIGITAL SOUND SERVICES, L.A. CA

TC INSIDE



From one of the world leaders in signal processing technology comes UNIT·Y, a dual engine effects plug-in card for the Yamaha O2R digital mixer. UNIT·Y delivers the kind of high quality effects TC Electronic is famous for - right inside the O2R. Completely integrated. Fully automatable. The ultimate solution for anyone who is truly serious about recording.

EVERYTHING YOU WANT

UNIT·Y gives you a wide selection of the most dense, natural sounding reverbs you can imagine... shimmering plates, lively halls and ambient rooms, they're all there - plus a lot of extras including TC's famous Chorus, Pitch Shifting, Delays, Phaser and more.

NO COMPROMISE



An optional 8 channel AES/EBU I/O expansion board provides access to the O2R's digital I/O, (as you might normally do with a basic I/O board in one of the O2R's four expansion slots). As a result, you don't have to sacrifice your card slot or a single input on your mixer to get these premium effects right at your fingertips.

ULTIMATE TECHNOLOGY

At the core of every UNIT·Y is a powerful 100 million-instructions-per-second processor, making it possible to run two full-blown 24 bit effects simultaneously, stereo or surround - for the most pristine and transparent audio processing you've ever heard.

Plug-in the ultimate reverb today. UNIT·Y. It's at your local TC Electronic/Yamaha O2R dealer.

t.c. electronic
ULTIMATE SOUND MACHINES

TC ELECTRONIC A/S, SINDALSVEJ 34, DK-8240 RISSKOV, DENMARK · PHONE: + 45 8621 7599 · FAX: + 45 8621 7598
EMAIL: INFO@TCELECTRONIC.COM · HTTP://WWW.TCELECTRONIC.COM/FIREWORX
TC ELECTRONIC GMBH · FLUGHAFENSTRASSE 52B · 22335 HAMBURG · TEL: (040) 5310 8399 · FAX: (040) 5310 8398

Yamaha DSP Factory

Yamaha's conception of the future of mixing consoles is further defined with the launch of its DSP Factory. **Rob James** takes a walk along the production line

ONCE IN A WHILE, a product captures the imagination of almost everyone who hears about it. Yamaha's announcement, a few months ago, of the DSP factory concept and the initial cards was one such. Word spread quickly—24 channels of 02R on a PCI card plus hard-disk recording, for how much?

This specification, and the price alone, should ensure success but there is a lot more to it than this. The significance of the concept goes way beyond the obvious.

Perhaps even more remarkable in a world cursed with vapourware and late deliveries, a shipping date was announced and Yamaha has pretty much kept to it, and initial units are available as you read this. Yamaha's contribution to making digital mixing widely available is undeniable. The first affordable alternatives to analogue mixers in 1985, the DMP series, was followed by the well-regarded professional DMC 1000. The lineage continues through to the current 01V, 02R and 03D consoles and the company has continued to innovate. The current range of 'hardware' mixers are available at price points which other manufacturers are still striving to meet. Yamaha has not achieved this by compromising its build quality or unnecessarily limiting the feature set. The remarkable achievement is that the sound is generally considered excellent, and the few operational compromises required are a small price to pay for what is on offer. Some people complain there are insufficient steps on faders, and other controls, but every piece of kit has its critics.

The DSP Factory takes hardware building blocks from other Yamaha products, specifically the LSI (Large Scale Integrated circuit) chips and offers them in a more affordable and potentially flexible form. Yamaha is currently only supplying the PCI plug-in cards and driver software for the appropriate hardware platform. (Initially Windows 9X and NT on the PC, to be followed by Macintosh drivers) All the initial application software will be supplied by third-party vendors. This brings me to the one warning about



the PC-Mac way of doing things. The reliability is unlikely ever to be of the same order as dedicated hardware products. Leaving aside any Windows, NT or Mac OS problems this is the price paid for the more flexible PC and Mac-based approaches. Having said that, I had no problems whatsoever during the review period.

The first results of the DSP-Factory concept are the DS2416 digital mixing card and AX44 Audio Expansion Unit and the SW1000XG PCI Audio-MIDI card that combines an XG-series synthesiser with a full-duplex sound-card and MIDI interface. The SW1000G will have the option of three associated daughter boards which will provide a DX7, a VL synth or a high-spec, time-domain, effects unit.

I had one of the first production DS2416 cards



and an AX44 interface. Installation is completely straightforward, simply a case of find a vacant PCI slot and plug it in. The driver installation poses no difficulties either. The only other software supplied with the card by Yamaha is a diagnostic program. After running the diagnostics as suggested, which takes just a few seconds, I tried using it as a simple I-O card with Sound Forge and it worked first time.

Fitting the AX44 is equally straightforward. This neat little unit attaches to the DSP factory card with one ribbon cable. A spare disk-drive connector is used for power and the unit conveniently mounts in a half-height 5 $\frac{1}{4}$ -inch disk-drive bay. This leaves the connectors where you need them, on the front of the PC.

The DS2416 is a half-length PCI bus card populated with five large, surface-mount DSP chips and an even larger gate array, all of which are custom-designed Yamaha devices. Three of the DSPs are used for mixing, one for audio streaming and one for effects while the big custom LSI handles interfacing to the host computer's PCI bus. Apart from socketry the rest of the board is remarkably sparse compared with the majority I have

The DS2416 is a half-length PCI bus card populated with five large, surface-mount DSP chips and an even larger gate array, all of which are custom-designed Yamaha devices. Three of the DSPs are used for mixing, one for audio streaming and one for effects while the big custom LSI handles interfacing to the host computer's PCI bus. Apart from socketry the rest of the board is remarkably sparse

encountered. This level of integration makes for reliability and can only really be attempted by companies with huge resources. Onboard audio I-O consists of stereo 20-bit 128x oversampling A-D converters and stereo 20-bit 8x oversampling D-As. These terminate on unbalanced, gold-plated phono sockets which are accessible from the rear of the PC or Mac, nominal level is -10dBV.

Stereo digital IEC 60958 SPDIF I-O is provided on two further phono sockets. There is no external socket for wordclock input so sync is either taken from one of the inputs or derived from one of the internal connections.

The 4 further connectors on the card >

Studio Sound September 1998

ADAC 9624



www.mytekdigital.com

mytek, inc. po box 1023, new york, ny 10276, usa. tel. (212)-274 9191 fax (212)-686 4948

< are all MIL types for IDC ribbon cables. Two 20-pin connectors are used for I-Os A and B, each allowing 4 or 8 channels of digital I-O at a maximum of 32 bits per channel. A 16-pin connector designated SERIAL IN caters for 8 or 16 channels of digital input and the final connector is a 14-pin designated SERIAL OUT which does the same for digital outputs. Both of these also have a maximum bit depth of 32. Serial in and out are also used to cascade (add) two cards together.

Just for openers the DS2416 is an I-O card. 8 physical channels of audio input and 16 channels of output to and from the PCI bus and the outside world. With a fast enough computer, storage subsystem and suitable application software this forms the basis of a multitrack recorder-editor. It is also a mixer, patchbay and two effects units.

There are two common approaches to adding audio workstation capabilities to a general purpose PC; both involve adding a card or cards. The difference is in the function of the card(s). In one approach the card handles getting audio signals in and out of the computer. In this case summing signals (mixing) or processing—such as EQ and effects—are undertaken by the main host computer's CPU. The alternative approach adds DSP to take some of the load off the computer when summing signals or processing. The majority of currently available cards following this approach use general-purpose DSP engines to provide a pool of processing able to do mixing, EQ and effects. Whichever route is followed the actual functions and ultimately the way the machine sounds is defined by mathematical algorithms. These algo-

There are two common approaches to adding audio workstation capabilities to a general-purpose PC; both involve adding a card or cards. The difference is in the function of the card(s).

In one approach the card handles getting audio signals in and out of the computer.

The alternative approach adds DSP to take some of the load off the computer when summing signals or processing

gorithms are translated into sets of instructions to the hardware to get the required audio, and crunch the numbers to perform the intended changes. Obviously this works, but there is a snag. A lot of power is required and this will vary depending on what function(s) are required concurrently with recording or playback of audio. It is difficult to guarantee a consistent level of performance using these models. Yamaha's approach is different—by using the same, purpose-designed, DSP engines as the 01V, 03D and 02R, it has provided a kit of parts to construct a digital console with all the signal-processing algorithms and the horsepower to carry it out built in, leaving software development to provide the user-interface. There is a risk with this approach, if the concept is as successful as I think it will be, that the 'Yamaha Sound' will become too common. However, as with the overuse of synthesiser presets, this does not have to be the case. It largely depends on the indolence of users and the laziness of programmers.

The result is 24-input channels, the first 20 of which are full channels with most the same facilities found on an 02R. This means; DC cut as required, an attenuator, 4-band parametric EQ with 12 EQ types per band, dynamics in any of 6 flavours with gain reduction metering, delay up to 2,600 samples, mute, fader, pan, channel meter and bus and aux sends with pre-post options. Channels 21-24 have everything except the programmable delays, and Channels 19 & 20 will automatically apply de-emphasis if required.

The 16 buses are organised as 8 bus outs/sub groups plus a stereo master and 6 aux sends. The bus and aux masters can have a fader, mute and meter. The stereo output also has the same EQ and dynamics options as the channels. Input and output patchbays are also built in, again only requiring a user-

September 1998 **Studio Sound**

dynaudio **acoustics**®

Munro Custom Monitoring Systems

QUAD
Recording Studios

Recently installed custom M4+

4-way active monitors in Studio A and Studio 3



"If sound quality was the only factor, the Dynaudio (M4+'s) would have won hands down. The great support from the company makes any other decision unthinkable!"

- Lou Gonzales (Owner), Quad Recording Studios, New York City

Munro Associates

Unit 21, Riverside Studios,
28 Park Street, London. SE1 9EQ.UK
Tel: +44 (0)171 403 3808
Fax: +44 (0)171 403 0957
Email: "info@munro.co.uk"
Website: "www.munro.co.uk"

UK Distribution by Unity Audio Ltd.

Elms Barn, Baythorne End
Halstead, Essex. CO9 4AB. UK.
Tel: +44 (0)1440 785843
Fax: +44 (0)1440 785845
Email: "sales@unityaudio.co.uk"
Website: "www.unityaudio.co.uk"



interface. On the input side Channel 1-8 sources may be PCI bus playbacks 1-8 or I-O connector B2 1-8 respectively. 9-16 source options are PCI bus, I-O B1, I-O A2, sub, and so on. This is, perhaps, a little restrictive as physical inputs are constrained to specific channel strips. On the other hand, I can already see a couple of ways around this that could be implemented in application software. On the output side any bus can be patched to any destination. When the card is used with software that is not specifically written to support it the patching assignments are fixed.

Two onboard effects units complete the picture. These use identical processing to the renowned ProR3 and Rev500 stand-alone effects processors. As you might anticipate, there is a vast palette of adjustable parameters, that again only require appropriate application software to manage them.

All processing is 32-bit or better. EQ uses a 44-bit data path. Sampling rates available internally are 44.1kHz or 48kHz (6% or externally from 32 to 48kHz plus or minus 6%.

The first multichannel interface to be released is the AX44 expansion unit. This connects to the I-O A socket on the DS2416 card via ribbon cable. Two

AX44 units may be fitted per card to add a total of 8 channels of analogue I-O. Sockets are unbalanced 1/4-inch jacks. Nominal levels are -10dBV, but inputs 1 and 2 are each equipped with a small sliding switch to change the gain to a nominal -50dBV that will facilitate

the use of microphones and low level instruments. A further stereo jack allows headphone monitoring of Outputs 3 and 4. The available level is more than adequate and a VOLUME CONTROL pot completes the panel.

In a conventional review we would >

Yamaha's approach is different—by using the same, purpose-designed, DSP engines as the 01V, 03D and 02R, it has provided a kit of parts to construct a digital console with all the signal-processing algorithms and the power to carry it out built in, leaving software development to provide the user-interface, but there is a risk with this approach

SONIC ROCKET

creamw@re

There are many cards that give you I/Os.

There are some cards that provide mixing.

But there is nothing like PULSAR.

The Pulsar DSP board brings it all together: integrating mixing, effects, sampling, and synthesis, all at the highest digital standards, in one ultra-powerful and compatible DSP environment. We just brought desktop audio to a new level.

Ultra powerful DSP Engine.

- PCI board for PC and MAC
- 4 x 60MHz Analog Devices SHARC
- zero latency multi processing
- multi channel, polyphonic

A world of DSP modules.

- fully featured 24 channel digital mixer
- EQs, Dynamics, Delays and more
- sensational synthesizer devices
- high performance sample player
- powerful Third Party platform

I/Os and — ultimate quality.

- 20 channels in
- 20 channels out
- 2 x ADAT, S/P DIF, analog
- 96kHz support
- 24 bit resolution
- 19" analog expansion via optional A8, A16
- int. S/P DIF bus connector
- MIDI interface
- MMIO and ASIO drivers

P
PULSAR



Much more than I/Os and mixing. Pulsar is the ultimate audio engine to drive your audio sequencer.

ALL for just \$1,298 US MSRP!

Available: September '98

You 'll never guess where our latest idea came from.

CreamWare GmbH • Wilhelm-Ostwald-Strasse 0/K1 • 53721 Siegburg, Germany • Tel. (+49) 2241-5958-0 • Fax (+49) 2241-5958-57

Now be describing and commenting on the functionality of the card(s) in combination with the manufacturer's application software, but because Yamaha does not offer any software beyond the low-level driver and diagnostics we won't. Where most new PC or Mac-hosted products, beyond simple I/O cards, arrive with v1.0 of a (hopefully useful) application either authored by the hardware manufacturer or in co-operation with them, Yamaha has 10 software houses are developing applications. Early choices are an updated version of Samplitude from SEK'D that exploits the recording capabilities of the card. This works in close co-operation with C-Console from C-Mexx that provides a real-time screen-based mixing console that allows access to the mixing functions of the card. I used these to explore the card's capabilities—both were easily installed and proved to be robust.

What most of the early applications are about though, is taking advantage of the sheer power of the card to take over and augment functions previously handled entirely by the computer's CPU. Steinberg will have a new version of Cubase and E-Magic a new version of Logic. Both of these will exploit the power of the DS2+16. Sonic Foundry is introducing v4.5 with DSP factory support. Cakewalk, Musicator, Innovative Quality Software, Canam Computers and Minnetonka have all announced software products which utilise the DS2+16. These early adopters cover a broad spectrum of applications, but there is clearly a bias towards music. This is to be expected, since sales volumes are greatest in this area, but it is far from the end of the story. This card offers vertical and niche market system integrators a wonderful opportunity to develop tools that are tightly targeted at their intended markets. Some examples include developing a hardware front end to constructing a digital mixing console with one-knob-per-function or any other model the developer chooses.

One of the problems with using general-purpose mixers or DAWs in broadcast or installation work is they actually

offer far too many options to the operator. Using this card it should be possible to quickly develop software or even hardware front ends with a reduced feature-set for applications where this is appropriate. Equally, by using two cards, more complex solutions can be conceived, designed and constructed. One of the ironies with digital implementations of audio devices is you almost invariably pay more for machines which are only capable of a limited set of functions.

One problem with using general-purpose mixers or DAWs in broadcast or installation work is they actually offer too many options. Using this card it should be possible to develop software or even hardware front ends with a reduced feature-set for applications where this is appropriate. Equally, by using two cards, more complex solutions can be conceived, designed and constructed

All of this would be of no consequence if the hardware did not deliver—but it does. The audio quality is, so far as I can determine, the same as a current 0-series hardware console. The card works reliably, both as a PC soundcard and with specifically written software. I generally distrust putting analogue audio anywhere near the noisy environment of a PC, but Yamaha has managed the difficult trick of keeping things quiet. Using the AX4 I was achieving signal-to-noise ratios of around 92dB and the onboard output managed 90dB easily. I admit my measurements were not particularly scientific but the card is subjectively quiet which is the real point. Other interface options will undoubtedly appear. Yamaha has already promised an ADAT interface and I am sure if demand exists interfaces will be produced in professional formats, balanced analogue and AES-EBC.

The initial point of the DSP factory is this: applications which previously relied on a heavyweight PC to provide a reasonable level of performance can be adapted to take advantage of the power of the DS2+16. The implications are that this will lead to a raising of performance expectations at the price point. New applications will be written specifically tailored to the capabilities of the card. These will be both generally applicable and highly specific. I also expect to see further additions to the DSP factory range. The concept is clearly scalable and I wouldn't be surprised to see an up-market console and/or workstation from Yamaha using the same core technology. Meanwhile, I think Yamaha has done it again with concept that offers potential for growth in directions which at this stage we can only guess at. ■

UK: Yamaha-Kemble Music,
Sherbourne Drive, Tilbrook,
Milton Keynes MK7 8BL.
Tel: +44 1908 366700.
Fax: +44 1908 368872.
US: Yamaha Corporation,
6600 Orangethorpe Avenue,
Buena Park, CA 90620.
Tel: +1 714 522 9011.
Fax: +1 714 739 2680.



CDR800 Compact Disc Recorder

INTERNATIONAL DISTRIBUTORS

- AUSTRALIA: AWA LTD**
Tel 02 9669 3477 Fax 02 9578 0140
Contact: Michael Guest
- AUSTRIA: STUDER AUSTRIA GMBH**
Tel 01 865 1676 Fax 01 865 167699
Contact: Reinhold Fliedl
- BELGIUM: EML N.V.**
Tel 011 23 2355 Fax 011 23 2172
Contact: Erik Gysen
- CANADA: HHB COMMUNICATIONS CANADA LTD**
Tel 416 867 9000 Fax 416 867 1080
Contact: Dave Dysart
- CZECH REPUBLIC: AUDIOPOLIS**
Tel 02 3332 2132 Fax 02 3332 4172
Contact: Martin Vysusil
- DENMARK: INTERSTAGE**
Tel 39 46 0000 Fax 39 46 0040
Contact: Finn Juul
- FINLAND: HEDCOM**
Tel 358 9 682 866 Fax 358 9 682 8489
Contact: Jarmo Ronvas
- FRANCE: MILLE ET UN SONS**
Tel 1 46 67 0210 Fax 1 47 89 8171
Contact: Didier Rupin
- GERMANY: MEDIACOM**
Tel 05451 94690 Fax 05451 946919
Contact: Uwe Seyfert
- GREECE: KEM ELECTRONICS**
Tel 01 674 8514 Fax 01 674 6384
Contact: Thimios Kolikotsis
- HOLLAND: TM AUDIO HOLLAND BV**
Tel 030 241 4070 Fax 030 241 0002
Contact: Peter de Fouw
- HONG KONG: DIGITAL MEDIA TECHNOLOGY**
Tel 2 721 0343 Fax 2 366 6883
Contact: Wilson Choi
- IRELAND: BIG BEAR SOUND LTD**
Tel 01 662 3411 Fax 01 668 5253
Contact: Julian Douglas
- ISRAEL: BAND-PRO FILM/VIDEO INC**
Tel 03 673 1891 Fax 03 673 1894
Contact: Ofer Menashe
- ITALY: AUDIO EQUIPMENT**
Tel 039 212 221 Fax 039 214 0011
Contact: Donatella Quadrio
- MEXICO: LDLA DE MEXICO**
Tel 525 250 6036 Fax 525 250 6038
Contact: Carmen Juarez
- NEW ZEALAND: SOUND TECHNIQUES**
Tel 09 846 3349 Fax 09 846 3347
Contact: Stephan Buckland
- NORWAY: SIV. ING BENUM A/S**
Tel 22 1 39900 Fax 22 1 48259
Contact: Wenche Gronvold
- PORTUGAL: ESTEREDSOM LDA**
Tel 01 356 0563 Fax 01 357 2981
Contact: Jorge Goncalves
- RUSSIA: A&T TRADE INC**
Tel 07 95 229 7516 Fax 07 95 956 6881
Contact: Alexei Gorsky
- SINGAPORE/ASIA: SENNHEISER ELECTRONIC ASIA**
Tel 065 273 5202 Fax 065 2735038
Contact: Donn Ho
- SOUTH AFRICA: E.M.S. LTD**
Tel 011 482 4470 Fax 011 726 2552
Contact: Dennis Feldman
- SPAIN: LEXDON**
Tel 93 203 4804 Fax 93 280 4029
Contact: Robert Serrat
- SWEDEN: PDL TEKNIK AB**
Tel 46 8 708 7570 Fax 46 8 88 4533
Contact: Jarmo Masko
- SWITZERLAND: DR. W.A. GUNTHER AG**
Tel 01 910 4141 Fax 01 910 3544
Contact: Roland Brucchi
- TAIWAN: DMT TAIWAN**
Tel 02 516 4318 Fax 02 515 9881
Contact: Henton Sze
- TURKEY: SF DIS TICARET AS**
Tel 0212 227 9625 Fax 0212 227 9654
Contact: Samim Mutluer
- USA: HHB COMMUNICATIONS USA**
Tel 310 319 1111 Fax 310 319 1311
Contact: David Beesley



HHB Communications Limited

73-75 Scrubs Lane - London NW10 6QU - UK
Tel: 0181 962 5000 Fax: 0181 962 5050 E-Mail: sales@hhb.co.uk
Visit HHB on line at <http://www.hhb.co.uk>



Andy Hewitt: 2nd Sense, Watford, UK.
 "The CDR800 is superbly well-equipped with all digital formats ..."

Forrest Lawson: Frostbite Productions, Haskell, NJ.
 "... marvellous - I don't know how I ever got along without it ..."

Brendan Capucci/Steve Tasch: The Toy Specialists, NYC.
 "... we recommend the CDR800 without missing a beat ..."

Dave Dusman: Recording Studio Manager, Eastman School of Music, University of Rochester.
 "... the CDR800 works beautifully ..."

Barbara Hirsch: University of California - Santa Barbara.
 "... the opportunity to do a digital transfer from DAT to CD without a computer is simply fantastic ..."

Tom Stanley: Town House Studios, London.
 "... It's a beautifully simple machine to operate which makes it a pleasure to use ..."

John Jones: Producer / Cel ne Dion, LA.
 "... just brilliant ... the CDR800 is the best CD-R on the market ..."

THE HHB CDR800. NO.1 IN CD RECORDING.

When we launched the world's first affordable pro quality CD recorder, we thought we might have a hit on our hands. But even we've been amazed at the popularity of the CDR800. Thousands of machines are now in daily use around the world in every conceivable application (and some we could never have conceived of!). You're kind enough to tell us how you love the way it sounds, that superior build quality makes the CDR800 exceptionally reliable, and that pro- features like balanced analogue inputs, an AES/EBU digital in and 5 simple record modes with built-in sample rate conversion are essential for the ways you work. So we'd like to say thanks for making the HHB CDR800 No. 1 in CD recording.



INCLUDES
10 FREE
HHB CDR74 GOLD DISCS



HHB Communications Ltd - 73-75 Scrubs Lane, London NW10 6QU, UK - Tel: 0181 962 5000 - Fax: 0181 962 5050 - E-Mail: sales@hhb.co.uk
 HHB Communications USA - 626 Santa Monica Boulevard, Suite 110, Santa Monica, CA 90401, USA - Tel: 310 319 1111 - Fax: 310 319 1311 - E-Mail: sales@hhbusa.com
 HHB Communications Canada Ltd - 260 King Street East, Toronto, Ontario M5A 4L5, Canada - Tel: 416 867 9000 - Fax: 416 867 1080 - E-Mail: sales@hhbcanada.com
 Visit HHB on line at: <http://www.hhb.co.uk>

Lab Gruppen DSP24; dba audio View

Increasingly, audio amplifiers are becoming an integral part of a powerful new breed of DSP-based systems incorporating EQ and control into the amplification chain. **Terry Nelson** investigates the Swedish option

ONE AREA of sound reinforcement that has quietly been following the road to refinement is that of loudspeaker control and equalisation. Whatever your personal feelings about digital systems, DSP can endow a single box with the kind of processing power that previously required a whole rack. And while setting up may be just as time consuming, you can at least save the results and protect them against unauthorised tampering.

The Lab Gruppen DSP24 processor with View software from dba audio made its appearance at PLASA in 1997 and can now be considered to be shipping. In its most basic form, the DSP24 can be considered a stereo 2-way or mono 4-way crossover-processor with 16 preprogrammed setups for different loudspeaker configurations. The unit is aimed at both the sound reinforcement and studio monitor sectors, so it is a shame that the unit lacks a dedicated mono subwoofer output as this would enable its use in 5-way surround systems.

The DSP24 is a 1U-high rack unit with the front panel divided into 3 main sections. The first features gain controls for Input A and Input B together with switches for the associated Clip Limiters; the second contains two 9-segment LED meters for the A and B inputs and 4 further 10-segment LED meters for the A and B low and high frequency sections (or Sub, Low, Mid, and High bands) together with an alphanumeric display and 7 status LEDs followed by two push-buttons for Setup selection (STEP and ENTER). The third section consists of 4 sets of LEVEL and LIMITER controls for the Low A and B, High A & B outputs or Sub, Low, Mid and High outputs. Each output features a MUTE switch and the front panel is completed by a mains rocker switch at

the far right. All rotary controls have a centre detent. The review unit was also fitted with the PCMCIA memory card option and this is situated over the centre of the output section.

The rear panel is simplicity itself and features PLRs for the inputs and outputs, a 9-pin XLRs socket for external computer control, an RS232 port and IEC mains connector.

The processor comes loaded with 16 preset configurations, ranging from mono 4-way to various versions of stereo 2-way, and can be used as a stand-alone unit. The different presets are selected by pressing SETUP and

View (Visual Interactive Equalisation Workbench) is comprehensive digital filter design software for Windows 95/NT4 and enables the user to maximise existing equipment as well as aiding system design—it can be regarded as the other half of the DSP24

loaded by pressing ENTER. At this point it will be useful to note the functions of the 7 status LEDs mentioned earlier.

These are arranged in a square around the alphanumeric display and, going anti-clockwise are labelled MONO, UNCAL, NET, LOCK, 44, 48, and stereo. The mono LED indicates that the DSP24 is using a mono setup and the stereo LED a stereo setup. Uncal indicates that the unit is under computer control and that the front-panel controls are disabled and do not necessarily reflect current settings. The net LED shows that the DSP24 is commu-

nicating with a computer (currently up to 10 DSP24 units may be networked together). The lock LED indicates a security locked mode and this requires a password from the computer to unlock. Again, all controls are disabled. The 44 and 48 LEDs show the sampling frequency. Units using analogue inputs will always use 48kHz.

View (Visual Interactive Equalisation Workbench) is comprehensive digital filter design software for Windows 95/NT4 and enables the user to maximise existing equipment as well as aiding system design—it can be regarded as the other half of the DSP24. The program is supplied on a CD-ROM and includes both View and View Pro, the latter being targeted at contractors, installers and loudspeaker designers.

The disc includes both programs, a Help file, a tutorial overview and user manual. Loading the programs into the computer presents no problems, however, you do need to install the supplied dongle for the computer and DSP24 to communicate. As mentioned earlier, there are two programs—View and View Pro. The latter is aimed specifically at design and installation, and has the ability to import measurement files plus other features suited to design work.

Upon booting, it is a pleasant surprise to discover that the software is really quite intuitive and user-friendly. I did go to the trouble of printing out the user manual and the help files as recommended, but found only minimal reference necessary to get into the system. This said, I am still of the opinion that a good manual is worth its weight in gold, and while it might look ecologically correct to supply everything on a CD-ROM, I am sure that more paper will get used up in unsatisfactory printouts and lost sheets. Having consulted on and written tech- >



PROD. NO.
SCENE

TAKE

are you

ready

for this?



POST PRODUCTION



MUSIC RECORDING



FILM SOUNDTRACK

New delivery channels, including DVD, satellite, cable, digital TV and the internet, are providing an explosive increase in the number of routes available to deliver material to an ever-more enlightened audience, demanding complex levels of audio format.

This in turn has created a requirement for powerful audio tools capable of generating and controlling these significantly more complex formats, effortlessly combining and distributing the increase in the numbers of audio channels.

Manual operation is no longer an option.

Are you ready for this?

People who work with Soundtracs DPC-II Digital Production Consoles are:

They're assured of 160 automated channels with comprehensive digital audio processing, controlled by an intuitive worksurface.

They're also dubbing in all current and known future mix formats in 24 bit and feeling secure with the knowledge that 'future proof' 96kHz resolution and 7.1 operation is built in.

And they're saving time by opening up creative possibilities with each new project they produce.

For a full colour prospectus, or better still book a personal demonstration simply call Soundtracs.



the new
DPC-II

- 160 Digital Channels
- Worksurfaces from 16 to 96 motorised faders
- 24 bit Conversion
- 96kHz operation
- Stereo, LCRS, 5.1, 7.1

digital
production
console



SOUNDTRACS

Soundtracs PLC, Blenheim Road, Longmead Business Park, Epsom, Surrey KT19 9XN, UK
Tel: (+44) (0)181 388 5000, Fax (+44) (0)181 388 5050, email: sales@soundtracs.co.uk, web: http://www.soundtracs.co.uk

Conventional manuals, I know that it is no easy task.

There are two basic modes of operation for the system, Control and Design, and these are accessed from the opening page. The connection status with the DSP24 is shown by one of three icons in all of the control windows and these indicate Connected, Unconnected and New OS (Operating System) required. We can note that the presence of an icon means that communication is open as no icon will be present should the DTF connection be faulty. Connection to the computer is initiated by pressing ENTER on the processor.

First-time users will want to see what is actually installed in the processor and the computer database, and this is two clicks away with Setup Configuration-Setup Explorer. The left-hand column displays the setups in the database and the right-hand column (if the DSP24 is on-line) the setups in the unit. A setup can then be selected as required and this can either be from the database or the memories loaded into the DSP24. Loading a setup from the database into the processor consists of a simple click-and-drag operation.

Once the setup is defined and loaded, the Setup Configuration shows a block diagram of the signal path and the settings of the various band-pass filters, delays and equalisation. All set-

tings are combined in the digital domain and implemented with high-resolution pseudo FIR filters for precise response control. The filter operation may be minimum, mixed or linear phase. At this point you can either use the configuration called up as it is or edit the settings. You can also design a whole new setup if this is required.

The Design Sequence takes you through the various stages and is, again, intuitive to use. The steps include: Loudspeaker, Amplifier, Target Band-pass Response for each output (all are totally independent), Limit (sets maximum SPL for chosen components), Target EQ (with an additional window for individual driver equalisation), Graphic display of group delay and physical offsets of the drivers, Analogue output gains for correct summation at the crossover points, and Exit (including setup name).

There are also a number of what dba audio calls 'curve tools'. These include two kinds of graphic equaliser, parametric equalisers, high-pass and low-pass filters and shelving filters.

When designing a setup, the loudspeakers and amplifiers may either be selected from the database or entered in as required. As might be surmised, there is a lot of automatic calculation by the software depending on

the parameters entered and required (such as driver alignment delay) though manual adjustment is still possible. The program features numerous possibilities but points such as the ability to combine different crossover characteristics or set different band-pass responses to have spaced crossover points are particularly appealing.

I was able to try the DSP24 under fire rather than just in the workshop—I programmed four different setups for a stage monitor wedge in a festival environment and was able to toggle the settings from 'standard response' through the variations user settings. The difference was quite amazing and shows what the system is capable of. Not everyone carries a computer to shows, and the fact that you can program off-line, as it were, and then select the presets on the job is very handy.

Space precludes a more thorough overview of the DSP24-View combination, but this report may have whetted your appetite. The system finds applications in all areas of sound reinforcement and for active studio monitors (which I would like to investigate further) and merits the attention of all who are interested in a hardware-software solution for design and control of loudspeaker systems. ■

Lab Gruppen
Gullregnsvagen 16,
S-43444 Kungsbacka,
Sweden.
Tel: +46 300 16823.
Fax: +46 300 14246.

The desk that changes the industry without changing the feel

AMPTEC
DIGITAL TECHNOLOGY

STONED-D 001
digital mixing console

Features

- ◆ conventional user interface
- ◆ modular just like analog consoles
- ◆ superb sonic performance, 24bit AD/DA 32bit DSP
- ◆ infinite internal digital headroom
- ◆ revolutionary Dynamic Range Control system prevents digital peak or overload
- ◆ easy installation, standard analog and AES/EBU digital inputs with sample rate converters
- ◆ future upgradeability by means of internal modular design
- ◆ snapshot, on air and dynamic automation
- ◆ optional serial and parallel interfaces

Applications

- ◆ TV & Radio on-air
- ◆ classical music and drama recording
- ◆ live theatre console
- ◆ video post production
- ◆ audio editing
- ◆ CD mastering
- ◆ data transmission

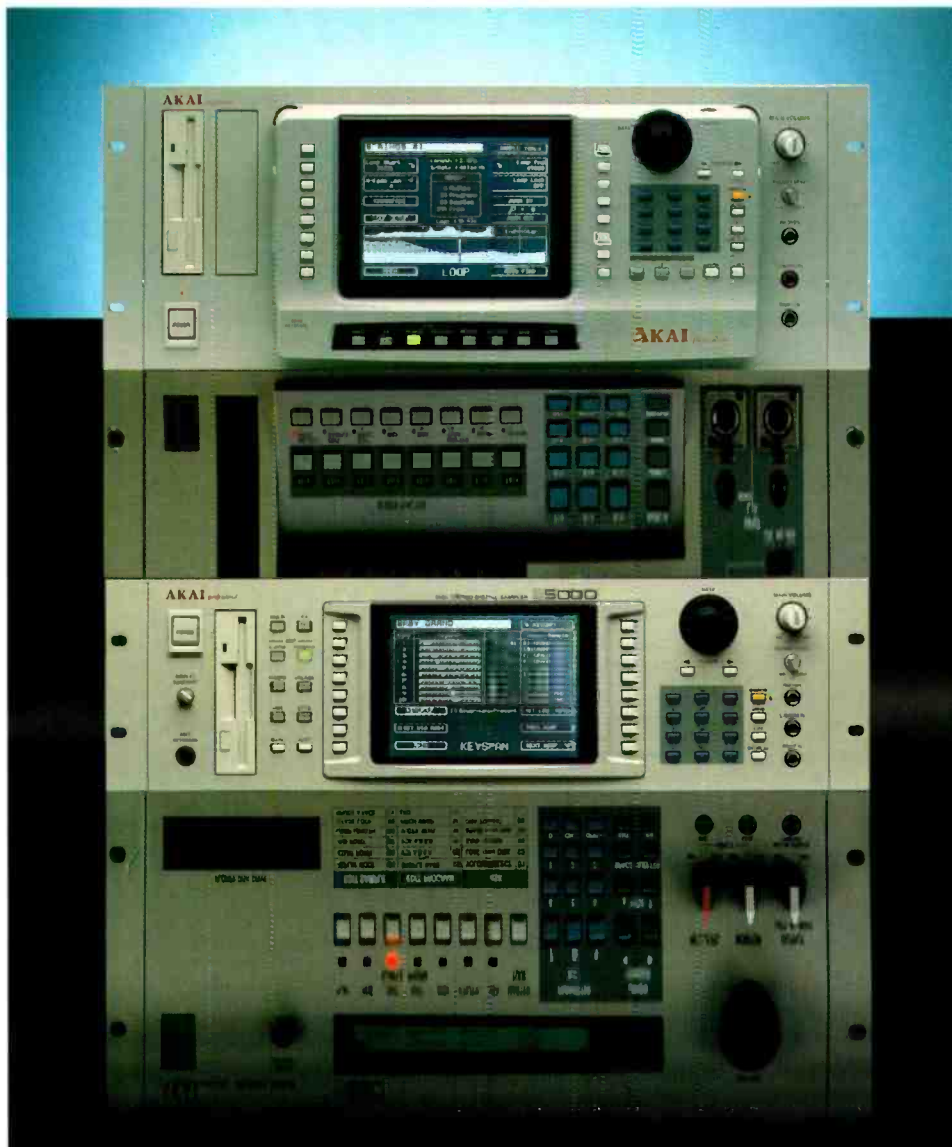
Helstraat 25
3500 Hasselt (Belgium)
tel +3211281458
fax +3211281459

evolution
of a



new Species

Akai Professional is the future of sampling. We established the standard for professional digital sampling in 1986 with the S900 and every important advance in the years since then has had our big red logo on its box. Now with the launch of the radical S5000 and S6000, the cutting edge of progress has got even sharper. Power, function, ease of use, incredible pricing - we've just reset the standards every other sampler will have to be judged against.



Power. 8Mb of RAM expandable to a colossal 256Mb for over 25 minutes of CD quality stereo sampling, 128 voice polyphony (standard on the S6000 and upgradable from 64 on the S5000), 26 different filter types, new 20 bit multi channel effects (optional on the S5000), stereo digital I/Os and the capacity to handle up to 16 individual analogue outputs which are also configurable as stereo pairs. Two MIDI In/Out/Thru ports give 32-channel multi-timbral operation and the two SCSI ports mean flexibility in a SCSI chain. A Wordclock connector allows the new samplers to be integrated into an all-digital environment and an optional adat™ interface provides stereo digital inputs and sixteen digital outs for direct connection to digital mixers.

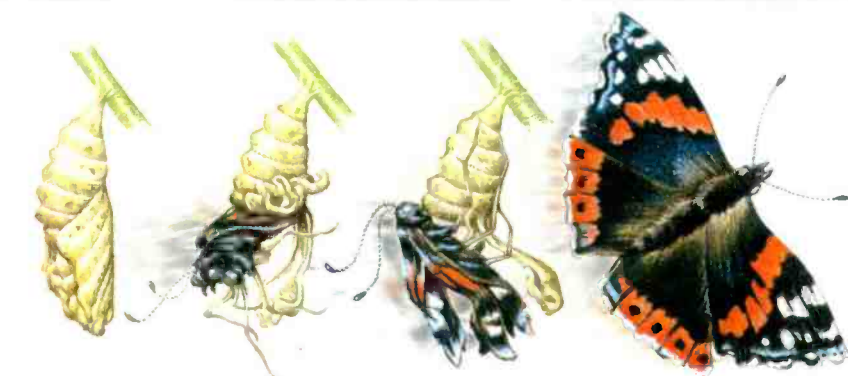
Function. Record to RAM or directly to hard disk for seamless transparent replay. Recognising that .wav is fast becoming the world-wide standard for audio interchange the S5000 and S6000 use .wav files as their native sample format allowing files to be loaded directly for instant playback from any PC formatted hard or removable disks attached to the samplers. The 'Virtual Sampling' function lets you assign disk recordings to keygroups so that long recordings may be triggered direct from disk within the context of a program. Not only does this enable disk recordings to be processed via the sampler's filters, LFOs, envelopes, etc., but a program containing 'virtual' samples appears in a Multi just like any normal program where it may be mixed, tuned and sent to the effects, elegantly integrating traditional sampling and disk recording. But we haven't forgotten our existing customers as the new samplers will read S1000 and S3000 sound libraries as well, making the decision to up-grade your sampler even simpler.

Ease of use. Both models have a large 6" graphic display with all common user-needed data such as number of items loaded and available memory space shown in the centre of the screen but unique to the S6000 is the seductive removable front panel. 16 function keys read against on-screen parameter boxes and with a large data wheel for adjustment give a 'Touch and Tweak' system that virtually eliminates the dreaded cursor trawl. Extensive use of graphics, icons, pop-up windows, progress displays, drop down menus and the inclusion of a PS2 port for ASCII keyboard attachment for naming give a computer like familiarity. And for more intricate operation we added a 'Window' function to allow power users deep level access to the sampler's heart.

Incredible pricing. Evolution has gone backwards here. The S5000 is £1799 (inc VAT) and the S6000 £2799 (inc VAT). Call for a brochure or visit your Akai dealer (look for the store with the queue outside).

adat™ is a registered trademark of Alesis Corporation USA

AKAI
professional



Akai (UK) Ltd., EMI Division, Haslemere Heathrow Estate, The Parkway, Hounslow, Middlesex TW4 6NQ Tel 0181 897 6388 Fax 0181 759 8268
<http://www.akai.com/akaipro>



Micron 570 SDR

Progress is a profound phenomenon, equally enthralling and terrifying by turns.

Neil Hillman muses on his childhood and the Micron Small Diversity Receiver

WHERE WERE YOU in 1972, when I was 12 and my birthday party became a true-blue-jean rock 'n' roll event? My mates and I played Sweet's 'Blockbuster' over and over after Ginger Davies discovered that the turntable on my parents' teak radiogram would repeat indefinitely if you left the magnetic auto-change arm open; we ate salmon boats and sausages on sticks, drank Dandelion & Burdock and were blissfully unaware that there were only boys at our house that night. It was also the year that my Rover P5B car was built in Solihull, David Bowie became Ziggy Stardust, and Audio Engineering Ltd launched onto an unsuspecting world the Micron pocket radio transmitter, packaging it in such a beautifully rugged case design that it became the audio equivalent to the classic Coca-Cola bottle.

How many of these have stood the test of time? Well, my P5B has undergone extensive and expensive surgery, while certain cherished childhood friends were destined not to travel with me as far as Bulging Midriff, FLA; and I sure miss them not being around.

But the Coke bottle is still with us, and so is the Micron radio transmitter, little changed in its appearance, but

brought up to date by the introduction of new features including what many might feel to be essential for a UHF radio channel—a diversity receiver.

A UHF receiver, operating on shorter wavelengths than its VHF counterpart, is much more likely to be susceptible to the signal drop-out 'dead spots' that occur when direct and reflected signals cancel each other out at the antenna, an event that is possible at regular $\frac{1}{2}$ -wave intervals, as the person wearing the transmitter moves. The advantage of a diversity receiver is two-fold with the opportunity to process the strongest of two—rather than—one signals through a comparator being the most obvious, but also where the two signals are of a similar strength, this Micron 570 mixes the two inputs to the comparator to improve the signal-to-noise ratio and increase the output by a useful 3dB.

The 570 is designed to offer the location recordist maximum flexibility; although for the designer we should recognise that this can present considerable difficulties as different sound recordists will prefer different personal microphones, each with their own characteristics; so while Sony or Sennheiser, for instance, can tailor their systems to their own types of

mic, as an independent manufacturer a compromise must be reached between popular makes like the Sony ECM 77, Tram TR50, Sennheiser MKE2 or Sanken COS-11. All credit then that the Micron test units fitted with ECM 77s sat comfortably in a mix with Sony 810s also using their dedicated ECM 77 microphones.

If you have ever used a Micron in the past, then the 570 transmitter will feel like you have stepped back through time. It differs visibly only in the improved battery compartment lid, now hinged on the single 9V transmitter model, rather than being secured via the reluctant 'tweaker' screwdriver clasp of the double-battery version, and the rotary frequency change switch situated on the front face, while the features available are unchanged with the proven limiter-Automatic Gain Control option available from a recessed SET LEVEL switch located on the top face of the transmitter beneath the line-up TONE button. When SET LEVEL is depressed, the AGC system is disabled and the modulation level LEDs alongside the TONE button act as a simple volume level indicator. My starting point with this adjustment is to light the -10 LED with normal speech and just cause the 0 LED to blink on higher volumes; >

fame

The totally integrated all-digital
audio post production environment.

M2 Television, London



TSI, London

Fairlight ESP Limited
Unit 12, Spectrum House, 32-34 Gordon House Road,
London NW5 1LP England
Tel (0171) 267 3323 Fax (0171) 267 0919

Sydney	Tel + 61 2 9975 1230	Fax + 61 2 9975 6744
Los Angeles	Tel +1 310 287 1400	Fax +1 310 287 0200
New York	Tel +1 212 819 1289	Fax +1 212 819 0376
Paris	Tel +33 1 4610 5050	Fax +33 1 4610 5012
Berlin	Tel +49 331 721 2930	Fax +49 331 721 2933
Tokyo	Tel +81 3 5490 1515	Fax +81 3 5490 1516

<http://www.fairlightesp.com.au>

fairlight
DIGITAL AUDIO

< adjustments to the input level being made by a recessed pot labelled SET LEVEL CONTROL, underneath the LEDs and calibrated 1-7. Depressing TONE causes the transmitter to radiate a line-up tone at 2dB below the limiting modulation level and like the SET LEVEL button, it may be latched into the down position.

The transmitter is fed with audio via a Lemo 8-pin connector offering the options of a high-sensitivity input for dynamic and condenser microphones, a direct powering connection for all popular electret microphones, powering for 12V T-powered condenser microphones, powering for 12V phantom powered condenser microphones, a dedicated low-sensitivity (-30dB) input, for use with high output condenser microphones, a high-pass filter—to avoid overload from wind rumble or from vocalists' plosive poppings, a line input and the opportunity for external powering with a suitable input lead; but a word of warning to existing Micron owners—the earthing of the transmitter connector has been changed with this model from positive earth to a more conventional negative earth, so take care with your older configured leads.

The overall frequency response of the transmitter is superb to the ear and is specified as being commendably flat at (2dB between 100Hz and 15kHz: a signal-to-noise ratio in excess of 100dB is possible given a full signal of 500µV and a current drain to the 9V battery of around 50mA, gives a useful operating life of about seven hours between changes.

THE BIGGEST differences come with the 570 receiver and its associated double-unit housing, the DDH2, designed in conjunction with radio mic specialists Mattijzen in the Netherlands, and offering the opportunity to hold two Micron SDR Small Diversity Receivers with one pair of antennae feeding both receivers via the built in Band Pass Filtering and signal splitters, with additional RF-DC outputs that allow multichannel operation from a single pair of antennae. The DDH2 can also power the receivers via the antenna sockets, obviating the need for internal batteries. With these useful facilities of separate power switching for accessories, such as a mixer or a DAT recorder, and internal balanced transformers on its line-level audio outputs, the DDH2 housing lets the side down by its agricultural appearance of a black steel case, unmarked connectors and seemingly vulnerable connector cables.

The pocket receiver itself, apart from the frequency selector slider-switch on its front face like the transmitter, car-

ries its controls on the top face of the device. In the centre is a 6-pin Lemo multiway connector that provides the audio outputs and DC input connections to the receiver, flanked on the outer edges either side by the A and B 50Ω Lemo co-axial antenna input sockets. The receiver can also be phantom powered from a 7-15V DC supply via these sockets. A recessed HIGH LEVEL output volume control is screwdriver operated and situated below a BATT TEST push-button that when operated changes the LED display to register internal battery cell voltage.

What Microns have always offered is comprehensive feedback monitoring for both the transmitter and receiver, albeit in a unique version of 4-light semaphore, (see-there's-four), which is brought up to date by the use of 3-colour LEDs albeit in the familiar star configuration. The display offers four indications: received signal strength (in normal use the height of the display indicates the received signal strength with the bottom pair of LEDs acting together); tuning (the bottom pair of LEDs act as a tuning indicator and show if there is any mismatch in the transmitter and receiver frequencies as normally both lamps should be lit). With the transmitter off, the display shows the presence of an interfering signal: transmitter battery warning (when the battery voltage in the transmitter falls low, a sub-audio tone is emitted to the receiver causing the bottom two LEDs to flash alternately 2-3 times per second); receiver battery condition (when BATT TEST is pushed the height of the LED column indicates the receiver battery voltage).

Back in 1972, the Micron cornered a huge slice of a small market by being the first and best for location filming, particularly when tucked away in the front pocket of a leather Nagra case. With the widespread introduction of tape in the 1980s, and the huge growth of out-and-about, portable single-camera shooting, other players subsequently entered this lucrative arena and have successfully challenged the Micron product on quality, features, ease of use, flexibility and price.

So did video kill this radio star? Nearly, very nearly, but not quite; and this latest 2-frequency crystal version embodies a purity of processing that none of the more flexible synthesised systems can offer due to their fundamentally higher inherent noise. But that clarity comes at a cost, and the price to be paid is the security of multiple channels available in hand, should the need arise, afforded by a synthesised system. However, for a purist that may not be considered too high a price to pay. ■

Contact
Audio Engineering,
 3 New London Road,
 London N8 8TA, UK.
Tel: +44 181 341 3500.
Fax: +44 181 341 5100.

Alesis Euro Distributors 1998

Austria

ATEC, AUDIO & VIDEOGERATE
 Phone: +43.2234.74004
 Fax: +43.2234.74074

Benelux

ELECTRIC SOUND B.V.
 Phone: +31.36.536.6555
 Fax: +31.36.536.8742

Bulgaria

FACTOR TC
 Phone: +359.2.46.30.57
 Fax: +359.2.946.12.90

CIS

A-T Trade Music
 Phone: +7.095.978.2016
 Fax: +7.095.956.6881

Czech Republic

INTON GMBH
 Phone: +42.02.533.237
 Fax: +42.02.530.644

Denmark

CMI
 Phone: +45.33.14.49.10
 Fax: +45.33.14.14.94

Finland

INTO OY
 Phone: +358.9.755.950
 Fax: +358.9.755.3581

France

IMPORTATION MUSICALE LYONNAISE
 IML
 Phone: +33.1.49.38.17.00
 Fax: +33.1.49.38.17.09

Germany

SOUNDWARE AUDIO TEAM GMBH
 Phone: +49.6074.89150
 Fax: +49.6074.891530

Greece

MELLON SA
 Phone: +30.1.364.6501
 Fax: +30.1.330.1412

Italy

M. CASALE BAUER S.P.A.
 Phone: +39.5.176.6648
 Fax: +39.5.176.6525

Norway

NORSK MUSIKK INSTR. CO. A/S
 Phone: +47.22.23.5683
 Fax: +47.2.223.7593

Poland

HEXAGON
 Phone: +48.22.44.6699
 Fax: +48.22.44.8355

Portugal

AMERICO NOGUEIRA LDA
 Phone: +351.2.2004616
 Fax: +351.2.2084949

Spain

LETUSA, S.A.
 Phone: +34.1.641.0812
 Fax: +34.1.641.4597

Sweden

MUSKANTOR & CO. A.B.
 Phone: +46.3.187.8080
 Fax: +46.3.187.9808

Switzerland

SDS MUSIC FACTORY AG
 Phone: +41.1.434.2270
 Fax: +41.1.434.2277

Turkey

YAPALI GROUP CO.
 Phone: +90.212.259.8758
 Fax: +90.212.259.5882

UK

SOUND TECHNOLOGY PLC
 Tel: +44 1462 480000
 Fax: +44 1462 480800

The all new **Alesis M20™**
ADAT Type II 20 Bit
High Performance
Digital Audio Recorder

was designed from the ground up for round-the-clock use in commercial recording and post-production facilities.

The M20 implements ADAT Type II, the only MDM recording format that writes 20 bits to tape - that's true 20 bit, no compression, no noise shaping. Its state-of-the-art 24-bit A/D converters yield an astonishing 117dB of dynamic range. So every time you hit Record, you'll be amazed by the M20's awesome sonic detail. Sixteen times more detail than the 16-bit format you might now be using.

And while the clock on the wall is ticking away, the M20's direct-drive, full-servo, industrial-grade tape transport will deliver the fastest chase and lock-up times of any MDM. Result: those ridiculous deadlines become a little more manageable. Plus, its robust ADAT Type II recording format offers the reliability that lets your tapes play as perfectly across town as they do in your studio.

We didn't leave anything out of the M20's incredible feature set. Built-in SMPTE/EBU synchronization with a separate time code track. A 9-pin input for edit control. A jog/shuttle wheel that works with a dedicated analogue aux track for scrubbing and cueing. All +4dBu balanced audio connections, plus MIDI Machine Control, video reference and word clock. Options including a built-in eight-channel AES/EBU interface card, the CADI™ remote/autolocator that can be used hundreds of yards away from the recorder and the RMD™ digital remote meter display.

And if that isn't enough, the M20 is compatible with over 110,000 ADATs in use today. In other words, you'll have a direct link between your facility and thousands of project studios around the world.

As an audio professional, you can't gamble on unproven technology or intense learning curves while you're up-and-running 24 hours a day, seven days a week. Instead, look toward the format that gives you tracking, archiving and transferring... all in one incredibly affordable tape format.



© Alesis and ADAT are registered trademarks. M20, CADI and RMD are trademarks of Alesis Corporation.

ALESIS M20

PROFESSIONAL 20 BIT
DIGITAL AUDIO RECORDER

- Direct Drive Transport
- Full On-Board Synchronisation
- True 20 Bit to Tape
- 24 bit A/D giving 117dB dynamic range
- A feature set and operation matched precisely to the demands of pro users

For a free colour brochure please call
Sound Technology on 01462 480000

Sound Technology plc, Letchworth Point, Letchworth, Hertfordshire. SG6 1ND
Fax: 01462 480800 www.soundtech.co.uk

Crookwood Mastering Bricks

Custom and modular are terms frequently associated with desks,

Dave Foister discovers a Lego approach to the business of mastering

IT TOUGHT to be very simple. Managing half a dozen sound sources, routing them to various destinations with or without processing, and listening to the results—effortless. Yet outside the confines of a mixing console, most of us will have encountered all too many lash-ups and tangles, where even a patchbay does not seem to manage the job of interfacing a set of disparate boxes properly. This is becoming more common with the widespread use of DAWs with various sources, recorders and processors vying for access, but the basic problem has always been best demonstrated in the cutting and mastering room. Here there is no mixer as such, just a bank of playback machines, a selection of EQs, compressors and limiters, and destinations ranging from a workstation to a cutting lathe. Fast, flexible and reliable routing and monitoring around this lot has always been vital, yet there is almost no off-the-shelf equipment available on the market to deal with it. Or there wasn't.

Crookwood's modular approach to, well, anything is well known, as is its Home Improvements nomenclature. Its Paint Pot became better known than the one on Phil Collins' piano, and the idea of modular consoles assembled from Bricks was forecast some time ago. Now the concept has become reality in the form of Crookwood's Mastering Bricks. I visited London facility Tape to Tape to see the system as installed in George Lambert's cutting room.

It is important to make the point straight away that the Tape to Tape installation is just as much a one-off as any other Mastering Bricks console would be. The system has been designed to be as flexible as possible, with a wealth of configuration and operational options available. There is no such thing as a 'standard' console, which means by extension that there is no premium to pay for having it just the way you want it. Every one will be a custom build with differences coming down largely to software programming and simple printed panel inserts.

The work is done in an anonymous rack that can reside anywhere convenient to minimise cable runs. This can accommodate a number of cards to carry out the switching, routing and other processes, and is connected to one or more control panels via serial links. Since routing is the primary function the cards' main job is switching,

and this can be done in the analogue or the digital domain. Digital crosspoint switchers operate with AES or SPDIF signals and can be ganged together up to a 64x64 matrix, and for analogue signals the switching is done with relays rather than any active electronics. Analogue outputs are, of course, buffered to allow the system to feed multiple destinations—a glorified distribution amplifier—and Crookwood's analogue expertise entitles them to feel confident of the signal integrity. A wide range of cards is now available, covering options such as microphone preamps, A-DCs, meter drivers, and monitoring for up to 8 channels.

The user need never see the rack; operation is carried out by small stylish

gold control panels, that come in a few distinct types and can all be customised to suit the application. Tape to Tape has four panels in two basic types, with three selection panels, and one to handle the monitors. The button layouts are similar, and; although the three selector units perform quite different

functions, they are mechanically identical. Each has 16 selector buttons with a display panel showing sources and destinations, an ENABLE button for safety interlock on certain functions and a button for invoking additional functions. Where these are fitted they are shown on the LCD screen at the top of the module, which otherwise shows messages chosen by the user. The obvious custom element is the labelling panel, but as this is printed to order in house—no silk-screening or fancy metalwork—it's simple and cheap to have what you want and even to change it afterwards. Even so it looks very slick, slipped beneath a transparent panel and backlit to show current status.

The real customising is in the software inside, and, again, the whole setup is designed to deliver maximum flexibility. The Tape to Tape system shows some of the possibilities simply in the three different uses of the selection panels.

One selects a dubbing source for transfer, and routes it to all the available destinations with the exception of the chosen source's own input. Obviously this avoids feedback in any situation, but when a cutter head is on the end the results of a mistake could be costly. The second panel deals with inserts in the chain, and handles both analogue and digital devices transparently. Tape to Tape has an interesting mixture, and the units can be inserted in any order, the only limitation being that the digital stuff must come first. This is partly because the final system output is analogue to drive the lathe, and it makes efficient use of the available converters. More converters would increase the flexibility still further. Note



Every one will be a custom build with differences coming down largely to software programming and simple printed panel inserts

that button pushes can do more than simply switch a signal: effectively each button runs a macro that can include things like automatic wordclock routing and momentary mutes to cover resync glitches.

The third selector panel determines what will be heard on the monitors, and can take its feed from the chosen transfer chain or any of the other machines. If the chosen source is digital a D-A converter is automatically inserted, and since Tape to Tape has two Prisms the monitor selector will use whichever >

NYC TAXI

3D30

DONT
WALK

ACTORS
SQUARE

Live sound is changing



Broadway is leading the way

Live sound designers are increasingly being asked for the impossible. Thankfully, the Soundcraft Broadway delivers.

Already working hard from Seoul to Scandinavia, Broadway combines an advanced implementation of digitally controlled analogue technology with a flexible, modular system design to take the largest and most complex productions in its stride, effortlessly providing exceptional sound quality and perfect repeatability, night after night.

What's more, it does it from a fast, intuitive and compact control surface that doesn't eat into valuable seating space.

Soundcraft is delivering the future of live sound mixing. You'll find it all on Broadway.



BROADWAY

Soundcraft

www.soundcraft.com

Soundcraft +44 (0)1707 665000
Soundcraft US 1-615-360-0471



H A Harman International Company



< is not being used by the insert chain. This signal then comes under the control of the monitor panel, that has buttons for selecting which set of loudspeakers or cans is to be used, and a large black volume knob with a ring of LEDs to show its position. Level matching between monitor outputs is preset, and buttons are provided for CUT, DIM and LIFT functions. DIM can be set to be absolute (always at the same level regardless of the volume control setting)

Provided everything is properly labelled it puts a whole room full of equipment under the fingers for fast setup and reconfiguration

or relative, and LIFT gives a similarly preset high level for checking tails of fades and other low-level details.

All the panels have an ENABLE button and its function is determined by the software programming. For safety's sake, the transfer source selection panel can only have a new source selected after the ENABLE button has been pressed, and this is also necessary to change the insert configuration. The two panels relating to monitoring have no such risks attached, so their buttons are always live. Even here, the buttons

can operate in different ways, perhaps requiring both buttons to be pressed together or possibly as a sticky shift type of arrangement. This kind of setting up is performed quickly and easily by Crookwood to suit the individual user.

Put all this together and you have a system that is intuitive, neat and powerful. Provided everything is properly labelled it puts a whole room full of equipment under the fingers for fast setup and reconfiguration, in a way that seems so simple you wonder why you have not seen it before. But the possibilities do not end there: there are modules available with faders, P&G belts, meters, and controllers for mic amps, EQ and compressors. The whole lot is surround ready, as a control panel can be linked to as many as eight signal paths in the rack to switch them and monitor them simultaneously. Eight-channel linked compression is on the way, and cards are already available for surround downmixing.

The control panels are so small and neat that the word console almost seems inappropriate even for a 4-panel system like Tape to Tape's. They will fit four across in a 4U rack chassis, and also have individual pods available for table-top use, but the most popular arrangement is flush mounting in studio furniture. This is

Contact

Crookwood, The Old Police House, Station Hill, Cookham, Berks SL6 9BS, UK.
Tel: +44 1628 528 026.

how Tape to Tape have them, in a 2x2 layout, and in among the other equipment it almost disappears. This, of course, is quite an advantage, as everything required is right under the hand without taking up large amounts of real estate in the monitoring sweet spot.

The possibilities of the Mastering Bricks are seemingly endless. A simple one-panel controller for a workstation set-up would be very reasonably priced, and just as customisable as a larger system, while the power and convenience of a big surround system would be hard to match with anything else. New applications and special requests are emerging all the time, and once Crookwood has done something new for one customer that option is available to anybody else. Tape to Tape is currently installing a second Mastering Bricks system in a new room, which speaks for itself, and I came away wanting one of my own for sorting out the equipment around my SADIe system, as the savings in time and frustration were immediately obvious. Its

aims are simple, but in terms of flexibility and delivering what is really needed it breaks new ground. ■

Thanks to Tape to Tape for the opportunity to spend time on the system preparing this review.

Need a New Point of Reference?

If you've ever wondered why, for nearly 30 years, so many hits have been mixed on Westlake Monitors - now is the time to find out. Go straight to your dealer and demand a demonstration.

Westlake Audio Speakers are designed as reference tools for the most demanding of audio engineers and golden-eared audiophiles. The no-compromise manufacturing process includes extensive internal cabinet bracing, hand built crossovers with precision matched components, and drivers that are meticulously selected, tested, measured and matched. Cabinets, drivers and crossovers are also thoroughly dampened to eliminate any resonance or vibrations. You have to listen for yourself. We know you'll be impressed!



If you already own a pair of BBSM-10s and want to extend the bottom end, or if you're looking for a full range speaker system - you have to listen to the BBSM-10s with the BB10-SWP subwoofer system. Awesome!!!



Lc3w10 • The 10" 3-way monitor done the Westlake way. Perfect for the higher end project studios that demand a little more.



Lc265.1 • Multi-use system for dedicated center channel, L/C/R or 5 channel configurations. Dual 6.5" 3-way.

MANUFACTURING GROUP

2696 Lavery Court, Unit 18, Newbury Park, CA 91320 USA • 805-499-3686 FAX (805) 498-2571 • <http://www.westlakeaudio.com>

**Westlake
Audio**

DISTRIBUTORS

ARGENTINA
DBA Systems
545 6800
AUSTRALIA
Technical Audio Group
02 9810 5300
AUSTRIA
ATEC Audio Technology
02234 74004

BELGIUM
EML
011 23 23 55

CANADA
Audionova Inc.
888 247 8580

CYPRUS
AGC Echitiki Ltd.
2 591325

DENMARK
StageGroup
38 60 73 97

EGYPT
Alpha Audio
245 8957

EIRE
Sensible Music Sales
01 497 0661

FINLAND
United Show Enterprises
09 7594180

FRANCE
SCV Audio
01 48 63 22 11

GERMANY
SEA
05903 93880

GREECE
Even Studio
041 554355

HONG KONG
Top Plot International
2419 1868

ITALY
Audiosales
0521 690290

JAPAN
Onkyo Tokki
03 3237 1201

KOREA
Fine Trading Corp.
02 326 2032

NETHERLANDS
Iemke Roos Audio
020 6972121

NORWAY
Norstage A/S
52 714 310

RUSSIA
Studitech
095 575 7444

SINGAPORE
Ultra Sound Agency
284 8123

SOUTH AFRICA
Tru-Fi Electronics S.A.
011 462 4256

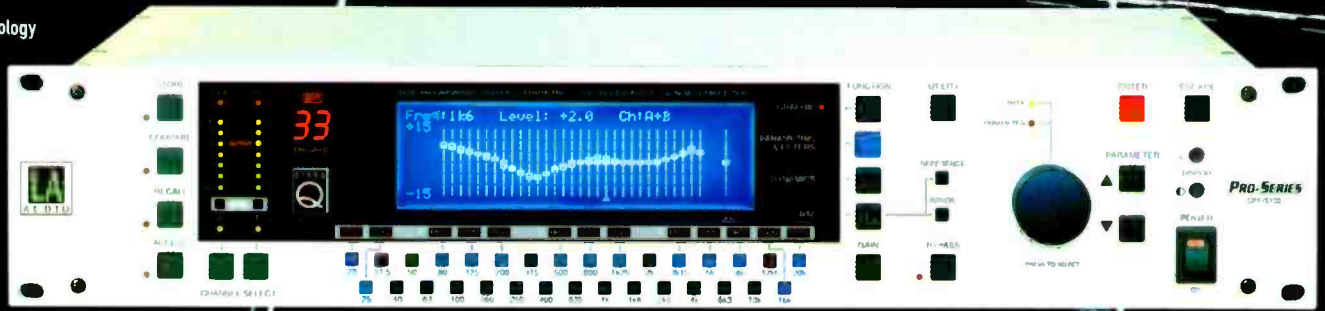
SPAIN
LMC Audio Systems
93 471 14 40

SWEDEN
TTS
08 597 980 00

SWITZERLAND
Soundhouse
041 240 4231

TAIWAN
Splendid Sound Technic
02 278 2347

UNITED KINGDOM
SCV London
0171 923 1892



Instant Access Equalisation

Introducing the *DigEQ* from LA Audio.
A new standard in ergonomic control
of digital equalisation.

- Simultaneous Dual Channel Graphic, Parametric, Shelving EQ and variable slope Hi Lo filters
- Simultaneous Compressor/Limiter and Noise Gate
- Optional RTA with advanced post processing
- Optional Digital Delay and Digital I/O
- Optional wired or wireless remote control with desktop docking
- Controls up to 15 Dual Channel Slave Units
- Instant Access to frequencies, bandwidth and gain
- Real time response and seamless processing
- 99 programmable memories with instant recall and compare
- Transformer balanced outputs with advanced distortion cancellation
- 24 bit digital audio

The better choice.

digEQ

PRO-SERIES



6-24 Southgate Road London N1 3JJ LA Audio is a division of SCV Electronics Limited
Tel: +44 (0)171 923 7447. Fax: +44 (0)171 241 3644 email: sales@laaudio.co.uk
web: <http://www.laaudio.co.uk>

tc electronic Gold Channel

Amplify the mic traditionally and then convert the signal for processing, **Dave Foister** investigates an elaborate digital voice-channel of sorts

WHAT GOES around comes around. For years analogue manufacturers have had to explore digital technology as it marches relentlessly on, and it sometimes feels as though before long the only analogue gear we'll have left will be the old stuff. But, of course, it becomes ever more apparent that there is a need for both, and occasionally we are treated to the scenic route—diversification works both ways.

tc electronic is known almost exclusively for its digital expertise. From benchmark delay lines to effects and digital dynamics control, and even software plug-in versions of its hardware, it has done everything the numbers way. While its products can provide all you need from digital conversion to recorder and back again, they can not quite complete the whole chain; before you start you need to preamplify a microphone, which has become a specialist area all to itself. tc has decided to fill that gap and take on the specialists, and the result is the Gold Channel, combining tc's attempt at high-spec mic

and gating. The analogue front end has the expected collection of discrete knobs and switches, while the rest is controlled with tc's familiar setup of on-screen adjustment.

The microphone preamps themselves are straightforward yet comprehensively equipped. Microphone and line-level inputs are provided, and the full complement of switchable phantom, pads and polarity inversion follows. The character of the preamps is quite anonymous; although this is meant as a compliment and I believe tc would take it as such. This is not a pre-amp with a character to impose, rather a clean accurate circuit that simply sets out to deliver the microphone signals to the convertors, and this it manages very well with good noise, distortion and frequency response figures. Gain adjustment is on a single small knob, and three different high-pass-filter frequencies are offered. A switchable soft limiter precedes the convertors for safety. Each channel has a MUTE switch, and this is also operative when a digital input is selected.

Digital signal handling is equipped

allow either a single process on both channels or three processes on one channel only.

The available processing algorithms encompass a comprehensive spectrum of treatments, from the obvious to the obscure. Two types of EQ are available, described as Easy and Advanced, and the difference is just that—Easy gives high and low-shelving equalisers with one swept mid and filters, while Advanced is a 5-band EQ with shelf-bell selection on the end two, and variable slope or width on all five. Boost and cut is a powerful 18dB.

Two dynamics blocks are available simultaneously, one for expansion and the other for compression-limiting; although it should be noted that there is no separate limiter. Like the EQ, two flavours are offered for each; the expander has a choice of Easy Gate and Advanced Expander, the latter having variable time constants and gain reduction ratio, while the compressor can be configured as Soft or Vintage. The first designation is slightly misleading as it has a hard knee available, but its point is fully variable parameters across the



pres with its established digital processing capabilities. This take on the established voice-channel concept contradicts the usual format by having no valves, no reliance on fancy analogue EQ, and no opto-couplers; it goes digital at the earliest possible opportunity and does all the hard work there. In the process it provides all the digital advantages of program memories and compact size; although those who expect a voice channel to be 3U-high and punctuated with black knobs may feel slightly short-changed.


A brief run-down shows just how much is squeezed into the 1-U-high box, which not surprisingly resembles the Finalizer and the M2000. Its front panel is silver rather than black, and its nature demands more controls, but otherwise it clearly carries the tc electronic hallmark. Two fully fitted mic pres are followed by 24-bit conversion, and this leads to a broad palette of digital processing including various flavours of EQ, compression, limiting, expansion

This is not a preamp with a character to impose, rather a clean accurate circuit that simply sets out to deliver the microphone signals to the convertors, and this it manages very well

for high-resolution recording. The onboard convertors will only run up to 48kHz, but they are 24 bit and the digital path can handle 96kHz, albeit with restrictions on the amount of processing that can be used. At 44.1 or 48, four processes can be chained together on each channel, either in stereo or as two independent paths. High sample rates

board, with everything you might expect including the possibility of using channel 2 as a side-chain input for channel 1. This allows the channel 1 input to be split across the two paths and the channel 2 EQ used for controlling the compressor operation. The Vintage mode removes the knee selection and the side chain, and, most importantly, the Threshold control; the threshold is fixed at -24dB and the degree of compression is set by the Input Drive level. This is quick, dirty and very effective, and the two alternatives cover just about everything you're likely to need. In this context in particular it's worth noting that if both channels have the same specific algorithm placed at the same point in the chain, the two can be stereo linked for setup and proper dynamic control.

The last block of processing, described as Tools, offers a more varied choice of special treatments. One is a clever de-esser that relates its threshold setting to the average level of the material, making it, according to the >



The
Ultimate
Quality
in Sound



High output low noise mastering tape

Zonal Limited, (Head Office & Sales)
Holmethorpe Avenue, Redhill, Surrey RH1 2NX, England
Tel: +44 (0) 1737 767171
Fax: +44 (0) 1737 767610
E-Mail Address: sales@zonalmedia.com

CANADA Zonal Canada Limited, (Sales) Tel: 416 253 1889 Fax: 416 253 8088
USA Zonal USA, Inc. (Head Office) Tel: (302) 999-9096 Fax: (302) 999-8986



< manual, more musical and useful. Certainly its simple controls for Threshold and Frequency make it very fast to set up, its Monitor mode helps identify the problem, and the end result is effective and not obviously processed even when a whole mix is going through it. A dynamic equaliser is another option, giving a much wider range of parameters than the de-esser with the same general set-up, allowing more flexible frequency-conscious compression. Again a relative threshold is provided; although there is also the choice of the more familiar absolute setting.

The final general-purpose tool is the Digital Radiance Generator familiar to Finalizer users. This is a particularly subtle and effective enhancer, openly adding low-order distortion (particularly second harmonic) to fatten and brighten the sound without EQ. I found it a very useful and pleasant effect; although whether the manual should use the word Tubessence to describe it is a matter for Aphex. The very last option is, believe it or not, an RIAA equaliser that allows a turntable pickup to be connected to the microphone inputs for properly corrected playback.

I have sometimes found it frustrating that the Finalizer, for all its range of analogue and digital inputs, cannot use some of them as splits or inserts. This is put right in the Gold Channel; if the input and output are digital, the analogue I-O can be used as a stereo insert, and to evidently assume this will be used for some sort of valve outboard. There is even the facility to mix the digital and analogue inputs, and, amazingly, the TOSLink optical input can also read channels 1 and 2 of an ADAT format signal.

This is a lot to have to sort out and control, particularly when the front panel is only 1U high and a third filled with analogue controls. However, tc electronic is adept at user-interfaces, and even if it takes a while to become familiar with it, the front end of the Gold Channel is impressively straightforward. This time two rotary encoders are fitted, one to select parameters and one to adjust them, and the screen

shows what is happening in inimitable style with clever combinations of text and graphics. Here the overall configuration can be built up as a set of blocks, and editing a particular block can be invoked either from the screen's associated buttons, or from the function buttons on the channels themselves; these use a clever idea I've not seen before where the buttons that select or bypass the steps in the chain can be double-clicked to call up the relevant setup display. For such a small screen it is remarkable how much it shows and

I have sometimes found it frustrating that the Finalizer, for all its range of analogue and digital inputs, cannot use some of them as splits or inserts. This is put right in the Gold Channel

how effortless it is to navigate it is once you know what's on offer.

One hundred factory presets are provided, and the intention that the unit should be used on individual tracks as much as complete mixes is evident from the names, which include EQ and compression settings for a range of classic named microphones. Besides this, 200 user presets are available, and up to 999 more can be stored on a PC card. For any stored setting, any individual block can be recalled to have other bits added, as well as full recall of everything.

The Gold Channel is not a souped-up Finalizer. It does not have the multi-band dynamics that make the Finalizer so powerful, but the comprehensive mic amps and bigger choice of

processes mean it is not only a superb complete microphone-to-recorder signal path, but an intensely desirable general-purpose processor as well. ■

tc electronic, Denmark.
Tel: +45 86217599.
US, Tel: +1 805 373 1828.
Asia, Tel: +1 813 5456 4071

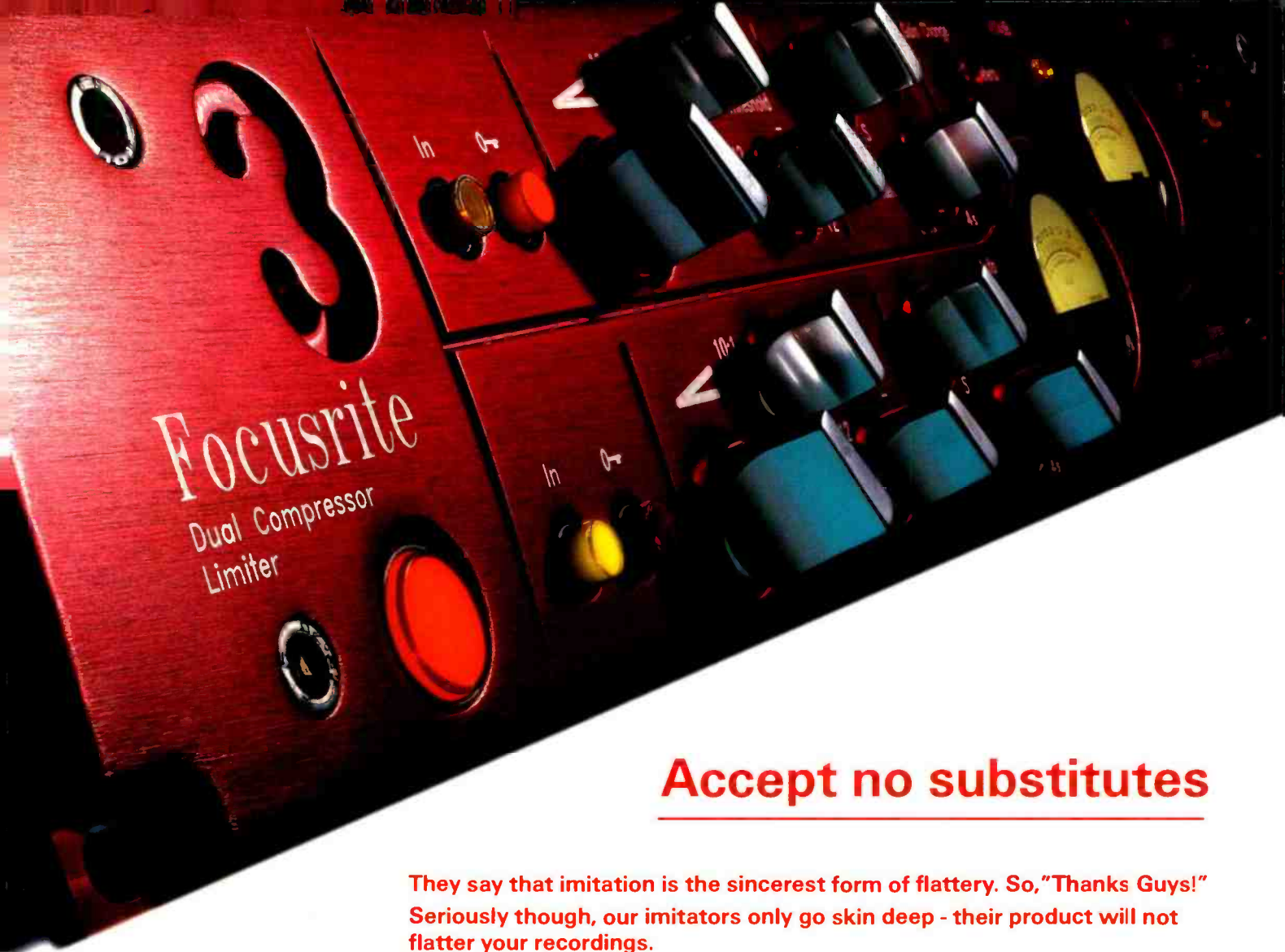


DISTRIBUTORS WORLDWIDE



- Argentina: DBA Systems SRL**
Tel: 00541 545 6800 Fax: 00541 573 3969
- Austria: TC Electronic Austria**
Tel: 0800 201 652 Fax: 0800 201 653
- Australia: Electric Factory**
Tel: 03 9480 5988 Fax: 03 9484 6708
- Belgium: EML**
Tel: 011 23 23 55 Fax: 011 23 21 72
- Brazil: Proware Audio Innovations**
Tel: 011 55 85 2866 Fax: 011 55 84 6586
- Canada: Sonoteknique PLJ Inc**
(Toro.) Tel: 416 947 9112
Fax: 416 947 9369
(Mont.) Tel: 514 332 6868
Fax: 514 332 5537
- Chile: Clio Productora Musical**
Tel: 02 274 9621 Fax: 02 274 9575
- Croatia, Slovenia, Bosnia, Macedonia & Serbia: Music Export (Germany)**
Tel: 0049 711 616692 0049 711 616697
- Denmark: New Music AG**
Tel: 086 190899 Fax: 086 193199
- Finland: Studiotec KY**
Tel: 09 5123 5300 Fax: 09 5123 5355
- France: DM2J Audio Solution**
Tel: 01 48 63 04 43 Fax: 01 48 63 18 09
- Germany: TC Electronic Deutschland GmbH**
Tel: 040 53 10 83 99 Fax: 40 53 10 83 98
- Greece: KEM**
Tel: 01 67 48 514/5 Fax: 01 67 46 384
- Holland: The Netherlands: Total Audio**
Tel: 020 613 0608 Fax: 020 614 9031
- Hong Kong: Digital Media Technology**
Tel: 2721 0343 Fax: 2366 6883
- Iceland: Audio Solutions**
Tel: 896 5626 Fax: 551 6476
- India: R & S Electronics**
Tel: 022 636 9147 Fax: 022 636 9691
- Ireland: CTI - Control Techniques**
Tel: 01 454 5400 Fax: 01 454 5726
- Israel: Sontronics**
Tel: 03 570 5223 Fax: 03 619 9297
- Italy: Grisby Music Professional**
Tel: 071 710 8471
Fax: 071 710 8477
- Japan: All Access**
Tel: 052 443 5537 Fax: 052 443 7738
- Korea: Best Logic Sound Co**
Tel: 02 515 7385 Fax: 02 2 516 7385
- New Zealand: Protel**
Tel: 04 801 9494 Fax: 04 384 2112
- Norway: Lydrommet**
Tel: 22 80 94 50 Fax: 22 80 94 60
- Poland: hexagon Warszawa**
Tel: 022 44 66 99 Fax: 022 44 83 55
- Portugal: Caius Tecnologias**
Tel: 02 208 4456 Fax: 02 208 6009
- Russia: A&T Trade**
(Russia) Tel: 095 229 7516 Fax: 095 956 6881
- Singapore: Team 108 Technical Services Private Ltd**
Tel: 748 9333 Fax: 747 7273
- Southern Africa: Powerhouse Electronics**
Tel: 00 27 11 728 3102 Fax: 00 27 11 728 6789
- Spain: Media Sys.**
Tel: 03 426 6500 Fax: 03 424 7337
- Sri Lanka: HiFi Centre Ltd**
Tel: 00 94 1 580442 Fax: 00 94 1 503174
- Sweden: PolySonic**
Tel: 031 706 90 50 Fax: 031 706 91 10
- Switzerland: Bleuel Electronic AG**
Tel: 01 750 5142 Fax: 01 750 5153
- Taiwan: Advantetek International Co.Ltd.**
Tel: 02 2716 8896
Fax: 02 2716 0043
- Thailand: KEC**
Tel: 02 222 8613/4 Fax: 02 225 3173
- Turkey: Imaj Music Yapim VE Organizasyon Ticaret A.S.**
Tel: 0212 275 8310 Fax 0212 275 8384
- UK: Focusrite Audio Engineering Ltd.**
Tel: +44 (0)1494 462246
Fax: +44 (0)1494 459920
email: sales@focusrite.com
- USA: Group 1 Ltd.**
(East) Tel: 516 249 1399 Fax: 516 753 1020
(West) Tel: 760 360 8511
- Venezuela: C&M Audio**
Tel: 00582 263 8790 Fax: 00582 267 4319

www.focusrite.com



Accept no substitutes

They say that imitation is the sincerest form of flattery. So, "Thanks Guys!" Seriously though, our imitators only go skin deep - their product will not flatter your recordings.

So before you rush off to buy the latest new offering in signal processing, allow us to remind you why the Focusrite Red 3 Compressor and Limiter is the choice of professionals the world over.

Class A

The heart of the Red 3 is Focusrite's proprietary Class A VCA technology which delivers outstanding low distortion performance to both Compression and Limiting functions, whilst increasing the compression ratio provides the punch and warmth from second order artifacts.

Dual Mono or Stereo

Red 3 is a two channel device switchable to true stereo operation under the lower set of controls, so you can use it for tracking (great on vocals and instruments alike) and across the mix to make it jump out of the speakers.

Extraordinary Build Quality

Red Range build quality is the envy of the industry. The extruded aluminium front, side and rear panels are milled, finished and anodised a rich burgundy red whilst the legends are anoprinted into the finish so they cannot wear off.

The brushed stainless steel covers conceal glass-fibre circuit boards, the shielded power supply and the wealth of electronic components employed to ensure reliable, outstanding performance, for life.

High grade potentiometers and switches complete the bill of materials. Even the control

knobs are individually machined and hand polished before anodising to feel smooth as silk to the touch.

It's no accident that the Red 3 was awarded the 1995 TEC Award for Outstanding Technical Achievement - many of the nominators actually own one!

Make an informed judgement. Before buying your next compressor ask your pro-audio dealer for a Red 3 to evaluate or ask him to set up a comparative demonstration.

There's no substitute for your own ears!



Red 1 Quad Mic Pre



Red 2 Dual Equaliser



Red 3 Dual Compressor/Limiter



Red 4 Pre-amplifier



Red 5 Power Amplifier



Red 6 Mono Pre & Equaliser



Red 7 Mic Pre & Dynamics



Red 8 Stereo Mic Pre



Focusrite
audio engineering



Spendor SA300

For methodology see *Studio Sound*, April 1998, page 14.

See it on the Internet website:

www.prostudio.com/studiosound/apr198/r-tannoy.html

Studio Sound's 'bench test' loudspeaker reviews continue with the SA300. **Keith Holland** reports

THE SPENDOR SA300 is a 2-way active loudspeaker with a built-in amplifier and crossover package. The low frequencies are handled by a nominally 200mm diameter cone driver, and the high frequencies by a 25mm soft-dome tweeter that fires through a shallow horn waveguide. The cabinet has dimensions of 470mm x 250mm x 340mm deep, a slot-shaped port on the front panel beneath the woofer, and front panel edges that chamfer towards the top of the cabinet to a depth of



25mm. The rear panel has a large heatsink with vertical fins, an IEC-type mains socket, an XLR-type input socket, and controls for gain, LF cut, LF tilt and HF tilt. The LF cut switches the cut-off frequency of a 'sub-sonic' protection filter to either 50Hz, 70Hz or 90Hz. The LF tilt gives up to 3dB boost or cut to frequencies below 500Hz, and the HF tilt to frequencies above 4kHz; both in 1dB steps. The measurements presented in this review were carried out with the LF cut control at 50Hz and the tilt controls 'flat'.

The on-axis frequency response (Fig.1) lies within

±3dB between 40Hz and 19kHz; a commendable result. The low frequency response rises by about 3dB at 50Hz before a very steep roll-off through -20dB at 301Hz—a consequence of the use of a ported enclosure and a high-pass protection filter. The acoustic centre result (Fig.2) confirms this rapid roll-off with the low frequencies suffering a group delay that corresponds to a shift of about 3m relative to the high frequencies. The rise at 50Hz may be tamed somewhat in practice by adopting a higher frequency setting for the protection filter. The harmonic distortion results shows levels below -40dB (1%) at low frequencies but the third harmonic rises above this level between 200Hz and 1kHz with a further, narrow peak at 2kHz. There is also a narrow peak in second harmonic at about 6kHz to -40dB.

The horizontal directivity (Fig.5) is well controlled with only a slight narrowing in the upper frequency range of the woofer and there is no evidence of side-lobes in the directivity pattern at any frequency. The vertical directivity (Fig.6) is similar except for the inevitable dip at the crossover frequency due to the physical spacing of the drive-units.

The step response of the loudspeaker (Fig.3) shows good time-alignment with a high frequency rise occurring only about 100µs earlier than the main response. The power cepstrum (Fig.4) shows only low level and time-smeared echos at about 500µs and 750µs; cabinet edge diffraction problems appear to be kept to a low level by the adoption of chamfered

edges and the short tweeter horn—a result that is confirmed by the smooth on-axis frequency response. Fig.7 shows the waterfall

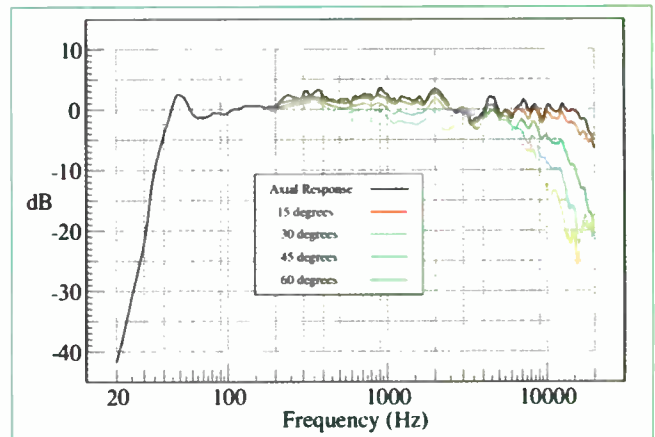


Fig.5: Horizontal directivity

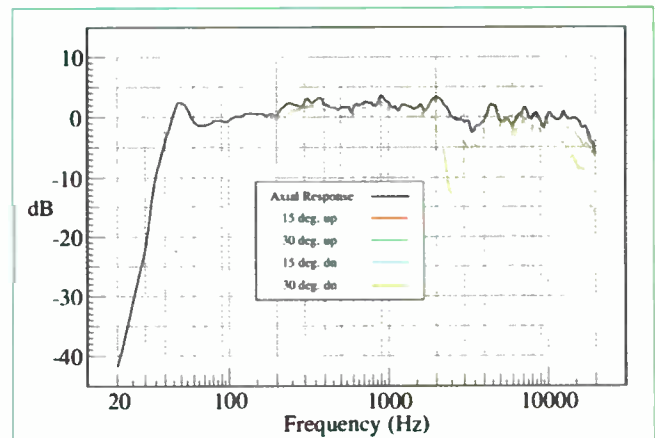


Fig.6: Vertical directivity

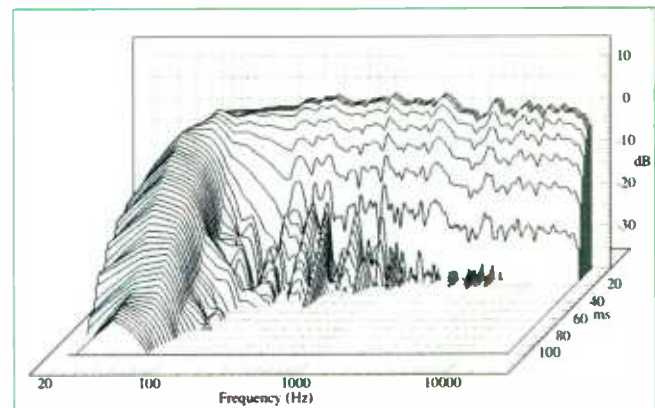


Fig.7: Waterfall chart

plot for the SA300. The most dominant feature of this plot is the ringing at low frequencies due to the rapid roll-off. At higher frequencies though, the plot shows rapid decay except for some slight ringing of two resonances at 300Hz and 400Hz.

Overall the Spendor SA300 is a very good performer. The on-axis and off-axis frequency responses and time response are com-

mendably good, but the mid-frequency harmonic distortion is higher than that found in some similar loudspeakers. The rapid roll-off at the low frequencies seems to be very common in compact monitor loudspeakers of this type; it is, perhaps, a necessary compromise where good low frequency extension along with reliably high output level is required. ■

Spendor Audio Systems.
Station Road Industrial
Estate, Hailsham, East
Sussex BN27 2ER.
Tel: +44 1323 843 474.

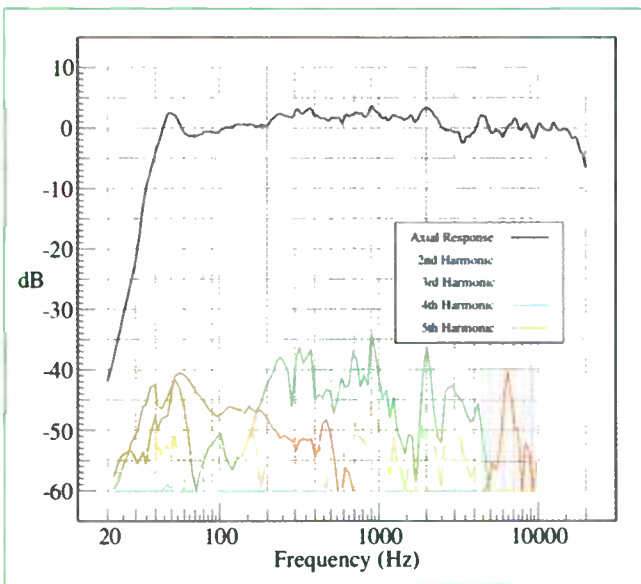


Fig. 1: On-axis response and distortion

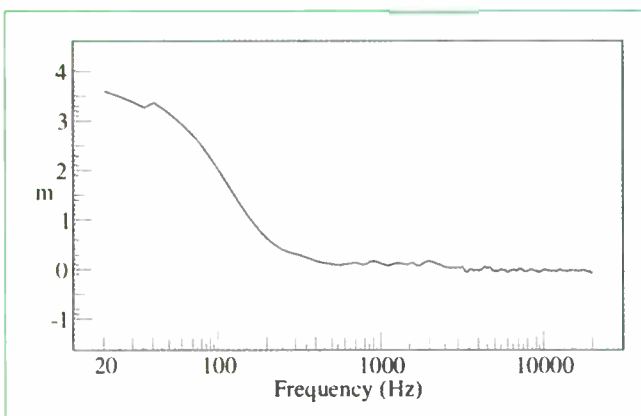


Fig 2: Acoustic centre

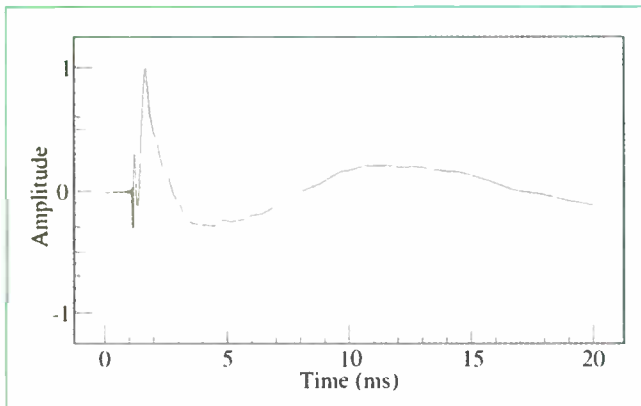


Fig.3: Step response

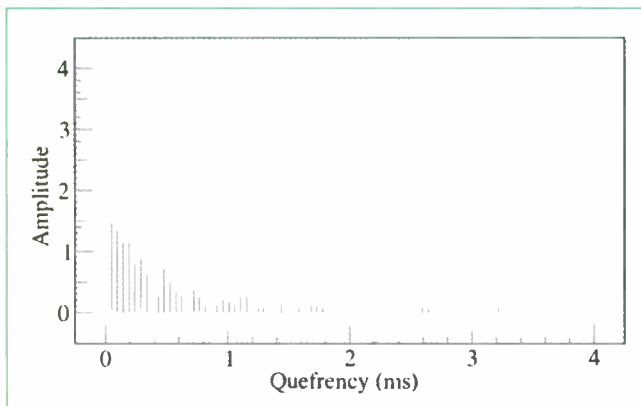


Fig.4: Power cepstrum

Perfect CD-R Copies and Easy Input from Various Sources?

New Features:

- Audio Verification
- Multiple Image Storage
- Expandable from 1-64 drives
- Full onsite service backup
- Dedicated technical staff
- Network multiple systems
- All CD formats supported
- Various finance options
- P.D.Q. discs available
- Analog Audio input
- Digital Audio input
- Mastering System input
- Stored data input



MAGELLAN
GROUP PLC

...for further information or details of our free evaluation, contact us on +44 1256 681186...

It's DAT Easy!

Magellan Group plc
Concept House, Bell Road, Basingstoke, Hampshire. RG24 8FB UK

Finally, after 58 takes she got it right.



Like all of our studio products, TDK's new CD-R Studio is tested and optimised especially for professional audio recording. Incorporating our unique Reflex technology, the newly formulated dye ensures the most accurate pit writing possible for crystal clear audio playback, every time. Even if it took her fifty-eight times.



NEW



<http://www.tdk-europe.com>

TDK

at the heart of it

Dolby Digital price slash

Dolby has slashed the price of Dolby Digital encoding with the release of the \$5,000 (US) DP569 at the San Francisco AES, and paved the way for entry-level multichannel working in light of the promised explosion in DVD and DTV. The new encoder costs some 74% less than its PC-based predecessor, but has even more features.

Dolby, US. Tel: +1 415 558 0293.

Soundfield goes 5.1

Soundfield is to unveil a surround-sound processor that enables the conversion of B-Format information generated by SoundField microphones into 5.1, Pro Logic, and other surround formats. The 1U-high processor makes it possible to make live surround broadcasts or recordings from a single SoundField MkV System or ST250 Portable System. Four high-resolution bargraph meters display the incoming B-Format information with individual bar-graphs showing the variable front left, front right, centre, rear left, rear right, and sub-bass output levels. Further stereo 'front width', 'rear width' and 'rear focus' controls are provided to compensate for speaker positioning and room acoustics.

Soundfield, UK. Tel: +11 1924 201 1089.

Sonifex reds

Sonifex has released a range of budget Red-box interconnection units. The range includes the RBDA6 6-way stereo, 2 x 6-way mono or 1 x 12-way distribution amp; the RBMA2 dual mic preamp; RBMS2 dual stereo



to mono convertor; RBBL2 balanced to unbalanced bidirectional convertor; and the RBSL2 twin mono or stereo limiter. All units are housed in aluminium boxes which can be screw-mounted to any surface and can be powered by 115V, 60Hz or 230V, 50Hz. **Sonifex, UK. Tel: +44 1933 650700.**

Drawmer digital DC Line

Drawmer is to introduce digital products for 24/96 processing and analogue-digital conversion at the AES. Three products will offer 'refined analogue' sound quality to TDIF, ADAT, SPDIF and AES-EBU interfaces plus a host of features. The DC2476 Digital Mastering Processor has 24-96 inputs and outputs, and the inclusion of S-RAM card slot allows settings and parameter to be memorised and recalled on any Drawmer DC2476 or Drawmer DC2486 units. The Drawmer DC2486 TwinScreen Processor is a digital mastering 2U-high processor >

Studio Sound September 1998

dbx DDP

Renowned for its analogue units, dbx recently introduced its first digital dynamics processor. **George Shilling** puts it through its paces

DIGITAL REVERB AND DELAY are far more prevalent than their analogue forebears, yet in the area of dynamics processing the analogue design reigns supreme. Only very recently have any significant inroads been made into this market by digital processing, and this has mainly been restricted to all-digital setups. The DDP (Digital Dynamics Processor) is the first stand-alone digital processor from dbx.

The latest dbx Type IV 24-bit conversion process is included, which does away with the 0dB brick-wall concept, instead letting you occasionally hit +6dB without harsh noises. Additionally, dbx include a feature called TSE, or Tape Saturation Emulation. This includes 5 different tonal 'colours': Dark, Warm, None, Light and Bright, and helps to make the unit sound more 'analogue'. Unfortunately this function is unavailable on the digital inputs where it would most likely be needed. A digital I-O board is optionally available, but was not fitted to the review model. Analogue inputs are on jacks and XLRs, alongside MIDI connections for fully implemented remote control or automation.

The DDP's DSP operations comprise Equalisation, Gating, Compression, De-essing and Limiting—in that order only. Surprisingly for a software-based processor, the processing chain can only be altered in a very limited way. You can include external or internal (EQ) side-chain processing, or exclude certain of the above processes from the chain. You cannot, however, put the EQ after the compressor, or the gate after the limiter. All processes take their key from the initial input, rather than the output of the previous element in the chain, so that tweaking one part does not affect another section's key level. Unfortunately, there is no separate side-chain input, so the only way to use an external side-chain is to sacrifice an audio input.

The two channels can be used as stereo if you select a 'linked chain' of effects blocks. Alternatively, two completely separate mono chains can be used.

The EQ is a 3-band parametric with bell curves. A graph displays the changes. The Gate includes a RATIO control rather than a range in dBs, providing treatments from gentle expansion to brick-wall gating. The Compressor is the most fully featured section, including 10 levels of Over Easy (soft-knee) and Hold as well as Attack and Release, the last unusually calibrated in dB/s. The De-esser and Limiter sections are fairly simple to operate, the De-esser working particularly well.

The front panel features LED meters switchable for Input or Output level, accompanied by 4 stepped rotary controls for input and output trimming of both channels. These controls have a wide range of adjustment, so no switching for -10dB/+4dB operation is needed. A large illuminated LCD screen dominates the front panel. This contains a huge amount of information, some of it in tiny lettering, and not as contrasted as it might be. There are additional meters on screen, a large program number indicator, and a whole host of other information, depending on the mode. When adjusting any dynamic processes a graph indicates all thresholds and ratios. Alternatively, you can display real-time threshold indicators for all dynamics processes. A Data Wheel is used for parameter adjustment and takes you through the 50 preset programs; an additional 50 are available for storage of user settings. The multitudinous presets are something of a waste of time, as they always need tweaking for a given situation. The bank of push-buttons include a PROGRAM button, that really should be larger or more obviously located. EDIT buttons for each of the processing functions, and a SELECT button to choose between up to three visible parameters. NEXT PAGE and PREVIOUS PAGE buttons take you to further parameters. The whole system is simple to navigate, but it is extremely slow to use compared with any dedicated analogue unit.

TCM, or Transient Capture Mode, is a parameter adjustment found in the Gate setup, but it can affect the way the DDP processes all dynamic effects. This is a look-ahead feature that delays the audio signal, but uses the real-time input as key, so you do not miss catching the transients with the Gate or Compressor. It can be set up to 3ms in 20µs steps. This is useful and worked well, but I would challenge the manual's claim that a 3ms

delay is not enough to cause phasing errors. The manual is surprisingly amateurish and it waffles—for example, it boasts that the compressor is 'more unique than other compressors', and if making a button light up by pressing it is 'telemetry', then I'm Murray Walker.

The DDP is a powerful package, priced very competitively. However, some ergonomic features leave much to be desired. Subjectively, the sound quality has something of a 'closed-in' digital sound to it, compared to the warm openness of the best analogue units. However, dbx has done its best to make it sound as good as, if not better than any similar digital processor. ■

dbx, 8760 South Sandy Parkway, Sandy, Utah 84070, US.

Tel: +1 801 568 7660.

Fax: +1 801 566 3565.

UK: Arbiter Group Wilberforce Road, London NW9 6AX.

Tel: +44 181 202 1199.

Fax: +44 181 202 7076.



Alesis LX20

Lowest of the new Type II breed but better than the old, **Dave Foister** goes 20-bit again

LIKE BUSES, you wait ages then three come along at once. Alesis' jump to 20-bit recording on ADAT is an assured commitment, with a complete product range from the outset. We have already seen the XT20, adding 20-bit capability to the established XT; and we've looked at the M20, which takes a leap into the major league with more facilities than ever seen before on ADAT. But it would be a betrayal if Alesis were to neglect the entry-level end of the market that helped so much to establish its position, and with that in mind there is now the LX20, bringing us affordable 20-bit ADAT streamlined for the application.

The LX20 could look cheap, but it does not. In fact it looks sleek and desirable than the original ADAT, and, although it is lighter than the XT20 it still seems to have a solid construction, and good-quality buttons and controls. The back panel shows the most obvious sacrifice: for the first time an ADAT has no balanced pro-level analogue connections. The EDAC is gone, leaving only the phonos that



the XT substituted for the original jacks. For me this places the machine in the home or semipro market, as I have never been thrilled with phonos as professional connectors, seeing them rather as a necessary evil on those bits of consumer kit that are otherwise so good that it would be silly not to use them. But then they have now become pretty much standard for the -10dB connections on MDMs among many other things, so it would, perhaps, be wilful to insist on something more grown up.

Everything else is still there, the important bits being the optical digital connections and the D-connectors for synchronisation. In every significant respect this is a full-blown ADAT machine, just as capable as any other of being slotted into an existing system and integrating transparently with the rest. It also makes it an ideal choice as a stand-alone one-off in conjunction with an ADAT-compatible computer card, or any of the many peripherals—outboard converters, mixers, mic pres—that sport the little red glowing socket. In this context the lack of professional analogue interfacing, and the slightly downrated converters, are no longer an issue and the machine remains as useable as its larger stablemates.

This is possible because the front panel also retains most of the features that have graced ADATs since the beginning, and the way they are presented resembles the XT far more than

the original machine. The main display window shows the familiar set of information, with the eight big meters surmounted by the time read-out, and flanked by status indication such as sample rate, input selection and monitoring mode. To the right is the S-VHS transport slot, with a couple of rows of soft-feel buttons beneath. These deal with the setting of the above functions as well as the basic set of four locator positions; it comes as a surprise to find that the whole system of looping and auto punching is carried across to the LX20 complete with rehearsal mode.

The most prominent controls are those for the transport, which are large and responsive with indicator LEDs above. The mechanism they control is clearly faster and smoother than the one in the original ADAT, like that in the XTs; although it seems to make a little more noise. This may be because of the lighter overall construction of the machine, which is fairly plastic, but still apparently robust. Going from wind to play is fast and smooth, but the locators always overshoot several times before

settling in the required place, much like many an analogue multitrack.

The quality of the recorded audio is what this whole range depends on, and like the XT20 and M20 the LX20 uses the Type II ADAT format which records 20 bits on tape. It's at the bottom of the tree as far as on-board converters are concerned: the M20 is 24-bit both ends, the XT20 has 24-bit ADCs but 20-bit DACs, and the LX20 has 20-bit conversion both in and out. The sound through these converters shares the very slight brightness of the other machines, but overall it's quite astonishing that 8 tracks' worth of this quality can be had at this price. This is what will score heavily in the smaller installation, where the

feature complement of the bigger ADATs will not be required, but this level of audio fidelity will be a huge bonus. One or two of these hooked up to a computer-based system, via one of the simple synchronisers that use ADAT's on-board sync code, would be a very impressive set-up indeed.

Alesis is clearly out to make a clean sweep of the market with a machine for everybody, placing 20-bit MDM on the agenda in all areas of the business. The new range certainly seems to offer the tools for the job, and the LX20 sets the seal on a suite of machines that should make the technology available to, and appropriate for, everybody. ■

Compare
Alesis, US.
Tel: +1 310 558 4530.
UK: Sound Technology.
Tel: +44 1462 480000.

NEW TECHNOLOGIES

< with the additional features of twin mic preamps, frequency-conscious noise gating and more extensive metering than the DC2476. Individual screens and operating controls for each channel allows simultaneous access and display of parameters. An S-RAM card slot is included. The DC2496 is a super high resolution A-D converter with an additional 20/16-bit 'Intelligent Backup' output for creating a simultaneous backup copy at 48/44.1kHz, a full in-out TDIF, ADAT, SPDIF, AES-EBU bay for transferring between two different formats; 'Multiple Converter Technology' for 130dB dynamic range; four different programmable limiters; and the ability to convert a 96/88.2kHz DVD recording down to 24/44.1kHz.

Drawmer, UK. Tel: +44 1924 378 669.

CD dupe

Otari's CDP50 CD duplicator is aimed at short runs, requires no external PC, and can continuously copy 50 CDs using pre-installed screen-operated application software. In auto mode, master CDs and blanks can be mixed in the copy stack, the machine automatically detects prerecorded material and will continue to copy blanks until it detects a new master allowing multiple small runs to be copied in one pass. Features include write verification, error disc detection, and a separate reject disc magazine. The machine supports CD-I, CD-Video, CD-ROM, CD-ROM XA, CD Plus, enhanced CD and Photo CD. Expanding on the stand-alone Lightwinder LW10 system for PA use, the LW50 fibre-optic wiring system is intended for uses where setups have to be changed rapidly and stored. It also supports video camera signals. Lightwinder



uses fibre-optic cable to transmit 128 channels of up to 24-bit, 48kHz audio 3km between units and 16 units can be chained together for a maximum transmission length of 45km. LW50 includes control and off-line editing software for PC remote control of routing, mic-line gain and setups. Interface options include video, A-D and D-A, AES-EBU, 4-channel intercom and control data I-Os.

Otari, Europe. Tel: +49 21 5950861.

Euphonix multitrack

Euphonix will unveil the R1 multitrack digital recorder at the AES that is expected to start shipping in the first quarter of next year for around \$25,000 US for a 24-track system with MADI interface and remote control. The system claims 24-bit conversion and storage combined with 40-point floating >

digital

three two eight

Menus belong in restaurants
not on mixers

Spirit's unique
E-Strip avoids the
need for tedious
menus, so 328 is
as easy to use as
an analogue desk



42 Channel
Digital Mixer
with the
Human
Touch



MAIN FEATURES: Up to 42 Inputs at Mixdown
8 Bus 16 Mic/Line Inputs with Inserts and HPFs
16 Digital Tape Returns with 2 x ADAT Optical and 2
x Tascam TDIF connectors as standard. All inputs
have access to 3-Band Parametric EQ, 4 external
Auxes, 2 Lexicon Effects Sends and Pan via the E-Strip
5 pairs of Stereo Inputs and 2 Internal FX Returns
24 Bit A/D and D/A Converters with 128 x oversampling
throughout. Moving 100mm Faders throughout. 2 x Lexicon
Dual Programmable Effects Units. 2 x Assignable Mono/Stereo
Dynamics Processors with Compressors, Limiters, Gates &
Duckers. Snapshot Automation with recalling of all main console
parameters for up to 100 "scenes". Dynamic Automation capability
Undo/Redo, Copy & Paste functions. Solo-in-Place. AFL & PFL Solos. Full Metering
and Monitoring of all inputs, Processors, Auxes and Masters. Full Machine Control
capability with large Tricolor display. 2 Consoles cascadable for 84 inputs at
mixdown and 32-track recording. Third ADAT Optical Output for Groups or
Aux Masters. 1 x AES/EBU and 1 x SPDIF gives 28 Digital Outs and
20 Digital Ins. **OPTIONS:** TDIF 8 Channel Analogue I/O Interface. TDIF Mic
Preamp Interface. 8 Mic Preamps with Insert, Gain, HPF and Direct Out
TDIF AES/EBU Interface - 4 pairs AES/EBU I/Os for Hard Disk production systems

A Harman International Company

SPiRiT DIGITAL 328

Send me a brochure on Digital 328 The full Spirit Range
I would use Digital 328 for Recording Theatre or other installation

Other:

Digital Mixing Console

I read the following magazines:

Name:

Address:

.....

Spirit by Soundcraft™, Harman International Industries Ltd., Cranborne House,
Cranborne Industrial Estate, Cranborne Road, Poltles Bar, Hertfordshire EN6 3JN, England.
Tel: +44 (0)1707 665000, Fax: +44 (0)1707 665461

Check out the Spirit Website:
<http://www.spirit-by-soundcraft.co.uk>



CLM Dynamics DB200S

Less than four, but better than one, **Dave Foister** discovers a dual channel version of an established product

IT'S DIFFICULT to come up with something that sets your microphone preamplifier apart from the competition, but CLM Dynamics is determined to give it a go. A while back (*Studio Sound*, June 1997) we looked at the DB400S, which scored extra points for putting four preamps in a 2U box, and now here is the DB200S, essentially two of those preamps with a few modifications. While the attraction of the four-pack has gone, other details remain to mark the unit down as a little unusual, notably the built-in M-S decoding.

Its appearance, for a start, is wilfully functional rather than sleek. Green panels on a black background, simple plastic knobs and a slightly muddled screen print do not suggest the employment of a style consultant, for which these days we should perhaps be grateful. Instead we have a practical design that incorporates all the standard functions expected of a microphone preamp, but with a couple of extras. The functions and facilities are, by and large, self-explanatory and straightforward.



The main inputs and outputs are on rear-panel XLRs. The inputs are for microphone signals only, which is slightly surprising in view of the M-S facilities, and the nominal output level can be switched independently between +4 and -10. A helpful extra here is an insert point for the addition of external EQ, compression, or other processing not provided on board. This is a standard unbalanced 3-pole jack. Otherwise the back panel is pretty sparsely populated, with only the mains input and a thoughtful signal ground lift switch to break up the monotony.

For its operation each preamp depends on three rotary controls and a bank of seven push-button switches. Two of the knobs are for input gain and output level; an output fader often seems superfluous on a simple preamp like this, placing an unwanted source of miscalibration and potential trouble in the signal path, but in this case it can much more easily justify its presence in the context of the M-S decoder. LED

meters show final output levels, and as before only go as far as +9. This is apparently referenced to 0dBm, so full scale on here is +13vu, but this is still some way below the levels one would be wanting to drive into the destination machine (unless you are calibrated to 0dBFS=+12vu). With most

machines on the end the preamps' meters are pegstopping most of the time, rendering them less useful than they might be.

All the standard switches are present; 48V phantom power is independently switchable, as are 20dB pads, polarity reverse and a high-pass filter. Rolling off 12dB per octave below 80Hz this is not too aggressive, but just enough to deal with the odd rumble, hum and close singer. Independent muting for the two channels is useful in the kind of direct-to-tape situation the unit is intended for.

Purism demands the minimum possible in the signal path, so there is no EQ, and no compression: what the DB200S does have is, perhaps, the only process allowable on a box like this as it can save an awful lot of red faces: a limiter. This is only turned off by taking its threshold control to maximum, so you're taking it on trust that it is effectively out of circuit, but when it's introduced by reducing the threshold it does a neat and tidy job of keeping the lid on the levels. There is a switch for giving it a fast attack, and this provides all the flexibility it needs.

An LED at the top of the signal meter shows when the limiter is doing its job and unless it's horribly overdriven this is the only way you would know.

Channel 1 has a switch for ganging the limiter side-chains for stereo or M-S operation, and the corresponding switch on channel 2 selects the M-S mode. This allows an M-S array to be converted to L-R stereo here within the preamps, with full control of the resulting stereo image. The M signal is connected to channel 1 and the S to 2, and decoded stereo appears at the outputs—the right way round this time, unlike its predecessor. This means that the level controls on the S channel adjust the width of the stereo output. The stereo linking of the limiters works in this mode as well, which is thoughtful; if it didn't, limiting of either input signal would result in a widening or narrowing of the image.

I would be interested to know how many people need to convert M-S to L-R at this stage. I know many classical recordists use the technique, but for location work the whole point is to record the raw M-S signals (perhaps with a decode matrix for monitoring) and sort out the stereo back at base. Here,

perhaps, CLM has missed a trick by not allowing the unit to accept full line inputs for straightforward decoding. At the same time, for those who do want stereo straight off the mics, the DB200S is an elegant single-box solution that provides just the right combination of quality and features. ■

CLM

Serious Audio,
96 Queens Road,
Watford, Herts
WD1 2NX, UK.
Tel: +44 1923 442121.

NEW TECHNOLOGIES

< point SHARC DSP optimised for 9Gb hard disks. Features include cut and paste editing, nondestructive recording, a modular, scalable, and open architecture, and FireWire, and MADI interfaces.

Euphonix, US: +1 415 855 0400

Audix large capsule

The Audix CX101 is a true large capsule cardioid condenser that uses a 1-inch gold vapour diaphragm and boasts a noise floor of 17dBa. The housing is brass, finished in black satin, with powering via phantom. The more expensive CX111 adds a -10dB pad and a bass roll-off switch, but both mics come with a shockmount stand adaptor and an aluminium carrying case. A 2-channel power supply is optional. Also new from Audix is the TR40, described as a test and recording mic, that employs a 1/2-inch diameter prepolarised condenser capsule with an omni pattern. Frequency response is claimed as 20Hz-19kHz ±1dB. Price in the US is \$249 complete with carrying case and clip while stereo matched pairs are available for \$559.

Audix, US: Tel: +1 503 682 6933.

Westlake monitors

The 3-way bookshelf LC3W10 monitor from Westlake has extensive dampening, an integrated passive crossover and a claimed high output. The speaker contains a 10-inch polypropylene woofer, 5-inch midrange and



3/4-inch tweeter with an 80W power handling capacity and sensitivity of 88dB@1m for 2.83V input. Frequency response is claimed as 42Hz-20kHz. Westlake has also announced the LC265.1 centre-channel speaker driven by dual 6 1/2-inch woofers, 5-inch coaxial mid and 1-inch tweeter.

Westlake, US: Tel: +1 805 499 3686.

Digital mixers

Italian company LEM has previewed two affordable digital mixers which are expected to start shipping later this year. The entry level model is the Falcon that has 6 mono mic/line channels, 20-bit A-DCs plus two stereo line channels, and one AES-EBU-SPDIF input. Eight outputs are covered by two auxes, a digital output, and main mix analogue buses. Each channel has 3-band fully parametric EQ with 4-band graphic >

September 1998 **Studio Sound**

SONIC BLUE

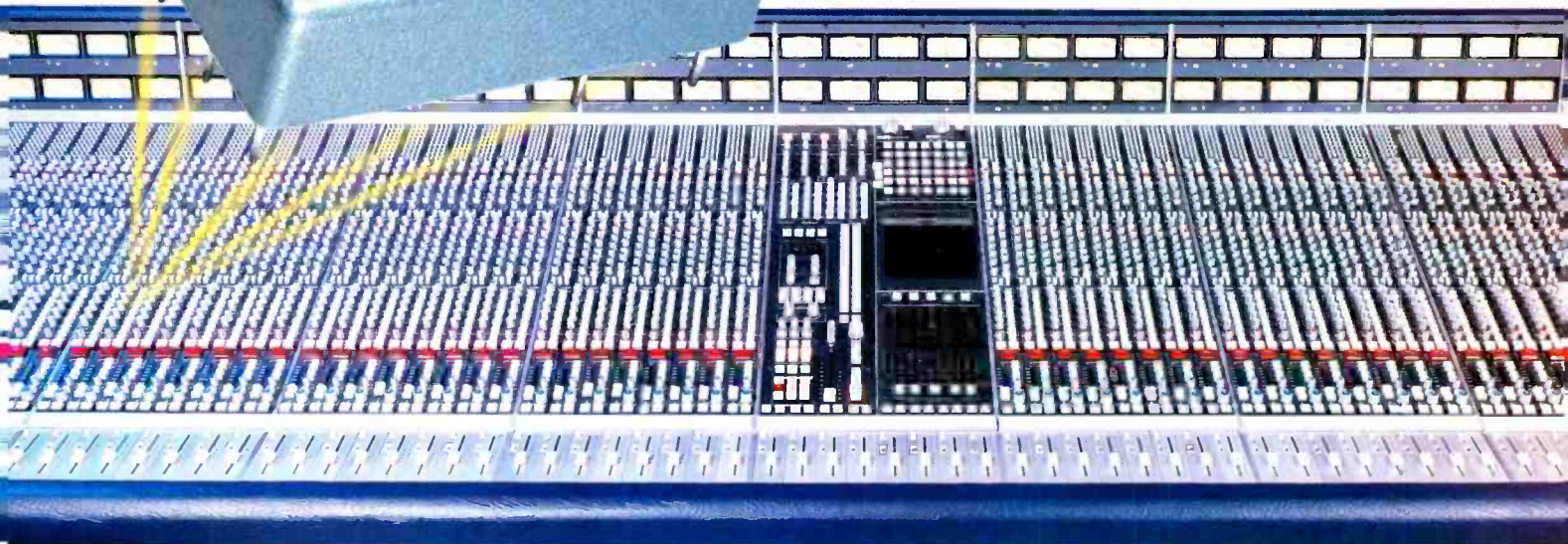
Introducing the THAT 2002 Modular VCA Upgrade for SSL Consoles



Clarity

Transparency

Accuracy



For over 10 years the engineers at THAT Corporation have been improving the sound of the world-famous 202 VCA. Each new 202 model has advanced the state of the art in sonic quality and performance...Well, the state of the art just took a big leap forward!

INTRODUCING THE BEST SOUNDING VCA ON THE PLANET - THE THAT 2002

With the lowest noise, lowest distortion and widest dynamic range of any 202-series VCA ever made, the THAT 2002 is not just about better technology or better specs – it's about better sound.

AVAILABLE AS AN UPGRADE FOR ALL 202 MODULAR VCA'S

Regain that industry leading audio performance with the THAT 2002. Available as pin-for-pin upgrades for every 202 ever made. You and your clients will hear the improvement!

"THAT Corporation has outdone themselves with their new VCA module! With lower distortion and increased transparency, it is A&M's new standard for both the Recording and Mastering facilities."

Bob Borbonus, Asst. Studio Manager
A&M Recording and Mastering Studios

Give us a call or visit our web site for all the details.

THAT Corporation

MAKING GOOD SOUND BETTER™

THAT Corporation, founded by senior engineers from dbx, designs and manufactures high performance integrated circuits and products for the professional audio industry.

734 Forest Street, Marlborough, MA 01752 USA • Tel: +1(508) 229 2500 • Fax: +1(508) 229 2590 • www.thatcorp.com

The THAT 2002 is available to owners and operators of consoles from SSL, Neve, Sony, MCI, and Harrison.

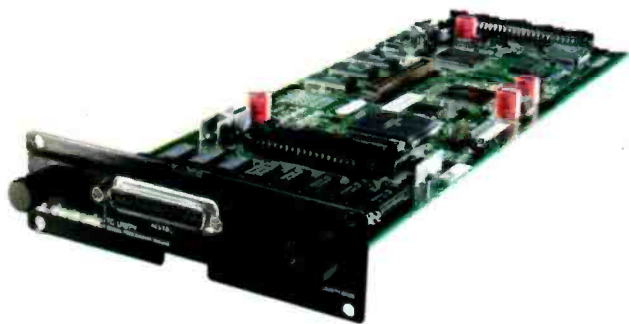
tc electronic Unity

The concept of the plug-in extends to the Yamaha 02R mixer.

Zenon Schoepe reports on adding even more value

YOU ONCE WOULD NOT have believed that a time would come when another manufacturer would be allowed to develop and insert an effects board into a Yamaha digital mixer, but this is precisely what tc electronic has done. It says as much about the increasing openness of the Japanese giant as it does about the resourcefulness of the Danish processor company.

The Unity card contains two 'engines', in tc speak, which amounts to two separate processors or a whole lot of power if you are acquainted with the potential of the M2000 outboard unit on which the card's processing is said to be based. Unity cards can be supplied with or without AES-EBU I-O, and when supplied this comes with the same 25-pin Sub-D-connector that is provided on Yamaha's own AES-EBU card. An I-O extension card



for the Unity can be bought as a retrofit.

Installation is, perhaps, not as straightforward as might be assumed as it requires the changing of two EPROMs in the 02R regardless of what software version you are already running. Access to the chips is gained after removing the desk's standard wordclock, digital I-O panel and the process is simple, although fraught with the painful care that multilegged chip removal and insertion instils.

Thereafter you are free to insert the Unity card into one of the 02R's four slots by simply sliding in the board and locking it in. Power up reveals a small tc electronic credit on the boot-up screen and you are then into the desk as normal without having to bother with the Unity if you don't want to. After all the tc chips are v2.0 variants, and if you haven't got around to upgrading your 02R to this standard yet then you are likely to spend some time enjoying some of the finer points of this substantial software upgrade.

Indeed the Unity does seem to be tied in to v2.0 quite heavily, and the biggest relief is that the plug-in behaves remarkably like any other part of the 02R's excellent operating system. The operation of the Unity resides in one of the v2.0 remote screens, which incidentally also takes in a variety of control for such things as Pro Tools, other Yamaha digital mixers and effects. There are three screens—one for each engine and an output page—that deal with the management of Unity

parameters and the simple way to access these is to simply hold down the desk's FLIP switch with a repeat of the same manoeuvre taking the desk back to its previous status.

Screens represent parameters as rotaries, adjusted by desk cursor key and dial, and faders that are adjusted by using the desk's faders, and predictably these parameters are dynamically automated. One of the best inclusions, and one that demonstrates the strong linking to v2.0, is that if the desk's Touch Sensing mode is activated you can move between the two engine screens and the output mix screen by touching a fader from the relevant group of assigned controllers. A word about the routing possibilities with and without the aforementioned optional extension I-Os fitted: in both instances the sends to the two engines are selected from the four signals sent

to the desk's card slot Buses 5-8 and returns from the effects units arrives at faders that are allocated according to which slot you chose to install the card in. The real difference resides in the fact that external inputs can be mixed in with the engine returns when the I-O is included and the Unity's output can be broken out from the desk.

From here on in it is really all down to the sound of the effects that tc has brought to the party. There are 50 ROM presets and 150 user-locations, and within this you encounter reverb, delay, pitch change, chorus-flanger, phaser and de-esser.

There are gargantuan programming possibilities being offered here with some of the busier algorithms housing some 18 different parameters. As it happens access is clear; although the simplicity of moving a fader to change parameters is revealed as being markedly superior to the comparatively laborious routine of cursor and dial adjustment of the remainder.

The quality is quite excellent, but then you would expect that from a card that closely resembles the M2000 in performance terms. Reverbs in particular are decidedly thicker and more complex than those found in the 02R.

What impresses most is that it works at all as I am still struggling with the concept of plugging in third-party processing hardware into another manufacturer's product and the result functioning seamlessly. The true triumph is in

the co-operation that made Unity a reality and for this both manufacturers should be commended. It is a fabulous idea, and it is a fabulous product. Users of 02Rs may be quite content with the already fairly

slick onboard processing of the desk, but for those who want something more sophisticated and different, then the Unity is the only choice. And you won't have to compromise the fundamental appeal and operation of the 02R to do it. A masterstroke. ■

Contact
tc electronic, Denmark.
Tel: +45 86217599.
US, Tel: +1 805 373 1828.
Asia, Tel: +1 813 5456 4071

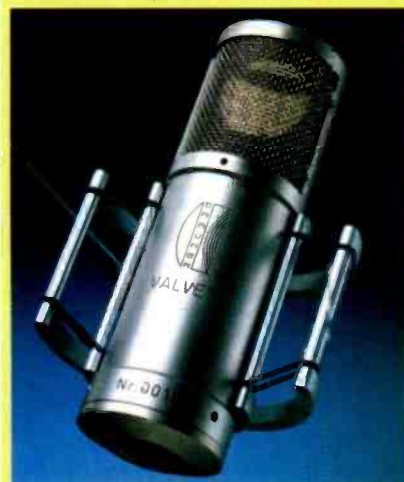
NEW TECHNOLOGIES

< EQ for the stereo channels, and the desk can be equipped with an optional ADAT extension interface. Two internal effects processors handle reverb and multi-effects on internal aux sends while eight other types of effect are available including dynamics, additional EQ, and enhancers. The larger Eagle digital mixer provides 12 mono mic-line channels, four aux outputs, two reverb processors connected to two aux sends and an additional 30 different processors. This version also has motorised faders for inputs and outputs.

General Music, Italy. Tel: +39 541 959511.

New from Brauner

Brauner is introducing two new mics at the AES—the VM1u and the Valvet. The former offers the same performance as the VM1, but is restricted to omni and cardioid patterns and has no -10dB switch; although



the mic can be upgraded to full VM1 spec as a retrofit. The Valvet uses a Lundahl transformer and is a cardioid and omni valve mic and is cheaper than the upgradable VM1u.

Brauner, Germany. Tel: +49 2856 9270.

HHB speakers

HHB has launched its own Circle 5 studio monitors. The active 2-ways employ an 8-inch bass driver, the cone thickness of which is varied across its diameter, which is mated to an aluminium voice-coil. The tweeter is a fluid-cooled soft dome. The monitor is powered by an amp pack that delivers 129W to the woofer and 60W to the tweeter. HHB's ADAT45 tape is now available as a boxed library cassette in 45 and 60-minute versions. HHB Bulk CD-Rs are shrink wrapped in 100s and packed 600 to a box.

HHB, UK. Tel: +44 181 962 5000.

Location preamp

FEL has released a low noise mic preamp that is smaller than an XLR plug, boosts by 20dB, and is intended for location recorders. The mono version is built into an XLR and terminates in a 3.5mm plug to replace the mic lead while the stereo version is cable mounted and terminated with a 3.5mm >

Precision Digital Performance

SADiE 24.96

Digital Audio Workstation

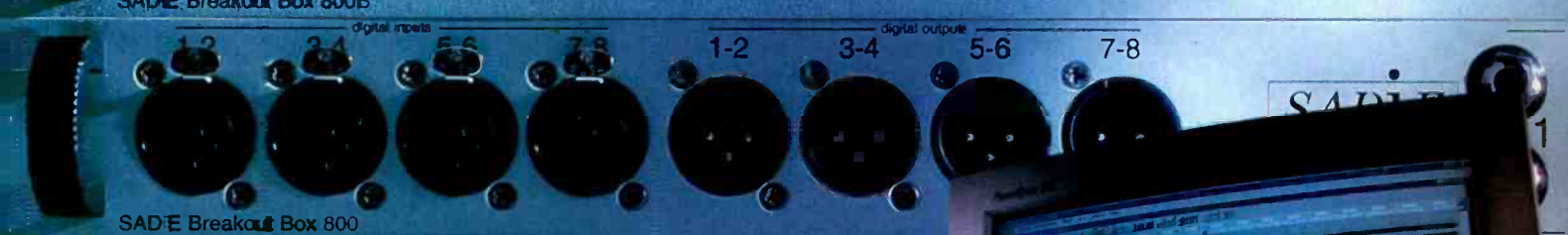
Sound for Picture



8 to 32 inputs and outputs 30 to 120 simultaneous replay tracks **up to 192kHz 24bit audio** full surround sound mixing & editing **DVD compatible** real time architecture **professional plug-ins** segment based automation **free software upgrades & support** comprehensive PQ editor **direct exchange with Lightworks/Genex/BWF** 4 9-pin ports **region editing** bars & beats timeline display to 768 PPQN **project management** background autoconform/recording/archiving **Exabyte DDP** 50 levels of **undo** sample accurate waveform display/editing **integrated random access video** rack mount system **hardware control surfaces** with jog/shuttle, edit and moving fader **mixing** all timecode formats supported for all post production & CD mastering applications.....and more...



SADiE Breakout Box 800B



SADiE Breakout Box 800



Studio Audio & Video Ltd
The Old School
Stretham, Ely
Cambs CB6 3LD.UK

Tel: +44 (0)1353 648 888
Fax: +44 (0)1353 648 867
www.sadie.com

SADiE
24.96

Call UK: +44 (0)1353 648 888

Roland VS-840

Applying the principles of its up-market VS-880 to a lower level of the DAW market has given Roland the VS-840. **Rob James** reports

LAST YEAR I had a Roland VS-880 for review and found it rather hard to part with. Since then Roland have expanded their range of digital multitrackers—the VS-880 has been joined by the upwardly mobile VS-1680 and a more economical version, the VS-840.

Although the VS-880 is designed primarily as a successor to the ubiquitous cassette-based personal multitrackers, the quality of the package and the sound it can produce positively encourages more professional use. I am a little more equivocal about endorsing the VS-840 for professional use due to the absence of any uncompressed record modes.

Like its siblings the unit is small and neat, and contrives to feel solid and well built. Rear panel connections are few: 1/4-inch mono jacks facilitate the four analogue inputs while an



additional high impedance 1/4-inch jack on Input 1 provides direct connection of a guitar. Inputs 3 & 4 have alternative phono connections and 4 further phonos take care of analogue master and aux-monitor outs. A-Ds are 20-bit and D-A's are 20-bit oversampling types.

There is no digital input, but there are both optical and co-axial SPDIF outputs. An optional board allows connection of external SCSI storage devices. With a footswitch for punch-ins, a pair of DINs handle MIDI In and Out, and 1/4-inch jacks deal with headphones.

The headphone output level is generous—an essential feature on this type of unit. Competitors please take note.

The mixer has 6 channel strips and a master strip. Input sensitivity ranges from -50dBm to +4 dBm. Peak LEDs light at -6dBm before clipping. Faders 1-4 are mono, but 5-6 and 7-8 are only available as stereo pairs. This pairing extends to the record and virtual or 'V' tracks. Some may find this a little limiting, but I feel it helps keep things simple.

Transport controls are prominent and positive. Monitor levels are set by six TRACK CUE pots. The back-lit display is small yet effective. Grouping of other function keys is logical and reasonably easy to follow without

frequent recourse to the massive 190-page manual. The chosen recording medium is the Iomega Zip disk. It is a good compromise, offering limitless storage at reasonable cost although a second drive would be a good idea if you want to copy disks. It is possible to copy using the internal drive, but the number of disk swaps required may quickly send you insane.

The VS-840 has 4 recording modes, each of which can be set at 32kHz or 44.1kHz sampling rate; although all use data compression. The modes are: Multitrack 1 and Multitrack 2, Live 1 and Live 2, which translate to record times of 37, 50, 60 and 75 track-minutes per 100Mb disk at 44.1kHz sampling. There are limitations on the number of simultaneous record tracks depending on the chosen mode and whether varipitch is used. MT1 is restricted to 2 tracks or 1 with varipitch, The other modes to 4 and 2 respectively.

Each of the 8 tracks incorporates 8 virtual tracks to give a total of 64 within which punch-in can be manual or auto and you can set the VS-840 to repeatedly loop over a section, rerecording on each pass, until you get it right. The Scrub function loops a section of sound (25ms-100ms).

Internal processing is 24 bits wide facilitating 3-band EQ on all channels with provides 12dB of boost and cut. The built in effects are well up to Roland's usual high standard making much of the company's individual algorithms, and I was delighted to discover the inclusion of a Vocoder and some RSS (Roland Sound Space) presets. I also enjoyed the guitar patches.

Snapshot automation gives 8 scene-memories. Scenes can only be recalled when audio is not playing. There is no dynamic automation. MIDI allows the transport and record functions to be controlled by a suitable sequencer using MMC commands. Alternatively the sequencer can simply be synchronised to MIDI clock or MTC.

Since Roland introduced the VS-880, other manufacturers have entered the same field at challenging price points and with alternative features. But when considering the options it pays to remember the practical price paid

for a big feature set is the complexity of the user interface. Roland has made a good effort to produce an entry-level digital multitracker that is not simply a cut down VS-880, and a number of the VS-880's features help to make this unit an ideal introduction—I particularly like the idea of having a proper DI input for guitar. The bus structure and separate track monitor controls make the

whole business easier to understand. The clever EZ Routing functions accessed from a dedicated button help set the unit up for various tasks and should go a long way to demystifying the process for newcomers. ■

UK: Roland (UK) Ltd,
Atlantic Close, Swansea
Enterprise Park, Swansea,
West Glamorgan, SA7 9FJ.
Tel: +44 1792 702701.
US: Roland Corp US,
7200 Dominion Circle, Los
Angeles, CA 90040-3639.
Tel: 213 685 5141.
Fax: 213 722 0977.

NEW TECHNOLOGIES

< plug and socket for use with semipro stereo mics. The amp runs on the power available on the mic socket on the majority of portable recorders.

FEL, UK. Tel: +44 181 286 4011.

Tascam ADAT convertor

Tascam describes the IF-TAD at \$349 (US) as the first truly affordable convertor for translating data from DTRS and ADAT and back again. The interface features LEDs for TDIF activity, ADAT optical I-O, LEDs for ADAT activity and word sync out.

Tascam, US. Tel: +1 213 726 0303.

Opal graphic

BSS has added a graphic equaliser to its Opal series. The FCS966 is based on constant Q technology that maintains filter width regard-



less of fader gain setting. Separate HF and LF contours filters are provided along with a sweepable 18dB/octave high pass filter. Output level is monitored by LED meter and a clip warning LED. I-Os are electronically balanced with transformers an option.

BSS, UK. Tel: +44 1707 660667.

Distribution system

XTA is to launch the DS800 8-input, 32-output audio distribution system. In standard format each input is split into two transformer-isolated outputs and two actively balanced outputs. The unit can be internally reconfigured to give more than the standard four outputs from each input up to a total of 32. Each input has a remote activated pad, adjustable input gain, mic-line switch, phantom power, 5-segment LED metering and a listen facility. A headphones socket and level pot are included and the listen function can be ganged together when using multiple units.

XTA, UK. Tel: +44 1299 879977.

THX crossover

Lucasfilm THX has introduced the D1138 monitor-digital crossover which has an 8-channel input stage in analogue and digital and a software configurable output stage for compatibility with all formats. Output stages also offer adjustable delays and dig-



ital EQ for surround and subwoofer channels. For postproduction it combines numerous functions in one product including customisable computer control for channel solo and muting, digital delays for all channels and THX standardised subwoofer monitoring of screen and surround channels for discrete and matrix sources.

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

>

September 1998 **Studio Sound**



DPR-422 Dual Compressor / De-Esser



DPR-944-2 Parametric Compressor & Gate



DPR-522 Advanced Dual Noise Gate

There are a few things you'll miss with the Opal Series

Like noise, distortion, lack of headroom, limited facilities, and no pedigree.....

It's obvious that the better you protect your sound, the better your mix will be. When you buy an Opal Series processor by BSS Audio you're getting not only the best in audio quality, but a heritage and proven track record that has benefitted artists, sound companies, studios, broadcasters, theatres and clubs the world over.

From this pedigree, BSS engineers have brought you a range of products designed to solve your sound problems without adding either impurities or complexity in operation. And by exploiting the latest advances in component technology and manufacturing techniques, we can now bring you this thoroughbred processing power for less than you'd think. Don't miss out on an Opal - call your BSS Dealer or Distributor for more information.



Audio Processing with things missing

BSS Audio, Linkside House, Summit Road, Potters Bar, Herts, England EN6 3JB
 Tel: +44 (0)1707 660667 Fax: +44 (0)1707 560755 e-mail: info@bss.co.uk Internet Site: www.bss.co.uk
BSS Audio USA, Harman Pro North America, Inc, 1449 Donelson Pike, Nashville, TN 37217 USA
 Tel: (615) 360 0277 Fax: (615) 360 0480

H A Harman International Company

Thermionic Culture Vulture

Bringing useful valve distortion into the studio environment has proved an entertaining chase, **George Shilling** is close to a kill

WHEN THE TL AUDIO Indigo valve distortion unit appeared, I predicted that we would see further expansion in this area of outboard equipment. And, perhaps belatedly, the Culture Vulture has fulfilled my prophesy. While not an essential in every studio, a distortion box is something for the enthusiast recording engineer to really get his teeth into as evidenced by the hours of frustration logged by engineers struggling to connect guitarists' stomp-boxes with inappropriate impedances to a pro console. Realistically, few studio multi-effects boxes include distortion effects, and those that do often possess all the character of a microwave oven.

Directly following Thermionic's remarkable Phoenix compressor (*Studio Sound*, August, 1998) comes the Culture Vulture, which looks similarly marvellous. The black 2U-high front panel includes a host of vin-

age-style knobs and toggle switches. The unusually ugly meters are not vus, but ammeters, measuring current flow through the valves. The unit's construction is similar to the Phoenix, with a sealed metal base-section containing smaller components, on top of which are mounted the larger parts. These include a large old-fashioned bobbin mains transformer, and an array of obscure valves, almost conceivably from the designer's attic. This top section is covered with a metal mesh casing. The unit is, surprisingly, lighter than it looks, especially as this is an all-valve unit. There are no ICs in sight, and not even any printed circuit boards.

The front panel layout is irritatingly messy. The two channels' controls are arranged side-by-side, but as a mirror image of each other, which can be confusing. The two meters are vulnerable to breakage, as their glass casing protrudes from the front panel. Each channel has controls for BIAS and DRIVE, scaled 1-11. A 3-position switch selects Triode or one of two Pentode modes. However, all these controls' labels are below the large knobs, and are therefore invisible if your eye level is above the top of the unit. At either end of the panel are OVERDRIVE toggle switches for each channel. These appear to be something of an afterthought, mounted extremely close to the DRIVE knobs and without proper leg-

ending—just a stuck-on label. Between the meters is a large ON-OFF toggle with accompanying light, which is a torch bulb behind a green cover that takes a few seconds to brighten at switch-on. Below the meters are chunky OUTPUT level knobs, similarly legended 1-11. Also on the front panel are unbalanced jack sockets for inputs

and outputs of each channel, their layout following the mirror imaging of the controls. On the back of the base section are duplicate connectors: both sets of outputs can be used simultaneously, but the front input jacks override the rear ones.

The Drive function behaves as you would expect, working similarly to a preamp gain control on a guitar amplifier. Bias is a little more esoteric—as you turn it up it 'starves' the valve, the level drops, and a brightening tonal change takes place, depending on the mode selected, and a gating effect starts to occur with only the peaks getting through and sounding fairly nasty. The meter displays the bias current, and as you turn the BIAS knob, the current decreases. The meter waggles slightly, upwards if you are starving the valve, or downwards if the valve is 'over-fed'. The latter setting (with BIAS set low) gives a warmer,

more even distortion. In use, the BIAS knobs have to be constantly adjusted in conjunction with the DRIVE and BIAS knobs. The Triode distortion mode (even harmonics) and Pentode 1 mode (odd harmonics) can vary from gentle warming to raucous, with the latter mode seemingly slightly richer and creamier. P2 mode provides an even more drastic distortion, with a really horrible thin sound at high bias settings. In any mode, flipping the OVERDRIVE toggle gives a boost to the Drive and Bias for more radical distortion effects.

At extreme settings, there is a remarkable lack of self-induced noise. Any buzzing or humming I came across was generated by the source plugged into the inputs. This is thanks to the use of a very high-quality military-spec valve (CV4010) that gives plenty of gain with very low noise.

I found the Culture Vulture most useful for distorting guitar parts that were lacking a bit of sparkle, and warming up plain-sounding electronic keyboard D-I's. I tried the manual's suggestion of putting the whole mix through it and after some experimentation it was possible to add some subtle warmth in Triode mode with a low Bias setting. However, without onboard bypass switching it is difficult to set up and assess. Also, the unusual mirror-image layout takes some getting used to. It is easy to find yourself adjusting the wrong knob, particularly when you cannot see its label.

The Culture Vulture is a peculiar piece of equipment, and a luxury rather than a necessity. It does what it sets out to do, but is a little awkward in operation, and comes across as

slightly unrefined in terms of usability. However, its quirks will probably endear it to potential owners, and Thermionic Culture should be applauded for their unique approach. ■

Contact
Serious Audio
 Tel: +44 1923 442121.
 Fax: +44 1923 442441.

NEW TECHNOLOGIES



Reference cassette

The BASF Reference II Master audio cassette is described as an innovative product in the chrome class with outstanding output in the high frequency range. Output levels at low and high frequencies are around 3.5dB above those of the IEC reference tape while overall dynamics are 7.5dB higher. Other features include a high-precision shell with a separate sound head and an Anti Stick Slip Pad.

EMTEC, Germany. Tel: +49 621 5920406.

Zone expansion

Citronic now offers a 5-zone distribution mixer, the Z-5DM, and the Z-2A5 50W power amp. The former can be used independently or as a zone extender for an existing system and is a two stereo line mixer with five stereo outputs to which either of the inputs can be mixed. Mono or mixed distribution can be selected and while I-Os are balanced, inputs have enough gain to handle unbalanced connection. The Z-2A5 is available in low voltage and 100/70 Volt line versions and has a protect mode indicator that shows when the amp is shut down on switch on, thermal overload, DC on the output or a short circuit.

Citronic, UK. Tel: +44 1225 705600.

Monitors and sub

M-Tech has introduced four new products. The 2-way PM30 is designed for medium to large rooms while the 2-way PM15 for small to medium rooms. The PMS70 subwoofer is designed to integrate with the aforementioned and extends response to below 20Hz and employs an 8-inch x 12-inch elliptical long-throw driver. Input to the internal 100W amp and adjustable crossover is by phono or XLR. Additionally a 2U-high rackmount monitor is available in active or passive versions with an equalised frequency response and magnetic shielding.

Musical Technology, UK.
 Tel: +44 1656 842000.

MOTU

Mark of the Unicorn has launched a 24-track expendable hard-disk recording system for PC or Mac, with a UK suggested price of 850 plus VAT. Model 2408 offers 24 simultaneous inputs and outputs, with the ability to expand to 72 channels and include real-time effects. The system's PCI card connects via Firewire to an external IUI-O module containing six Alesis ADAT fibre-optic >

September 1998 **Studio Sound**

NEW

GS³⁰⁰⁰

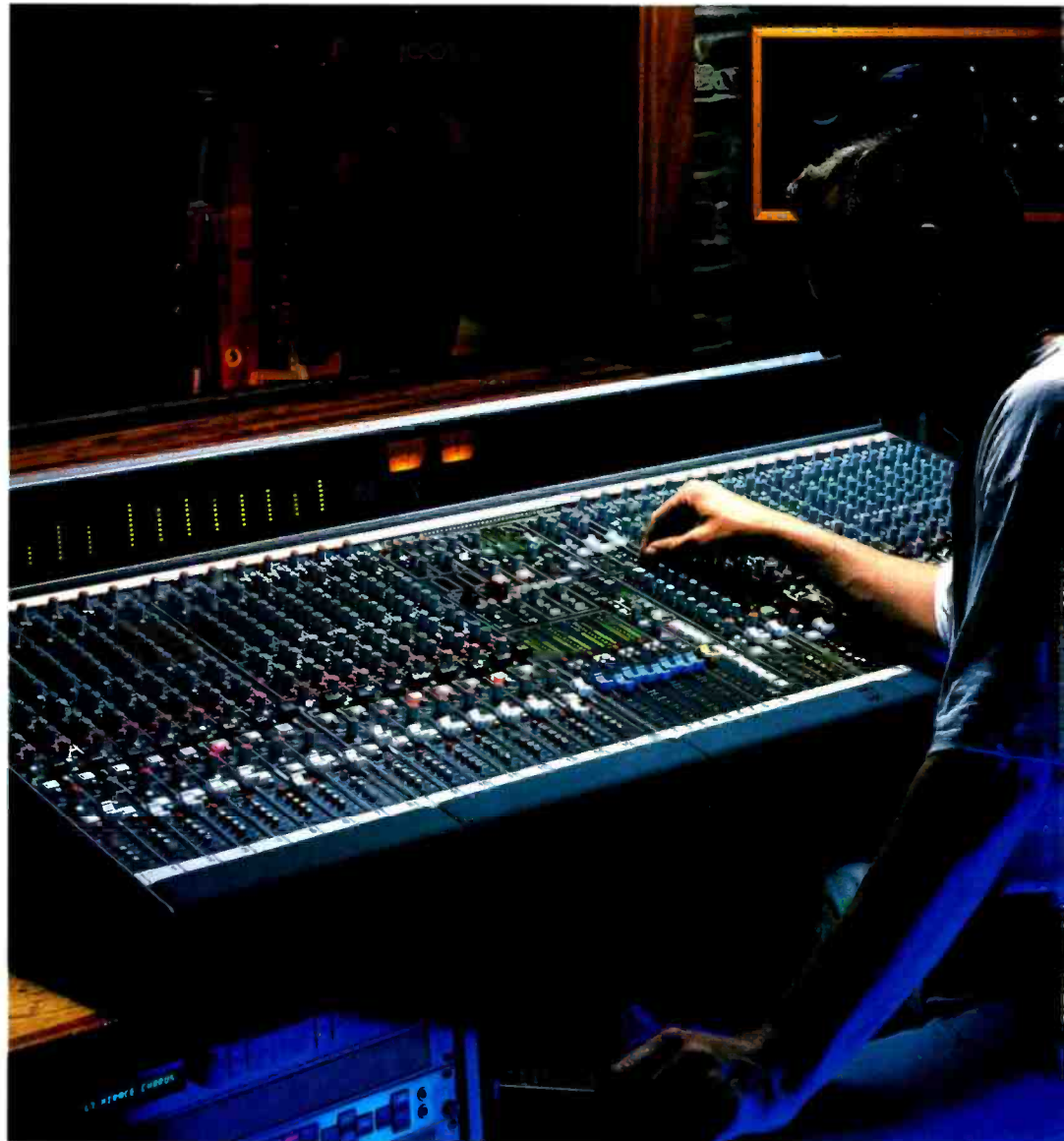
OK... or Outstanding?

- 8 buss routing architecture
- 24 and 32 channel frames
- 52 and 68 inputs to the mix
- 2 SVT (symmetrical valve technology) valve preamps
- Wide ranging mic preamp
- In-line twin fader input format
- 4 band EQ with fully parametric mids
- 2 dual stereo inputs with automation as standard
- 6 aux sends with 2 automated master mutes
- MIDI mute automation
- 4 mute groups
- MIDI machine control
- Tape send and return on every channel
- Group/direct switching
- Oscillator for signal setup
- Talkback facility
- 2 studio feeds
- Solo in place and PFL on both fader paths
- Channel status indicator LED
- Optional 21 segment input bargraph meterbridge
- Interface for three 2-track recorders

SVT VALVE PREAMPS



GS3000's 2 valve preamps can be patched to individual channel inserts, groups or LR. The valve preamps incorporate Symmetrical Valve Technology, allowing them to be used in balanced mode for regular inputs or in single-ended 'guitar' mode, which drives the valve to give the type of pleasing harmonic distortion much sought after by guitarists. Other valve preamp features include valve drive control, pre-valve swept frequency EQ, hi-cut filter and output level trim.



Most modern recordings sound OK - but few sound really outstanding. The new GS3000 gives you truly great sounding mixes, with all the analogue warmth, sparkle and power that set the best apart from the rest. The new GS3000 - sounds glorious.



H A Harman International Company

ALLEN & HEATH
Kernick Industrial Estate,
Penryn, Cornwall TR10 9LU, UK.
Tel: +44 (0)1326 372070
Fax: +44 (0)1326 377097
<http://www.allen-heath.com>
email: sales@allen-heath.com

ALLEN
&
HEATH

Audio-Technica AT4060

Everyone is after the valve effect and the valve premium.
Dave Foister reports on a less blatant implementation

MOST PEOPLE currently making valve microphones are recalling former glories. The valve tradition, so enthusiastically rediscovered in recent years, has few specialisations with as much continuity as microphone design, and the people who built the classics are mostly still around to bring them back. The rest are divided between those who genuinely think valves are a good idea, and those who just think selling them is a good idea, and usually the difference shows in the finished product.

Audio-Technica has made its name as a studio contender very recently, and has done it impressively quickly and effectively. It has produced microphones that compare favourably with established standards right from the outset, and at competitive prices. It has won the approval of major names and major organisations with its first catalogue of serious microphones, and continues to build on its strengths apparently driven from within. And yet, unless I've missed something, its heritage does not go back far enough to include valves, and indeed its perceived selling points have been the kind of parameters done best in solid state. Nevertheless, the latest model in the all-encompassing 4000 series is a valve microphone whose chief claim to novelty is its valve as it has an unusually restricted set of features. In fact it seems to set out to be a valve 4033, with the intention of combining transparency and valve character in the simplest possible package.

Putting it up consists simply of mounting it on a stand and hooking the bits together. It is a big microphone, albeit slim and modern in appearance—there is no attempt to make it look as though it is 35 years old. The styling is very similar to the 4033 and 4050, the main difference being a longer body to accommodate the valve. Its mount is elaborate and secure, holding the body with two rings, one with screw clamps and the other fitted with elastic bands. The resulting mechanical isolation is good, yet the suspension is tight enough to hold it where you put it.

The link between the microphone and its power supply is terminated in 5-pin XLRs, and the supplied cable looks to be of a good quality even if the folding up to fit it in the box has been done in such a way as to impart the maximum possible twisting effect. If the microphone were mine I'd hang the cable from a high ceiling overnight before using it just to get the tangles and kinks out. The power supply has an

input for this lead, an XLR output, and IEC mains inlet, an ON-OFF switch and a GROUND LIFT switch, and that is it—no adjustments for the microphone at all. Considering this it is surprisingly big, and comes as standard with rackmount fittings to slot into 1U of space.

Like the 4033 the 4060 is cardioid only, and the simplicity of its configuration goes even further, in that it has no pad and no filter. Yet the internal design is surprisingly complex, as the capsule has two diaphragms, a state of affairs normally only found in variable-pattern microphones—indeed, the need for only one diaphragm in a cardioid microphone is generally the big cost saving that makes it worthwhile. The rationale behind this is not made clear, except that it is supposed to improve the SPL handling and the evenness of the frequency response. Like the other big A-T condensers, the 4060's diaphragms are pre-aged to ensure stability with time, and the same applies to the hand-picked miniature valves.

The resulting specification does not read like a typical valve microphone. The printed frequency response plot is unusually flat, more like a good solid-state design, and the distortion, and SPL handling figures could leave you wondering why they put a valve in at all. Clearly the aim has been to deliver the kind of extended flat response that has made the existing models so successful, with just a hint of valve character.

And that is what the 4060 produces. The initial impression is of a smooth quiet microphone with more than its fair share of HF extension, coupled with the kind of clean transparency that such extension needs. It is not a clinical microphone, but neither is it flattering in the way of many valve models. I tried it primarily with a jazz singer whose album we had just finished: all her vocals on that had been recorded with another modern valve microphone, and we both felt that the

4060 had a less pronounced signature. Its avoidance of overstated warmth left it sounding slightly thin by comparison, but in reality this was simply showing its flatter response. In all there was very little sonic difference,

with the 4060 just having the edge at the top end while retaining the slight fatness of the sound. It is also quiet and clean in the best Audio-Technica tradition, so could be said to be offering the best of both worlds. Valve microphones do not have to be retro and obviously coloured; this is a microphone of serious quality, and can only further A-T's already enviable reputation. ■



Contact

Audio-Technica, Technica House, Royal London Industrial Estate, Old Lane, Leeds LS11 8AG, UK.
Tel: +44 113 277 1441.

NEW TECHNOLOGIES

< connectors and three Tascam TDIF connectors, either of which will provide 24 tracks of digital interfacing. There is also a bank of eight unbalanced phono outputs, as well as one stereo SPDIF input, two stereo SPDIF outputs, and two balanced outputs on TRS jacks. As many as three 2408 I-O units can be connected to a single PCI card, giving the full 72 tracks. Macintosh versions will be shipping with audio workstation software supporting 16-bit and 24-bit recording. The Windows version will have a driver compatible with audio applications that support multichannel Wave drivers. The Mac software will apparently include multichannel waveform editing, automated virtual mixing, graphical editing, real-time effects plug-ins and support for third-party plug-ins in MOTU Audio System and Adobe Premiere formats. Although the PCI card handles I-O processing—and also acts as a digital router—audio processing is handled by the host computer. MOTU says that a 200MHz+ Power Mac will provide 16–24 tracks of audio, with the very fastest machines allowing 32 tracks or more.

MOTU, UK. Tel: +44 1462 812010.

Directional mixer

Shure's Directional IntelliMix direction sensitive mic activation is used in the AMS8100 automatic mixer which activates mics only for sounds originating within a 120° acceptance angle. Additionally the system can gate only one mic per sound source or multiple mics when multiple sound sources are in use. Designed for the broadcast market, the SM63LB is a black version of the company's SM63L omni dynamic mic while the VP64AL is identical to the existing VP64A except for a longer handle.

Shure, Europe. Tel: +49 7131 7214 23.

Small hooters

Designed by Ted Fletcher of JoeMeek processor fame, the Hooter Sound B1 is a single-channel mic preamp with phantom power, a volume compressor, peak limiter



and variable noise gate for £137 + VAT UK. Compression can be bypassed and ratio is variable up to 8:1, and includes automatic gain compensation, while the gate has variable threshold. LEDs indicate compression, limiting and gate status and line-level output is tracked on a LED peak meter.

Hooter Sound, UK. Tel: +44 1626 333234.

Digital radio desk

The Audiotronics NuStar 3001 affordable digital radio console has been redesigned following the acquisition of the company by >

EBU, COAXIAL
INPUTS

TDIF-1
A

DIGITAL FOR THE PEOPLE

At last the
promise of
digital mixing is
fulfilled with
**TASCAM's extremely
powerful, compact
TM-D1000** – the lowest
cost digital mixer ever, at
just **£899 inc vat.**



- 8 ch integral TASCAM (TDIF) digital I/O
- 8 ch Alesis digital I/O (with optional interface unit)
- 8 mic / line analogue ins; inc. 4 balanced XLR
 - optional rack mount kit
- AES / EBU and SPDIF stereo digital I/O
- stereo analogue and separate monitor outs
- 4 configurable aux / group outs
- assignable on-board digital effects
- optional additional FX board doubles effects DSP
- 128 snapshot memories
- MIDI sequencer automation of console
- MIDI I/O, MMC and MTC slave and Word sync. I/O

TASCAM
TM-D1000

Bellari LA120; MP110

Low cost no longer means no valves. **George Shilling** investigates Bellari's tube compressor-limiter and direct drive tube mic preamp

A SELECTION OF smaller devices supplements the Bellari range of full-size rackmounting 'tube' studio equipment. The two units reviewed here are each smaller than a 1U-high half-rack box, being 194mm wide, 40mm high and 135mm deep. Potential purchasers surely include electric and electronic musicians on the move: this must be one of the cheapest and most portable ways to incorporate valves into a performance set-up. And any studio setup can always find space for devices such as these; although the lack of any feet is an oversight, as PC-Mac users won't be happy with a scratched computer table. As with their larger cousins, these Bellaris' description as 'tube' kit might be con-



sidered slightly misleading. They each contain just one valve, and much of the serious business is carried out by solid-state circuitry.

Both units require outboard power. The review models came directly from Utah where they are made and were supplied without adaptors. If purchased in this country one would expect the necessary 12V AC 300mA rated power transformers to be included. This is a fairly uncommon rating, and there is a danger that someone might try plugging in a more common 9V DC transformer, as these units feature power sockets more commonly used for such supplies. Also on the back panels of



both boxes are Input and Output sockets, mono jacks and XLRs. Oddly, for budget units, both operate at +4dB, but the MP110 will happily output a lower level. The LA120 will operate at -10dB, but without an input gain control you will not be making use of all the available headroom.

The LA120 features a brushed-aluminium silver front-panel with clear black legending. It sports two damped knobs of the same plasticky variety as those found on larger Bellaris, and two push-buttons of similar retro style. The ACTIVE button lights an LED, when switched out the unit is in Bypass mode. Strangely, when the unit is bypassed (ACTIVE out) the signal is boosted by a few dBs, while the (output) LEVEL control is inoperative. Another quibble is with the legending of the LEVEL knob, marked from [-∞] to 0dB full up. In fact, there is a boost of about 18dB with the knob fully clockwise with no compression applied. This is useful, as otherwise you would have no make-up gain after compression. The only

compression controls are a THRESHOLD knob (marked -20 to +20) and a COMP-LIM push-button. I initially found the compression very harsh, but then discovered that the COMP-LIM button operates the opposite way round to my expectations. Nowhere in the manual or on the unit is this explained, but for the record, gentler Compression is apparently achieved by pushing the button in, with harder Limiting achieved when the button is out. Compressor mode enables a ratio of between 2:1 and 20:1 whereas Limiting mode varies from 20:1 to ∞. A small round vu meter indicates Gain Reduction, giving a good indication of compression, and its illumination indicates power on (there is no power switch). Thankfully, this unit has a (very) 'soft' knee character, unlike other Bellari compressors, which I have criticised for their unexpectedly extreme 'hard' knee characteristics. In Compressor mode the unit worked very well on vocals and instruments, although the time characteristics were a bit fast for my taste, especially compared to what one might expect for a photo-electric compressor billed as 'tube'. Limiting mode is useful for heavy compression on drums and where extreme squashing is required.

For no obvious reason, the MP110 has a slightly shinier front panel than the LA120. This is no problem, but the smaller, more spidery legending is a disadvantage. Considering that this model gains just one push-button and LED over the LA120 and lacks the latter's vu meter there is no excuse for the inferior lettering. On the rear the XLR input is marked MIC-LINE, while the jack input is marked INSTRUMENT, claiming a different impedance. On the front panel are push-buttons for a handy 20dB PAD, PHANTOM POWER and useful PHASE REVERSE. Tiny LEDs indicate Clip and Power. The two knobs are GAIN and VOLUME, the latter usefully acting as a fader, something lacking on certain outboard mic channels. Plenty of gain is available, the legending indicating a range of +17 to +75dB. In combination with the PAD switch this covers everything you might want to plug into the unit. In use the MP110 performed extremely well, providing a full-bodied, clear tone with

low distortion and a very low noise floor. In a brief comparison I preferred the sound to a vastly more expensive competitor. Driven hard, valve overload is audible when the Clip LED glows, which is quite fun when hooked up with a

guitar. However, nasty transistor overload can quickly take over. You must bear in mind that the Clip LED indicates tube circuit clipping rather than output overload.

The LA120's manual erroneously states that the unit includes side-chain connections, but apart from this glaring error the manuals adequately explain the functions. For budget units, audio performance is remarkably good, and these Bellaris are very useful little boxes. ■

Contact

Rolls Corporation-Bellari,
5143 S. Main Street, Salt Lake
City, UT 84170, US.
Tel: +1 801 263 9053.
Fax: +1 801 263 9068.

NEW TECHNOLOGIES

◀ **Broadcast Electronics.** The desk offers 4 stereo output buses, 4 telephone-caller input modules with incremental mix-minus for each, and frame sizes ranging from 24 to 30 positions. The on-air or production 2500 console now sports an AES-EBU input module and comes with 6 to 24 inputs in a table-top or drop-in design. Other features include solid-state switching of signal paths and DC control of all level functions.

Broadcast Electronics, US.
Tel: +1 217 224 9600.

Mastering processor

The Z-Systems Z-Q6 6-channel digital mastering processor provides 6-channels of 6-band parametric EQ, level control, dither and digital source selection. The EQ algorithms are the same as those found in the



Z-channel Z-Q1 stereo digital parametric. Additionally the unit has three AES-EBU and three SPDIF I-Os. For complicated processing the device can be put into a 'super' 2-channel mode for 18-band stereo operation. The device has 24-bit resolution and 88.2/96kHz operation as an option.

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

Genex DSD

The HHB Genex GX8500 is described as the world's first DSD compatible digital audio recorder. Equipped for Super Audio CD recording, the GX8500 also supports UDF (Universal Disc Format) for DVD mastering and BWF (Broadcast Wave File), and features SDIF 2 and AES-EBU I-Os. Existing GX8000 owners can upgrade to GX8500 specification.

HHB, UK. Tel: +44 181 962 5000.
US. Tel: +1 516 784 7865.

Hafler TRM6

Hafler is introducing the TRM6 monitor which is based on the same performance as the TRM8. The TRM6 2-way bi-amplified active speaker system is being offered at \$1,399 US. Frequency response is claimed as 55Hz-21kHz, ±2dB and the peak acoustic output at 1m is 120dB or greater.

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

Tascam CD-R

Tascam will introduce the CD-RW5000 Compact Disc Recorder with the ability to read and write to CD-R, CD-RW, CD-R-DA and CD-RW-DA. Other features include XLR and phono connectors, an AES-EBU digital input, SPDIF coaxial and optical digital I-O, a Sync Start function, auto or manual track increment capability, a sample-rate convertor, an erase function and parallel control I-O capability.

Tascam, US. Tel: +1 213 726 0303.

The Sign of Sound



NEW



AUTOCOM PRO
AUDIO INTERACTIVE DYNAMICS PROCESSOR MODEL MDX 1400



We proudly present to you our new series of purely analogue audio processors. Taking account of many of your suggestions in terms of expansion and functionality, the BEHRINGER PRO SERIES features advanced versions of our Standard Audio Devices which have proven their reliability in applications throughout the world.

The tube stage in our discrete ULTRAGAIN PRO microphone pre-amp, the side-chain filter and the balanced ins and outs of the AUTOCOM PRO, the expanded level meters, the COMPOSER PRO's expander/gate with adjustable threshold and ratio as well as many other details are living proof of both your and our good ideas. These improvements have only been made possible through the use of state-of-the-art SMD technology and the resulting higher packing densities. Moreover, optimized circuit design and extremely short signal paths allow for improved S/N ratios and greater reliability. The BEHRINGER PRO SERIES - the first choice for creative and efficient sound design.



Get more information about our entire product range and the interactive world of BEHRINGER
Hotline +49 (0)2154/9206-66, internet at <http://www.behringer.de>
Copyright BEHRINGER 1998

© BEHRINGER UK Ltd. Tel. +44 (0)1483 408877, Fax - 458822 © BEHRINGER INTERNATIONAL GmbH Tel. +49 (0)2154-92 06 0, Fax - 92 06 30 © BEHRINGER France S.A.R.L. Tel. +33 (0)4 - 7804 4416, Fax - 47804 4429
© BEHRINGER España S.L. Te. +34 (9)1- 766 1398, Fax - 1363 5052 © BEHRINGER AC Tel. +41 (0)56 - 210 9555, Fax - 210 9556 © BEHRINGER Austria GmbH, Tel. +43 (0)7752 - 85181, Fax - 88707
© BEHRINGER Benelux b.v. Tel. +31 (0)73 - 513 0900 Fax - 513 0778 BEHRINGER China Ltd. Tel. +852 - 2808 6050, Fax - 2873 3911 © SAMSON Technologies Corp. +1 516 - 364 2244, Fax - 364 3888

Evolution

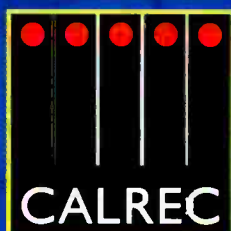
the Calrec all digital on-air
audio production console

Digital T Series

From a digitally controlled
analogue console to an
all-digital console...Evolution.

- Hot pluggable cards
- High level of built-in redundancy
- Proven T Series operating system
- Designed for live broadcast applications

The Calrec Digital T Series...
Believe everything you hear.



Calrec Audio Ltd.

Nutclough Mill, Hebden Bridge, West Yorkshire, HX7 8EZ UK
Telephone : +44 (0) 1422 842159 Fax : +44 (0) 1422 845244
E-mail : enquiries@calrec.com Website : www.calrec.com

Mixing with the right company

IT IS SUMMER, it is early morning and after an absurdly punctuated journey of four hours you have made it to the Port of Dover, or more precisely the ferry departure lanes, in a vehicle heaving with a spouse, three children and a multitude of items each member of the family has considered to be indispensable for a 2-week camping holiday in mainland Europe. A quarter-way through Day 1 and the atmosphere has become more about tense than tents.

Take a look at the car next to you, and to the one next to that; take in the sight of the cars surrounding you in a sea of shiny metal and notice that these people are just like you. They too have driven here in a car—maybe its not the seven-year-old model that yours is, or maybe its a people-carrier rather than a saloon—but they will also be packed to the gunwales with their essentials. In essence their vehicle will have been purchased with the same set of objectives in mind as you had when you bought your car, and by means of this strange analogy we may draw a parallel between real-life and that time, space and dimension occupied by us, the aurally anxious.

So come with me, if you will, and let us escape the squabble of siblings and stretch our weary legs in a figurative car park of audio mixers; where workhorses flick their tails next to thoroughbreds, and witness how the adage of being 'built for speed not comfort' might have been coined by the audio industry. In no order other than alphabetical, and where size matters less than what you do with it, here are the light and heavy-weight contenders. The truth is in here.

Making informed purchasing choices relies most essentially on being properly informed—whatever the market.

Neil Hillman surveys the available location mixers and their facilities

Audio Developments AD-261

4 channels in, 2 out. MS-AB

Arguably the most elegant of all the worn mixers, the 261 offers the ability to stereo-gang the XLR balanced inputs 1&2 and 3&4, decode MS inputs to AB or vice-versa and comprehensively monitor all stages of the mix. Slugging it out for the top-spot with the SQN-45 in the over-the-shoulder stakes, the essential features of a lightweight mixer are all here: mono-stereo limiter, 48V phantom and 12V T-power, 90Hz and 150Hz high-pass filters, phase reverse on Channels 2 and 4, plastic-conductive rotary faders, unbalanced output feeds with main outputs available on a Hirose 10-pin connector

or two balanced XLRs, switchable between mic or line level, all neatly packaged into an intuitive layout.

Audio Developments AD-140 series

6-24 inputs. MS-AB.

A range of chassis sizes and modules allow the purchaser to precisely define the configuration of their mixer with the legendary AD flexibility and audio integrity. The film-flagship 149 offers an adjustable limiter on all inputs, insert point on inputs, direct output from each mic-line module, 3-band EQ with a choice of four centre frequencies in the MF section. Two main and two aux outputs with a limiter on Left and Right which can be linked. Comprehensive MS facilities in both main and monitor paths. The full range is AD 144, a 4 output plus 4 aux sends, 12-24 input mixer; AD 146, a 4-output, 6:12 input mixer; AD 147, a 2-output plus 2 aux sends mixer; AD 148 4-output, 6-12 input Edit Suite mixer; AD 149 2-output plus 2 aux sends or 4 output, 6-12 input film drama mixer and the AD 245 a 2+1 output, 6-12 input mixer.

Cooper Sound CS 104

4 channels in, 2 out. MS-AB

Smaller brother to the highly successful CS 106 trolley-top location drama mixer. All controls are sited on either the top or sides of this 4-channel mixer with channel pan-pots, high-pass filters, peak indicators and PFL. The output section includes slate microphone, limiter and tape-direct switches, master level control and twin vu or peak meters. The 4 XLR inputs have line and 4-position mic gain selectors, 48V phantom or 12V T-power and phase reverse for channels 2 and 4. The outputs are via the obligatory 10-pin Hirose video connector, on balanced Left and Right XLR outputs or unbalanced Left and Right outputs. A mix-bus connector is available to daisy-chain additional mixers.

Cooper Sound CS 106

6 (+ 1) input channels. MS-AB.

The supremely flexible 106+1 offers 6 input channels plus the option of a stereo input module with MS decoder. Each input channel offers a limiter, PFL, an aux feed pre or post fade selectable and a mix bus that allows a channel to be used discretely from the mixer output. EQ is provided by 2 high-pass filters of 70Hz and 100Hz with high and low-frequency shelving of 10KHz and 100Hz and mid-frequency selectable from 500Hz to 5KHz. Both 12V-48V phantom power and 12VT power is available. There are 3 discrete monitor outputs with tape returns, talkback, communications and a remote-roll facility.

Filmtech LSP-4

4 channels in, 2 (+4 direct) out. MS-AB.

The LSP-4 is a 4-channel portable mixer with several features in addition to the usual facilities on this type of mixer. Slightly larger than some of the other over-the-shoulder mixers on the market because of the design philosophy to get as many of the controls as possible onto the front panel for ease of use and access, the unit is built into a strong aluminium enclosure. The LSP-4 has 4 transformer balanced input channels with 48V phantom or 12VT power available, rotary attenuator switches and phase reverse on Channels 2 and 4. Each channel has a 6-position switch that routes the signal, off, left, right, centre, via the MS matrix or via the adjacent pan pot. Each channel also has an AFL switch and LF cut filters. The transformer balanced outputs appear on a 10-pin Hirose connector and two male XLRs with



< attenuation switches. There is also a stereo unbalanced line output, a mono unbalanced mic level output and a cascade socket for ganging two mixers together. Each channel on the LSP-4 also has an electronically balanced direct channel output that appears on a 12-pole Hirose connector.

Shure FP-33

3 channels in, 2 channels out. AB stereo.

The baby of the Shure Brothers range of mixers, the stereo FP-33 can be powered by two 9V batteries or externally via a 12V-30V DC source. Each channel offers 12V or 48V phantom or 12VT power and pop-up pan-pots. The 3 mic or line inputs are transformer-balanced and accept a wide range of signal levels without the need for stepped attenuation. A link switch couples Inputs 2 and 3 as a stereo pair and the Left and Right outputs are on transformer balanced XLR's, with a mix-bus available for connecting further FP-33 mixers.

Shure FP-42

4 channels in, 2 channels out. AB stereo.

As the adolescent version of the baby FP-33, just the additions of an extra XLR input and pull-pot cueing for previewing each input are welcome substitutes for the growth of facial hair and spots.

Soundcraft LM-1

6, 8 or 12 input channels. MS-AB.

The LM-1 may be configured by the purchaser into a chassis designed to accommodate 6, 8 or 12 input channels of which these may be either mono or stereo mic level or stereo line level. Optional isolating transformers may be specified and the switchable 3-band EQ section is supplemented by an independent 80Hz high-pass filter.



Two auxiliary sends are available. Aux 1 being switchable pre or post fade while aux 2 is a switched post fade send. Inputs may be paired for MS working and stereo placement is via rotary pan controls. Four long-throw faders control the Left and Right and auxes 1+2 output levels which may be shown on the twin PPM or vu meters. External talkback audio and control signals are interfaced via 6-pin XLR whilst DC power is provided by 12 D cells for the 6 or 8 channel version and 16 D cells for the 12 channel mixer.

SQLN-4S series IV

4 channels in, 2 out. MS-AB.

The 4 transformerless balanced inputs of the highly popular SQLN-4S use XLR-3 type female connectors while uniquely, channels one and two also share an XLR-5 type connector for stereo microphone operations. While offering all of what may be considered 'standard' features, the mixer is intended to work in several modes: Twin Mono in which the channels are ungangd and each input channel can be routed or pan-potted to either or both of the output channels, Stereo Ganging in which the first channel fader controls the gain of

both channels and the first channel pan-pot acts as a stereo balance control. Mid-Side Ganging in which the first channel fader controls the gain of both channels and the second channel fader acts as an image width control. Mid-Side Matrixing in which each channel pair has an MS matrix which will convert an MS input into AB stereo or vice-versa or finally 'Panning Mode' where the Channel 3, Channel 4 pair has its output treated as MS encoded stereo and the channel signal is panned to move across the equivalent AB stereo image.

TL Audio PM-1 4/2

4 channels in, 2 out. MS-AB.

TL Audio's objective with the PM-1 4/2 was to produce a mixer offering features similar to those found on models offered by the more established manufacturers such as Audio Developments or SQN, but at a significantly lower cost. The PM-1 employs an all-steel chassis, sealed plastic conductive pots and gold-plated switches. Inputs for the four channels are via combined 3 pin XLR-jack sockets with a 20dB pad on jack inputs. Individually switchable 48V phantom and 12VT-power is available, as are switchable high-pass 12dB per octave filters, selectable for roll-over frequencies of 75Hz or 150Hz. The balanced XLR inputs are transformer isolated and the mixer also offers stereo coupling of inputs, stereo limiting, MS decoding and a choice of PPM or vu metering. The outputs are electronically balanced on 2 3-pin XLR connectors, duplicated on the Beta-Cam standard 10-pin Hirose multiway connector that also provides a tape-return monitor path. Some mixers are destined to lead a hard life as a means to an end; for others they will become like one of the family. A piece of advice, however; packing them for the annual vacation is definitely taking things too far. ■

MediaFORM Introduces a New CD-R Duplicator Designed for the "Audio Professional"

DAT'S EASY



CD2CD/POWER PRO CD-R Duplicator

MediaFORM's CD2CD/POWER PRO is already the industry leader in CD-R copiers with one button burning of 8 CD's simultaneously, expandable to 64 drives, and autoloader ready. The CD2CD/POWER PRO offers an option bay which allows for the following: Jaz Drive, Zip Drive, Plextor CD-Rom Drive or virtually any SCSI device. So how do we top that? DAT's easy! MediaFORM's new Easi-DAT option allows audio users to interface their existing DAT player with the CD2CD/POWER PRO by way of SPDIF, Optical and AES/EBU ports. Audio professionals can also take advantage of the CD2CD/POWER PRO's unique track extraction feature. Finally, a CD-R copier that's flexible enough to meet all of your audio needs.



400 Eagleview Blvd., Suite 104 • Exton, PA 19341
Phone: 610-458-9200 • Fax: 610-458-9554 • Toll Free in the USA 800-220-1215
email: info@mediaform.com • web: http://www.mediaform.com



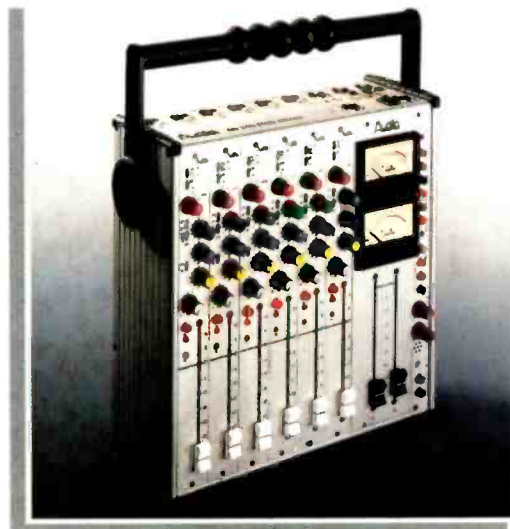
NEW!
CD2CD/POWER PRO
CD-5900

CD2CD/POWER PRO is a trademark of MediaFORM, Inc. • All other trademarks remain the property of their respective companies.

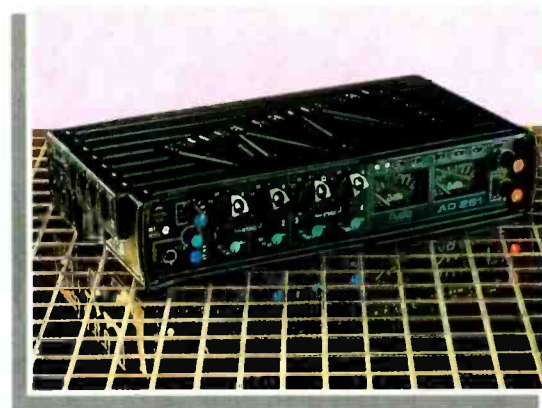
The Family Portraits



AD146 *A Wizard on Location
and at Editing*



AD245 *The latest addition to the family*



AD261 *The Best of Eng Mixers*



AD149 *Our Film and drama Specialist*



AD144 *A Favourite for OB Vans
and Production*



AD147 *With Talent All Round*

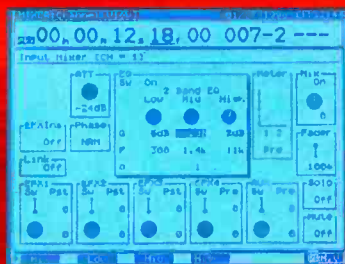
A Technical Achievement by

Audio
Developments Ltd.

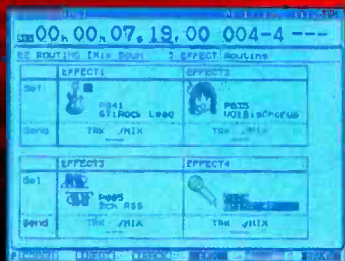
Audio Developments Ltd, Hall Lane, Walsall Wood, Walsall, West Midlands WS9 9AU.

Telephone : 01543 375351 Fax : 01543 361051

Email sales@audio.co.uk support@audio.co.uk Web Site <http://www.audio.co.uk>



See all track and input parameters with the push of one button including routing for all 12 output busses, V-tracks and EQ settings.



With up to 4 stereo FX processors onboard*, your effects are stored with each project and everything stays in the 24-bit digital domain.



Studio One: The VS-1680

Finally, your dream digital studio is within reach. With its 16-track playback (8 simultaneous record) and 256 virtual tracks, up to 4 stereo (or 8 mono) built-in effects processors*, 26-channel automated digital mixer, MT Pro 24-bit recording mode and direct SCSI CD-R burning capability (for audio CD's and data backup), the VS-1680 brings your recording space right up to date.

*VS-1680P is supplied with internal 2.1 Gig H/D and one VS8F2 effect board (2 stereo/4 mono FX processors)

Make it with a Roland



VS-1680 Digital Studio Workstation

 **Roland**[®]

For details of this and other new Roland products call the Roland Brochure Hotline: 01792 515020
Roland (UK) Ltd. Atlantic Close, Swansea SA7 9FJ. UK web site: <http://www.roland.co.uk>

THERE'S A TENDENCY in music to think that we're educating people or coming up with a cure for cancer, but we're not,' says Bruce Swedien. 'The only thing you can do to music is listen to it, and I have always felt that the real value of what I do as an engineer or as a producer lies not in the technical or acoustic sense, but in what the music signifies to the people who listen.'

Swedien does not regard himself simply as an engineer, for as someone who also produces, arranges and composes he is not quite so easy to define. Indeed, among his 13 Grammy Awards (starting with Frankie Valli and the Four Seasons' single, 'Big Girls Don't Cry', in 1962), there was one for his co-writing of 'Jam', the opening track on Michael Jackson's *Dangerous* album, and one of three songs which he has thus far composed with the King of Pop. Swedien also recorded and mixed 11 of the tracks on *Dangerous* while co-producing five of them, so there within a single project several of his skills were put to good use.

Born in Minneapolis in 1934, he is fast approaching his sixth decade in the recording business, and the credits keep rolling in—from pop to classical, jazz to blues and almost everything else in between, Swedien has lent his talent and expertise to projects with Lionel Hampton, Count Basie, Stan Kenton, Duke Ellington, Woody Herman, Oscar Peterson, Sarah Vaughn, Dinah Washington, John Lee Hooker, Buddy Miles, Muddy Waters, Mick Jagger, Paul McCartney, Nat 'King' Cole, George Benson, Barbra Streisand, Herb Alpert, Donna Summer, Patti Austin, Lena Horne, Natalie Cole, The Chi-Lites, Edgar Winter and Jackie Wilson. He has won Grammys for his engineering of Michael Jackson's *Thriller*, *Bad* and *Dangerous* albums, as well as for *Back on the Block* and *Q's Jook Joint* courtesy of his long-standing professional relationship with Quincy Jones, and he has also worked on the scores of movies such as *Running Scared* and *The Colour Purple*.

It has been quite a career, yet Swedien is not ready to wind it down just yet. 'What else would I do?' he asks, before musing, 'I guess I could drive a tug boat. You see, I'm such a junkie. I love this business just as much today as I did the first day I walked into Studio A at Universal when I was 20 years old.'

Adding to the list of legendary blues artists with whom he has worked, Swedien is currently scheduled to record BB King together with a large orchestra. This is the kind of music that he has a passion for, having been instilled with the spiritual sounds that reverberated around a black church which he and a friend used to sneak into as children.

When he was just 10 years old Swedien was given a disc recording machine by his father, and, in his own

Bruce Swedien Coming of age

At 65 Bruce Swedien talks about old studios, new mics, Dinah Washington and Michael Jackson with equal enthusiasm.

Richard Buskin meets the man who witnessed the introduction of mag tape but still has his hearing



words, '10 minutes later I decided on music recording as a career'. To that end he acquired an evening-weekend-vacation job in a small basement studio at the age of 14, and after graduating from high school he then bought a Magnacord PT-6 pro tape recorder. Entering the University of Minnesota, he studied electrical engineering with a minor in music, and at the same time worked in and around Minneapolis recording jazz groups, choirs, polka bands and radio commercials.

A job running the Schmitt Music Company's recording facility led to work assignments with major artists such as Tito Gulzar and Tommy Dorsey, and eventually Swedien bought out the business and relocated it to an old movie theatre, where it would evolve into a world-class studio. In 1957 he and his family moved themselves to Chicago, and there for the first 11 months Swedien worked for RCA Victor's facility and recorded the Chicago Symphony Orchestra. Then he transferred to Bill Putnam's new Universal recording complex and he remained there for the next nine years, working with the aforementioned luminaries in the world of jazz.

'Bill could be called the "father of recording"', he says. 'Many of the techniques that we use today originated in his mind. He believed in me as a kid, and for the first few weeks at Universal I would follow him around, bring him his coffee, set up mics, and generally try to learn how things were done. I would sit down and get the song started and Bill would finish things up. Well, we were doing a Stan Kenton session for Capitol and he must have arranged something with Kenton, because at one point Bill said, "Bruce, come on, you sit down and do this song. I've gotta go take a leak." I didn't see him again for five years. So that was my baptism of fire. Evidently he thought I was ready, and so did Stan, because I did the rest of the record.'

That was in 1957, yet it was several years earlier that Swedien first became truly inspired by the thought of recording and mixing.

'I didn't really get excited about pop music until I discovered that it was possible to use my imagination,' he recalls. 'That came with a record which I myself didn't work on; Les Paul and Mary Ford's 'How High The Moon' in 1951. Up to that point, the goal of music recording was to capture an unaltered acoustic event, reproducing the music of big bands as if you were in the best seat in the house. It left no room for imagination, but when I heard 'How High The Moon', which did not have one natural sound in it, I thought, "Damn, there's hope".'

'You see, being a Scandinavian from Minnesota, it was okay to like your life's work, but not to get too excited about it. Well, I was absolutely in love with music and with what I was doing, and when I got to Universal in Chicago and did the first couple of albums with Duke, and I had the chance to talk to him and to spend a little time with him, all of a sudden he made me realise that it's perfectly all right to love what you do. So, things evolved from there and I did some exper- >

Catch the Tube

AT4060

The AT4060 combines premium 40 Series engineering and vintage tube technology to deliver the exacting, versatile performance required in the most demanding studio applications. With a dynamic range that far exceeds that of other tube mics, the AT4060 provides the coveted sound of value design without compromising the specification standards necessary to excel in today's diverse recording situations.



Vintage Sound

Contemporary Performance

Excellent Dynamic Range

Extended Frequency Response

High Max SPL

Low Self Noise

High Resistance Shock Mount

Rackmountable PSU

To Warmth

Call, fax or e-mail us today for further information



audio-technica
The Complete Microphone Solution

Technica House, Royal London Industrial Estate, Old Lane, Leeds LS11 8AG
Tel: 0113 277 1441 Fax: 0113 270 4836 email: sales@audio-technica.co.uk

< imenting with Basie's band, Ellington, Woody Herman and Quincy Jones, and they were all very supportive of what I was trying to do, which was to include a bit of myself in the recordings. That evolution took a long time, and, as a matter of fact, it was when I started working with Quincy again in the late seventies that I began to realise reality was not an important part of music recording and probably wasn't even desirable. I kind of see my mixes as sonic sculptures—I would like them to be in this world, but not of this world."

Nevertheless, having been present for many of the revolutions that have taken place in the studio—starting with the switch from disc recording to tape—Swedien feels that technological advance hasn't necessarily played a large part in helping him to realise this goal.

"Does digital multitrack recording make it possible to produce material that is devoid of musical errors?" he asks. "Or, more importantly, does digital technology make it possible to produce a recording that is free of technical errors? I think the answer lies somewhere in between, yet what is more important than all of that stuff put together is being able to use my imagination; to create a sonic canvas that could not exist in reality, only in my mind."

In that respect Swedien cites Quincy's *Back on the Block* album as, perhaps his

Bruce Swedien's favourite recording environments

• "Definitely not a live venue. I will do anything to avoid doing a live record. I think I must be a control freak, but live recording is too unpredictable and there is a part of my psyche that hates surprises!"

• "Carnegie Hall [New York]. I've never recorded anything there but I love the sound of it."

• "Studio D at Westlake in Los Angeles. I've used it quite a bit for choir recordings, also for [Jackson's] 'Man in the Mirror', and I love it there. It has a little bit of resonance that peaks around the D below middle C and that provides a wonderful warmth on vocal recordings."

• "Studio One at The Hit Factory. I love that big room."

• "There are a couple of rooms which are gone now that used to be my favourites: Studio A at Universal in Chicago was incredible, and Studio A1 at A&R in New York was absolutely wonderful."

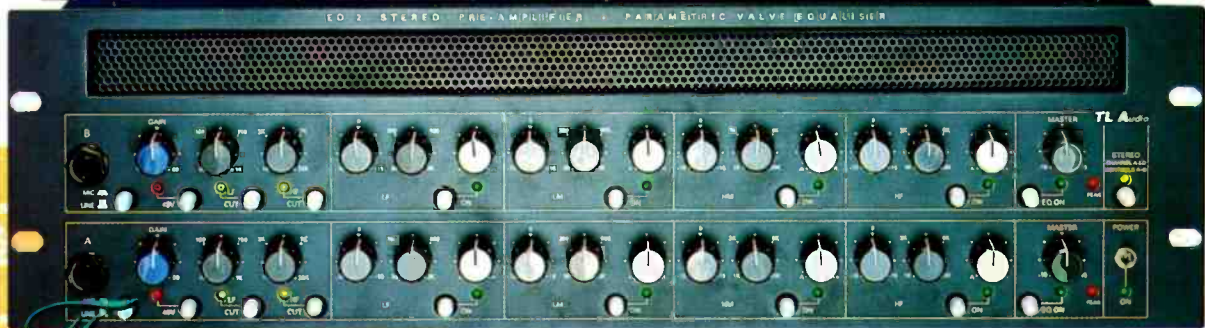
most well-realised project, and the title track in particular as an example of a 'sonic canvas'. What's more, he also regards music mixing as an extension of arranging, and as if to back up this theory he points to the arranging credit that he once received on a Sergio Mendez album. Indeed, it's not so much the equipment that he uses, but the way in which he uses it, as well as his willingness to extend the accepted boundaries,

that has placed Swedien in the esteemed position that he finds himself today.

"I learned early on with some of the older ribbon mics, like the RCA 44BX, that moving them from a vertical plain to a more horizontal plain added more high-frequency response," he recalls. "Gravity put a little bow in the ribbon and brightened the sound up. This was when we had little—and, in many cases, no—EQ in the recording path. Well, that was a great time to be working. We were learning so rapidly and things were moving so quickly."

"I remember in the late fifties, early-sixties, when the moguls of the record companies said there was no future in stereo, and they took it to the point where they'd refuse to pay for the tape to record some of these incredible bands in stereo. So, a bunch of us guys—myself, Phil Ramone, Al Schmitt and so on—paid for the tape ourselves. In fact, I have a lot of stereo recordings of Oscar Peterson, Duke Ellington and all of those major artists that I worked with in Chicago, and now the record companies come to me, of course, to see if I have a certain recording and I'm always happy to sell it to them."

It was in 1969 that Bruce Swedien went independent in order to concentrate on album recordings and film scores, and shortly after moving to Los Angeles in the mid seventies he encountered Michael Jackson >



"The detail provided by the valve circuitry means that the EQ-2 only ever seems enhance."
- Studio Sound

£1299 EX VAT
E1526 INC
In USA \$1775

The TL Audio EQ-2 equaliser is quite simply the ultimate in valve equalisation. Nothing beats the flexibility, the supreme audio quality and valve sound of the EQ-2.



Andy Jackson - Pink Floyd
(Sound engineer) - "All the lead vocals on the 'Division Bell' album mix were run through the EQ-1 and the new EQ-2 is probably the best all-round EQ I've ever used."

EQ-2 Dual Parametric Valve Equaliser

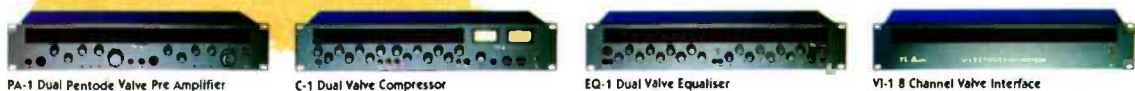
- 2 channels - each with 4 bands of fully parametric valve EQ
- Wide band width (better than 40kHz)
- LF band variable: 30Hz to 3kHz
- LM band variable: 30Hz to 3kHz
- HM band variable: 1kHz to 20kHz
- HF band variable: 1kHz to 20kHz
- All bands ±15dB of gain and variable Q between 0.5 and 5
- Channel EQ bypass switches
- Continuously variable high and low cut filters (12dB/oct) with bypass switches
- Ultra low-noise
- 48v phantom power
- Low cut filter variable from 30Hz to 1kHz
- High cut filter variable from 1kHz to 25kHz
- Output level control giving +/- 15dB of trim
- Peak LED indicates degree to which valves are being driven
- Balanced mic & line level inputs with variable gain control
- Balanced line outputs, switchable -10dB or +4dB
- Line inputs & outputs duplicated on unbalanced jacks
- Front panel dual sensitivity auxiliary inputs (for guitars / keyboards etc)
- Insert point on each channel (between mic pre amp and EQ section)
- Status LEDs on all function switches
- Frequency response 20Hz to 40kHz +0 / -1dB
- Very high quality build quality



Worldwide distribution:
Tel: +44 (0)1462 490600
Fax: +44 (0)1462 490700
Web: <http://www.tlaudio.co.uk>

SASCOM DIRECT

Canada & USA:
Tel: +1 905 - 827 9740
Fax: +1 905 - 469 1129
Web: <http://www.sascom.com>



PA-1 Dual Pentode Valve Pre Amplifier C-1 Dual Valve Compressor EQ-1 Dual Valve Equaliser VI-1 8 Channel Valve Interface

THE AMEK DIFFERENCE A TOTALLY FLEXIBLE APPROACH TO RECORDING AND MIXING



DMS DIGITAL MIXING SYSTEM

- 32 OUTPUT BUSES
- 8 - 64 FADER CHASSIS
- 72 SIMULTANEOUS MIX INPUTS
- INTEGRAL EQ, DYNAMICS & AUXES
- COMPREHENSIVE AUTOMATION
- MULTI-FORMAT PANNING
- 32-BIT FLOATING POINT PARALLEL PROCESSING ENGINE
- COMPREHENSIVE RANGE OF PRO I/O OPTIONS INCLUDING SRC

Whether you're working in music recording, broadcast or post-production, the AMEK DMS can be customised to suit your application precisely.



Uniquely, the DMS is built around a revolutionary 32-bit floating point DSP core, a highly flexible chassis design and a fully modular I/O system, which allows it to be designed in any shape and system configuration.

Its powerful software resource enables the same DMS to be reconfigured for music recording, broadcast and post-production - all on the same day, if that's what is needed. For every different operator, DMS can be a different console.

A modular system, AMEK DMS can expand as your business grows, which means you don't have to invest in features or hardware until you need them.

music
recording
dms
digital mixing system
broadcast
post production



H A Harman International Company

< while working on the movie, *The Wiz*, with Quincy Jones. The rest, I suppose you could say, is *HiStory*.

"I can't be in the control room when Michael listens to a mix," says Swedien. "He plays it so loud. We'll be in the middle of one of our huge mixes and he'll turn to me and say, 'Bruce, hurt me!' So I'll turn up the speakers and leave the room. He'll then leave me a little laundry list, signed 'Love, Michael' at the bottom."

Leaving the room when Jackson asks to be hurt brings me to another interesting point about Bruce Swedien; namely, the fact that his hearing—even at the top end—is still intact after so many years in the studio. Now, considering that some of those years happened to be the 1970s, when people often monitored at outrageous levels, his present state of well-being is all the more remarkable.

"I have been very, very careful," he says, "and I have very critical monitoring parameters that are set up in the studio before I start. For near-field speakers I use Westlake BBSM8s and I never run them at an SPL above 87 or



90 at the absolute most. Then there are my Auratones which will never be above an SPL of 83. I've worked that way for 25 years.

"Of course, when we're doing an R&B track or a big

kick-ass thing I like to play it loud once in a while, but if it's at an SPL of over 100 I'm very careful not to listen to it for more than five minutes out of the hour.

"About 15 years ago I did make a major change in terms of the way that I listen, in that I previously used three parameters: large studio monitors, near-fields and small-scale. Now I've eliminated the large studio monitors and I go just with the near-fields and small-scale. I love my Westlakes, not only for their accuracy, but also their imaging which is to die for. You can tell probably every 15' of position in the panorama, and that's pretty amazing. At the same time they have low impedance in the mid-range, so they're powered by four amps out of Norway which are fantastic. I also love Auratones; I have a lot of them and the older ones are the ones that sound really good."

As for microphones, Swedien does not

experiment too much during a session these days, being able to pretty much discern what will work best with a specific voice as soon as he hears the artist speak. "As the saying goes, 'The first million hours in the studio are the hardest, and after that it gets easier,'" he quips. Nevertheless, he does still like to move the mics around himself, and in his home studio in Connecticut, where he has been based since 1994, Swedien continually experiments with new equipment.

"I'm lucky in that—because of my visibility within the industry—people constantly send me new equipment to try, often before anyone else, so I'm able to remain on the cutting edge," he says. "You should see the gear that I now have—Quincy says moving me around is like moving the 5th Army. I have two 7ft racks of effects and some very esoteric equipment, and wherever I go I bring my own monitors and my own wire; monster cable, which looks a bit like garden hose. On top of that I have 17 cases with microphones."

Some of which go all the way back. Listen to old Nat 'King' Cole performances and, while the orchestrations may adhere to the kind of sonic standards that you would expect from 1950s recordings, marvel at how the velvet-smooth vocals often jump out. Several of these were captured by Swedien with a Neumann U47.

"Nat was great," he says. "I'd place >

THIS is a PLUG-IN!

MANLEY LABORATORIES INC
 13880 MAGNOLIA AVE
 CHINO, CA. 91710 USA
<http://www.manleylabs.com>
 Phone (909) 627-4256
 FAX (909) 628-2482

SOLID-STATE FOR CALCULATORS
 VACUUM TUBES FOR MUSIC

Professionals all over the world
discover the highest level in german
tube microphone engineering

When will you?

Here is the comment
of someone who did:



"I just used my Brauner VM1 on a week of solo vocal sessions. Did the whole album with it. It sounds unbelievably clear and warm! I absolutely love it! The VM1 is my new „favorite“ vocal mike."

Bruce Swedien

Engineer for Michael Jackson and Quincy Jones



UK distribution: Digital Audio Technology Ltd.
134 Cricklewood Lane • London NW2 2DP • 0181-450 5665

Dirk Brauner
Röhrengerätemanufaktur
Entwicklung, Design und Restauration
von Röhrengeräten
van de Wallstraße 1 • 46499 Brünen
Fon: 02856/9270 • Fax: 02856/9271
www.dirk-brauner.com



Discover the sound you've always been looking for. VM1, more than just a legend.

The Ultimate Plug-in



extreme audio

M80

The PreSonus M80 Eight Channel Microphone/Preamplifier with Mix Bus. Featuring High Quality Jensen® Transformers. FET, Class A Discrete Buffers. Twin Servo® Gain Stages (No Capacitors). Mix Bus assign For Multiple Mic/Instrument Stereo Imaging. Unique IDSS Control for Adjusting Harmonic Distortion. Servo Balanced Send & Return Jacks on Each Channel for External Balanced Processing. Auxilliary Bus Inputs.

- Greatly improve the quality of any console, analog or digital, by adding eight very high end mic preamplifiers.
- Amazing front end for two, four or eight channel analog to digital converters such as the Digidesign 888® or Soundscape SS810-1®.
- Add warmth to any microphone using the proprietary FET IDSS adjust.
- High headroom summing bus allows true stereo imaging utilizing more than two microphones.

Call Today: 1-800-750-0323
fax: 504.344.8881 • voice: 504.344.7887
email: presonus@presonus.com • website: www.presonus.com
international: global@presonus.com • international voice: 714.440.0760



Reader Response No. 051

PreSonus
[audio electronics]

< the microphone in the studio, hit the button on the tape machine and he would do the rest. It was so easy. I still have the 47 that I used on him, and in fact I also used it on Michael.'

Still, while the 47's enduring qualities are beyond dispute, Swedien recently took a strong liking to another brand that he was introduced to while lecturing in Germany.

'I was in Munich, and I met a guy over there named Dirk Bräuner,' he says. 'He has come up with a hand-made series of condenser tube mics, and I have never heard anything better. He gave me one and I brought it back and used it, and it's just phenomenal. It sounds like the best U47 that you've ever heard in your life.'

In his home studio Swedien has a Harrison 32 Series console that is similar to the one that he used on *Thriller*. 'It's absolutely beautiful,' he says. 'I bought it from Roy Clark in Nashville, and it's like the day it came out of the box. Still, being that it only has 32 inputs, I'm looking for a second one in the same kind of condition so that I can put the two of them together.'

'On the other hand, I also love the SSL 9000 which, although I don't like to make predictions, is probably the last big analogue desk. They just went all out with regard to the quality and durability, and it's fabulous. In fact, there's no other modern analogue desk that compares.'

MEANWHILE, pointing to his work with the likes of the aforementioned Mr Jackson, as well as with Messrs Jones, Ellington, Basie *et al*, Swedien modestly describes his role in the studio as that of 'the fortunate student'. As for the teachers, it is Quincy who stands at the head of the class.

'Music has only two categories; good and bad,' says Swedien. 'Working with a great artist and great material brings more responsibility to a project, and I think the most important thing that I've learned from Quincy is never to take that lightly. We've worked together for over 40 years, and I promise you there is no one like Quincy in terms of the quality, and the musicality, and the good taste, that he brings to every project. In the beginning I was 21 and he was 23, and one of the first recordings that we did was Dinah Washington's 'What a Difference a Day Makes', which was not a bad start.'

'There again, both Quincy and I bring all of our experience to every session, and so another thing I've learned from him is that the kaleidoscopic approach is really where it's at. When you play one of my mixes, for instance, you can hear it in a certain way, but then you can play it again and listen for something else. I mean, they're still trying to figure out some of the techniques that I used on *Thriller*, and I've got stuff buried in there that people will be studying for years.'

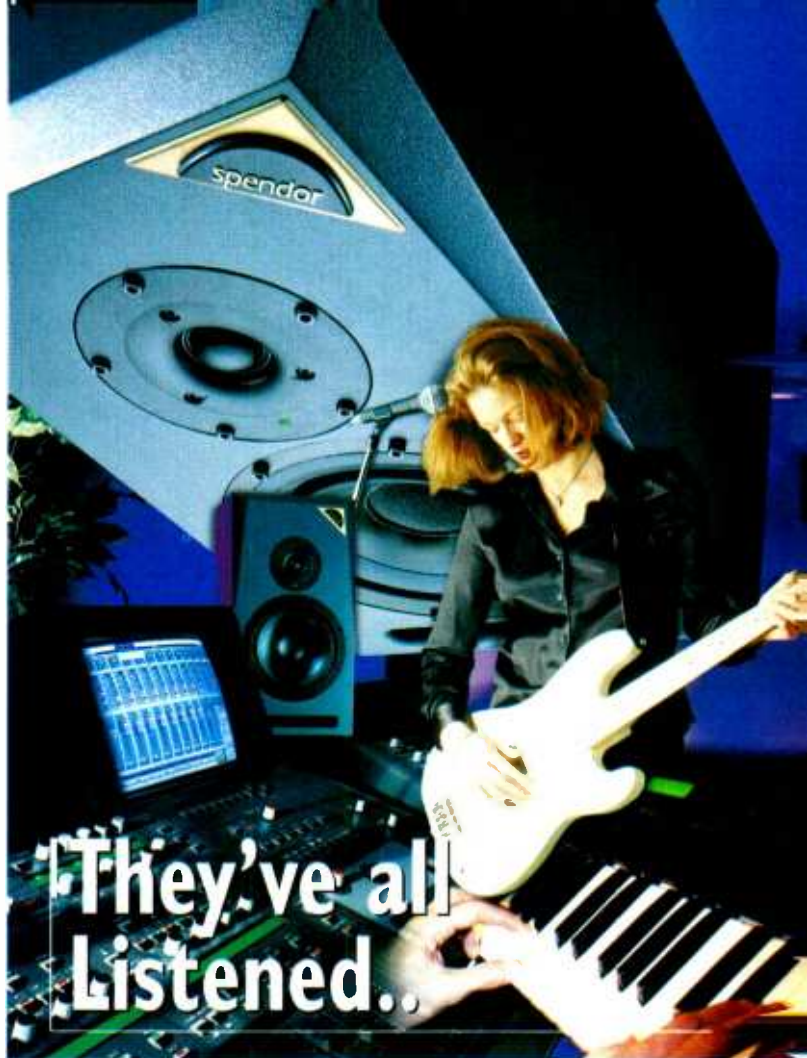
Indeed, having conducted a master class in music engineering at the University of California, Los Angeles (UCLA), and conducted lectures and recording seminars for numerous universities, colleges and industry organisations both in America and overseas, Swedien is more than happy to disclose his work methods.

'I don't believe in secrets,' he asserts, 'and I'm criticised by both Quincy and Michael for that. Michael especially. He'll say, "Bruce, you can't go telling people all this stuff", but I don't believe in that, the reason being that I have yet to find anybody who really understands what I'm talking about. As a result, I am more concerned about finding people who will understand my approach to what I do than I am about anyone stealing ideas. That's never been an issue. So, microphone technique, multitrack recording technique, I go through all of them.'

In that case, what techniques did Swedien use on *Thriller* and what kind of sounds are buried in there? After all, he did just say that he doesn't believe in secrets, and as for Michael, well, he'll get over it...

'There's the title track, for instance,' comes the immediate reply. 'On the intro there's a little rhythm track that commences the music, and I purposely limited the bandwidth on it so that as you listen to it your ear adjusts to that spectral response. Then, all of a sudden, the real bass and kick drum come in >

Studio Sound September 1998



MODEL SA-200



MODEL SA-300



MODEL SA-500

“ THEY EXCEEDED ALL EXPECTATIONS BY PRODUCING SOME OF THE clearest imaging I have heard to date. **SOUND ON SOUND. SA200**

THE SPENDORS REVEALED A STARTLINGLY TRANSPARENT SOUNDSTAGE. THE STEREO IMAGING ACCURACY WINS HANDS DOWN. **THE MIX. SA200**

THE STEREO IMAGE AND DEPTH WAS OF STUNNING PRECISION, COMBINED WITH AN EXACT AND RECOGNISABLE MID POSITION WITH FIRM AND DEFINED LOW FREQUENCY RESPONSE. THESE SPEAKERS SOUNDED DAMN CONVINCING. **STUDIO MAGAZINE. SA300**

IT IS FAIR TO SAY THAT THESE ARE PROBABLY THE BEST MONITORS I HAVE TESTED IN THIS CONFIGURATION WHETHER ACTIVE OR NOT. **AUDIOMEDIA. SA300**

OVERALL I FOUND THESE SPEAKERS TO BE EXCEPTIONAL. THEY ARE ABSOLUTELY RUTHLESS WHEN IT COMES TO REPRODUCING A RECORDING WITHOUT COLOURATION. **MIX MAGAZINE. SA300**

IN MY PERSONAL EXPERIENCE I HAVE NEVER HEARD MONITORS WITH SUCH INCREDIBLE IMAGING, EFFORTLESS REPRODUCTIVE ACCURACY AND MOST IMPORTANTLY AN ACCURATE, NON MYSTERIOUS BOTTOM END. **JERRY RAGOVY, PRODUCER/WRITER. SA300**

EVEN THE REPRODUCTION OF DEEP BASS SIGNALS ARE IMPRESSIVE...THE MEASUREMENT RESULTS CREATED SPONTANEOUS CHEERING. **PRODUCTION PARTNER. SA300** ”

Still unconvinced?

IBC - HALL 1 STAND 320
AES - STAND 1552

SPENDOR
YOUR ULTIMATE REFERENCE

SPENDOR AUDIO SYSTEMS LIMITED

STATION ROAD INDUSTRIAL ESTATE HAILSHAM EAST SUSSEX BN27 2ER

TELEPHONE 01323 843474 FACSIMILE 01323 442254 EMAIL spendor@mcmail.com WEB www.spendormcmail.com



Legendary Sound to Make Your Dreams...



The **Studer V-Eight** is an 8 channel 20 bit digital recorder based on the ADAT™ type II format, using S-VHS cassettes. The V-Eight is **100% compatible to all current ADAT formats** with over 100'000 units sold. The professional design and reliability will give you a cost effective, faithful workhorse for all professional audio recording applications. The V-Eight features a **professional S-VHS Tape Drive** for extremely fast

and gentle tape handling which leads to substantial time savings. The V-Eight also has the convenience of an **integrated TC generator and chase synchroniser**. Unique features are: **24 bit Studer converters** based on the legendary D-827 DASH recorder technology, to improve the sound of your recordings and an **On-board 9 channel monitor mixer** to make live recordings without a mixing console. ■

STUDER
professional audio equipment

H A Harman International Company

50 years

< and the effect is really startling. So far I've told people about this but nobody has verbalised to me how it actually happens.'

Maybe, but hasn't he heard anyone else imitate the effect?

'Oh yeah. I love that.'

So there's a little titbit about the title track, but what about one of the other hit songs on *Thriller*?

'Well, when we recorded 'Billy Jean', for instance, Quincy told me, "Okay, this piece of music has to have the most unique sonic personality of anything that we have ever recorded". Now, that's a hell of a way to go into a recording, so I thought and thought about it, and when it came time to do the rhythm track—consisting of drums, bass and so on—at Westlake Audio on Beverly Boulevard (in LA) I did everything I could imagine to really make it sound unique, even to the point of calling my old pal George Massenburg and borrowing a super-high-quality small recording console from him.

'That was the first time that I began using a specially-built, 8ft square, plywood drum platform, courtesy of the carpenters at Westlake, which is a great studio by the way. I also had a special bass drum cover made, and I took the front head off the drum kit, put cinder blocks in there to hold it still, put the cover on and slipped the microphone through. Then I made a special little isolation flap that went between the snare mike and the hi-hat mike in order to give much better imaging. Consequently, I think that track really is unique, see if you can think of any other piece of music where you can hear the first three drum beats and know what the song is. That's what I call sonic personality.

'Separately these elements are all small things, but as Quincy told me early on when we began working together, everything is important. Every little detail. Anything you can do to enhance the image is important, and I admired that approach so much early on that it's kind of become a part of my everyday life, and it drives people crazy.'

This amounts to spending a lot of time in the preparation, but not when the musicians are around. For, once a session is underway, Swedien is intent on retaining the spontaneity.

'Something else that Quincy brought home to me is to learn to listen to my instincts and believe in them,' he says. 'Also, from Duke Ellington I learned a lot about listening for the primitive elements in music, and being sure that none of them are overlooked. Primitive is important, and I would hate to be the first person in the world to make a perfect record. I don't think that would be very interesting.

'It's all about feeling responsibility to the music that we're working on, because anything that we do in a studio is, for all practical purposes, carved in stone. I mean, it will be there forever if it's important enough for people to examine, and like a good photographer I always like people to look at my best pictures.'

CONTRARY TO the popular proverb, Swedien asserts that the older he gets, the more he knows, and he also states that, in his experience, the bigger, more successful artists are also nicer to work with.

'Michael is a doll in the studio,' he says. 'You could not possibly ask for anyone better to work with. At the same time, I'm an only child and I would love to have Quincy for a brother. The same goes for Burt Bacharach. Oh man, the list just goes on and on.'

Although there are a few choice names that didn't make it on there...

'Sometimes I think that I would have loved to work with Sinatra, but Quincy's worked with him and so did my pal Phil Ramone, and as a result I think that it's better if I just remember his music. I recall a time when Quincy and Phil were working with him while I was in LA producing a band named Missing Persons, and they called me and said, "Bruce, just be glad you're not here".

'Other than that I usually hear from Phil Ramone on my birthday. You see, we have an old joke. We used to call each other at Christmas and say, "Up is louder..." and hang up.' ■

The ReporterMate MTR/64



...the most complete
MPEG Tapeless Recorder!

- tapeless recorder • recording on flash card or hard disk • two PCMCIA slots • extensive communication features for live transmission and file transfer • communication over ISDN/PSTN/GSM/Satellite/Internet/Intranet • full stereo 20kHz • supports MPEG/G.722/G.711/WAV/BWF/FTP • bitrates up to 384 kbits/s, incl. J.52 • battery powered • rechargeable or alkaline batteries • mains adapter or car battery
- buffer memory for faultless recording on hard disk • built-in telephone function and data communication • non-destructive editing using markers • on-line and off-line voice-overs
- during transmission simultaneous communication with newsroom • compatible with broadcast automation and newsroom systems

YouCom
Telecommunicatie BV

The Netherlands
Tel: +31 15 262 59 55 - Fax: +31 15 257 15 95
www.youcom.nl

What more do you want from a mate?

Moving forward into the digital age.

Audio Pro



adat

A-DAT[®] is a registered trademark of Alesis Studio Electronics, Inc. © 1998

DTRS
DIGITAL TAPE
RECORDING SYSTEM

**Mini
Disc**

DAT
Digital Audio Tape

maxell
PROFESSIONAL

Maxell Europe Ltd. (UK Sales Office)
Multimedia House, High Street, Rickmansworth, Hertfordshire WD3 1HR, U.K.
Tel.: +44 - 1923 - 49 44 00 • Fax: -44 - 1923 - 49 44 10

War on warez

I HAVE BEEN spending quite a bit of time recently travelling between what feel like parallel worlds. And it seems I have a confession to make. I will try to explain.

If somebody offered me an album's worth of 'far too cheap' multitrack tape—'it fell off the back of a lorry guy'—to record an album, I would not want to know about it. The album project would be too close to my heart and far too expensive to even think about the risks let alone the karma. Yet when it comes to software, until recently, my computer seemed to have amassed truckloads of applications, some inherited from employers, others borrowed from friends, but most of which I never quite got around to buying; and that made me a pirate and guilty of some pretty serious crimes in most countries. The funny thing is, that many people I know in the industry could probably say the same thing at one time or another.

Some time ago I was in my office in Nashville thinking about Bill Gates' new offering of Microsoft Office 98 for Macintosh. I'd read the reviews and it looked pretty good—corrected many of the tiresome bugs of earlier versions and for the first time was not artificially hobbled to run slower than the Windows versions (maybe something to do with him being an Apple shareholder?). There was only one small problem—the bespectacled one wanted over \$400 for his new software and I was a little short of cash that week. So I looked on the internet, shopping around to see if there was any special deal available. Soon enough I came across a pirate site offering a complete image of that CD for free download at a scary fast T-1 speed. I confess, the temptation was significant; well, can you think of anybody in this world besides the Sultan of Brunei who needs \$400 less than Bill Gates? But of course, the simplest of analyses will reveal that morally, ethically and legally, the bottom line is that

piracy is piracy, period.

A little bit more poking and prodding my way around the net revealed that it was not just the mega business titles which were being pirated, almost every other kind of specialist software was there for the illegal taking. Without exception, all of the software that many of us use as our primary tools in audio production were also being cracked, hacked and illegally distributed.

I talked about this subject with many software-developer friends at the AES in Amsterdam earlier this year. It was immediately clear that any attack by pirates on intellectual property and copyrights strikes at the heart of free enterprise. Many software developers are 2-man or 3-man companies with highly innovative products, some of which have taken years to bring to market. There is not a Bill Gates among them; although if the criteria for riches was based upon quality of product they should all be richer than they are. The reality is, that like most of us, they are running their businesses on tight budgets with development and marketing costs factored into a final selling price. Piracy throws all of their business equations and models into a cocked hat.

There's a paradox here, in that we make our living in the music business either directly or indirectly from royalties earned on sales of recordings. We fight hard to defend those royalties and yet to date, as an industry, we've done almost nothing to defend the copyrights of the tools that help us to earn those royalties in the first place. So in the best tradition of poacher turned gamekeeper I've been getting involved in putting together an organisation which will be up and running by the time you read this article. It's specifically targeting these issues in our industry.

The most reliable figures for software piracy (from a study conducted by the

International Planning and Research Corporation, funded by the BSA and SPA) show global software piracy figures of 43% and in excess of \$11bn in 1996 (for all business-related software excluding operating systems and client-server applications). That is almost one in two of every software application in use. Okay, so you say the figures are distorted by China and Hong Kong or South America. Actually, the truth makes surprising reading with 27% of all software in the US being illegal to the incredible value of \$2.3bn, 34% in the UK to a value of £33m, 44% in France or \$411m, 53% in Netherlands or \$221m, 55% in Italy for \$340m and 41% in Japan for a whopping great \$1.2bn. The sheer size of these numbers is as staggering as is the breadth of the problem. It would be simply too naive to think that we in the pro-audio industry are alone in being immune to piracy.

PIRACY REMOVES the incentive for developers to invest in new and innovative products, decreases the margins developers have to support existing software and slows down the introduction of new features and upgrades. At its most insidious, piracy can force software developers out of the audio business if the risk-return ratio becomes unacceptable, or developers will need to spend more money on software copy protection and thus software may increase in price. Piracy is not going to go away of its own accord. As more and more products are becoming software based, running on generic platforms, the steps we take now as an industry to reduce piracy will determine the quality and range of products we will be able to enjoy in the future, it's that simple. In short, what can we as an industry do?

We can begin by recognising that software is copyrighted intellectual property and has a value; that we should not use software that has been deliberately pirated or is illegally copied; that we should not use multiple (backup) keys when you are licensed for one copy; that we should not use studios that use illegal software; that we should not purchase, download, trade, or even try >

The pirate's fear of the penalty

IN THE US, if caught with pirated software, the infringing company may be liable under both civil and criminal law. Authors can seek civil damages in the amount of their actual value, or statutory damages of \$100,000 per work infringed. Criminal penalties for copyright infringement include fines of up to \$250,000 and jail terms up to five years, or both. Last December, President Clinton signed a law called the 'No Electronic Theft' (NET) Act that allows for criminal prosecution of copyright infringement, even where there is no profit motive, closing a loophole in US copyright law. FAST

points out that, 'breaking the law could have serious consequences for you and the organisation you work for, threatening both your own and your employer's reputation and future prosperity'.

In the UK, legal penalties include unlimited fines and up to two years in prison. Personally, you could lose your reputation, promotion prospects or even your job. There are no mitigating circumstances and no organisation would condone or defend either illegal copying or the use of unauthorised software. Also, most countries have now subscribed to a UN agreement designed to harmonise international copyright law. This agreement should be ratified later this year and come into local law shortly thereafter.

< pirated copies of software. If you purchase software installed by someone else, ensure the vendor provides all the original materials and proof that the product is licensed and itemised in the receipt. Equally, we should purchase genuine software from reputable dealers or manufacturers and install it in accordance with the license agreement. Additional tips for the purchase of software can be found on the BSA-SPA-FAST and other web sites. The license agreement that comes with each piece of software explains what you are entitled to do with it—it will not include making copies of unlicensed software for colleagues. It will help to know what software is in your company as the company is liable for the actions of its employees and can be sued for copyright infringement even when the management is unaware that unauthorised software is in use or being downloaded.

And if the logic of supporting our industry is not sufficient, the potential penalties for using pirated software (even unknowingly) make for sobering reading. FAST explains simply, 'The [UK] Copyright, Designs and Patents Act 1988 states: The owner of the copyright has the exclusive right to copy the work. That means it is illegal to copy software without the copyright owner's [a software developer or publisher's] permission'.

Using pirate copies of software is a

civil offence. This means you could be sued by the copyright holder. Buying and swapping pirated copies is aiding and abetting the criminal offences of distribution and sale, for which you can be prosecuted and thereby obtain a criminal record. According to BSA, it's illegal to distribute 'warez', which is a slang term for pirated software. Downloading or purchasing pirated software is illegal.

'Legal software comes with required [serial] numbers or keys to install the software. Providing them for others to use with pirated software contributes to copyright infringement and is illegal.' The BSA also states that you should not use 'cracks', which are programs that will modify the copy protection in an application, enabling you to use the program after a trial period has ended, or access features of the program restricted to fully licensed users. It is illegal to make these modifications.

Lastly, SPA has indicated that the additional concept of Contributory Infringement can be quite wide ranging: 'Anyone who knows or should have known that he or she is assist-

FAST

Federation Against Software Theft
<http://www.fast.org.uk/>

ELSPA

European Leisure Software Publishers Association
<http://www.elspa.com/>

BSA

Business Software Alliance
<http://www.bsa.org/>

SPA

Software Publishers Association
<http://www.spa.org/piracy/>

IAPC

Internet Anti-Piracy Campaign
<http://www.spa.org/piracy/iapc.htm>

Copyright Control Services

Tel: +44 775 597 677.

Fax: +44 181 420 7130.

ing, inducing or materially contributing to infringement of any of the exclusive rights by another person is liable for contributor infringement.'

For those who need further convincing (convicting?), there are also technical risks. For your own sake, don't use pirated copies. They are usually the work of clever, but often mischievous programmers, who, once they solve the protec-

tion problem, might try to stir up more trouble by inserting viruses. Also poorly worked hacks can potentially damage your system.

To cut to the chase, Jeff Bloom of Synchro Arts fame, Julian Searle, an enormously talented network programmer and reformed hacker, and yours truly have put together Copyright Control Services to educate professional software users, and target blatant pirates for action. If you'd like more information we'd love to hear from you.

It's our industry and computers and software will play an ever-increasing role in it. It is up to us to decide now what sort of future tools we want to be able to enjoy. ■

StudioNet FC™

Rorke Data's StudioNet-FC includes a family of Fibre-Channel storage & network products that range from high-capacity RAID/JBOD disk storage arrays to complete turnkey workgroup configurations including bridges, hubs, NICs, cables & volume management software. We understand your workflow requirements. Fourteen years of industry experience enables us to customize and integrate the power of Fibre-Channel for you today.

RORKE DATA
 9700 W. 76th Street,
 Eden Prairie, MN 55344
 (800) 328-8147, (612) 829-0300,
 Fax (612) 829-0988

RORKE DATA EUROPE
 Nautilusstraat 5a 7821 AG Emmen
 The Netherlands
 Tel. 31-(0)591651165,
 Fax 31-(0)591651185

Fibre-Channel workgroups for DAW's
 data

26-29 september 1998 Booth 418
 11-15 September 1998 Amsterdam Hall 1, Booth 418

www.rorke.com

All trademarks are the property of their respective holders.

XL4 BROADCAST CONSOLE



MIDAS

DESIGNED FOR A PURE PERFORMANCE

EVI Pro Audio Group, Klark Teknik Building, Walter Nash Road, Kidderminster, Worcestershire DY11 7HJ, England. Tel: (01562) 741515. Fax: (01562) 745371.

EVI Pro Audio Group, 660 Cecil Street, Buchanan, M1 49107, USA.

Tel: (616) 695 4750 fax: (616) 695 0470.

Web site: <http://www.midascnsoles.com> Email: midassales@eviaudio.com



ACTIVATE YOUR VISIONS

Welcome to an oasis of *real* satisfaction, where your thirst for the Whole Truth and Nothing But the Truth will finally be quenched.

For Nearly 20 years we've been known for our active monitoring systems, particularly our compact, nearfield bi-amplified ones.

But outside the nearfield, where the heat really gets turned up, Genelec's S30C, 1037B and 1038A integrated tri-amp* active monitors are designed for bigger spaces - *mucho grande*.

1038A



*Amplifier modules may be rack-mounted in any soffitt installation.

GENELEC®
ACTIVE MONITORING

The Whole Truth And Nothing But The Truth



Craig Leon: best of both worlds

Tempering style with flexibility is an enduring challenge facing both artist and producer. **Phil Ward** corners producer Craig Leon and grills him on news of artist Deborah Harry

WORKING on both sides of the Atlantic, Craig Leon revels in producing records from almost any genre of music. With credits ranging from punk to country and blues, from industrial to folk and jazz, and from mainstream pop to esoteric classical, the only common denominator throughout his producing and arranging career is individuality. His roots lie in the R&B days of Criteria Studios in Florida, working with Alex Sadkin. In the early 1970s they built a small demo facility, while Sadkin was a mastering engineer at Criteria. One such demo was for Richard Gottehrer and Seymour Stein, who ran Sire, the seminal New York label. These sessions—with the Climax Blues Band—led to sessions in New York for the label, and by the osmosis of the industry Leon closed up in Florida and became Gottehrer's full-time assistant.

"In those days, especially in America, "A&R" and "production" were the same thing," Leon recalls. "You came to it from a musical background, whereas in the UK you worked your way up through the studios."

As a case in point, Leon discovered

Blondie while working as an A&R scout at Sire, having snapped up local luminaries Talking Heads and The Ramones. As an A&R man, he was in the thick of New York's punk explosion. As a producer, he supervised the recording of every significant band of the era during the making of *Live At CBGB's* for Atlantic in 1976.

"Blondie lived across the street from CBGB's, and became the 'soundcheck band,'" Leon recounts, "routining their set every week while we prepared for that evening's recording. Richie Gottehrer and I had formed our own independent production company, and the soundcheck tapes prompted us to make a single with Blondie—a project which turned into a year during which I arranged and rehearsed every song they had."

By the time the band was signed—to Chrysalis—around 40 tracks were ready. Although Gottehrer is credited as producer of the first two albums, it was this material—honed by Leon—that constituted *Blondie* and *Plastic Letters*, while much of what was left over—including "Heart of Glass," known to Leon as "Disco Song"—was inherited by

Parallel Lines producer Mike Chapman.

At a time of art-school idealism, with multitrack analogue recording established as the sensible way of making records, Leon's production was characterized by an innovatory approach, in which he took unstructured ideas and pieced them together into songs. The method of tape splicing, which enabled him to dovetail grooves into pop structures, presaged today's sampling techniques directly.

"Most bands in the US were just trying to get their live performances represented on record," he says. "Blondie were different. They brought a layering, sampling approach: we'd do a riff, and work that into a verse; then we'd do another riff, and work that into a chorus. These would be chopped together into a whole track, and then Debbie would take that away and come up with the vocal."

Most of these sessions took place during downtime at Plasa Sound, where Leon was making the first Ramones album. "There was a big rehearsal hall for the NBC Symphony Orchestra on top of the Radio City Music Hall, and we'd do stuff there at night. Another >



< blag was Bell Sound—now Sear Sound—which was the old home of The Shangri-La's, The Four Seasons and all those early sixties recordings.'

It wasn't all punk, though. Country artist Rodney Crowell, Tex Mex pioneers Sir Douglas Quintet, and folksy feminists The Roches were among credible clients, and there was even an album co-produced with Bob Marley and Lee Perry featuring The Wailers.

By the early eighties, however, the American music scene was losing its flavour for Leon and he was drawn to the UK, where he is still based today. Following his muse for idiosyncratic, original material ('Those that want more of an arrangement approach') he wound up producing several bands on an indie offshoot label at Virgin called Statik, including Gun Club, Flesh for Lulu, The Sound and his own wife Cassell Webb. From this basis he has become one of the UK's most eclectic producers, with acts as varied as The Fall, Jesus Jones, The Primitives and Mark Owen benefiting from his touch. For good measure, Canadian noise grinders Front 242 and nutty Japanese girl trio Shonen Knife also figure on his CV.

Next month, though, a new Blondie album is scheduled to appear, picking up where Leon left off, piecing together Chris Stein and Debbie Harry's arty ideas in that Warhol way. This time his multitrack recorder of choice is the Otari Radar, which allows him to continue his art of assemblage with the luxury of digital cut and paste. Where the Radar

scores over other DAWs, according to Leon, is sonically.

'The Radar doesn't have a sound, that's why I like it. When we were doing Clem Burke's drums on the new Blondie album, we tried the Studer A827, the Sony 3348 and the Radar. I needed to get in to a digital medium because of the amount of editing I do during the work in progress, and the best sound out of those three—and the closest to the real analogue sound, without that change to the top end of the cymbals, or that loss of depth that you normally get with digitally recorded drums—was Radar. You would be hard pressed to play the analogue tape next to the Radar and hear a difference.'

Recall and last-minute editing equally suit Leon's 'work-in-progress' approach. But there are no hard and fast technical rules in Leon's domain, in which an old Neve console or a Capricorn can provide the solution.

'Right now I like to take everything from Radar into a Capricorn digitally, just to check balances, but the mix may not end up that way; it takes 25 seconds to recall something on Capricorn. And needless to say we may be in Electric Lady working on an SSL, so there'll be a different mix from that.'

'No gear is universally right; at the same time, the range of gear available for different sounds is fantastic. I love an old MCI sound, for certain analogue sounds, and I love old Neves, but if they're not available I can make do with something else. To me, the feel of the >

Genex

INTERNATIONAL DISTRIBUTORS

AUSTRALIA: AWA LTD

Tel 02 9669 3477 Fax 02 9578 0140
Contact Michael Guest

BELGIUM: EML N.V.

Tel 011 23 2355 Fax 011 23 2172
Contact Erik Gysen

CANADA: HNB COMMUNICATIONS CANADA LTD

Tel 416 867 9000 Fax: 416 867 1080
Contact Dave Dysart

DENMARK: INTERSTAGE

Tel 39 46 0000 Fax 39 46 0040
Contact Finn Juul

FINLAND: HEDCOM

Tel 358 9 682 866 Fax 358 9 682 8489
Contact Jarmo Roivas

FRANCE: S. A. V.

Tel 1 42 40 55 22 Fax 1 42 40 47 80
Contact Philippe Desgué

GERMANY: MEDIACOM

Tel 05451 94690 Fax 05451 946919
Contact Uwe Seyfert

GREECE: KEM ELECTRONICS

Tel 01 647 8514 Fax 01 647 6384
Contact Thimos Koliokotkis

HOLLAND: TM AUDIO HOLLAND BV

Tel 030 241 4070 Fax 030 241 0002
Contact Peter de Fouw

HONG KONG: DIGITAL MEDIA TECHNOLOGY

Tel 2 721 0343 Fax 2 366 6883
Contact Wilson Choi

ITALY: AUDIO EQUIPMENT

Tel 039 212 221 Fax 039 214 0011
Contact Donatella Quadrio

JAPAN: TIMELOD

Tel 3 3794 5575 Fax 3 3794 5605
Contact Henry Dienne

NEW ZEALAND: SOUND TECHNIQUES

Tel 09 846 3349 Fax 09 846 3347
Contact Mike Westgate

NORWAY: SIV. ING BENUM A/S

Tel 22 1 399 00 Fax 22 1 48259
Contact Wenche Gronvold

PORTUGAL: ESTEREOSOM LSA

Tel 01 356 0563 Fax 01 357 2981
Contact Jorge Goncalves

SINGAPORE/ASIA: SENNHEISER ELECTRONIC ASIA

Tel 065 273 5202 Fax 065 273 5038
Contact Donn Ho

SPAIN: LEXON

Tel 93 203 4804 Fax 93 280 4029
Contact Alejandro Palencia

SWEDEN: POL TEKNIK AB

Tel 46 8 708 7570 Fax 46 8 88 4533
Contact Jarmo Masko

SWITZERLAND: DR. W. A. GUNTHER AG

Tel 01 910 4141 Fax 01 910 3544
Contact Roland Bricchi

TAIWAN: DMT TAIWAN

Tel 02 516 4318 Fax 02 515 9881
Contact Honlon Sze

TURKEY: SF DIS TICARET AS

Tel 0212 227 9625 Fax 0212 227 9654
Contact Samim Mutluer

USA: HNB COMMUNICATIONS USA

Tel 310 319 1111 Fax 310 319 1311
Contact David Beesley



HNB Communications Limited

73-75 Scrubs Lane · London NW10 6QU · UK
Tel: 0181 962 5000 Fax: 0181 962 5050 E-Mail: sales@hnb.co.uk
Visit HNB on line at <http://www.hnb.co.uk>



Genex Professional MO Disk Recorder

London - At the world famous Abbey Road Studios, "Our GX8000s move between the studios and on location for use on a wide range of projects." Neil Aldridge, Chief Engineer.



Nashville - Mastering the new George Strait album at Georgetown Masters. "Everyone was astounded when they heard it at 88.2kHz compared to 44.1kHz. Its reliability has also been amazing." Denny Purcell.



Montreal - Major multinational TV production company (INAR) uses 8 GX8000s in a variety of applications. "By recording at the maximum possible dynamic range, we're preparing for new formats as they become available." Francois Deschamps, VP of Studios.



London - Digital Audio Technology applied its 48 track Genex system for 24-bit location recordings at the Glyndebourne Opera Festival. "The ability to access remote drives made the continuous recording of a two and half hour performance possible. It couldn't have been done with tape." Ian Silvester, Owner.



Hollywood - Recording the new 20th Century Fox fanfare at the Newman Scoring Stage. "We liked the sound of the live mix so much that we didn't remix it at all." John Kurlander, Grammy award winning Scoring Mixer.

AROUND THE WORLD IN 24-BITS



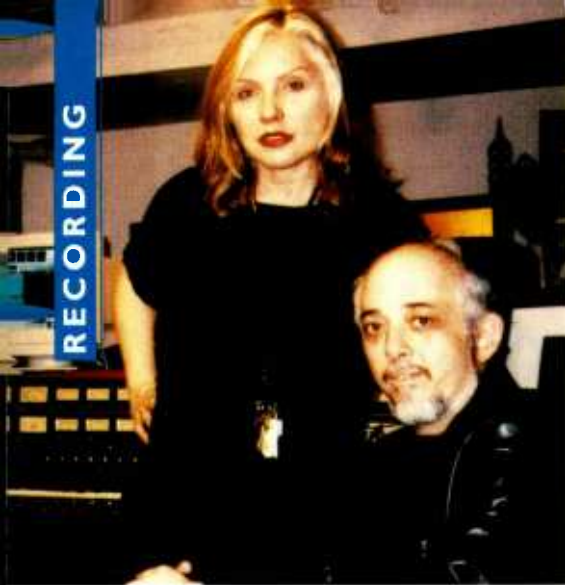
Up to 24-bit / 192kHz sample rate · Simultaneous recording of 8 x 20-bit tracks on a standard 2.6Gb MO disk, using internal A-D converters · Forwards, backwards or varispeed lock to timecode or bi-phase · SCSI interface for links with external editors (SADiE, etc.) · Sample accurate synchronising of up to 8 machines · New GXR48 remote control



Manufactured in the UK by Genex Research. Exclusive worldwide distribution by HHB Communications.

HHB Communications Ltd · 73-75 Scrubs Lane, London NW10 6QU, UK · Tel: 0181 962 5000 · Fax: 0181 962 5050 · E-Mail: sales@hbb.co.uk
 HHB Communications USA · 626 Santa Monica Boulevard, Suite 110, Santa Monica, CA 90401, USA · Tel: 310 319 1111 · Fax: 310 319 1311 · E-Mail: sales@hbbusa.com
 HHB Communications Canada Ltd · 260 King Street East, Toronto, Ontario M5A 4L5, Canada · Tel: 416 867 9000 · Fax: 416 867 1080 · E-Mail: hbbcan@istar.ca
 Visit HHB on line at: <http://www.hbb.co.uk>





Deborah Harry with Craig Leon

actual music is a lot more important. I come from playing music; I learned engineering by the seat of my pants along the way—mainly because people wouldn't make records as loud as I wanted. I watched Tom Dowd at Criteria, and figured I'd have a go at that and just make it a little louder.'

Leon chooses a studio by the quality of the live area and the atmosphere for the band. 'Studios are right to emphasise their unique creative vibes over what gear they have. If you've got the right music and the right feel, it doesn't matter if it's recorded on one console or another, or one tape-disk format or another. I've done records entirely on

MCI's. The Ramones record was done on a now extinct API console, with 550A EQs, mixed manually, 16-track to a 2-inch 3M 79—one of the worst machines ever made—and mixed down to another 3M, with a bunch of odd compressors and stuff. And you get other records mixed on SSLs which sound great, too.

'Monitors are the most personal thing; you have to get those exactly right for you. Same with amps; if you go with a Hafler amp or a Dynaudio amp, they'll sound radically different. But in terms of EQs and desks, well... Nowadays you can chop and change so much. If I don't like the desk EQ in a place, I'll bring in my own stuff, so I would never say I'll only go to a studio which has, say, a Studer Mk.III 12-in, 4-out console. As long as your favourite records sound right to you in that room, that's basically it. As long as the band is comfortable to be there, too, of course.'

Reacting against the decadence of albums by Steely Dan, The Eagles or Emerson Lake & Palmer, Leon drew upon the rootsy heritage of Florida R&B and his early radio influences when tackling mid-1970s New York punk.

'All the pioneering producers of country, blues and folk were the guys that I thought were really cool. There was Alan Lomax and the recordings of Muddy Waters in The Library of Congress; the Chess brothers and Howlin'

Wolf's 'Smokestack Lightning'—one of my favourite records. I was listening to these on the radio when they first came out. Hank Williams, Chuck Berry... The appeal of these records was that they were very direct. Phil Spector blew me away; here was a guy who could make a little Wagnerian opera condensed into three minutes on a bit of plastic, using studio technology.'

Other influences were the record company executives who were the precursors to today's independent producers. 'Richie Gottelhrer was one of those old-time songwriters from the fifties; he wrote 'My Boyfriend's Back', and so on—again a primitive, rootsy style of recording.

'Once I moved to New York, the fifties jazz producers really hit me. I wanted to make records as direct as *Sketches of Spain* [by Miles Davis], whatever the genre. As little interference with the music as possible. Even people like Tom Dowd had made very slick records, not raw at all. Because I did punk first, my first records were raw—because the music was raw. But I'm equally proud of some of the country records I've made, which had the same philosophy. Things like Rodney Crowell, Guy Clark, Sir Douglas Quintet. Take the Roches record I did with Robert Fripp—acoustic guitar and vocal, that's it. Oh, Tony Levin plays triangle on one track...

'We would switch the audio >

Earthworks

Designed by Dave Blackmer founder of DBX™

The QTC1 quiet omni

The QTC1 offers 4 dB less noise than the TC40K, ruler flat frequency response from 4 Hz to 40 kHz, superior impulse response and that great Earthworks sound.

...and because omnis are not for everyone,



The Z30X cardioid mic

The Z30X offers unusually smooth on-axis response to 30 kHz, very low off axis coloration, extraordinary rear rejection, clean impulse response and great sound for vocals, drums and etc.! Excellent for stage, studio, and broadcast.

Matt black finish now available for all models.



The LAB series preamps

- Flat response from 2 Hz to 100 kHz ± 0.1 dB.
- 0.25 μ sec rise time.
- Stepped gain from 0 to 66 dB.
- Variable control of gain to three separately driven outputs.
- Gold plated switches!
- Standby, Polarity and +48v and Phantom Switches.
- Inaudible preamp noise even at 60dB of gain.

The LAB series preamps are ideal for 96K/24 bit digital or extended frequency analog recording. If you like the clarity and realism of Earthworks mics, you'll love our preamps!



Earthworks Distributors

Belgium	Apex	8930 6313	Finland; Norway; Sweden	Golden Age Music	+46(0)32266 5050
Denmark	Orkester Graven	8618 4922	Netherlands	Focus	20687 8600
France	JukeBox	14093 0101	UK	Unity Audio	01440 785843

Mike Hedges



on BASF tape

“When we changed to SM 911, 7 or 8 years ago, we got that sound back. It has a really good musical edge.

When **BASF SM 900 maxima** came out we started to use that on the 24 track – it gives me that sound I want.”

Producer of the **Brit Awards “Album of the Year” 1997 “Everything Must Go”** by the **Manic Street Preachers** and Winner of the **Music Week “Producer of the Year” 1997**, Mike Hedges has produced hits of artists such as **Texas, Everything But The Girl, Siouxsie and The Banshees, The Cure, The Beautiful South, Geneva and McAlmont and Butler.**

EMTEC Magnetics

For more information contact
+44 01295-227838 or visit EMTEC Magnetics’
web site at <http://www.emtec-magnetics.com>

www.americanradiohistory.com



SM 900 maxima is a high-output analogue tape designed specifically for multi-track recording and mastering, with extra wide dynamic range, low noise and low print through.



BASF

< perspective between verse and chorus, again getting back to that art technique of cut-ups. We even toyed with the phrase "audio vérité". You have to use little tricks and enhancements, but they shouldn't be noticeable. You shouldn't be able to pin-point any specific effect that you've done.'

Without pin-pointing, it must be said that the punk ethic was undoubtedly to avoid reverb. 'It was seen as very slick,' Leon admits, 'and we were distancing ourselves from all those smooth productions of the seventies. And all the old country, jazz and blues records that I really liked were very natural-sounding, where you would only use reverb for a specific effect.'

It's a big mistake, for example, to think that Phil Spector's wall-of-sound records were washed in echo. Sometimes there are overall effects on voices,

but in general it's pretty dry. There's just a whole lot of things going on at once, and what you hear is the ambience of the room. I've always been fond of placing room mics in odd places to enhance that: you walk around the room with one ear covered so you're listening like a microphone—sometimes I'll move a couple of grand pianos near the drum kit, and put a mic into each one. I did that with The Ramones—you get a very dry sound, in fact, but a big sound as well.

Experimentation with what you had was the thing. Technology was very expensive in those days, and most of my records were on shoestring budgets. We had the Cooper Time Cube, which is all over the Ramones album, but that was about it. Level and tape compression were the keys: what it did to bass and drums was amazing. You have to

remember that there were only a few primitive compressors and limiters in those days. Tape compression was a specific effect, it wasn't just the punk ethic dictating loudness. You got a big, round bass drum sound from it. Even jazz producers would use it for the same effect.'

L EON ARRIVED in England to find that the producer was expected to have a lot more on his palette. Just at that time, high-end sampling systems from Fairlight and Synclavier were becoming established in British recording, and he quickly found himself taking stock of the changes.

'My main concern was to avoid sounding like those very obvious "Fairlighty-sounding" records, with a certain frequency and a certain sheen which made it sound like the technology was in charge, rather than the other way round. I was using Fairlight at that time, but in the opposite way to, say, The Art of Noise. In retrospect it was more in the spirit of Jesus Jones or The Fall, using the equipment but trying to make it sound like it was part of the band. I'm not saying it's wrong to make statements with that technology: I think Propaganda's album was one of the defining albums of the decade. But it was contra to my own philosophy—unless of course I was working with someone like Front 242 or Cobalt 60.'

Indeed, Leon collaborated on albums and 12-inch mixes in the pioneering days when industrial music was banging on the doors of house—puzzling for Ramones fans, but reflecting Leon's paramount sensitivity to the needs of the artist. 'No, I'm not a luddite; I'm just saying that to me technology has to serve the purpose of the record. If it's important for the project, I love using it. A lot of eighties records were mundane soul records made entirely with technology, which I didn't like, but if you take those sounds and mutate them, so that they sound totally different to anything else, you have a meaningful record.'

'Working with Blondie and Suicide, we were very interested in the hypnotic effect of loops. Kraftwerk were a great influence on all the punk bands. We were even more partial to Can, which sounded like Kraftwerk but played live. Muddy, lo-fi recordings with that real techno vibe of the modern world.'

'The biggest influence on The Ramones' album, sonically, was 'Silver Machine' by Hawkwind—a total techno-noise record, recorded live with a wall of synth. One of my greatest joys was working down at Rockfield in the eighties, and borrowing a synth from Hawkwind in the next studio. They said, 'don't touch any of the presets'—so we had to find out what was so important about these presets. And every single one of them was that wooshy noise from 'Silver Machine'—slight variations of the same sweep.

Classic Performer

The classic 4006 omnidirectional microphone from DPA Microphones (formerly known as Danish Pro Audio,) is a proven, no-nonsense cost effective workhorse with an enviable pedigree. The audio professionals' choice, the 4006 embodies the finest available materials. Utilising advanced production and quality assurance techniques, the 4006 is an indispensable tool for the professional studio or broadcast environment. Outstanding performance is characterised by an extremely linear frequency response and a very low noise floor.

The 4006 is just one of the high quality products from the renowned 4000 series, evolved from over 50 years of innovation and customer service - available now from DPA Microphones.

AUSTRALIA: (02) 99575309
AUSTRIA: (02236) 26123
BELGIUM: (02) 5200027
BRAZIL: (11) 2468166
CHINA: 24981788
CROATIA: 51 675 150
CZECH REPUBLIC: 2544173
DENMARK: +45 4814 2828
ESTONIA: 6418006
FINLAND: (09) 512 3530
FRANCE: (01) 46470210
GERMANY/MID: (06171) 4026
GERMANY/NORTH: (040) 3554230
GERMANY/SOUTH: (081) 4253900
GREECE: (01) 3304220
HUNGARY: 1 214 9549
INDIA: 226335450
INDONESIA: (021) 8292202
IRAN: (0171) 3855565
ISRAEL: (03) 5441113
ITALY: (051) 766648
JAPAN: (03) 37798672

NETHERLANDS/LUX: (010) 4147055
NEW ZEALAND: (9) 2797266
NORWAY: 671 223 90
POLAND: (022) 8274854
PORTUGAL: (01) 3538331
RUSSIA: 503 956 1826
SINGAPORE: 7489333
SLOVAK REPUBLIC: (7) 654 22249
SOUTH AFRICA: (011) 466156574
SOUTH KOREA: (02) 5653545
SPAIN, LEON: (9) 3 203 48 04
SWEDEN: (046) 320370
SWITZERLAND: (01) 8400144
TAIWAN: (02) 7139303
THAILAND: (02) 732 2350
TURKEY: (212) 2243201
UKRAINE: (05251) 527500
UNITED ARAB EMIRATES: (02) 655446
UNITED KINGDOM: (0171) 8907070
USA & CANADA: 5197451158
VENEZUELA: (02) 358002

Series 4000 Microphones from DPA

Hejrevang 11, 3450 Allerød, Denmark
 T: +45 48142828 F: +45 48142700
 www.dpamicrophones.com

DPA
 MICROPHONES

I thought, yeah—this is my kind of band.'

All recording is sampling, according to Leon—it's just that the mechanical means to do it have become more efficient.

'Recording is a manipulative process in the first place. When they put a mic in front of Robert Johnson sitting in a hotel room playing guitar, the result was not just Robert Johnson. It was Robert Johnson caught inside a medium. Something was changed. You can try to duplicate as much of the input as possible, but you're making a transfer. You're just trying to package the spirit of what's being expressed in the most suitable way for the final product, whether you start with a bottleneck guitar or a Fairlight.

'People in recording get hung up on analogue or digital, one kind of reverb or another. Anything which improves the picture is okay. But you can't do it to the point where you overwhelm the sound. It has to come through on its own.

'One thing that makes the modern era so much better than when those guys were making those old records is that the sound of the nineties can be the sound of anything. You have this whole storehouse of information to draw on. The way that dance music samples antique sounds and incorporates them into modern recordings has been really positive. The world is not so structured any more.'

It is arguable that the role of the producer is to find a structure in this confusion—but if the producer, like Leon, is a good A&R guy too, things should fall into place naturally.

'Every time you go into the studio you should hope to bring out the most individual characteristics of what you're doing. Producers don't make the music; you're working to bring out the vision of the artist on a mass communications medium. Sometimes artists are attracted to you because of some old record you made. And while I'm very glad to have worked with The Ramones or The Fall, I have to say to them, well, I really like your music' and I want to make your record, not theirs again.'

ONINITIAL meetings with bands Leon won't talk about studios or records, least of all his own records. 'You're going to spend a lot of time with someone, and you've got to establish some common ground. But I'm only interested in them, and what's happening now. With this new Blondie project I was very keen to document what they're doing now, and have none of that, 'gee, wasn't it great in the old days'. We did that already, and it documented those ideas perfectly well. The new record should not refer back to that period at all.

'Sometimes the guy in the loudest band in the world will tell you that his favourite album is a Nick Drake, or something like that. It's very important

to focus in on personal details like that. You can take it as given that you like the band's music once you've heard the tape or seen them live and you've agreed to work with them—and later on you can get to the specifics of each individual sound, but in between, you've got to establish a general understanding of what they're trying to say.'

A new project with Ray Cooper, Elton John's percussionist, is already underway. 'It's going to be live drum loops with various ethnic drums, with Ray directing, then using these loops as a basis for tracks with invited musicians. Maybe a string quartet on one, a vocal on another, Eric Clapton doing straight country blues on another... Then we'll make a 'Ray Cooper Project' band and do some live shows.

'It goes back to an album I made in 1980 using a prototype Linn drum, on

which I made up a load of North African rhythm loops and fused these with simple, ancient Greek music on synthesisers.'

For trivia buffs, this was called *Nommos*, released by Chrysalis in 1981. But to find out where Leon's tireless search for originality may lead him next, you'd better just keep an open mind.

'I'm not averse to having different engineers at different stages, because different people are good at different things—even for different songs on the same record. It's an ongoing process, and there are always people that you'd like to work with if you get the chance.'

And just to prove his eclecticism, Leon answers the obvious last question with a less than obvious choice...

'I'd really like The Prodigy to do some remixes of this new Blondie stuff.'

Wouldn't we all? ■



More features and more performance per pound than any other UHF Radio System on the market.

The new Freedom range of wireless microphones gives you the choice of upto six full diversity UHF receivers in 1 U. Freedom is a fully synthesised, frequency agile UHF system with additional features such as auto set up, selectable user groups and battery status indication. The system has a built in DA, allowing you to run an active aerial system giving outstanding audio and R.F. integrity even in the most demanding environments. Freedom allows you to choose from a range of six transmitters giving you the flexibility to match a system to any application. Why use VHF systems when UHF technology is now so affordable?

For further details & prices, and to arrange a demonstration, please contact Total Audio Solutions

Total Audio Solutions Limited,
Stockwood Business Park, Stockwood, Worcestershire B96 6SX
Telephone: 07000 45 6000 Facsimile: 07000 45 5000



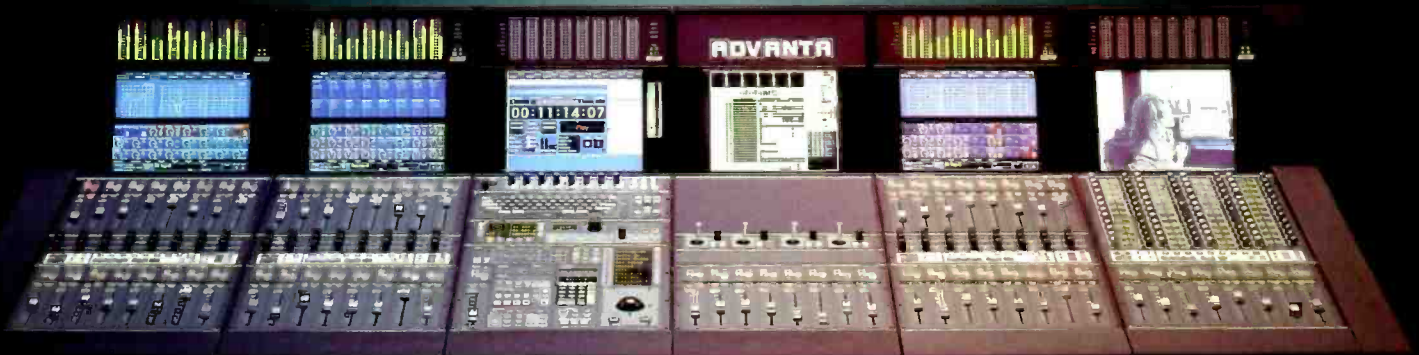
Freedom is a trademark of Sony Corporation. Sony is a registered trademark of the Sony Corporation

Lightwinder Colosseum

ADVANTA RADAR II



RADAR II is a self-contained, extremely compact, superb sounding 24 track recorder. Two RADARs can be linked for 48 tracks, with both mainframes controlled by a single remote.



ADVANTA is Otari's first large format digital mixing system with extended 40 bit floating point DSP and 24 bit / 96 kHz capability. Designed for music, post, broadcast and film the console is available with up to 256 channels. Input sections include mapped or dedicated control surfaces with motorized faders & exclusive motorized rotary encoders (whisper pots™).



LW-50 COLOSSEUM is Otari's new optical, digital audio transmission and routing system. **LIGHTWINDER** will send and receive up to 64 full bandwidth channels. Using fiber optical cable multiple modular frames can be linked over a distance of up to 4.5 km. Analog, AES/EBU, intercom, RS-422 and video signals can be distributed.

Introducing the first digital multitrack production studio in 24 bit

The Otari Logo is a registered trademark of Otari • RADAR & RADARLINK are trademarks of Creation Technologies Inc • ©1998 Otari Europe GmbH

Otari Inc. Japan
Phone: +81 (0) 424-81-8626
Fax: +81 (0) 424-81-8633
www.otari.co.jp

Otari Corporation USA
Phone: +1-650-341-5900
Fax: +1-650-341-7200
www.otari.com

Otari Singapore Pte. Ltd.
Singapore
Phone: +65-284-7211
Fax: +65-284-4727

Otari Europe GmbH
Germany
Phone: +49 (0) 2159-50861
Fax: +49 (0) 2159-1778



Lavender Castle

The new Gerry Anderson television series is a space adventure with a difference, as **Simon Croft** discovers when he talks to Daren Cox, sound editor at UK facility Hullabaloo

The 21st century already has a few pioneers working full-time in outer space. These bold adventurers devote their lives to pushing back the boundaries of what is possible. One such man is Daren Cox: sound editor.

Cox is currently working diligently on *Lavender Castle*, a 26-part television series from Gerry Anderson. Mr Anderson is no stranger to space himself, after all, it was Anderson who inspired generations of children to run round the school playground yelling, 'You take Thunderbird 3', 'FAB, Virgil', or just plain 'Wooooosshh!'

Lavender Castle may not be a *Thunderbird*, *Stingray*, *Fireball XL5*, *UFO*, *Space 1999* or *Captain Scarlet* remake, and its plot occupies more fanciful territory, as Cox explains: 'It's about these space travellers who are looking for Lavender Castle, which is the centre of the universe, and the place where goodness radiates,' he enthuses. 'They are the goodies, but they come across baddies along the way. The main one is called Dr Agon, who flies around in this big, menacing looking ship. He tries to stop them by blowing them up and

there are various other baddies along the way.'

So, even by Anderson's standards, *Lavender Castle* is no 'ordinary' space adventure. Visually, the spacecraft make even the implausibly dimensioned Thunderbird 2—the retro-rockets on which used to help the lumbering craft descend—look like an orthodox link in aerospace history.

Cox and his Hullabaloo partner, Simon Hall, wanted to give each spacecraft a unique sound and to move away from the 'tub boat at half speed' sound, which has become the *de facto* spaceship effect. It soon becomes clear why a rethink was in order.

'We've all seen space ships flying around [in films] and they all look and sound similar,' Cox explains. 'One of the ships in *Lavender Castle* actually looks like a thatched cottage, so creating a sound for that was quite a challenge.

'Obviously, you needed the sound of a rocket underneath it all but then also the creaks of all the wood,' says Cox. 'There is also a kitchen which you can see sometimes, so we've got pots bubbling away in there and a fire

crackling away. There is an old Rolls-Royce tickover engine in there as well, so that it sounds quite old, but there is power there.'

Armed with samplers, keyboard instruments and other sources, Hullabaloo went about making just the right effects for each spacecraft and each planet visited. It turned out to be quite a job in itself.

'For that one spaceship, there's probably about 16 tracks, just to make up the one noise. It's quite a complex job,' Cox reveals. Many of the other craft were no less involved.

'There's one pirate ship in space, so you have the noise of the sails but also the noise of a spaceship,' says Cox.

At the time of writing, Cox is editing Episode 24 of 26 but, as the episodes have not been worked on in exact sequence, he actually has another five to work on.

The chance to pitch for the sound posting on *Lavender Castle* came through Cosgrove Hall Films, which won the contract for the model animation (see side-bar). Previous Cosgrove Hall animation contracts have >

< included *Danger Mouse*, *Count Duckula* and *Wind in the Willows*.

Hullabaloo came recommended but Cox notes, 'If Gerry Anderson didn't like us or thought we weren't up to the job, he would have the clout to go somewhere else. But we seemed to hit it off straight away when he came here to have a look and he liked what we were saying about the project, some of the ideas we had.'

Ask Cox about the difference between working with animation and 'real' footage, he initially jokes: 'I suppose the actors are less temperamental—although some of the animators might disagree when puppets fall over in mid shot. I've worked on dramas and documentaries but I actually think that animations can be a lot more challenging. You are starting from absolutely nothing, so you are creating every single sound.'

'In a drama, you would have the atmos of where it was recorded on location. With animation, if the character wears a cloak, you have to create sounds for that. You have to make that cloak move and come alive. That is true of every effect: if they move something, put a cup down, you have to do it. All you've got is two tracks of dialogue.'

'We use over 70 odd tracks for a 10-minute programme. With computers, it is quicker than it used to be. A programme of this length used to take



about five weeks for four dialogue editors to work on. I can now do it on my own in five days.'

One thing animation does have in common with feature films is the difficulty in getting to a locked off cut and the flexibility of new technology has been used to keep some fluidity in the process for longer than would have been the case.

'Sometimes, we work to an off-line picture, but then there are still scenes missing where they want reshoots,' says Cox. 'Whereas the models are shot in the studio, the space ships are computer generated, so there are time lim-

its and sometimes we may be waiting for the computer shots, or reshoots of the model.'

'So we can be working on shows where all the scenes are not there or you know there are scenes which are going to change, so you don't do anything for that part. It can get a bit higgledy-piggledy but normally, a good 70% of the scenes are there for us to work on. Then we go over it again when the new scenes are there, then go through it with the director just to make sure it's all okay for them.'

Although postproduction started around 18 months ago, the majority >

FAR

<http://users.skynet.be/far>



THE FIRST EVOLUTIONARY ACTIVE MONITORS

NEW!

CHOOSE YOUR BEST LISTENING ENVIRONMENT

phone : + 32 4 259 74 12
fax : + 32 4 259 74 10



AV-1



AV-5



AV-10

FAR - 1997

" The Euphonix brings a unique level of flexibility to the Strongroom taking the studio to a great new creative plain. The versatility matched with the sound quality of console is its great strength."

Rob Buckler, Strongroom

Erasure, The Prodigy, Courtney Pine & Beverly Knight.

" There's nothing we cannot do with our Euphonix from full orchestral recording to 5.1 Surround mixing. Euphonix's capabilities are truly staggering."

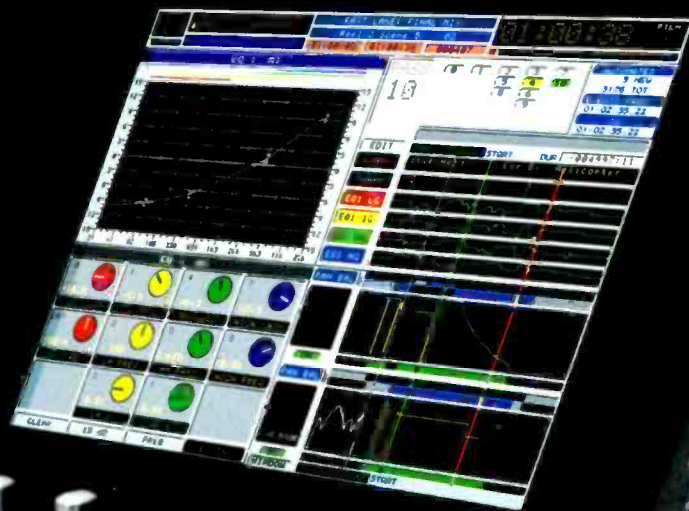
Steve Parr & Sharon Rose. Hear No Evil.

Divorcing Jack, Our Mutual Friend, Painted Lady, Cold Comfort Farm & Bramwell.

" Quite simply the best decision we ever made."

Tony Taverner, Sensible Studios.

East 17, Gabrielle.
Steve Parr & Sharon Rose. Hear No Evil.



www.euphonix.com

CS3000

Euphonix
digital control audio systems

World Headquarters Tel: (650) 855 0400
Nashville (Central US) Tel: (615)327 2933

Los Angeles (West US) Tel: (818) 766 1666
London (Europe) Tel: (171) 602 4575

New York (East US) Tel: (212) 302 0696
Tokyo (Japan) Tel: (03) 3288 4423

< of the dialogue recording was done two and a half years ago, before the second Hullabaloo studio was built. As with most animation, the dialogue was cut to the storyboard before the animation was created. Cox explains:

'The dialogue is cut to the length of the body of the programme. The body is nine and a half minutes and the titles make it up to the full 10 minutes.

'So you cut the body with all the gaps for action, scene changes and everything else. Then it goes to a process called barcharting, which means that someone counts every frame and every syllable so that if "La-ven-der Cas-tle" lasts three seconds, at 25 frames a sec-

ond that's 75 frames. Someone has to go through every frame so that the animator knows how long to move the mouth and to move the body for action.'

With every other sound added in post, it's small wonder that Cox does not attempt every aspect of it single handed. Mixing is handled by Simon Hall and again, maximum advantage is taken of computerisation.

'On the Avid AudioVision, you can make up sequences of the same scene over and over again,' says Cox, 'so we lay up one sequence just of dialogue, which Simon will premix. Then we do a spaceship premix, with them all whizzing around. Then there is an

atmos premix, followed by an effects premix. We put all that together with the music that's specially written and go for the final mix.' Just the premixes take about a day to complete; although there is occasionally some scope for reusing sequences.

'There are things I've done and kept which we can use again, such as an atmos they keep going back to,' he says. 'If it's premixed on the computer, I can bring it in again to save Simon's time.'

'This is proper film mixing,' Cox concludes, 'It is a complicated little process. It's not quick and it's not easy. It takes another whole day to do the final mix for a 10-minute programme.' ■

Hullabaloo facility tour

Part of the Cosgrove Hall media complex in Manchester, England, Hullabaloo was set up two and a half years ago. Founders Daren Cox and Simon Hall formerly worked at John Wood Sound in Manchester.

Hullabaloo has grown since 1996 to employ three more people. In addition to the Dolby Surround dubbing studio, it now has a stereo studio, set up for multi-mic and Foley work. It also has a number of edit suites and a machine area, which includes the computers and video systems, so that working areas have the minimum of heat and noise generating equipment.


John Wood Sound was an early adopter of the Avid AudioVision system, so it is no surprise to discover that they are central to Hullabaloo's editing and dubbing set-ups.

'The main studio has the Avid AudioVision 16 track and an Akai DD1500, so we have 32 tracks which we can play off and

record onto at any one time,' explains Cox. 'We can also put into that Hi-8s and DAT and desk we also have the Amek DMS.'

In fact Hullabaloo became something of a test bed for Amek, which is based in nearby Salford. Although it was Amek's first digital console, the technology developed was soon adapted to some of Hullabaloo's more arcane postproduction techniques.

The second studio has a recording booth which will house about five people and the paraphernalia necessary for Foley recording. Although Hullabaloo obviously benefits from its connection with animation experts Cosgrove Hall Films—and other media companies in the complex, such as nonlinear film editors Flix Facilities—it also works for UK broadcasters the BBC and Granada, as well as independent advertising agencies and clients in the corporate sector. Nonetheless, Cox estimates that about 50%–60% of Hullabaloo's work is sound for animation.



INTERNATIONAL DEALERS

AUSTRIA	T: +43 1 4895757 F: +43 1 4895758
AUSTRALIA	T: +61 2 99040344 F: +61 2 99040368
BENELUX	T: +31 10 4147055 F: +31 10 4113580
CHINA / HONG KONG	T: +852 28989366 F: +852 28967603
DANMARK	T: +45 45 460460 F: +45 45413413
FINLAND	T: +358 9 5499400 F: +358 9 54994300
FRANCE	T: +33 1 42468501 F: +33 1 42462048
ITALY	T: +39 2 48022775 F: +39 2 48022770
JAPAN	T: +81 3 33323211 F: +81 3 33323214
KOREA	T: +82 2 3262031 F: +82 2 3262034
MALAYSIA	T: +60 3 7242466 F: +60 3 7242467
NORWAY	T: +47 22 37 02 18 F: +47 22 37 87 90
SINGAPUR	T: +65 748 9333 F: +65 747 7273
SPAIN	T: +34 1 6943711 F: +34 1 6942413
SWEDEN	T: +46 3 7087570 F: +46 3 884533
SWITZERLAND	T: +41 1 8400144 F: +41 1 8410726
U.K.	T: +44 181 4607299 F: +44 181 4600499
U.S.A./CANADA	T: +1 905 4698080 F: +1 905 4691129
and	T: +1 212 765 3415 F: +1 212 581 8938

Unique Digital Voice Processing!

vamp 1
vamp 2



WINNER
vamp 1
COMBINED
OUTBOARD
DEVICE



digital voice and monitor processor

voice processor

MEMORY KEY

SAVE

Already tested?

Jünger audio
Studiotechnik GmbH

Jünger Audio Studiotechnik GmbH
Rudower Chaussee 5 (Geb. 9.51)
D - 12489 Berlin
Germany

phone: +49 (030) 677721-0
fax: +49 (030) 677721-46
e-mail: info@junger-audio.com
http://www.junger-audio.com

VISIT US! SEE THE NEWS!



Amsterdam San Francisco
hall 9, booth 115 booth 147

Focused on Film ...

Perfect for Post



Avant is the only digital console with a control surface designed specifically for multi-channel film mixing and video post production. SSL's Real Time Resource Processing means that all the controls on every channel are always available, whether the console has 24 channels with a single operator or 96 channels and three film mixing positions.

Avant combines the look and feel of a traditional analogue console with all the digital benefits of dynamic automation plus global or selective snapshot instant reset. With 32 main mix buses, 24 pre-dub buses and a 64 x 8 digital monitor matrix, Avant becomes the logical choice for multi-channel surround sound mixing.



"It's the overall flexibility and expansion capabilities of Avant that convinced us."

Alan Snelling, Anvil Post Production, UK.

"Mrs Brown" Image courtesy Ecosse Films.

Solid State Logic

International Headquarters

Begbroke Oxford OX5 1RU England

Tel: +44 (1865) 842300

Fax: +44 (1865) 842118

Email: sales@solid-state-logic.com

<http://www.solid-state-logic.com>

New York

+1 (212) 315 1111

Los Angeles

+1 (213) 463 4444

Tokyo

+81 (3) 5474 1144

Paris

+33 (1) 3460 4666

Milan

+39 (2) 2622 4956

Toronto

+1 (416) 431 9131

Singapore

+65 285 9300

The World of

Milab

VIP50

EMBLA

DC96B

VM44

LSR 1000

LSR2000

LC25

D37

MP30

Milab
SWEDEN

EMBLA

made in Sweden
now with Lifetime Warranty
for Each Performance and Application

AUSTRIA
DANUBIO TONTECHNIK - WURSER KEG
PHONE: +43 732 34096
FAX: +43 732 345307

BRAZIL
LIBOR COMERCIO E IMPORTACAO LDA
PHONE: +55 116048339
FAX: +55 116045027

CANADA
SOUND OPINIONS
PHONE: +1 416 254 8808
FAX: +1 416 530 4565

CYPRUS
FSD ELECTRONICS LTD
PHONE: +357 5 367985
FAX: +357 5 352635

DENMARK
STAGE GROUP
PHONE: +45 38 607397
FAX: +45 38 600884

FINLAND
STUDIOTEC KY
PHONE: +358 9 5123 530
FAX: +358 9 5123 5355

FRANCE
JEDIS
PHONE: +33 1 42398080
FAX: +33 1 42398687

GERMANY
PRO AUDIO MARKETING GMBH
PHONE: +49 69 658011
FAX: +49 69 653165

GREAT BRITAIN
AUTOGRAPH SALES LTD
PHONE: +44 71 267 6677
FAX: +44 71 485 0681

GREECE
KEM ELECTRONICS LTD
PHONE: +30 1 6478514
FAX: +30 1 6476384

HOLLAND
AUDIO ELECTRONICS MATTHESEN B.V.
PHONE: +31 20 6990480
FAX: +31 20 6993641

HONG KONG
ADVANCETEC INTERNATIONAL CO., LTD
PHONE: +852 2408 2322
FAX: +852 2408 2332

INDIA
BOMBAY FILM LABORATORIES PVT LTD
PHONE: +91 22 4222510
FAX: +91 22 4135638

IRELAND
CONTROL TECHNIQUES IRELAND LTD
PHONE: +353 1 545400
FAX: +353 1 545726

ITALY
AUDIO LINK
PHONE: +39 521 648723
FAX: +39 521 648848

JAPAN
HOOK UP INC
PHONE: +81 3 5256 2853
FAX: +81 3 5256 2856

KOREA
HANYANG ELEC. MARKETING CO LTD
PHONE: +82 2 289 5424
FAX: +82 2 269 9130

LATVIA
AUDIO AE
PHONE: +371 2 296828
FAX: +371 8621127

MAINLAND CHINA
ADVANCETEC INTERNATIONAL CO., LTD
PHONE: +86 21 6471 1046
FAX: +86 21 6471 1843

MEXICO
VARI S.A DE C.V.
PHONE: +52 5 255 3723
FAX: +52 5 203 7243

NEW ZEALAND
PROTEL INTERNATIONAL TECH. LTD
PHONE: +64 4 385 4874
FAX: +64 4 384 2112

NORWAY
SIV. ING. BEMUM A/S
PHONE: +47 22 139900
FAX: +47 22 148259

SINGAPORE
STUDER REVOX
PHONE: +65 4815688
FAX: +65 4819096

SLOVAKIA REPUBLIC
PRO AUDIO MARKETING S.R.O.
PHONE: +42 7 786667
FAX: +42 7 786133

SPAIN
ALPROSA
PHONE: +34 3 3517762
FAX: +34 3 3402766

SWEDEN
ERATO SOUND SIDE
PHONE: 08-743 07 50
FAX: 08-714 82 99

SWITZERLAND
JBC INTERSONIC AG
PHONE: +41 56 450 21 70
FAX: +41 56 450 21 71

TAIWAN
ADVANCETEC INT'L CO. LTD
PHONE: +886 2 716 8896
FAX: +886 2 716 0043

THAILAND
KAMOL SUKOSOL ELECTRIC CO., LTD
PHONE: +66 22227000
FAX: +66 22253173

USA
GROUP ONE LTD
PHONE: +1 516 249 1399
FAX: +1 516 753 1020

MILAB MICROPHONES AB
DISTRIBUTORS

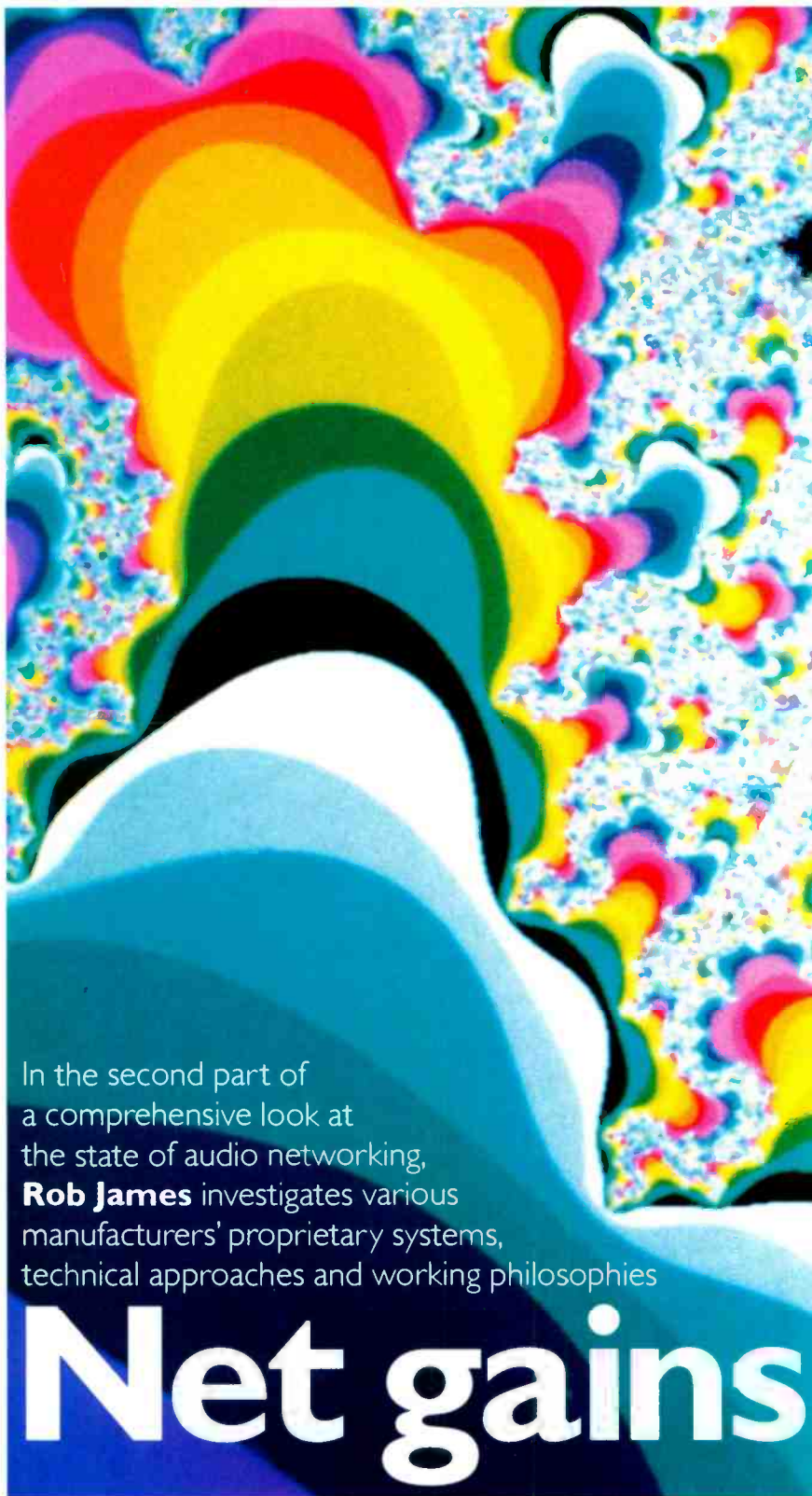
THAT NETWORKING is a hot issue is, in part, driven by the interest of computer systems companies such as Hewlett Packard, Silicon Graphics, Tektronix, Oracle, Apple Computer and Microsoft. These companies are extending their existing data processing and transaction models to support video, audio and associated 'metadata'. And they are not alone—the push from the suppliers is endorsed by radio and TV chief engineers worldwide and the traditionally conservative film people have been equally quick to see the possibilities.

If a satisfactory architecture for the transport of massive amounts of digital video data can be established, it follows that the same technology will be adopted in many applications for audio networking. To do otherwise would be perverse. Accordingly, it is worth taking a look at some of the manufacturing solutions. Although it is becoming an increasingly difficult category to define, the companies here may all be considered manufacturers of 'hardware' DAWs.

Akai was one of the first digital audio manufacturers to use existing Ethernet network technology to allow the various items in their product range to be interconnected. No audio is transferred over the network. It is designed to be a sophisticated means of remote controlling many of the functions of multiple machines. As an example, this allows multiple DD8 dubbers and DD1500 DAWs to be controlled from a single DL1500 remote. A DL1500 in a dubbing theatre can 'dial up' any DD8s-DD1500s in a facility, put them on line and control all functions. Audio is delivered to the theatre by conventional tie lines. Project interchange is efficiently dealt with via 'sneakernet' and this includes direct access to audio disks from Avid systems among others. By keeping it simple Akai have delivered a solution that is stable and useable. It employs today's technology with very little management overhead. Akai feels the use of high-bandwidth networks is still in its early stages.

Many of the larger studios have already investigated the installation of networks to distribute video to various locations within the facility. Given the high costs involved in installing and maintaining such a system, and the high degree of management it requires, a logical step from this may be for the studio's audio departments to use any spare bandwidth on the 'video' network for audio distribution. This gives audio manufacturers a problem in that the amount of available bandwidth on the network for audio may vary depending on the level of video traffic.

Network technology itself is rapidly changing both in terms of physical specifications, cabling and the maximum bandwidths achievable. Given these changes, it is understandable that none



In the second part of a comprehensive look at the state of audio networking, **Rob James** investigates various manufacturers' proprietary systems, technical approaches and working philosophies

Net gains

of the major studios have yet committed to the installation of large-scale networks. Those that have tried have been beset with problems (for example, BBC News 24).

Akai has been following the developments in network technology but feels it is too early to commit to a particular medium as many of the current solutions will not be able to achieve the full expectations of users at a sensible cost. Akai's digital audio products have been

developed with an open-architecture. As such, it is possible to quickly add support for any network technology that becomes established as a standard, whether this is Fibre Channel, Gigabit Ethernet or some other variation.

Akai has a robust, practical and economical system that is field proven and they intend to ensure future developments, to extend the functionality, meet the same criteria.

AMS Neve's AudioFile first appeared >

< in 1984. The company has remained at the forefront of technical innovation, and is still imitated more frequently than one might suppose. Today's third-generation network capable version of AudioFile is based on the latest 24-bit hardware platform.

Due to success in major broadcast facilities with multiple rooms working on various aspects of projects, AMS Neve understands that elegant technology is not enough. Users require complete 'process' solutions. In company speak this is referred to using the umbrella term of 'Workflow'.

The Workflow 'audio resource management system' consists of three layers, any or all of these may be specified. The Audio layer handles Distribution of digital audio signals from multiple sources to multiple consoles/editors. The Control layer is a control bus that provides shared access to machine resources (ATRs, VTRs), plus the control of remote I-O units. The Project Management layer deals with Networking of AudioFile editors to enable sharing of projects and sources, plus off-line centralised archiving. Much use is made of industry-standard technology such as MAD1, ESBUS and OMFI.

StarNet is a network designed to enable multiple AudioFiles to share access to any project or sound source on the system. Any AudioFile control surface can be connected to any hard

disk array. When connected to StarNet, the direct connection between the AudioFile processor and its local disks is replaced by connection to any storage device on the network. Users can attach to any disk on the system just as if it were a local disk independent of traffic elsewhere on the network. The actual disks may be physically installed with each AudioFile or centrally in a 'disk farm'. Disks are often housed in a removable chassis to enable 'sneaker-net' project exchange with other facilities. Different projects can be stored on different drives. This simplifies tracking a project through postproduction as all the elements are in one location rather than distributed across several disks in a central server. Since each AudioFile processor and each disk bank has its own 400Mb/s optical connection, the performance is consistent, even with all users playing audio at the same time. The directory of all disks may be viewed by any user with the correct authority, whether attached to the disks or not. Shared disks, such as effects libraries, can be browsed by any user and recordings auditioned in real time. The selected items may then be copied to the project drive at high speed. If multiple rooms are working on the same project they may all wish to record and playback using a single drive containing all the project elements. Each user is given access to a number of tracks of

the disk which ensures that all users can playback their allocation of tracks at all times, independent of other users.

PROJECTS from OMF and Lightworks edit systems can be played back and edited directly without file translation. The Media Toolbox provides network-wide off-line backup and restore of either disk images or individual projects. This enables the 'house-keeping' aspects of the system to be carried out independently, off-line. The Media Toolbox also enables off-line conversion of OMF and WAV files to AudioFile format.

AMS Neve believes existing IT network technologies are unable to provide the required functionality, so StarNet uses a hybrid of proprietary and generic technology. The drives are grouped together logically to form a large server for the network, without requiring a stand-alone server. The central network router provides a high bandwidth path for directly connecting disks to AudioFiles. Other network functions are administered by network controllers which are interconnected via the central router. The StarNet system is scalable, and may be expanded by the addition of multiple routers and network controllers.

As well as performing network management functions, the network controllers provide an interface to the outside world. The controller is based >



Real time linear audio via ATM



the
sound
choice

IBC 11.-15. September, booth 9.231

Lawo Gerätebau GmbH, Am Oberwald 8, D-76437 Rastatt, Tel. +49(0) 7222/10020, www.lawo.de

Soundscape™

DIGITAL TECHNOLOGY

mixtreme™

Designed for



Microsoft
Windows NT
Windows 95

Digital Mixing, Real-Time Effects, 16 inputs & outputs, any questions?

UNBEATABLE
£449.00



There are many companies in the market place offering multi-channel audio PCI cards, but for most, this is where it ends. Most companies can at best just 'put chips on boards', but from Soundscape Digital Technology there is an unbeatable combination of software and hardware... **mixtreme**.

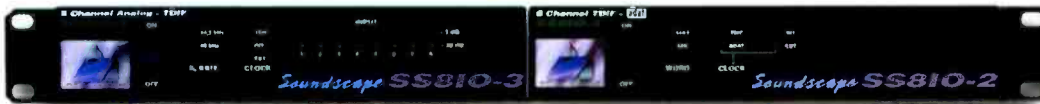
The **mixtreme** PCI card has a completely different concept, as not only does it provide 16 channels of 24 bit digital I/O via two industry standard 8 channel TDIF (Tascam Digital Interface) ports, but it also has 24 bit custom digital mixing and real-time DSP effects plug-ins from some of the worlds' leading audio companies.

mixtreme performs like you expect, without the annoying in/out delays that make native mixing and effects impossible to use in real time.

You can connect two Soundscape SS8IO-3 8-Channel TDIF to Analogue Interfaces to **mixtreme**, for a full 16 channels of 20 bit analogue input and output, or you can connect the TDIF directly to a digital console or Tascam DA-88.

For ADAT users, there is the SS8IO-2 TDIF to ADAT converter, and you can connect two of these, or combine one ADAT and one Analogue interface. Optional SPDIF completes the range of Digital Connections available.

With standard Multimedia drivers for Windows 95 and Windows NT, plus VST compatible ASIO drivers, **mixtreme** can be used with most PC based MIDI/Audio sequencers or PC based recording/editing software.



SS8IO-3 Interface

- 8 channel TDIF to unbalanced analogue I/O (cinch/RCA connectors)
- 20 bit AD/DA Converters
- Wordclock/Superclock in/out

SS8IO-3
£449.00

SS8IO-2 Interface

- 8 channel TDIF to ADAT 'lightpipe' conversion in both directions (simultaneously)
- Wordclock/Superclock in/out

SS8IO-2
£449.00

Reader Response No. 020

TDIF

Soundscape Version 2.0

emagic Logic

Soundscape™
Digital Technology

AUDIO TOOLBOX

WaveMechanics

APHEX

TC|WORKS

CAKEWALK
MUSIC SOFTWARE

Tel: +44 1222 450120 Fax: +44 1222 450130

email:sales@soundscape-digital.com

http://www.soundscape-digital.com

on a Windows NT platform. The PCI bus enables connection to other network technologies—ISDN, ATM. This gateway also provides a route to integration of video and other networking developments in the future.

DAR Digital Audio Research has been actively concerned with networking for a considerable time and currently offers the D-net system with the option of an AXIS audioserver for more complex systems. D-net is an integral part of DAR's 'open media' concept. To the user, all the workstations on the network appear as an extension to the individual DAW. Projects and Segments are auditioned in real time across the network in exactly the same way as if they were on a local drive. If remotely sited audio segments are placed in a local project the audio is copied in the background to local storage without user intervention. This allows editing to continue while the housekeeping takes place. There is a system of access writes to restrict remote users ability to erase or edit non local projects. To facilitate all this each recording is allocated a unique serial number so there should never be a problem with finding identical file names even when a project or segment is moved across the world to another machine. Material transfer is intelligent. If a project is edited on a remote machine and copied back only the changes to the EDL and any new pieces

of audio are actually copied. This would usually represent only a tiny fraction of the entire project.

The current hardware underlying D-net is a network hub using 100-Mbit Fast Ethernet. The technology employed is really irrelevant to the user and can, in any case, be upgraded as better things become affordable. The point is what this networking offers the user in functionality. In this case audio transfers across the net are typically 10 times faster than 'real' time.

The AXIS server uses a hierarchical filing system to manage projects and sound libraries. Furthermore the server may be used as a central archiving station, backing up material from remote DAW's to Exabyte or whatever. A standard Windows PC can be used to organise all this. There is no need to tie up a workstation. It is also possible to integrate ISDN links into the network.

The DAR approach is a perfect real-world compromise between providing a reliable solution and maintaining reasonable cost. By intelligent use of local storage the required bandwidth is minimised. CD Advance, DARs term for the use of a CD drive as on-line storage, which also allows CD tracks to be scrubbed as if they were conventional segments can also be accessed across the network. The desirability of this will increase still further when and if DAR develop a CD juke-

box as network device.

A lot of work has gone into getting the management aspects right. The system is easily able to take advantage of the rapid developments and falling costs of IT networking technology to improve throughout.

FAIRLIGHT, one of the early players in the DAW market, has recently introduced MediaLink which, together with Audiobase, a database to manage libraries, is its first networking effort. Their goal is real-time full-bandwidth networking with no local drives together with multiple simultaneous access to the same data. Currently, the hardware supports 86 tracks of concurrent real-time audio which equates to two or three MF3s plus other machines working 'store and forward'—with local storage.

There are five states a Project can possess: Media Read, Project Read, Marked for Backup, Append Write and Modify Write. A second operator can save his version on your project using an Extension in Fairlight parlance. To assemble tracks for, say a final mix, dialogue, effects and music blocks edited as separate Extensions can be merged into a single new project.

Fairlight's server uses a dual Pentium based PC with Windows NT as the operating system running proprietary networking software. Topology is cur- >

It's NEW!
2 pole version



WE ARE SETTING STANDARDS

www.neutrik.com



Neutrik AG
Liechtenstein
Tel 075/237 24 24
Fax 075/232 53 93

Neutrik USA INC.
USA
Tel 732/901 9488
Fax 732/901 9608

Neutrik (UK) Ltd.
Great Britain
Tel 019 83/811 441
Fax.. 019 83/811 439

Neutrik Zürich AG
Switzerland
Tel 01/734 0400
Fax 01/734 3891

Neutrik Tokyo Ltd.
Japan
Tel 081/3/5411 2551
Fax 081/3/5411 2827

Speakon®

THE WORLD LEADING Loudspeaker - Amplifier Connectors

- **2-, 4- and 8-** pole versions with „Quick Lock“ system
- **All contacts touch proof according to EN 60065 / IEC 60065 (CE)**
- **Contacting principle designed to prevent any damage from arcing when disconnected under load**
- **Chassis connectors are acoustically tight**
- **The new cable connector NL2FC mates also with NL4MP (+1, -1)**
- **Cable connectors have solid contacts with screw-type terminals and a special stranded wire protection, solderable too**
- **The chassis types are fast and reliably to wire with FASTON tabs**
- **Extremely reliable and robust**

NEUTRIK®

CONNECTING THE WORLD

Unleash your creative power

Xtrack

Versatile multitrack digital audio editing software

Xtrack's intuitive, full-featured digital audio multitrack editing software, plus one or more Digigram sound cards provides everything you need to take your audio production to a new level. Radio editing, multimedia editing, post-production and dubbing have never been easier.

The first editor to transparently mix compressed and linear data on a single track, Xtrack takes advantage of MPEG's high quality and low data rates.

Work smarter with Xtrack, a Digigram Powered application running under Windows both on standard PC and laptop.



- External Effects Plug-ins
- Mixing of up to 16 virtual tracks in real-time on two inputs/outputs
- From 2 to 32 physical inputs/outputs
- Simultaneous record and playback on the same track
- Direct access to a range of effects via a drop down menu
- Instant exportable files for broadcast
- Comprehensive sound library management (local or remote)
- Specific functions for dubbing
- User configurable screen, toolbar and shortcuts keys
- Assignable on-screen faders for level monitoring
- SMPTE time-code and RS422 Sync capabilities
- Unlimited Undo



Parc de Pré Milliet
38330 Montbonnot - France
Tel. +33/ (0)4 76 52 47 47
Fax +33/ (0)4 76 52 18 44
E-mail: info@digigram.com
www.digigram.com

See us at IBC booth 9100



<rently 100 baseT Ethernet using Category 5 cable, but with greater bandwidth. A RAID disk array is required to provide the real-time bandwidth. Fairlight expect users to operate with a mix of real time and store-and-forward. Real time is used for applications such as auditioning library material, at the one end of the scale and final dubbing at the other. While bandwidth remains at a premium, store-and-forward is used for other purposes where real time is not an essential requirement. The use of an NT server enables Fairlight to provide direct connectivity with Avid Media Composers or AudioVisions and with the SGI servers used by some facilities for OMF file storage. Together with Fairlight's ability to use OMF audio only files this considerably extends the appeal of networking.

The company is predicting a big

increase in bandwidth capacity, that is the number of simultaneous real-time tracks in the near future. However, European top man Nick Cooke, believes video and audio networks will remain separate for the 'foreseeable future'. Meanwhile Fairlight is offering a practical solution.

SSOLID STATE LOGIC, another long-term player in the DAW market, has championed the cause of networking since it pioneered networking for audio production and post-production with SoundNet in 1989. This system provides multi-user digital audio networking by means of a central mass storage unit comprising up to 16 SCSI devices—either hard disk or magneto-optical drives—with tape backup. In 1989, a 300Mb hard disk (approximately 1 track-hour of digital audio) was the

zenith, but 1Gb disks quickly replaced 300Mb, and growth has been exponential ever since. It was not long before a SoundNet system could offer up to 96 hours of hard disk storage, with 8 tracks per disk.

Any user with an SSL ScreenSound (and later Scenaria and Omnimix) workstation can select any disk via the SCSI switcher and have sole unrestricted access to that disk for as long as required, and by slaving together several ScreenSound workstations up to 56 simultaneous channels can be provided. Once the user finishes work on that disk, control can be relinquished, thus allowing another user to carry out further work on the material without physically moving the recording medium. This direct connection of the user to the disk is the key to the system, providing full time access to eight simultaneous tracks.

SSL believes the expectation of professional audio users is that a network must operate in real time, and that a source should be available to any number of users simultaneously. As discussed in the first article this has little direct relevance in a classic packet-switched IT network. The real-time requirement is why SSL developed its proprietary HiWay system which carries up to 95 digital audio signals for up to 100m via a single coax connection, or up to 2km via their FreeWay optical fibre option. Combined with SSL's Hub Router, the HiWay-FreeWay system can provide real-time networking with access to a potential 2280 sources and destinations, and multiple Hub Routers may be interconnected to share sources between groups of consoles and input-output sources and destinations.

Until the vision of seamless interconnection between different proprietary systems becomes a reality, Solid State Logic regards transferable media as the most satisfactory technology for the interchange of large amounts of multitrack digital audio between compatible systems. John Andrews reckons, 'A reel of tape is still the safest bet at the moment'.

What all of this amply demonstrates is there are wide variations in approach. The common themes are the use of generic IT technology where appropriate to reduce R&D costs and the current lack of any obvious single answer. One question which arises is 'Do I wait for a video networking standard to emerge or get involved with audio networking now?'

I do not believe it matters except to major broadcasters and their symbiotes. For everyone else, the essential point remains: ask very searching questions about the management and security of any system under consideration. The functionality will rapidly improve with developments in IT technology, but an efficient technical solution is no guarantee of a good operational outcome. ■

Oktava Microphones.

www.lorenzomusic.com

Large capsule condenser MK 319

Multi capsule condenser MK 012

Large capsule condenser MK 219

Oktava

For further information on the complete range of microphones and accessories contact A & F McKay Ltd. on 01483 208 511
www.afmckay.demon.co.uk



More than
50,000
 Panasonic DAT Recorders
 Now in use

THE PANASONIC SV3800 AND HHB DAT TAPE AN UNBEATABLE MIX

Look in the rack of any major studio and chances are you'll find a Panasonic SV3800. Legendary sound quality, solid engineering and a price tag of just £935 + VAT* have made it one of the most popular professional DAT recorders of all time. Press 'Eject' and chances are you'll find an HHB DAT Tape.

Independently proven to be the highest performing DAT tape on the market** , leading recording facilities the world over simply won't trust their valuable masters to anything less. The Panasonic SV3800 Professional DAT Recorder and HHB DAT Tape. An unbeatable mix from leading pro audio dealers.



DAT
 Digital Audio Tape



Panasonic DAT Recorders and HHB Advanced Media Products distributed by:
 HHB Communications Ltd · 73-75 Scrubs Lane, London NW10 6QU, UK
 Tel: 0181 962 5000 · Fax: 0181 962 5050 · E-Mail: sales@hnb.co.uk · HHB On-line: <http://www.hnb.co.uk>

DISTRIBUTION

VISIT US AT IBC BOOTH 9.342 AND AES BOOTH 384

THE NEW WAVE IN SOUND.

This is the RMS 2020 radio microphone system.

It's an advanced, 32 channel synthesised diversity system with ground-breakingly clear sound and superb reliability. Audio Media called it "quite remarkable".*

Test it and you will too.

* Audio Media, January 1998



Visit us at.
IBC Booth 9.342
+AES Booth 384



RADIO MICROPHONE SYSTEMS

Sound Designed

For information, please call 01494 511711 or fax 01494 539600,
e-mail us at info@AudioLtd.Com or visit us on the web at www.AudioLtd.Com

Plagued by a drugs scam, Le Tour de France went from sports to news coverage
Kevin Hilton reports

IT IS THE WORLD'S GREATEST cycle race, a French institution that is recognised in other countries as one of the highest physical challenges a person can face. It is also the most watched of all sporting events, attracting over 10 million spectators along the way. The Tour de France, le Tour, la Grande Boucle—everybody knows it. But this year it became the Tour de Farce in a 3½-week period that threatened to undermine 95 years of history. Prima donna participants and then a protracted drugs scandal were all captured by the attendant TV cameras, as the high point in the cycling calendar stopped being purely a sports broadcast and became an international news event.

First held in 1903, the race—for professional, individual riders; although sponsored teams of 12 take part, with a 'star' supported by others—covers approximately 4,800km/3,000 miles of road, including the gruelling mountain stages. The majority of the competition takes place in France, but occasionally stages are held in other European countries. This year everything started in the Irish Republic, which, despite the supremacy of French, American and Spanish contestants recently, has made its mark on le Tour through Stephen Roche (the 1987 winner) and Sean Kelly, who took the green jersey—awarded to the rider with the most consistent points record during the race—in 1982, 1983, 1985 and 1989.

When the Tour has ventured outside of France, it has generally been on the same land mass. This tradition was broken a few years ago when, soon after the opening of the Channel Tunnel, some stages were held in the south-east of England. The trip to Ireland was an involved logistical exercise. France Television Sport, the host broadcaster of the event and a collaboration between public service TV channels France 2 and France 3, chartered a ferry for all the vehicles involved and four aeroplanes to get the various personnel back to the race's home after the Irish stages were completed.

Le Tour is an institution in France and hundreds upon hundreds of people line the course of the various stages, just to catch a glimpse of a brightly coloured, Lycra clad man on a bicycle zip past them. Much the same happened in Ireland. The race started in Dublin; the Grand Depart, as the opening stage is known, began in the Irish capital with the Prologue, the opening time trial that started at College Green and then ran for 5.6km around the inner city streets. Residents were trapped in their >



BROADCAST

Tour debacle

PHOTO: GRAHAM WATSON

< homes, public transport was disrupted and such vibrant thoroughfares as O'Connell Street were closed to traffic.

This was the weekend that The Three Tenors played in Paris under the Eiffel Tower. A sign of the frustration among some Dublin residents came in a strangely predictive email sent to me by a friend: 'I hope you had a good time hanging around with Jose, Luciano and Placido. Soccer operetta under the Eiffel Tower definitely beats a load of drug addicts belting around the streets of Dublin on expensive bicycles'.

Stage One also started in the Irish capital, birthplace of Stephen Roche, and moved out into County Wicklow, which, despite its romantic image as the Garden of Ireland, provided some of the most testing stretches for the riders. The race moved onto Enniscorthy for the start of Stage Two, moving around Wexford; Kilkenny was next, with between 20,000 and 50,000 people expected to view proceedings in this county. Ireland's other cycling hero, Sean Kelly, was honoured by the race passing through his home town of Carrick-on-Suir in County Waterford; although the sheen was lost as Roche chose this as the place to lambaste the organisers and announce that he was leaving Ireland for France, which he sees as a better place to bring up his family. The final Irish leg was held on 13th July in Cork City.

Back on home soil, le Tour resumed at Roscoff for what many probably considered the real meat of the event, with long runs through the French countryside and the testing mountain stages. It was estimated that 950 million people would watch the Tour de France in some shape or form. Certainly France Television was providing international pool feeds for 60 TV stations in 165 countries, working in collaboration with outside broadcast facilities company SEP to provide the scanners and location equipment. For some of the stages backup came from the regional service of France 3.

The Tour is about speed and excitement and to capture this France TV employs four motorcycles carrying cameras and a further two bikes with sound recordists. The cycles winding their way along remote roads is a powerful sporting image and this is captured by a Wescam unit mounted in a helicopter; two more helicopters and an aeroplane act as signal relays. During the mountain stages these are supplemented by a second Wescam helicopter and an aeroplane with additional video equipment.

Signals from the mobile units were received by two trucks, one positioned along the route, the other at the finish line of the stage being covered. Also at the finish was a digital production truck, equipped with five cameras, a super slow-motion camera, and three slo-mo video units, among other gear.

France Television assembled its main feed in SEP's digital scanner, offering four lightweight cameras and a further portable unit, with a crew of four camera operators, plus a remote control camera. Other equipment included a 4-channel Profile hard-disk player-recorder, often used for replays and slo-mo, and six Betacam video tape machines. Full editing facilities were provided on site, with a multifunction truck for postproduction and archiving of the hundreds of tapes used during the course of the three week production. Two vehicles were also used for electronic newsgathering purposes, one to carry video tapes around, the other to ferry the journalists covering the story from place to place.

AS WITH ALL host broadcaster productions, the signal produced centrally is then made available to the rights holders, who are provided with facilities to customise the coverage for their own purposes. These were supplied under the auspices of the EBU Eurovision service and included a truck with 16 commentator positions, ENG equipment for use by the over-

seas broadcasters (more romantically known as TV *etrangeres* in French) and an edit van.

The French passion for le Tour may not be matched in all European countries, but there is always intense interest from TV *etrangeres* if any of their country's riders are in with a chance. After his win last year, Jan Ullrich of Germany, and his Deutsche Telecom team, was the focus of attention for his country's broadcasters. Saarland broadcaster ARD, which was additionally sponsoring Ullrich's team, contracted an independent facilities company—which, for reasons that have not been made clear, cannot be named—to provide specific coverage, opting for the digital route to maintain quality through the number of different tape passes that occur on a production of this nature.

Pool pictures and sound were received from France Television and loaded onto a Sony Betacam SX DNW-A100 hybrid recorder, equipped with an additional six hours storage time. The anonymous scanner company provided two mobiles, between them offering BVE-910 and BVE-2000 editing systems, five DigiBeta DNW-A 500 machines, the DNW-A 100, three DigiBeta machines.

Ullrich did not fully repay this attention, coming in second to Marco Pantani, the first Italian in 33 years to win the Tour. Generally considered the best rider never to have won a major tournament, the distinctively shaven-headed Pantani should have been the only true story of this year's Tour de France. Regrettably it became about a tawdry drugs scandal as French police heavily handedly raided the bases of leading teams, causing the other riders to stop racing and sit in the road in protest. It is unfortunate that the abiding TV image of this year's Grande Boucle will not be Pantani and his team mates with their triumphantly blond dyed hair (or goatee beard in the winner's case) but a mass of sullen cyclists riding very slowly through France. ■

Q. What happens when I turn this knob?

'COMPRESSION' is a feedback gain control in the sidechain. It amplifies a bandpass filtered mixed signal from the left and right inputs and drives this into a precision full wave rectifier and integrator. The resultant voltage is time controlled by a complex non-linear attack and release circuit and provides the voltage drive to a servo LED driver which punches current into a pair of LED/light resistor gain cells. The cells are activated and reduce the gain in the audio path according to yet another non-linear characteristic. The resulting compression is the awesome

JOEMEER and unique **JOEMEER** sound:- Lost in the 1960s and recreated in the 90s. Ted Fletcher, Designer

Worldwide Distribution by: JOEMEER Distribution, Quay House, Quay Road, Newton Abbot, Devon, England, TQ12 3BU
Tel: +44 1626 333948 Fax: +44 1626 321157 e-mail: sales@joemeer-uk.com



Compression

www.joemeer-uk.com

All of our products perform brilliantly in any language.

Short/cut™ Editor

Fast and easy enough for on-air use, Short/cut is the perfect replacement for generations of reel-to-reel tape recorders. It delivers hard-disk storage, plus fast cut and paste waveform editing. Add an optional Zip™ drive for low-cost copies. Whether you're on-air, in production, or on the road, Short/cut performs great edits in any language.

The world's next
reel-to-reel recorder.



The voice of master control
around the globe.



DigiCart®/II Plus

DigiCart/II Plus stores 50 hours of audio on hard disk, and includes a built-in Zip™ drive. It offers your choice of linear or Dolby® AC-2 recording, with precise editing and powerful playlisting capabilities. All the reliability that has made DigiCart the standard for analog cart replacement around the world, and a great price too.

Instant Replay® 2.0

NEW • SCSI port supports external disk drives for expanded storage capacity. • Choose linear or Dolby® AC-2 recording format.

Instant Replay puts a thousand audio clips right at your fingertips. Sound effects, music, station ID's - up to 24 hours of your greatest material.

And with 50 Hot-Keys, you can make your shows as spontaneous as you'd like. Instant Replay is fast, easy to use and a world of fun. That's why you'll hear it on number one talk shows and live broadcasts all around the world.

Instant sound effects.
Instant music. A world of fun.



— We speak your language. —

Call a 360 Systems distributor for a demonstration of any of our products. For our International Distributor List please visit our website.

Corporate Office

Website: www.360systems.com / e-mail: info@360systems.com

Europe

e-mail: pjlee@worldonline.nl

PROFESSIONAL DIGITAL AUDIO

VISIT US AT IBC BOOTH 9.230

Sound Advice for Beautiful Digital Audio



Complementing the outstanding range of broadcast video products from Leitch:

- Digital Glue now offers AES/EBU digital audio distribution, audio synchronisation, audio multiplexing and a full range of precision converters
- Leitch analogue and digital AES/EBU digital audio routing from 2x1 to 128x128 providing low cost monitoring routers to fully integrated control systems
- Latest digital server technology from ASC. The VR300 now offers AES/EBU digital audio to complement up to 24 channels of video, sharing 96 hours of Fibre Channel storage

Leitch audio products,
that's sound advice.



Distribution

Routing

Digital Glue

Production Products

Storage

Sync & Test



ENGINEERING THE BIG PICTURE™

International/Canada +1 (416) 445-9640, (800) 387-0233 • U.S.A. +1 (757) 548-2300, (800) 231-9673 • Latin America +1 (305) 884-5484
Europe +44 (0) 1256-880088 • Australia +61 (2) 9939-3355 • Japan +81 (3) 5423-3631 • Brazil +55 (11) 867-0218

Aerial warfare

SIX MONTHS is a long time in broadcasting, particularly in digital radio. In March, *Studio Sound* examined the background and current status of digital audio broadcasting (DAB) worldwide, coming to the conclusion that, although the technology was in place, the format was still a long way from general acceptance, or even understanding, by the listeners until suitable, affordable receivers came onto the market. In-car digital radios started to appear at the end of August, with the promise of hi-fi units, Walkmans and PC-plug-ins for the end of the year.

Just to prove that broadcasters have driven things all along, adoption of DAB is increasing around the world, while countries with services are seeing them develop and expand.

The big breakthrough of the last six months has been the eventual appearance of digital radio receivers. Previews were given in Germany and the UK during July, with the BBC hosting a reception to introduce five in-car units. The Corporation's director of radio, Matthew Bannister, commented: 'The BBC was founded in 1922 by six radio manufacturers who wanted to develop some programmes to be heard on their cutting-edge wireless technology. We are here today with five radio manufacturers to celebrate another leap forward for the medium.'

Bosch-Blaupunkt, Clarion, Grundig, Kenwood and Pioneer were the manufacturers present; the new units range in price from £499 to £1099 (UK), with further developments to come. Bosch has produced a prototype miniDAB portable radio, a PCMCIA receiver and a PCI plug-in card; a low-cost PC digital radio has also been announced by UK company RadioScape, with demodulation and decoding software running on Windows 95 and NT.

With the BBC's pilot service now established, the Corporation announced plans for other programming to join Radios 1, 2, 3, 4 and 5 Live, BBC Parliament and BBC 5 Live Sports Plus on its multiplex. This will be pilot schemes based around the BBC's extensive rock and pop archive, a travel data service and a nationwide version of the BBC Asian network, which is currently confined to the Midlands region of England on analogue.

The UK commercial sector is similarly moving ahead. The Radio Authority, which licences and regulates independent radio, advertised the licence for a single national commercial multiplex earlier this year, receiving an application from Digital One, a consortium owned by GWR Digital Radio, NTL Dig-

ital Radio and Talk Radio UK. Local multiplex licences will be advertised once the mix of programming on the national multiplex has been determined; Digital One is proposing a 24-hour classic rock station, a rolling news service, a dedicated sports channel, plus teenage-style programming, books-drama-comedy and club dance music.

A focus for progress so far in DAB was the Radio Academy Festival, held in Birmingham towards the end of July. Here the BBC gave the first ever live transmission of a multimedia radio music programme, plus airing two other shows made specifically for the new format.

Eureka 147 is being used by the majority of countries establishing digital radio networks. The UK's fellow pioneer, Sweden, estimated that 75% of the population would be able to receive its national services, with 55% having access to regional services, which also offer private broadcasters. Germany has more than 200 DAB transmitters, while France is catching up, with public broadcaster TDF running an 8-programme multiplex, which additionally carries five commercial services. NRJ is also running a service, while the TDF Networks, run by Radio France and other companies, is offering multimedia output. During the World Cup, transmitters and receivers were available in three major towns, covering 20m people.

Other European countries are at different stages of development, but all have some digital radio itinerary planned. The Australian government has said that services will start in January 2001.

Radio Television Hong Kong was due to launch a test service in August, and All India has a test system in Delhi and is looking into satellite distribution.

WorldSpace Corporation, founded by Noah Samara, formerly a senior adviser to the ITU on global business and regulatory matters for mobile and portable communications, is pushing ahead with plans for global digital sound broadcasting, based around three satellites. The first of these, AfriStar, is set for launch in October and will cover the majority of Africa using three beams. AsiaStar and AmeriStar are due to launch in the first half of 1999 and will transmit to India, China and South-East Asia; Mexico and Central and Latin America respectively. By the end of next year WorldSpace

intends to be transmitting news, education and entertainment to 4.6bn people within its three network markets.

In the US, the Federal Communications Commission held an auction in April of last year for what it calls satellite digital audio radio services (DARS). The sale raised \$173.2m for two licences, which were awarded to Satellite CD Radio and American Mobile Radio Corporation. However, the terrestrial situation in North America is confused. While Canadian broadcasters have enthusiastically adopted Eureka 147, with CBC intending to cover 75% of the population over the next five years, the US is moving towards the in-band on channel (IBOC) system. Although Eureka 147 performed better in laboratory and field tests, the NAB opposes its adoption, citing lack of new spectrum, a dislike of sharing transmitters in the multiplex and concerns over new competition.

At the BBC launch in July, there was solidarity from broadcaster and manufacturers, but there is still the acknowledgement that more, varied receivers

need to come onto the market and at prices that will encourage listeners to move to digital.

Although digital radio is seen as a way to free up existing analogue spectrum, there is still the question of where to 'park' the multiplexes. At present, most countries have chosen the L-band for digital radio but there is an on-going discussion as to whether the FM spectrum should be used for the purpose once simulcasting is no longer necessary. In a

recent speech, Sir Peter Gibbings, chairman of the Radio Authority, encouraged European manufacturers to 'seize the opportunity that this new technology offers', adding, 'we also hope that every effort can be made to ensure that more frequency spectrum is made available, both in the L-band and Band III, to allow the RA to offer the prospect of local digital radio in all localities across the UK.'

As receivers appear in shops, it is up to market forces, led by how broadcasters and manufacturers promote the technology and its benefits, to decide whether digital radio will be an instant hit or not. Ultimately there is no other choice, but everything needs a good start in life. ■

The delicate relationship between operating radio stations and the take-up of domestic receivers holds the future of digital radio in its sway. **Kevin Hilton** paints the global digital radio picture

Telos ZephyrExpress™
Coming Soon!

Zephyr Is Everywhere

Look around. Everyday, there are more signs that Zephyr is everywhere. So, if you've ever thought about remote broadcasts or linking up with other studios, there's never been a better time to act than now. Zephyr has quickly become the standard, with many thousands already in use.

Zephyr is number one among radio stations and studios. It is the best sounding, lowest cost way to send high-quality audio over ISDN. Once programmed, anyone can Auto Dial ISDN calls. Not sure what to do next? Press the help button for simple instructions.

Zephyr is full-duplex for two-way transmission. And you don't have to worry about what codec is on the other side — with Layer 3, Layer 2, and G.722, Zephyr can adapt to any place you want to send your audio. With Zephyr, the whole country—even the world—is your studio. Just look for the signs...



- The ideal solution for remote mixing and broadcasts, ad hoc networks, recording sessions, voiceovers, distribution of commercials, backup to satellite and microwave links, and many other applications.
- Designed by Telos specifically for broadcast audio applications over ISDN.
- Optional AES/EBU digital audio input/output module with sample rate conversion.
- Clean, uncluttered front panel for simple operation. Full metering, call duration timer, headphone jack, and mic/line inputs.
- Built-in input protection limiter. When your talent screams, your audio doesn't distort.
- Zephyr has an integrated ISDN terminal adapter designed for the non-technical operator. You can even place a standard voice-grade call to a Plain Old Telephone Service (POTS) telephone.

Telos Zephyr: The Best Way to Hear from There™

PRECO

EXCELLENCE IN PROFESSIONAL AUDIO

Preco (Broadcast Systems) Ltd.,
3 Four Seasons Crescent, Kimpton Road, Sutton, Surrey SM3 9QR
Tel: (44) (0) 181-644-4447 Fax: (44) (0) 181-644-0474
E-mail: sales@preco.co.uk Website: <http://www.preco.co.uk>



E-Mail: • info@telos-systems.com
• <http://www.telos-systems.com>

PRECO: Your Telos Systems dealer for the United Kingdom

Telos Systems, the Telos logo, Zephyr, and The Best Way To Hear From There are trademarks of TLS Corp. Other trademarks are the property of their respective holders.
2101 SUPERIOR AVENUE, CLEVELAND, OHIO 44114 USA TEL: + 1.216.241.7225 FAX: +1.216.241.4103 E-MAIL: INFO@ZEPHYR.COM
TELOS EUROPE JOHANISTR. 6 D 85354 FREISING GERMANY TEL: +49.8161.42467 FAX: +49.8161.42402 E-MAIL: EUROPE@ZEPHYR.COM
WORLD WIDE WEB <http://www.zephyr.com> <http://www.audioactive.com> <http://audiolounge.com> <http://www.nogrunge.com>

First 'Bourne



Risking a new digital console for an exacting live broadcast and surround recording of a prestigious opera production, finds **Tim Goodyer** back stage at Glyndebourne

THERE IS ANOTHER WAY to consider the music accompanying an opera: as the precursor to the film soundtrack currently preoccupying many record-company marketing strategists. Except that opera recordings make soundtracks look sick in just about every respect, from musical merit to shelf-life.

That opera continues to enjoy the status of high art that it has held since its inception around the close of 16th century is in no doubt. Certainly, it remains classical music's 'greatest and most attractive challenge' according to *The Oxford Dictionary of Music*—and an evening at any of the world's premier opera venues does much to sustain its elitist image. What opera's critics consistently fail to realise, however, is that it shares production values as high not only as a modern music concert, but as a Hollywood movie.

The days of theatre 'flats' and languorous scene changes have given way to ingenious sets given to a level of historical accuracy unknown to early opera-goers. Lighting effects have grown in sophistication to challenge today's rock circus, and opera's sloping stages offer its audience unobstructed views that would be envied by the first 30 rows of the average stadium gig. Opera broadcasts, meanwhile, are regarded around the world as one of the most exacting tests of audio quality and expertise, while its recordings are preparing to show other musical genres—including modern film soundtracks—the way forward with surround-capable delivery formats.

A recent season at Britain's prestigious Glyndebourne Festival Opera managed to involve not only a new production of its second ever opera—Mozart's *Così*

fan tulle, first performed in May 1934—but the first broadcast use of a Soundtracs DPC-II digital console.

Taking a diversion between Glyndebourne's car park and auditorium for the subsequent production of Verdi's *Simon Boccanegra* reveals a collection of trucks housing the broadcasters—including the Visions scanner, NHK's satellite ops centre and the Soundmoves audio mobile. Inside the latter, audio director John Middleton, sound supervisor Andy Rose, and Soundmoves owner and engineer Steve Williams, have forsaken the evening's sunshine in the interests of meeting the audio brief. The barely finished mobile contains only the third DPC-II, and has cut its teeth on an earlier production of Mozart's *Rodelinda*. The project is so demanding that Soundtracs' Todd Wells had earlier considered it to be beyond the capabilities of the desk, but Williams' confidence won the day, and Soundmoves is again ready to provide 24-bit audio for live television broadcast to Japan, the recording for Channel 4 TV to be broadcast two days later, and a digital 5.1-channel surround mix for later DVD release. To further complicate matters, while NHK is working to a -20dBFS 0dBm reference, Channel 4 is working to -18dBFS.

Inside the 800-seat auditorium (increased in two stages from its original capacity of 300), John Gunter's set depicting 14th century Genoa occupies the vertical space between the London Philharmonic Orchestra and the super-titles for those whose Italian is wanting. Neumann KM140 microphones are arrayed across the front of the stage with more down each side and off-stage. In the orchestra pit there are Schoeps on

the strings, B&Ks on the woodwind and large-diaphragm Neumanns on the cellos. Rose—whose last encounter with this particular opera was recording Kiri Ti Kanawa's performance at London's Royal Festival Hall some 10 years back—describes it as 'all pretty standard, really', with the exception of three radio mics hidden in a table in the wings.

'Where *Boccanegra* sits at the end of Act 1 you can't see the mics,' he elaborates, 'and if you can't see the mics there's no pick up at all, so we got Glyndebourne to cut a hole in the table and in their very expensive table cloth and mounted three radio mics in the table.'

The total of 59 mic feeds arrive at the console as 24-bit digital signals and are treated, subgrouped, and routed to a pair of Sony 3348HR DASH machines before reappearing on over 100 monitor faders for the NHK mix. In addition, 16 further tracks of DA-88 running at 24 bits take care of the overflow from the 3348HRs and a 'virtual' 48-track made up of Tascam DA-88s and Sony PCM800s offers a 16-bit safety recording. John Middleton takes care of the orchestral mix on the left-hand side of the desk ('so he can tickle in an oboe solo if he wants...') and Andy Rose takes care of the on-stage and off-stage mics on the right. Their moves are exhaustively rehearsed as the Hi-8 machines have been put to good use prior to going on-air.

'The key to this is lots of rehearsing otherwise all you can do is get a general sound,' Rose explains. 'John and I don't go for a general "put some stereo mics up, add a bit of orchestra and a bit of stage", we go for a tighter, clearer sound. The only thing is that when it goes wrong, it goes spectacularly >



◀ wrong. If you put up half a dozen mics for a general sound that's pretty much your balance. But it's pretty wishy-washy. So we go for a tighter sound, but you have to work at rehearsing to get it right.

'To do that, the whole thing is recorded to the DA-88s and the desk is arranged so that the faders look at the tape machines—there may be some submix further up the line feeding one track, but at the end of the day you can spin the tape back and you've effectively got the same control as if they are playing live. Although we've only got two performances to work with, we spend a couple of days playing the tape back to picture and rehearsing our moves. As you can appreciate, if someone moves across the front of the stage, you've got to adjust the levels very quickly and there may be a series of moves that take half an hour to rehearse. John and I have our own phraseology and he can call out the cue for a setup and I'll know exactly what to do.'

'We wanted to do our postproduction in the same way as video postproduction,' Williams adds. 'That is, rehearse with an off-line mix using the cheaper Tascams and then bring in the 3348s to record and do the postproduction at 24 bits using the settings in automation in the desk and SADiE. You then end up with a 24-bit mixed and edited master having used the 3348s for a considerably shorter time at lesser cost.'

THE OPERATION is so polished that it is easy to overlook its pioneering nature. For the earlier *Rodelinda*, a 16-fader demonstration DPC-II with the same processing power and number of channels sat in the trailer next to the live desk. 'It would have meant that the orchestral mix would have remained static and we would have a limited amount of mixing on the stage mics,' Williams comments, but it might have saved the day. Had it not, an unused Calrec console in one of the TV scanners was paralleled of the analogue outputs from one of the 3348 IIRs.

Today the Calrec policy prevails, but the second digital console has gone—the stability of the DPC-II having pleasantly surprised all concerned.

'We considered all the big players,' says Williams of the choice of the desk. 'We had a long hard look at the Sony Oxford and it wasn't suitable for our line of work; we also took a look at the SSL, AMS Neve and Studer D950 desks, all of which were either grossly over-engineered and grossly over our budget, and in some cases the technology wasn't the latest as it is with the DPC-II. I have to say that Soundtracs have got it right; you can have the best sound and the best technology under the bonnet, but it's also about how you use it. From an engineering point of view, we can make it do what we want very quickly and easily, and from an operator's point of view, within about two hours somebody who's never seen the console can do basic input selection, routing, panning, EQ and mixing with no problems at all.'

Posting *Simon Boccanegra* involves taking the mobile back to Soundmoves' Surrey base and moving the console and monitoring into a more spacious room.

'The postproduction requirements are that the mix produced on the day is used as a guide for the NVC Arts video people and John Middleton to make a decision as to which is the best performance or which parts are the best from the two nights we've recorded,' Williams

explains. 'They make an editorial decision about cutting the pictures together to produce the international video release, and that comes back to us as an EDL and we produce the audio mix. That was done using the desk straight into a SADiE 24-96 system to give both the stereo format and the 5.1 format—we have both sets of monitors set up

to handle those.'

The stereo mix is then relayed back onto DigiBeta as a wide dynamic and compressed using a te electronic M5000.

'Although NVC have no contract to do the production in 5.1 for DVD, they are prepared to spend money on things like the IIR machines,' Rose adds in obvious appreciation. 'The extra cost to do 5.1 as we're doing it this time is not a lot where going back and doing it all again would obviously be a lot of money.'

On the details of the mix, he opens: 'It seems to me that the rules are that there are no rules. I have four mics at the back of the hall to drive the rear speakers and we add a bit of orchestral reverb to taste. Most of the reverb goes to the front, but a bit of that and the same with the voice went to the back.'

'In this opera there is quite a bit of off-stage stuff—trumpet, choir, percussion, various things—and depending on what is appropriate, we make them start at, say, rear right and what you'll hear is them effectively walking down to the front right and then they appear on stage.'

'With a lot of off-stage activity, you can maintain stereo compatibility and simul-



taneously make something move from the rear right to the front left with the DPC-II,' Williams adds. 'And those moves are very easy to accomplish and it's all recorded and edited against time code.'

'The centre speaker took a little bit of getting used to,' Rose continues 'And we won't use the sixth channel at all. At one point we fancied using it for some of the off-stage stuff or telling people on the sleeve that the sixth speaker should be hung off the ceiling or something, but it's a bit crazy to do that really. If we had a cannon then I think I'd have taken the bottom end of that to the sixth channel—it's film stuff really. But there are operas that have gunshots and things, so I'm sure it'll come.'

With the broadcasts out of the way and a completed 5-channel mix ready for marketing, Middleton and Rose can rest assured of having maintained Glyndebourne's reputation for artistic excellence and Williams can be confident of his new mobile's viability. ■

Contact
Soundmoves,
 The Oaks, Cross Lane,
 Smallfield, Surrey
 RH6 9SA, UK.
 Tel: +44 1342 844190.
 Fax: +44 1342 844290.

If you think all CD-R media are the same, think again.



(Yes, they're real discs. The upper surface of each disc was cleaned for the same length of time with a lint-free cloth soaked in 91% isopropyl alcohol – a recommended cleaning technique for CD-R media. Ours, of course, is on the right.)

FRIGHTENING, ISN'T IT! Your CD-R master could be reduced to a pile of gold dust, leaving a transparent disc, as the reflective layer and dye is rubbed off—and all this while using an *approved* cleaner!

The simple act of wiping off a fingerprint could result in the catastrophic failure of some CD-R media, such as the disc on the left.

And all because, despite the tens of thousands it cost you in studio time, you skimped when it came to the master CD-R.

You saved a few pennies, and now your master is lost forever. Is that false economy, or what?

Here at Apogee, we understand the technology of CD-R. You should too... because not all CD-R media are the same.

Our discs may sometimes cost a little more—but in the long run, isn't your master worth "a little more"?

Your most valuable recordings deserve the Apogee treatment – we care as much about your masters as you do.

Apogee digital media. Ask for us by name.

The Apogee CD-R Advantage

- ⊕ Gold phthalocyanine dye layer: proven to be more durable than green cyanine or blue azo dyes*.
- ⊕ Significantly lower Block Error Rates
- ⊕ Archive life in excess of 100 years – compared to 25 years for green discs*.
- ⊕ Two reflective layer options:
 - ◆ GOLD—The longest life of any CD-R on the market. Ideal for archiving;
 - ◆ SILVER—Highest output for lowest error rates. Ideal for mastering applications.
- ⊕ Unique DataSaver and new mirror-smooth Datasaver II resin films shield the reflective and dye layers from damage, protecting the disc from handling, solvents, markers and labels (unlike the disc on the left).
- ⊕ Higher reflectivity means higher output: CD-writer laser power is reduced for longer operating life of your mastering system.

DAT **ada!** **DBS** **COMPACT disc**
Digital Audio Tape **DIGITAL TAPE** **DIGITAL AUDIO**

Understanding the Technology...

Apogee
DIGITAL MEDIA PRODUCTS

APOGEE ELECTRONICS CORPORATION, 3145 Donald Douglas Loop South, Santa Monica, California 90405, USA.
Tel: +1 310/915-1000 Fax: +1 310/391-6262. Find our international dealers on the Web: www.apogeedigital.com or Email: info@apogeedigital.com.

Apogee is a registered trademark of Apogee Electronics Corporation. Other trademarks are the property of their respective owners. *Measured in artificial aging tests.

Like a modern *Odyssey*, the story of Athen's Concert Hall is a voyage of adversity and achievement. **Caroline Moss** hitches a ride

Megaron



THE STORY behind the Megaron Concert Hall in Athens has all the elements of an historical saga. The impressive world-class venue, which incorporates an innovative recording centre, stems from a concept originated in the 1950s by the cultural group Friends of Music, which began raising money for Athens' own concert hall. Construction began in the 1970s but suffered severe setbacks when funding ran out. In March 1991, after 15 years of sitting empty, the Megaron opened with its first performance following government and private fund-raising efforts, and the huge edifice is now established as a symbol of the country's musical heritage.

Headed by president Christos D Lambrikis, the Megaron is a joint venture between the Greek government and the private sector Friends of Music. It is a vast complex connected by labyrinthine corridors; a beehive of enterprise

employing around 250 full-time members of staff. To give some idea of the venue's turnover, between October 1997 and June 1998 over 250 events were hosted, including musical performances, conventions and seminars. The longest-running musical event will be staged for an absolute maximum of seven nights, with particularly successful productions brought back for another run at the end of the season.

An example of this was last October's production of Gluck's opera *Orpheus and Euridice* which was restaged at the beginning of June for an extra four shows, when it was shot for video. The hall is also used for TV productions, such as a recent LWT programme about John Tavener which was filmed in the large hall using Megaron's in-house orchestra Le Camerata, with extra footage shot all around the building.

The Megaron boasts two concert halls—the 1,961-seater Hall of the Friends of Music and the 456 capacity Dimitris Mitropoulos Hall—as well as a dedicated recording area, a control room installed with the third AMS Neve Capricorn digital console off the production line, machine room and editing suite.

The Hall of the Friends of Music has an overall volume of 19,400m³ with a ceiling height above the stage of 13m, an orchestra pit that can accommodate up to 100 people and room behind on three separate tiers for a 100-piece choir.



Mounted at the back of the stage is the Klais church organ with a total of 6,080 pipes. The hall's reverb time is 2.2s when empty, 1.8s when full, and 1.3s when modified for opera. Acoustics can be changed by means of moving roof, stage and balcony elements, making the hall suitable for a wide range of musical performances which encompass symphonies, chamber orchestra, lyrical performances, jazz and opera. The smaller Dimitris Mitropoulos hall has a volume of 3,340m³ with an over-roof height of 7.24m and reverb times of 1.3s when the hall is empty and 1.1s when full.



polyurethane diffusers. All the equipment installation and wiring was handled by Elliott Brothers, and was carried out under main designer Andrew Riley. The company was also responsible for the adjacent machine room equipped with systems for controlling air conditioning, ventilation and humidity, maintaining the array of racks for the Capricorn together with all recording devices in optimum conditions.

Apart from being used to record music played in the Megaron's two halls, the studio also has its own recording area which at 30m² can accommodate small ensembles and solo musicians to record under controlled conditions. This was built in a space originally earmarked for the air conditioning system. 'It took almost two years to convince the powers that be that we needed something next to the control room for overdubs and other recording projects,' says Espialidis.

The recording area was designed by Munich acoustic design consultancy Müller to provide controlled acoustics in the small area by means of RPG diffusers covering four of the room's corners and foam polyurethane diffusers on the ceiling. 'They were used to designing large rooms, so it was a learning curve for them, and they managed to get it right,' says Espialidis. The acoustic behaviour of the room can be adjusted by means of rotating reflectors, solid vertical panels which can convert the recording room from a dead area with a reverb time of 0.22s to a room with up to 0.4s reverb time, and which virtually behaves as a larger space. This is vital for the wide range of recordings undertaken by Megaron, allowing anything from the sound of a classical concert being played in a hall to suitable acoustics for Greek folk music which is traditionally played outdoors.

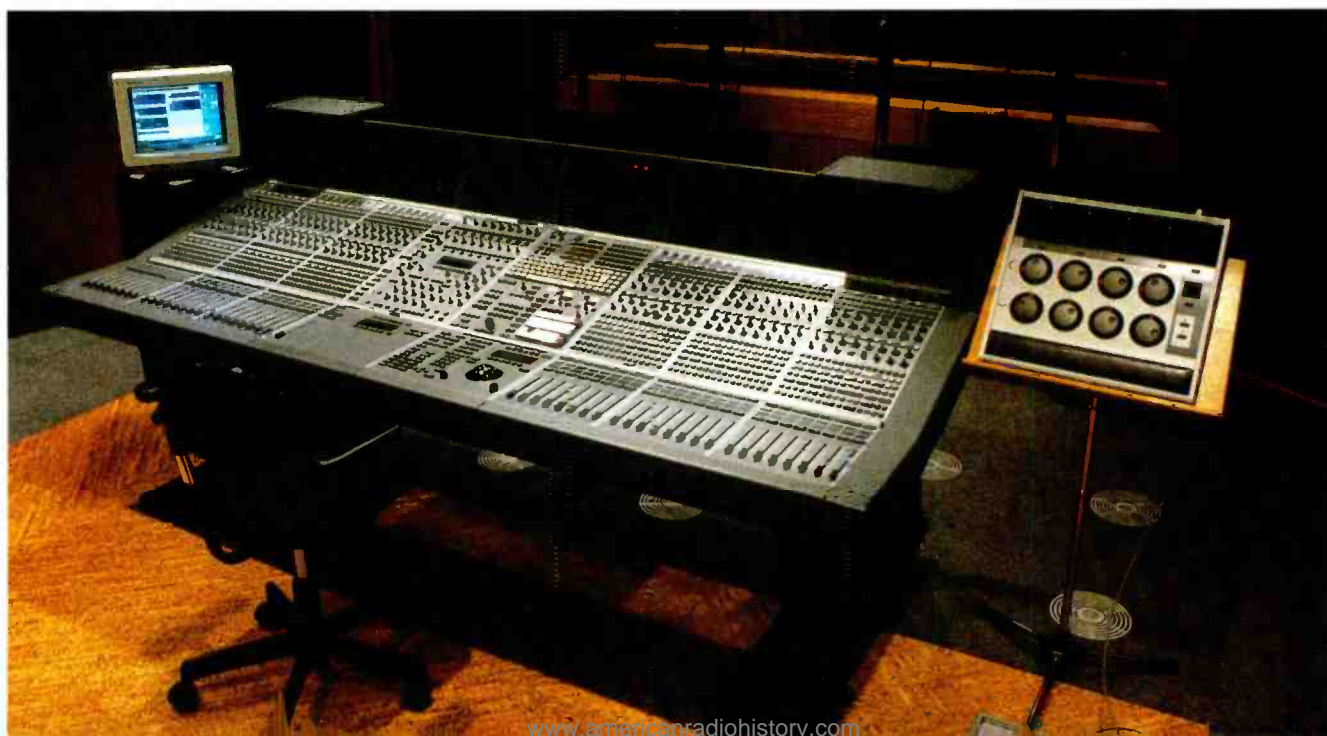
'We're always busy with lots of very >

It had long been intended that Megaron should have its own recording facilities, and when the time came for its design and construction somebody with a comprehensive knowledge of acoustics, electronics and the studio world was required to oversee the project. The ideal candidate was Nikos Espialidis, who had been working as a freelance recording, PA and broadcast engineer, having returned from overseas where he'd studied electronics in London and recording at Full Sail College and Centre for Media and Arts in the States. Apart from being instrumental in planning the studio's design and construction and selecting the equipment, he now runs the studio's daily operations and participates as an engineer on many of the recording projects. He joined Megaron in 1990, less than six months before the venue's projected opening the following spring. One of his most pioneering moves was to consider digital console technology, choosing the brand new Neve Capricorn as the studio's desk.

Explaining his decision to install the Capricorn, a 198-input, 80-output version MIDI delay unit, Espialidis says: 'I had faith in Neve and decided to go with this new console despite worldwide scepticism regarding digital technol-

ogy.' The desk was selected after a lengthy assessment period to determine whether digital or analogue would be the way forward for Megaron. This involved several visits to studios in Germany, the UK and the Netherlands to see analogue and digital technology in use. An important visit was to Bayerischer Rundfunk, a typically classical setup which had been using a Neve DSP2 digital desk for a number of years. It was this visit that finally persuaded Espialidis to accept digital technology.

ALONGSIDE the Capricorn, Espialidis chose to install an Otari DTR 900 II and Studer D-820-24 digital multitracks; a Studer A820 24-track analogue multitrack with Dolby SR, a Sony PCM 9000 24-bit MO recorder, Sony PCM 7050 DAT units, a Sony PCM 3402 DASH recorder and Studer A820 1/2-inch, 2-track analogue machine with Dolby SR. Monitoring is via PMC BBM5/XBD speakers with ATC electronic crossovers and drivers, and there is a wide selection of outboard and peripheral equipment. The control room, which floats on a sprung floor, is a totally symmetrical design in the form of a pentagon to provide good stereo imaging, with wall surfaces lined by



< diverse projects,' says Espialidis. 'There just isn't a typical event we stage here, and the same goes for the work we do in the recording studio—we have to set it up completely differently each time. Every day the building reinvents itself.'

To adapt to this flexible schedule the studio runs along very tight lines, with two sessions a day spanning from 10am to 4pm and from 4pm to 10am. Espialidis works with a team of six—recording engineers Babis Blazoudakis and Andreas Mantopoulos; mastering engineer Christos Chadjistamou; assistant engineer Yiorgos Mathioudakis; assistant Nikos Tsoukas and sales and marketing manager Rania Georgiou—and feels it would be detrimental to allow the staff to work around the clock.

'We've tried to change the traditional way of recording, whereby the studio is in use 24 hours a day,' he says. 'The recording studio is a technical facility and we need to stick to certain rules to run it.' The two daily sessions are split roughly between 60% outside projects and 40% in-house work.

Contact
Megaron
 Vas Sofias Ave 115
 21 Athens Greece
 Tel: 00301 7282209
 Fax: 00301 7290174

A further dimension is added to the hall's capacities by its hard disk editing/mastering suite. Installed with a Sonic Solutions editing system, all productions can be transferred here from the studio for final editing. Another major application is Sonic Solutions' NoNoise software which is kept busy cleaning up archive recordings. During my visit, engineer Christos Chadjistamou was removing clicks, scratches and background noises

from a recording by classical composer Yannis Christou which had been made from old 78rpm records from a 1951 recording at London's Royal Albert Hall. The master tapes had long since disappeared, and this was the only way of preparing the material for release. Another ambitious project was the retrieval of material from old recordings made by Greek soprano Jeanette Pilou. 'We had a whole lifetime of her recordings made around the world using all imaginable formats and methods,' explains Espialidis. This included a cassette recording made from the rear of a concert hall in the 1960s. All the recordings were cleaned up, edited and mastered on Sonic Solutions, resulting in a comprehensive archive of the artist's recording career. 'From this experiment we can say that everything can be retrieved to an acceptable level,' says Espialidis.

One of the hall's increasingly important roles has been to provide a growing number of Greek artists with the means to record their work at a comparable level with international standards. 'It's an opportunity for people involved in music in Greece to promote their recording dreams,' muses Espialidis. 'Some of the scores we resurrect have been gathering dust for years, waiting to see light of day.'

AN EXAMPLE of someone whose work has managed to penetrate the international classical market is composer Thanos Mikroutsikos. Three of his large-scale orchestral compositions now have a worldwide release on UK label EMI Classics, and are available in 167 countries.

'We've been recording artists in this way for five years now,' says Espialidis. 'I think we've come a long way in this time, and have gone some way to promoting classical Greek music internationally.'

This international renown should be further enhanced by the construction of a second concert hall behind the existing one. This will provide two more halls dedicated to theatrical productions, with another control room and recording area which this time will be incorporated into the building's overall design. The project has just gone out to tender, and is expected to be complete by 2001. 'It will run along the same lines as the existing hall, and will increase our versatility,' says Espialidis.

This can only be a good thing for the Greek classical music market and for visiting artists from all over the world. Like many good things in life, the Megaron Athens Concert Hall was a long time in the making. However, the end results have been worth it, providing Greece with its own world-class concert venue which is on track to expand and evolve into the next millennium. ■

The next generation of loudspeaker management - DSP 24



Take a close look at the selection of crossover slopes on the left! With VIEW the configuration software for the DSP 24, you can create filters that have not been possible - until now!

This is just one of the areas where VIEW removes the limits.

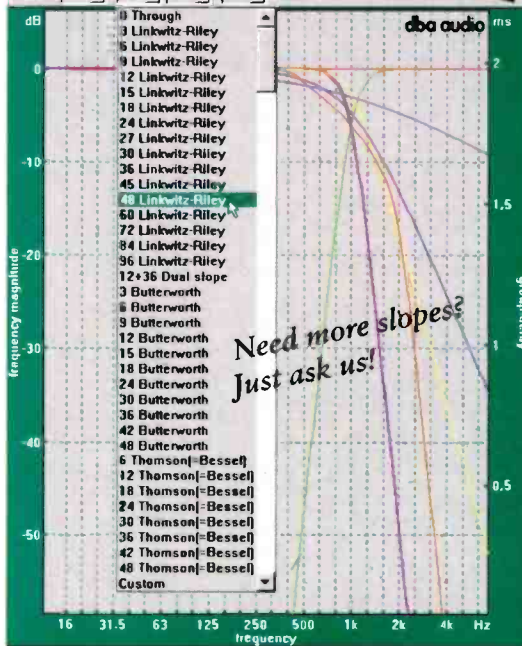
The DSP 24 is the first real digital filter without computing latency.*

Other products use multiple second order filters, which only achieve what you can do with traditional analog filters.

Lab.gruppen DSP 24 - The benchmark in digital processing for loudspeaker compensation and control.

Call your dealer or distributor for a chance to hear the full potential of your sound system.

*Note: Just one sample, time delay is dependent on filter group delay and conversion delay only (typically 1-3 ms).



VIEW is included with DSP 24.
 VIEW is a trademark of dba audio ab.
 Minimum PC requirements - 486DX,
 12MB RAM, 640x480 VGA graphics,
 Windows 95/NT. Windows is a
 trademark of Microsoft Corp.

LAB.GRUPPEN AB

Gullregnsvägen 16, SE-434 44 KUNGSBACKA, Sweden
 Tel: +46 300 168 23. Fax: +46 300 142 46

Distributor in UK, and Ireland: AUTOGRAPH SALES Ltd, Tel +44 171 485 37 49

Audio Duplication at its best

(at a price you can afford).

Thousands of cassettes
digitally duplicated per shift,
on the most sophisticated and
technically advanced system available,
with the ease and simplicity
that solid state brings.

And all at a price
lower than you think.

\$ 100,000*

*SAM C-60/HSL/5077 Twin Slave, Ex-works.

SAM Digital Master
HSL High Speed Load
5077 Twin Slave

100:1
DUPLICATION

To know more about this amazing offer
call a Tapematic office close to you.

TAPEMATIC®

Italy (Ornago/Milan)
Tel. +39 (0) 39/6010145
Fax +39 (0) 39/6010558

UK (Wickford/Essex)
Tel. +44 (0) 1268 570 760
Fax +44 (0) 1268 561 709

USA (Orlando/Florida)
Tel. (407) 354 1310
Fax (407) 363 7699

Asia (Singapore)
Tel. +65 324 6242
Fax +65 324 6243

www.prostudio.com

the only address you'll ever need.

The official website of Studio Sound, Pro Sound
News Europe, What's New in Pro Audio, TVB
Europe and the A.E.S. Daily.

With the most comprehensive mix of features, product reviews, news,
product directories and archive material available on a single website,
it's easy to see why prostudio.com has become the most widely accessed
proaudio website in the world.

ADAT.

It's not a VCR.
So don't use video tapes.



The HHB ADAT45. Designed specifically for professional audio multitrack recording only. Ask for it by name.



London: 0181 962 5000 · Los Angeles: 310 319 1111 · Toronto: 416 867 9000
www.hhb.co.uk

The rival merits of competing computer platforms have proved contentious to the point of straining friendships and stalling business plans.

Martin Polon draws the battle lines between the PC and the Mac

ALTHOUGH MANY in pro-audio are savvy about computers in general, and computers in audio in particular, they are an almost insignificant part of the story. There are many for whom a 'hard drive' is an well paved stretch of road leading from avenue to garage (a 'soft drive' being made of gravel). Similarly, a 'floppy disk' is something treated by a male doctor with the new wonder drug Viagra and 'RAM' is a kind of sheep with large curved horns. And to the same crowd, a 'processor' is something you use to make goose liver and brandy pate.

More seriously, for many in audio, the complex and constantly changing world of computers is so off-putting that they simply ignore the new technology. People who change the subject, run to the bathroom, answer non-existent pager calls or ignore pertinent conversations are today's equivalent of those who could not read 15 or 20 years ago and had to hide it.

For our collective benefit, the personal computer (or PC) was born as an IBM project to popularise and enable computing from the home, begun during the latter half of the 1970s. The software for the project was eventually contracted out to a small firm who produced the PC's digital operating system (or DOS). That firm was Microsoft; the processor chips came from a company called Intel and the rest is, as they say, history. Apple Computer on the other hand, was started by Steve Jobs and Steve Wozniak in a garage and the Macintosh (or Mac) later appeared on the scene in 1984 as the 'people's computer.'

The two systems continued to grow in different directions, with IBM ultimately creating an open system for which anyone could make hardware, while software for Apple's Macintosh has remained a more closed system for which hardware was and is limited to Apple and those companies licensed by Apple.

Perhaps the first step in making the two platforms have common elements was the effort of John Sculley, who was brought in to head Apple in the mid-1980s, who shared Apple's appearance. GUI and mouse technology with Microsoft as part of a deal between the two companies. The two platforms have >



Computer games

The similarities

THESE ARE elements that the two major computing platforms (Apple standard and IBM PC standard) share more or less in common.

GUI—Graphical User Interface—has become the very reason that computing has become successful for the masses. You no longer have to enter lines of code to communicate with a computer. Instead, you use a mouse on a screen filled with icons and other similar symbols that represents software applications, files and other elements of computing as graphical symbols. There is much evidence that this technology was the outcome of research conducted at Xerox Park in Silicon Valley, California during the early 1980s. Both systems use similar colour GUI and mouse technology, with slightly different modes of mouse use and file access.

Hard Drives—Although initially, hard drive technology (recording semi-permanently on several levels of magnetically coated moving metal platters hermetically sealed with calliper-style heads) was used differently by the two platforms, drive design itself has always remained the same and the drives themselves function analogously for each platform. Today, the drive connection technology (to the computer's internal processor), has flip-flopped so that IBM PC standard IDE connections are used by Apple for Macintosh computers (including the new iMac) and Macintosh standard SCSI connections are used by larger PCs to access hard drives of unusually significant capacity. Today's drives range in size from about 2Gb (2000Mb) to 20Gb or so (without resorting to RAID drives) on available systems for both platforms—a far cry from early drives that held 40Mb to 100Mb in the early 1990s.

RAID—Redundant-Rapid Array of Independent-Inexpensive Drives. A much used scheme of combining smaller drives to provide relatively inexpensive high-capacity/highly-protected storage. RAID uses SCSI connections and is available for both platforms. >

The differences

THE TWO systems have significant differences in how they are designed and how they operate.

Operating Systems—Windows uses an overlay on an underlying non-graphic system called DOS, with the exception of Windows NT. Windows 95-98 presents a graphical interface for users and is now the platform of choice for several successful audio recording software. Windows NT is the professional version of Microsoft Windows and in many ways emulates UNIX and other sophisticated languages. Some audio recording software already written for Windows 95-98 are being optimised for porting to NT and some are already NT ready. The Mac OS is a constantly revised operating system that has hosted audio recording software since System 7 days nearly 10 years ago. Today, with the release of System 8.5, which is optimised to run on G3 machines, the Mac operating system provides more processing power for audio but is hardware platform limited (slots).

Hardware—Windows machines at the top end of the cost curve come with a large number of slots for upgrades, support of audio recording, etc. Macintosh computers have, to some extent, surrendered the computer audio marketplace to Windows machines with the G3 line of computers that have only 3 PCI slots to start with and two of those are already occupied with SCSI and video cards.

DOS—Microsoft's Digital Operating System is the underlying layer of Windows 95-98 and the default location users reach after an especially nasty crash. One reason that Windows NT is so popular for power users is that it does not use the near 20-year-old DOS.

Pentium—Optimised to run Windows operating systems but will also run alternative operating systems such as the Be and UNIX. The current Intel chip of choice to power PC computers with its 400MHz clock speed. Expected from Intel are 450MHz and 500MHz versions of this chip. >

< continued to evolve; Microsoft moving from DOS through v3.0 to v3.1 and then into Windows, Windows 95 and now to Windows 98. On the other track, the Macintosh became System 7, then 7.5 and 7.6, now System 8 and 8.1 with System 8.5 due out any day now.

THOSE using the two platforms have argued the superiority of one over another for at least 15 years. From the standpoint of the recording studio user, Macintosh computing had the market pretty much too itself until the middle of the 1990s. Now, with a competitive marketplace for sophisticated recording software on the PC platform, the two systems have become evenly matched with the PC presently pulling slightly ahead, according to some observers.

The final decision on which platform

is best suited to your needs is an intensely personal one. So, no matter how useful and informative this article has been, it must come down to a careful comparison of your own preferences as compared with the opportunities offered by the machines in the Windows world versus those in the Macintosh universe. The PC today offers far more value in purchasing a system. There is a competitive choice among top quality sound recording-editing software for the PC. PC hardware and software is leading in the evolution of several categories such as voice recognition.

On the other hand, Macintosh computers are easier to use, easier to reconfigure after a crash, 'wrote the book' on audio recording and editing and are preferred by studio audio users two to one at this point in time. New G3 Macs can supply the six PCI slots needed for most

The similarities

< Floppy Drives—Mechanically, like hard drives, virtually identical in operation reading and writing with a magnetic head on a coated portable disk housed in a plastic cover, for either computing platform. The disks themselves are written (recorded) and read (played back) using the different formats for each platform, to the approximately one and a half megabytes of storage available. There are software available to exchange the contents of disks from the competing platforms/formats.

Monitors—At one time, the monitors used by each platform were not usable by the other platforms computer. Today, however, the use of adaptors allows Macs to use PC monitors, if desired. There is usually a price advantage to such a combination.

Internet Browsers—Both the Netscape 4 Communicator and the Microsoft Internet Explorer 4 are completely compatible on both platforms—although written in the different and appropriate code for each platform. They look, 'feel' and run more or less the same on both the IBM PC and Macintosh platform.

RAM—At the onset of personal computing, the Random Access Memory which stores application software and data in use, was different for each platform but Mac machines have been engineered to use more PC compatible (and less expensive) RAM today.

SCSI—Small Computer System Interface, a connection scheme for external (and sometimes internal) hard drives, scanners, CD-ROM recorders, other kinds of external storage media and other peripherals limited to seven devices—all pioneered by the Macintosh system. SCSI comes in several flavours including fast and wide. It can transfer data at a rate as high as 40Mb per second but in its basic form is limited to 5Mb per second. It is also used via plug-in boards for PC systems needing larger and faster storage options.

IDE—The basic connection system for drives used on PCs. IDE stands for Independent Drive Extension. Macintosh computers are now using IDE configured hard drives instead of SCSI.

PCI—Personal Computer Interconnect. The new standard for plug-in boards for both PCs and Macs. Although boards using the PCI technology are supposed to be interchangeable for both systems, in practice the board has to be manufactured for either PC or Mac at this time. Macintosh computers have switched over to PCI from the earlier Mac-only NuBus card slots for plug-ins.

USB—Universal Systems Bus. A new scheme for peripheral connectivity (keyboard, mice, hard drives, etc.). USB operates in a low speed mode of 5Mb per second and a high speed mode of 12Mb per second. It does not have the cable length, termination and peripheral 'hot-switching' limitations present in SCSI. All Macintosh computers from this point on will be equipped with several USB ports, beginning with the iMac. New PCs are being equipped with USB ports as well.

Level Two Caches—Memory chips, usually valued at 256Kb, 512Kb or 1Mb that serves to store recurring instructions to the processor. Often identified as 'pipeline burst' cache for PCs and as 'back-side' cache for Macs. By storing these much used instructions and supplying them to the processor chip as needed, overall system speed is enhanced—especially if this L2 cache is mounted near or next to the processor as the two modes mentioned above do. Both computing platforms use Level Two Cache in a similar way.

Modems—Electronic multi-component interfaces between the computer and the telephone system. Modems are probably the most 'asexual' component in the entire computer system, determining their allegiance to Windows or Macs by connectors and lines of software instructing the modem how to connect.



THE PHANTOM

new
Valve -
condenser
microphone

**with
phantom powering
48 V**

Large diameter capsule, switchable
○ ○ ◐ ◑ ◒

Transformer output

Sensitivity, switchable
roll - off : - 10 dB
◐ roll - up : + 4 dB

Roll - off for low frequency

Finish: satin nickel
dark bronze

UMI 9000

SEIT 1928

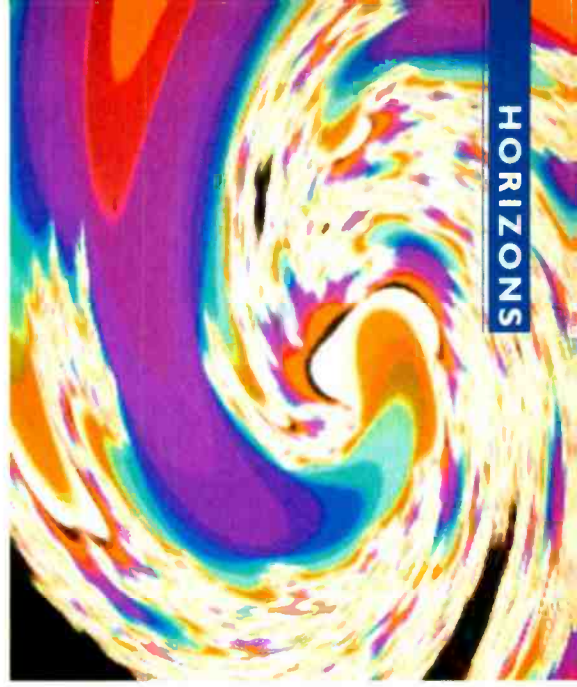
KONDENSATORMIKROFONE
FÜR STUDIO - UND MESSTECHNIK

MG

MICROTECH GEFELL

MICROTECHGEFELL GMBH MUHLBERG 18 D-07926 GEFELL
Tel: ++49 36649 882-0 Fax: ++49 36649 882 11
Int. <http://www.microtechgefell.com/> E-mail: microtechgefell@t-online.de

Int. <http://www.stirlflugaudio.com> Phone ++44 171 624 6000 Fax ++44 171 372 6370



The differences

< Intel—The company that has supplied what some analysts estimate as 85% of all chips used in PCs in the last 10 years. Intel will provide new state-of-the-art Merced chips in the year 2000 that will yield speeds approaching 1000MHz (1Ghz).

AMD-National-Cyrix—Alternative PC processor chip suppliers whose products are being received favourably by such manufacturers as Compaq, IBM and Packard Bell-NEC (among others). AMD's K6 and the National Semiconductor Cyrix Media GX are considered by many to be at least the equal of Intel's current Pentium chips.

Power PC—Apple's choice to replace the Motorola 68000 family of processors that it had pioneered with the Macintosh. Consider the processor chip as the engine that powers the computer. The bigger the processor (engine), the faster the computer. The very successful switch to the Power PC was made in the mid-90s. At least as measured with benchmarks or measuring points for computer performance, the Power PC processor chip family has outperformed comparable Pentium chips optimised for Windows since its inception.

G3, G4—Apple's current and anticipated replacement chip for the latest in the family of Power PC processors. The G4s could reach the one Gigahertz mark—similar to the forthcoming 'Merced' processor chip family from Intel.

IBM—One of Apple's partners in producing Power PC chips. IBM is a major captive and merchant chip foundry. Translation: IBM actually produces some of its own chips for its computers. That is something no other US domestic computer maker can boast. IBM also sells chips to other computer makers, such as Apple. Although Apple was influential in laying down the original specifications for the Power PC chip family and supplied staff for the AIM (Apple, IBM, Motorola) Power PC design facility in Texas, today the two merchant semiconductor partners (IBM and Motorola) are going it alone. IBM has built a sustainable business with Power PC by using it for embedded process control and for its mid-line minicomputer family. IBM does not subscribe to the Motorola developed set of multimedia instructions called AltiVec but is responsible for basic improvements in the Power PC design including the use of copper substrates.

Sound cards—PC computers have until this point used plug-in sound cards for audio. Macs come with built-in sound functionality including analogue-to-digital and digital-to-analogue chips. There is a move afoot to put sound functionality on the PC motherboard, which also houses the processor and RAM chips. However, the flexibility to choose your own sound board—with whatever level of MIDI and whichever quality of analogue-to-digital conversion one wishes—is very attractive to users.

Copper Chips—A technology developed by IBM and others to replace the long used surface or substrate that processor and other chips are 'built' on from Silicon to Copper. This would improve speed and all around processor functionality since Copper is a far superior conductor. It is expected that Power PC chips will 'go' Copper much sooner than Pentiums for the PC.

Cost—There is no real comparison for the PC versus the Mac platform. Macintosh computers are at least twice as expensive as comparable PCs, especially when you add the factors for monitor and computer speaker systems, which are usually included with new PCs as is a 'bundled' software suite (usually absent on new Macs).

Modularity—PCs are totally modular. Everything plugs in to the PC's chassis and failure-replacement generally means upgrading to the latest technology available for that machine. Macs are not as modular, and failure/replacement is dependent on Apple and/or Apple approved third-party vendors who refurbish major boards (such as motherboards).

audio recording-editing systems via extender boxes—albeit at a pricey tariff. Many Mac watchers expect a built-in six PCI slot G3 or G4 in the future to accommodate Apple's multimedia, audio and video customers.

Ultimately, it is for you to find a user with exactly the platform and configuration you want. Check out his installation either in person or over the Web or by phone and ask about his or her experiences and you will have your answer. How do you find such an installation. Go to your local AES meeting and ask around. Go to the Internet and ask on one of the professional audio chat groups. Put an advertisement in the want ads in an audio magazine. One way or another you will connect if you persevere and then as we say, you shall have your answer. ■



Dr.-Ing Schoeps



Dr.-Ing Küsters

Schaltechnik Dr.-Ing Schoeps GmbH
Spitalstrasse 20
Karlsruhe 76227
Germany
Tel: +49 (0) 721 943 20(0)
Fax: +49 (0) 721 495 750
E-mail: mailbox@schoeps.de
web: www.schoeps.de



In 1948 in Karlsruhe, two men joined forces to produce a microphone designed to set a new standard for sound recording.



CMV51
1948



CM51-3
1951



CM51-9
1953



MK4
1973



RC1200
1973



CMX-Y
mic
1998



CCM4
1994



M5TC64
1976



Ulrich Schoeps



Jörg Wulfke

50 years later, the men may have changed but the design goal remains the same.



JECT
AUDIO

Project Audio Limited
5 Castle Road
London
NW1 8PR
Tel: 0171 428 9700
Fax: 0171 428 9699
E-mail: project.audio@zetnet.co.uk



Leading the move into digital radio stations is a move girded about with promise yet fraught with danger. **Tim Goodyer** visits some of those brave enough to accept the challenge

IN RADIO, many commentators would have us believe that everything is about to change. As digital broadcasting takes effect, the whole structure of the industry will be redefined and the pressures on radio stations to reinvent their technical systems and practices will be irresistible. But those of us who know just a little bit more can tell you that it's not true...

That broadcasting is about to undergo a revolution is indisputable, but what the less attentive observers have missed is that in a handful of stations—the smart ones—many of the changes necessary to welcome the revolution have already been made. Take Europe 1 in Paris: the recent commissioning of its flagship Coluche studio (named after a famous French comedian and broadcaster who began his career at the station and died tragically in a car crash) marks another chapter in its ongoing modernisation. But make no mistake, Europe 1 is no state-funded indulgence or nationalistic tour de force, it is a private operation thoroughly dependent upon its commercial success for survival.

In fact, Europe 1—along with sister stations Europe 2 and RFS—is one of three radio stations under the ownership of the Matra group whose other interests include communications,

space, and military technology. Within the radio group it operates entirely independently, however, running as a fully manned station all day, every day, and complementing the predominantly music output of Europe 2 and RFS with

its mix of news and current affairs programming. Established in 1955 on LW and moving to FM in 1985, Europe 1 now reaches all the major French cities and beyond to Algiers in the south and across the water to London to the north—where it enjoys the kudos of being recommended listening for students of the French language.

The three stations share a common address and 12 studios in central Paris; although Europe 1's production head, Olivier Bauchard, is at pains to stress the independent nature of their day-to-day running and operation. Europe 1's share of the technical resources extends to four main studios and two production studios; its technical staff numbers around 20 with a similar number involved in operations and a further 100 journalists in the newsroom. There is also an engineering staff that helped keep the costs of the present work down to the extent that the only external contractor involved was a wiring company.

The basement of the radio complex also houses the television studios of Disney Channel France where you can witness the kind of organised chaos that plagues the average family's Saturday morning. What is readily apparent from a tour of the facility is the absence of the familiar continuity studio—its traditional duties of switching and summing having been assumed by a powerful custom analogue switching matrix. Bauchard identifies the functions of the matrix as being difficult to achieve with a digital matrix and that it will be necessary to 'put some intelligence between the console and the matrix' before it is possible to take this area of the station's operation into the digital domain.

The re-opening of the Coluche studio marks its complete redesign to be a showcase—the glass walls along one



side of both control and live rooms allowing unhindered viewing of its operation without interfering with its working. The refurbishment also sees the installation of an Amek DMS console running alongside a Numisys system for news material, D-cart for advertisements, a 360 Systems Instant Replay for jingles, three Studer D730 CD machines, a Studer D780 DAT machine, and two Studer A80 analogue open-reel machines for the remainder of the audio payout. The surface of the console carries no less than six screen displays accommodating two each for Numisys and D-cart systems as well as one each for the desk's audio metering, and a phone cueing system. All the screens are flat and output little heat and EM radiation—all of which are welcome attributes in a broadcast control room setting.

The news programming has been prepared in-house by the station's extensive newsgathering and editorial facilities using an Ares system feeding the Numisys for some time. Similarly D-cart enabled Europe 1 to be the first commercial station to use digital playout when it was installed some seven years ago. The key decision to the refurbishment, therefore, was the choice of console to replace the 16-year-old custom Digitec desk. The specific decision to go with a digital console had been taken by a new management team last year, bringing the choice down to models from Amek, Calrec, Seem Audio and SSL with the time frame between choice and installation being critical—the selection process having begun as recently as September last year.

Subsequently, Bauchard describes the Studer 950 as having been judged 'very interesting', but too old, and the 941 as being prohibitively expensive. The high level of flexibility that helped win the day for the DMS causes Amek's French distributor, Edge's Jean-Luc Gérard, to describe it as 'needing specifying before it exists', a description Bauchard translates as 'future proofing', either way, the DMS is able to meet the specific demands of a broadcast installation. The physical size of the console was, as is often the case, another critical factor, the studio having to accommodate an engineer flanked by a producer and assistant engineer for certain broadcasts, yet be operable by a lone engineer for others. Here the small size of the console monitors and the power afforded by the DMS's macros have helped make it possible to bring all the operational aspects of the control room into a physically small area.

The installed desk boasts 52 inputs, 40 outputs and in excess of 256 macros written by Amek to address the station's specific requirements. The studios' only complaint about the basic format of the DMS concerned the limitations of the metering, as it ordinarily requires the channel PPMs to be displayed on a



monitor as one of the desk's operations pages. Since the operations staff felt it important to constantly check the signal levels, an additional, dedicated, metering screen was provided. The flexibility offered by the DMS software 'toolkit' is also to be the key to solving the problems of replacing the old analogue switching matrix with its less capable digital counterpart. It also offers the security of being able to adapt the desk for future applications without the need to know too accurately what they might be. In this way a digital console can begin to address its shorter lifespan as compared to an analogue design. Certainly Bauchard is aware of these considerations and believes that after 10 to 15 years in service the Digitec desks gave a good return on the investment. And that at around the same asking price in 1998 as the Digitecs were when new, the Amek desks potentially represent both a cheaper and more powerful option.

Control room monitoring in the control room is by Genelec by way of Rogers, JBL and Urei, and is regarded by Bauchard as still being 'not ideal'. The acoustic of the programme room could also be described as not ideal due to the considerable amount of glass along the viewing wall—that it only becomes noticeably reverberant in very close proximity to the wall itself is, however, a tribute to the expertise at work. 'It's the first time in 10 years I've seen an acoustician,' comments Bauchard.

Europe 1's DMS is not the first digital console to find its way into a French radio station—the first went to Radio Classic and was followed by Radio France's SSL Axiom. Intriguingly, it's only the first to become operational at Europe 1 by a few months as it was delivered as one of an almost identical pair of DMSs.

The selection of the console for

Coluche, therefore, was made doubly important by the intention to refurbish Studio 7 in similar fashion later in the same year, completing this £0.5m phase of the modernisation project—a figure Bauchard estimates to be half that of using a 'traditional', non-digital solution. Europe 1's third main studio—called Merlin—presents something of a different challenge, as it will accommodate a small orchestra and a 30-strong audience. Although Studio 7 is not yet ready to accommodate it, the second DMS has been delivered to Europe 1 and is currently being used for testing and also

train staff of both Coluche and Studio 7 in its operation (following up on the 12-day course presented by Amek). So while no decision has yet been made regarding Merlin's next desk, it may well be that Studio 7's DMS will play a part in securing an

order for a third similar console.

Of course, it is true that the world of broadcasting is set to change dramatically in the coming years. It's simply that those smart enough and brave enough to address the future now stand to benefit from those changes and be best placed to move with the developments that will surely follow. That Europe 1 has adopted such a decisive stance so early in the days of digital radio is testament to its confidence not only in the available technology to take it into such an uncharted area but also to its own ability to make it work. Best of all is the fact that this confidence is being displayed against the background of commercial imperatives that will punish it severely if it is mistaken. The confidence of the staff is infectious, however, and a day spent watching them work and listening to them talk gives some insight into how they have secured the support of their management. Other radio stations may be well advised to take note. ■

Contact
Europe 1,
28 rue François 1er,
75008 Paris, France.
Tel: +33 1 47 231225.
Fax: +33 1 47 231207.

In its 30 years, LA's Village Recorder paralleled the careers of many of the classic artists who used it, riding the rollercoaster of rock. **Dan Daley** pays a visit to the once and future palace of sound and finds a comeback tale worthy of Hollywood

AN INSTANTLY recognisable mural adorns the entire side of the Village Recorder's four-storey studio building in a converted Masonic Temple on Butler Avenue in west LA. Painted in 1971 by artist Terry Shuenhoffen, it is the apocalyptic vision of Los Angeles after the Big One, with the jagged edge of a freeway leading off into earthquake-shattered empty space.

The mural, with paint now faded and barely visible, graced several album covers and bookplates over the last three decades. It also serves as a metaphor for what has happened to any number of classic recording studios that failed to make the transition from the astronomical rock 'n' roll budgets in the sixties, seventies and eighties to the leaner, meaner streets of the content-driven nineties.

Not so for The Village Recorder, which this year celebrates its 30th year in continuous operation. The studio, opened in 1968, has a client list of classic artists and records that could cover yet another side of the building, a who's who array that spans the modern rock era itself, including the Eagles, Eurythmics, Phil Collins, Bob Dylan, The Allman Brothers Band, Joni Mitchell, Sly & The Family Stone, Supertramp, New Edition, the Rolling Stones, Tom Petty, Heart, Fleetwood Mac, *ad infinitum* (well almost), through contemporary stars including Smashing Pumpkins, Cracker, Sneaker Pimps, Tori Amos, Fugees and Cowboy Junkies.

However, The Village Recorder struggled during the early 1990s, labouring not only under the tightened studio market of the times but also from its own legacy as part of that immoderate and unbridled era. In addition to everything else Los Angeles had to throw at it, from earthquakes to riots to immature rockers, The Village passed through its own near-fatal transition to adulthood, surviving several treacherous generations of the music business, some of which had to be literally shown the door.

'You can say The Village had fallen

from its high point,' says Jeff Greenberg, the studio's CEO for the last four years and the prime mover of the facility's tremendous turn-around during that time. Greenberg was recruited in 1994 by his friend and founder-owner Geordie Hormel's daughter, Julie, who was for all intents and purposes raised in the facility, at one point being regarded as a 'step-daughter' by Mick Fleetwood. Hormel and Greenberg waged a determined battle to reclaim the moribund studio from the damage of several previous management regimes. Hormel was also up against the studio's acquired collection of pharmaceutically inclined music business hangers-on, the accumulated detritus of the excess-laden 1970s and 1980s, when Village was at its peak, who often simply walked into the building's labyrinthine concatenation of offices, studios, hallways and secret Masonic passages and did unsanctioned busi-

ness. Which is precisely what Hormel did, and quite successfully. Within a few years of his arrival, he had embarked on what would become a hugely successful career scoring music for television series such as *The Adventures of Ozzie & Harriet*, *Lassie*, *Rin Tin Tin*, *The Untouchables*, *Huckleberry Hound* and *The Fugitive*. In 1968, he decided to create what we would now call a project studio in his home—a recording facility for his own use that would give him greater creative capabilities while allowing him more control over costs. A few generations of successful meat packing had infused him with a higher degree of business acumen than most musicians. However, the bankers at the time had less foresight and instead advised him to open a commercial studio—but keep in mind that consoles and tape machines at the time were not bought off-the-shelf at the local music store. He agreed and bought the former Masonic Temple. But he applied the Hormel business touch to that transaction, as well—the building was bought for \$125,000 with no money down, though Hormel subsequently pumped in over \$6m in improvements, starting with the design of Studio A by Rudi Brewer.

But Geordie Hormel soon subordinated his own use of The Village Recorder—named after the neighbourhood—to that of a growing coterie of young artists that gravitated to the studio, including Becker and Fagen of Steely Dan, who went on to make classics such as *Pretzel Logic*, *Can't Buy a*

Thrill and *Aja* in that studio. Today, it is equipped with a vintage Neve 8048 (all of Village's four present rooms are Neve-equipped) and a pair of Studer A800s (one of which still has a plaque affixed that indicates the machine was built by Willi Studer expressly for Phil Ramone) and has made records for Dr Dre, Snoop Doggy Dog, Counting Crows and the Eagles, who mixed 1996's *Hell Freezes Over* in Studio A. In his own words, Hormel explains his philosophy by stating, 'When someone rents the studio, it's theirs, not mine.'



Studio A with its vintage Neve 8048

ness of all sorts from within its walls.

Getting rid of that kind of history allowed Greenberg and Hormel to refocus on what Hormel *pere* had started three decades earlier. Geordie Hormel came to Los Angeles from Minnesota in the 1950s, the renegade scion of the Hormel meat family fortune.

'The family didn't like the fact that he wanted to pursue a career in music instead of in meat packing,' recalls Greenberg. 'So he basically had to come out here and start an entirely new career for himself from scratch.'

Thrill and Aja in that studio. Today, it is equipped with a vintage Neve 8048 (all of Village's four present rooms are Neve-equipped) and a pair of Studer A800s (one of which still has a plaque affixed that indicates the machine was built by Willi Studer expressly for Phil Ramone) and has made records for Dr Dre, Snoop Doggy Dog, Counting Crows and the Eagles, who mixed 1996's *Hell Freezes Over* in Studio A. In his own words, Hormel explains his philosophy by stating, 'When someone rents the studio, it's theirs, not mine.'

Village Recorder

They own it lock, stock and barrel. Making the artist comfortable in a good positive atmosphere has a lot to do with our success over the years.'

Brewer built the three succeeding studios over the next decade, and they reflected their era: none took advantage of the 20ft ceilings of the original Masonic Temple, and all still have an aesthetic that features wood panelling and trim. While Van Haaf's work has brought them up to contemporary standards today, the Brewer designs were perfect for the time and the studio continued adding studios to accommodate the new business as both rock 'n' roll and The Village grew in tandem.

These artists tended to hunker down and stay long-term in the studios, such as Sly Stone who spent well over a year making *There's a Riot Goin' On* in Studio A. The rooms seemed to take on the character of the artists using them after a while as Hormel, ever willing to make his facility as protean as his clientele, listened to their music with as much a musician's ear as a businessman's eye. Studio A's tight recording room was perfect for the close-in miking of the Steely Dan Records. (It was during those years that Jeff 'Skunk' Baxter, who played so many of the solos on those records, eventually decided to move in and set up his own studio in the building.

A suite of rooms on the third floor is snaked with wires and its walls lined with guitars. Baxter's private digs are mirrored by those of guitarist-auteur Robbie Robertson, whose rooms have allegedly been seen by fewer than a dozen people over the years—no one really knows quite how many—he's been in the building. A quick peek—authorised by a call by Greenberg to the sometimes reclusive Robertson—reveals a relaxed parlour-like anteroom whose walls are lined with his guitars dating back to The Band, and an equally informal studio room where much of his stunning, hypnotic *Blue Train* album was conceived and fleshed out on a vintage Neve 8021 desk, a Roland sidecar mixer and an array of gear and instruments as eclectic as their owner. The two artists are joined by six-time Grammy winning engineer Al Schmitt, who was brought in as consultant for the renovation period and who also continues to maintain an office there.) Studio D has a 72-input VR Legend console fitted with one of the first 8-bus VSP surround matrixes, which has been used on films including *Shawsbank Redemption*, *Good Will Hunting* and *The X-Files*, but its large recording space still resonates with the beats of Fleetwood Mac's seminal *Tusk* (for whom Hormel again modified a studio's design for the artist) and the Rolling Stones' classic 'Angie' from *Goat's Head Soup*. One large iso booth also serves as a massive echo chamber, adjustable by how far the door is left open, and whose

zebra wood-lined piano room Stevie Nicks favoured for her vocals and which later gave Bruce Hornsby & The Range's *The Way It Is* a unique sparkle.

In Studio B, built in 1971, where the recording of Smashing Pumpkins' *Mellon Collie & The Infinite Sadness* was one of the factors in helping revive Village's fortunes in 1996, Oscar Peterson's 1921 Steinway grand sits like an honoured elder in the small recording room, on the opposite side of the control room from the lounge, whose ceiling is studded with fibre-optic stars. Second floor Studio F's lounge, built in 1986, is reputedly where Eric Clapton penned 'Tears In Heaven' on an acoustic guitar for the soundtrack to the film *Rush*. Since so much of the original aesthetic remains in place, there is an otherworldliness to the facility, a sense reinforced by the reputed presence of a bass-playing ghost whom a few long-time clients have reported.

The renovation of The Village was undertaken in 1994. Greenberg brought in studio designer Vincent Van Haaf, whose mandate was to modernise the control rooms but retain their acoustical *je ne sais sais quoi*. 'Some of the rooms are not very deep, about 13 feet or so,' says Van Haaf of the original designs; although Studio D's control room has a depth of 30 feet. 'It would have been difficult to have enlarged most of them. For instance, Studio A's control room shares an exterior wall with the post office next door.' Van Haaf placed a Helmholtz resonator on the rear wall, tuned to 170Hz., to add a sense of depth to the room. His most radical change in all the control rooms was to shift low-frequency absorption from cavities in the floor made by Brewer to new ones in the ceilings, thus maximising the floor space of the control rooms.

'The facility has a certain attitude that affects the artists and producers who work there,' observes Van Haaf. 'You can hear it in the records. I think it's an overriding tension created by music and the environment of the Masonic temple. I've always noticed that records coming out of there had a feel like no

others. I don't think you could give a studio a greater compliment.'

Adds Greenberg, 'The business had changed and we needed to re-establish The Village as one of the premier studios in LA I looked at the physical presentation



Studio B with its Neve VR-72

of the building and decided it needed a transformation, from how the outside of the building looked to how clients felt when they first walked through the door. The lobby had been cool in the sixties, but with the mix of clients we were looking for in the nineties we needed something different. We went through the complex and literally ripped up the carpets, cleaning and renovating, then listened to every amp, speaker, wiring combination and component available to get the most accurate monitoring.'

Geordie Hormel was always a fan of technology; The Village was one of the first studios ever equipped for 24-track recording, was the first studio in Los Angeles to offer 24-track Dolby capability, and was one of the first facilities to commit to digital recording with the purchase, in 1984, of three Sony 3324 digital multitracks. (He was also instrumental in establishing Fairlight sampling engines to the US during the period.)

Greenberg is committed to continuing that; plans are already in the drawing stages to turn the second-floor games lounge into a dedicated 5.1 surround mixing room designed by Van Haaf, slated to open in October featuring a Capricorn console with wings loaded with 1081 EQ modules. Greenberg intimates that the development of this room is taking place with more than simply the purchase of a Neve digital console; it has the potential to become, he says, a showcase room for 5.1 audio mixing technologies, including Neve's. If so, it would fall in line with a current trend in the industry that sees surround audio systems manufacturers teaming with engineers, producers and facilities to showcase their wares, such as the pending arrangement in Nashville between surround scheme DTS on one hand and mastering engineer Denny Purcell >



Front and rear view of Studio D

◀ and engineer Chuck Ainlay on the other to build such a facility jointly.

'This room has a lot of potential for new technologies,' says Greenberg. 'And the way it's envisioned, it wouldn't look like most studios. We're keeping the windows in place, for one thing, to change the feel of the room from a studio into something more versatile.'

Across the hall is the Temple's original movie theatre—a huge, but unfinished room with a 20ft ceiling—which has been used over the decades as a recording annex, including for the Eurythmics drum tracks. This room is in the research stages of a complex redesign plan that would make it a large film-scoring stage that would be used for music sessions, as well. (Village has had significant suc-

cess in film and commercial audio for video, including sound elements for films including *Phenomenon*, *Con Air*, *Schaubank Redemption*, *The Man in the Iron Mask*, *Dead Poets Society*, *Fried Green Tomatoes*, *The Prince of Tides* and *The People vs Larry Flynt*, and commercial spots for Reebok, AT&T and Jack in the Box.

'This has been an amazing recording space over the years,' says Greenberg, clapping his hands to illustrate as he walks through the room.

'The key to making it workable is how to isolate it, which is something we're researching right now with [Van Haaf]. We'd have to create a room within a room, extending new support columns into the bedrock beneath the building. What makes it a

bit more tricky is that we have to be able to isolate the room from the other studios downstairs even during the construction phase.'

While the technology is being updated and the aesthetics polished up, Greenberg and studio manager Robin Bulla (after five years' tenure, he is one of only two staffers to have been there longer than Greenberg), whose petite form underscores her earlier career as a professional jockey, have worked on the facility's marketing plan.

'We needed to recreate the culture of The Village the way it was when Geordie first started it,' says Bulla. 'If you were to be here for a few days you'd see that it truly exists again and it continues to be the basis for how well the studio had done for all those years and how well it's doing again.'

But there are some twists to the studio marketing strategy implemented by Greenberg, whose ability to think in Hollywood terms again comes to the fore. Under his direction, the studio is a sponsor of new talent festivals South by Southwest (SXSW) and North by Northwest (NXNW), both of which have grown into sizable industry attractions. As a result, the Village Recorder name gets significant exposure to a large cross-section of an increasingly fragmented industry. Greenberg has also made the facility a daily sponsor of L.A.'s National Public Radio affiliate station, one known for taking musical chances and promoting new and underpromoted talent on a national basis. (Greenberg's relationship with the station was evidenced on a cruise down Santa Monica Boulevard when Greenberg waxes enthusiastically about a cut off the new Rufus Wainwright record, which gets him so excited he pulls out the cell phone, hits a speed dial button with the station's control room number pre-programmed in, and finds out the producer's name within two minutes.) 'It's all about interactivity,' explains Greenberg. 'The same thinking goes into getting the ISDN lines and making connections with other facilities, like Howard Schwartz Recording in New York and doing projects together. LA is now the centre of service for the communications industry in the middle of the Age of Communications. It's all part of The Village mind-set: make it comfortable and easy for people to create.'

All this is combined with a restaffing program that infuses new hires with a service-oriented mindset and a rededication to Hornel's notion that music and the client come first. (Greenberg prefers graduates of professional audio educational programs because he wants to focus on training them in the studio culture, not its theory, he says.) 'It took 30 years to build the culture of Village Recorders,' observes Greenberg. 'It took us three years of hard work to restore it. I'm ready for the next 30 years.' ■

Contact

The Village, 1616 Butler Avenue, West Los Angeles, CA 90025, US.
Tel: +1 310 478 8227.
Fax: +1 310 479 1142.
Email: VILLAGEREC@aol.com



DIGITAL POT

Need to do a smooth manual fade on your workstation? Or maybe you need to ride gain on a digital source. Perhaps you need to pan or swap channels in an AES/EBU pair. The Graham-Patten DFADE-2 may be just what you're looking for. It's a two channel remotely controllable digital fader and channel swapper. Housed in a compact, rugged aluminum enclosure, it's ideal for studio or field use.

The DFADE-2 is part of the SoundPals™ family, an expanding set of tools for the digital audio trade. To learn more, call us today or visit our web site.

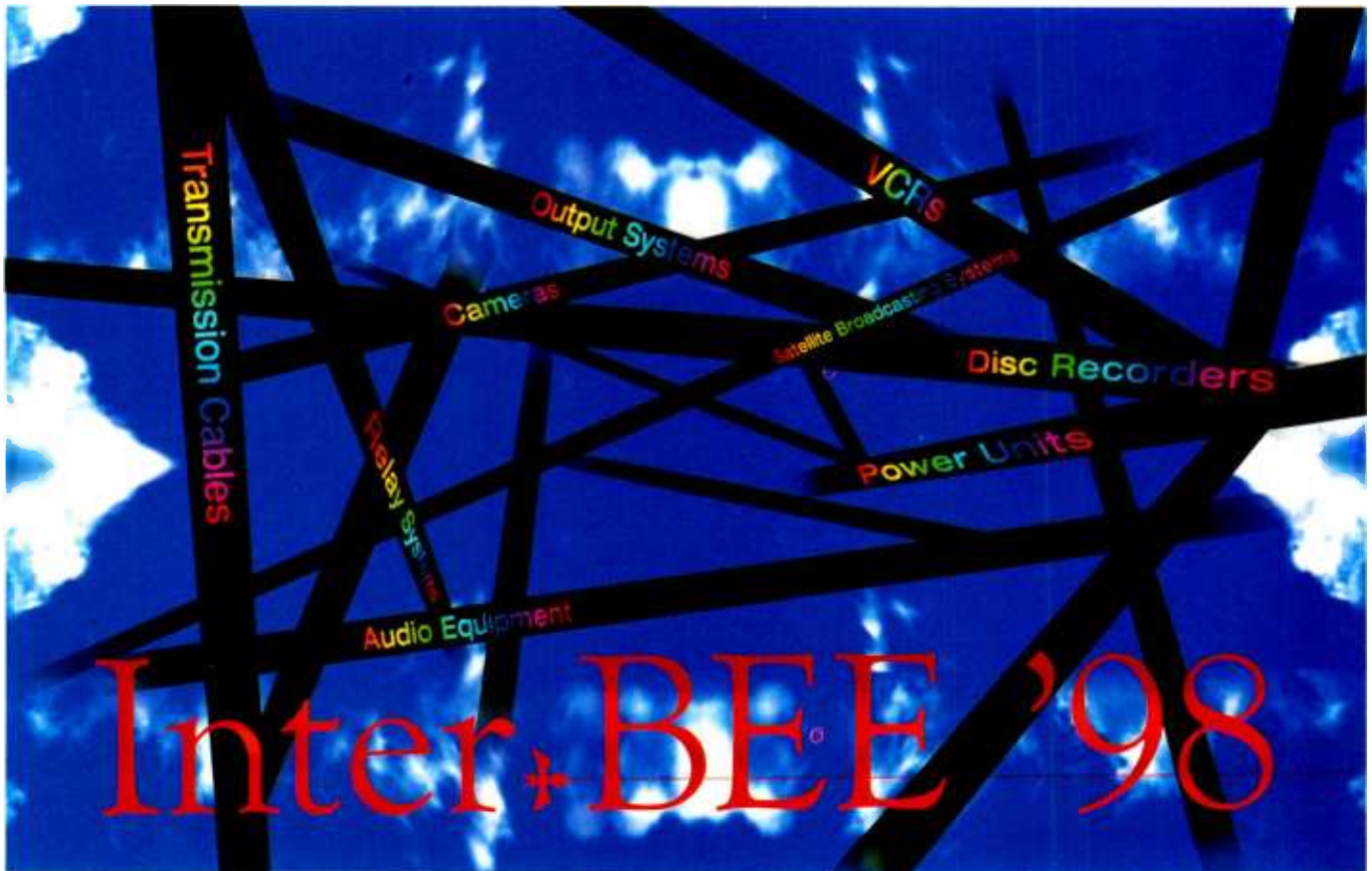
GRAHAM-PATTEN

The sound choice.

www.gpsys.com
800.422.6662
+1.530.273.8412

Inter BEE '98

34th International Broadcast Equipment Exhibition
November 11-13, 1998, at the Nippon Convention Center (Makuhari Messe)



Make a BEeline to Where the Action Is

Get out your calendar and mark down November 11-13 as the one date you will not miss this year.

It's the annual International Broadcast Equipment Exhibition (Inter BEE), one of the world's top showcases for professional broadcast, video, and audio technologies. You'll join 28,000 other visitors from around the globe in celebrating the latest advances in digital production systems for broadcasting, images, and music from more than 500 manufacturers. These will include networking solutions for small and home office producers.

The celebrations will continue with our 10th annual series of symposiums, forums, and seminars hosted by leading broadcasting, audio, and video software producers.

So, make a beeline for Inter BEE '98 and be where the action is in digital broadcasting, video, and audio technologies.

For more information on Inter BEE '98, contact:

Japan Electronics Show Association

Sumitomo Shibadaimon Bldg. 2 Gokan, 1-12-16, Shibadaimon, Minato-ku, Tokyo 105-0012, Japan

Fax: +81-3-5402-7605 E-mail: info@jesa.or.jp URL: <http://www.jesa.or.jp/bec>

Exhibition Categories

- Audio Equipment ● Cameras ● VCRs
- Disk Recorders ● Video Equipment
- Output Systems ● Relay Systems
- Transmission Systems
- Lighting Equipment ● Measuring Equipment
- Transmission Cables ● Power Units
- HDTV-EDTV Systems
- Satellite Broadcasting Systems
- Multiplex Broadcasting Systems ● Virtual Sets
- Video Servers ● Nonlinear Editing Systems
- CG Systems ● Multimedia Systems
- Other Related Items



PRODUCT & BROCHURE SHOWCASE

F A X B A C K + 4 4 1 7 1 4 0 1 8 0 3 6



Anthony DeMaria Labs

These precision-built devices are made in the U.S.A. to 'all-tube' designs for those who want the best. Their well-earned reputation for quality and reliability is backed by an impressive list of owners and users on both sides of the Atlantic.

Want to find out why?

Now available in the U.K.

For Sales, Service & Rental Call

tickle music hire Ltd
0181 964 3399



CANFORD

Your **FREE** copy of the latest Canford catalogue is now available. Expanded to over **850 pages** and giving detailed information on over **13,000 products**. 'The source' is truly the most comprehensive pro-audio catalogue available today. With several European offices, **FREEPHONE** numbers for Spain, Belgium, Sweden, Netherlands & Denmark, plus distributors worldwide, Canford can guarantee an instant response to a query from anywhere round the Globe. Call us today for your **FREE** copy or take a look at our impressive internet site for further information.



Tel: +44 (0)191 417 0057
Fax: +44 (0)191 416 0392
Internet: <http://www.canford.co.uk/index.htm>



smooth & creamy VAC RAC™

The modular vacuum tube system, with:
*Mic Preamp *Limiter *Step Equaliser
*Instrument Interface *All valve power supply stage...giving you the power of legendary tube technology for live recordings, tracking, mixing, sweetening and mastering.



UNITY AUDIO LTD

Upper Wheeler House, Colliers End
Herts SG11 1ET T: 01920 822 890 F: 01920 822 892
e-mail: sales@unityaudio.co.uk Web: <http://www.unityaudio.co.uk>



audio-
technica®

PROFESSIONAL
AUDIO
PRODUCTS

Technica House,
Royal London Industrial Estate,
Old Lane, Leeds,
West Yorkshire LS11 8AG

Tel: +44 (0)113 277 1441
Fax: +44 (0)113 270 4836
E-mail: sales@audio-technica.co.uk



Professional Audio Metering



DK-AUDIO • Marielundvej 37D
DK-2730 Herlev • Denmark
Phone: +45 44 53 02 55
Fax: +45 44 53 03 67
e-mail: dk-audio@dk-audio.dk
Internet: www.dk-audio.dk



The tools of the trade! Palmer

Adam Hall Ltd
3 The Cordwainers, Temple Farm Industrial Estate
Southend on Sea, Essex S52 5RU
Tel: 01702 613922 Fax: 01702 617168 e-mail: mailuk@adamhall.com



Prism Sound produces the DSA-1 hand-held AES/EBU analyzer, the Dscope FFT analyzer and high-quality A/D and D/A converters.

The DSA-1 is the only hand-held tool that measures carrier parameters and data content. With programmable

go/no-go limits and Watchdog or Channel Check modes it solves interface problems fast.

For more information on Prism Sound range of products, call:

Tel: +44 (0) 1223 424988
Fax: +44 (0) 1223 425023
William James House, Cowley Road,
Cambridge CB4 4WX



Microphone University

Do you want to learn more about microphones?

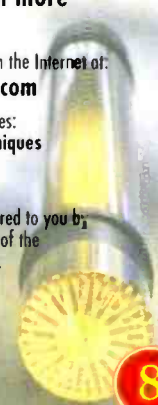
Visit the Microphone University on the Internet at:
www.dpamicrophones.com

The Microphone University features:
• General Microphone Techniques
• Application Guide
• Technical Corner

The Microphone University is offered to you by DPA Microphones - Manufacturer of the famous Series 4000 Microphones.



Hejrevang 11
3450 Allerød, Denmark
Tel: +45 4814 2828
Fax: +45 4814 2700



Analogue Perfection

For information on John Oram's stunning range of Consoles and Rack equipment, return details or visit our Web site.

<http://www.oram.co.uk>
E-mail: sales@oram.co.uk



ORAM PROFESSIONAL AUDIO
Tel: +44 (0) 1474 815300
Fax: +44 (0) 1474 815400



For an immediate response either FAXBACK Phil Stratten directly or mail to Studio Sound, 4th Floor, 8 Montague Close, London SE1 9UR. Fax: +44 171 401 8036

Circle

the number you require further information about

1 2 3 4 5 6 7 8 9 10

SEPT 98

YOUR INFORMATION

NAME

ADDRESS

POSTCODE

TEL

FAX

Studio classified

classified

To place an advertisement contact: Phil Stratten
 Studio Sound (Classified),
 Miller Freeman Entertainment Ltd.,
 8 Montague Close, London SE1 9UR, UK
 Tel: +44(0)171 921 5079 Fax: +44(0)171 401 8036
 All box numbers reply to the above address

RATES: Recruitment £38 per single column centimetre. All other sections £35 (minimum 2cm x 1) Box number £10 extra per insertion. Published monthly.
 Copy deadlines: contact Phil Stratten, Classified Advertisement Manager

-Barcelona-

We Never Close



TEL 0181 746 2121
 FAX 0181 746 4100

-London-

Fx Rentals Ltd, Europe's largest pro-audio rental company is expanding it's 24 hour service at it's London office and requires an additional person to take bookings and prepare equipment on Friday, Saturday and Sunday night's working a shift of 7pm to 8am. Salary by negotiation, immediate start.

Please phone Neil White on 0181 746 2121 for more information

▶ WANTED ◀

'OLD NEVE CONSOLES'
 any condition...
 we will purchase
 worldwide



PRO AUDIO
 A UNITED KINGDOM BASED COMPANY

THE 'VINTAGE' NEVE SPECIALIST!!

Telephone: 01932 872672 Fax: 01932 874364 Telephone International: 44 1932 872672
 Fax: International: 44 1932 874364 www.aesproaudio.com

Got your new
 R&W Catalogue
 yet?

Issue 8 of the Raper & Wayman catalogue is out now. 208 pages of Pro-Audio for Production & Presentation. Free within UK. Export price £10.



+44 (0)181-800 8288

Raper & Wayman Ltd, Unit 3 Crusader Estate
 167 Hermitage Road, London N4 1LZ UK

Fax: +44 (0)181-809 1515 r+w.proaudio@btinternet.com



equipment for sale

AARONSOUND
 PRO DIVISION
 AMS/NEVE NEW PRICES ON S-DMX DELAY RMX16 REVERB
 V RACK 1081 INPUT/EO 33609/3 COMP
 ₤ for prices
 USED EQUIPMENT

AMS DMX 1580	£1895
LEXICON PCM90	£2065
PCM90	£995
YAMAHA REVS 8 rem	£500
SPX90 mk2	£1199
ELECTROSPACE STRATE GATE	£1195
ASHLEY SC30 DUAL GATE	£175
DBX 161 EARLY MONO COMP/LIM (LARGE VU)	£369
DRAWMER DL 241	£265
M90	£375
MXR DUAL 15 BAND GRAPHIC	£199
TC 2240 EQ	£299
1128 PROG GRAPHIC/SPECTRUM	£249
ROLAND SBF 325 FLANGER	£309
ROLAND RES55 RACK TAPE ECHO	£489
RE201 SPACE ECHO	£299
ROLAND SYSTEM 100m (5 module)	£1199
FENDER RHODES STAGE 73mk2	£499
HÖRNER E7 CLAVINET	£399
DDA DM912 44 input console	£55K
SOUNDTRACS JADE S 40inputs + auto	OFFERS
TAC MATCHLESS 268 + BANTAMS	£1995
OTARI MK70 1 inch B TRACK REEL (30IPS)	£1899

Overnight delivery same day collection
 WE ALSO SELL YOUR EQUIPMENT ON BROKERAGE!
 FAX/TEL: 0161-442 8616 Mobile: 0831-10685
 E-mail: aaronsound@btinternet.com
 WEB: http://www.btinternet.com/~aaronsound

FOR SALE

AMS/Neve Audio Systems
 Logic 1 w/audiophile spectra 24
 Logic 2 w/audiophile spectra 24
 Logic 3 w/audiophile spectra 24
 All systems are "S Frame"
 24 channel
 24 bit

Contact: Andy Lewis
 Cutters, Inc.
 001 (312) 644-2500

Big Boy's Toys

Tel : 01923 442121

Fax : 01923 442441

CONSOLES

Anek Mozart	43 channel - very clean	£11,500
Anek Mozart	60 ch, superb, vgc	£28,000
Anek Mozart	40 ch, Rupert Neve Modules	£35,000
Soundcraft 6000	56 ch pb gc	£6,000
Soundcraft S2400	24 ch history !!	£6,000
DDA AMR24	24 channel vgc	£12,500
DDA DCM 232	56 ch, up/down automation	£32,000
TAC Scorpion	24 ch, stand pb good cond	£1,850
Soundtracs Jaded S	48 channel - so much more	£50,000
Yamaha 02R	ex-demo Version 2.0	£1,995
Neve V3	44 channel Neve 96 vgc	£6,000
Neve 5106	36 ch, dynamics, plasma	£13,000
SSL 4048	E, G comp / recall vgc	£6,000
SSL 4048E	Brown Eq + two orange, E-comp	£6,000
SSL B Series	40 ch, RHPB, VU	£6,000
SSL 9000J	48 ch, the full works	£6,000

TAPE MACHINES

Ampex ATR102	2T 1/2" New Heads	£4,950
Ampex ATR 102	2T 1/2" Flight cased	£4,500
Ampex MM 1200	24T 2" with remote	£9,500
Ampex MM 1200	16T 2" with remote, serv	£3,950
Orari MTR9011	24T 2" with remote, return	£11,950
Orari MTR9011	24T 2" under 1000hrs	£11,750
3M M79	24T 2" VGC	£6,950
Sony PCM3402	Twin Dash + 2" Digital	£2,950
Sony 3348 Dash	48T Dig. Upgrades, Low hrs	£6,000

MICS

Rode Classic	Valve Mic	£695
Audio Technica 4050	Pristine	£425
Micro Gefell UM97S	Beautiful valve mic	£1,100
Neumann M149	Used once ill	£1,750
Neumann TLM 170	two available	£895
AKG C451E	AKG C451E	£190
AKG C451EB	CK1 capsule	£190
Neumann U87	good condition	£850.00
Neumann TLM170	transparent large dia	£795.00
Sennheiser 421		£145.00
AKG D-12		£135.00
AKG D-112	Dyn bass mic	£115.00
AKG C-1000	Life's standard	£70.00

OUTBOARD

Lexicon 480L V3 +LARC		£4,995
Lexicon PCM480	3 to choose from	£895
Lexicon PCM170 v3	2 to choose from	£850
Lexicon 200	reverb	£1,100
Orban 622B	EQ	£895
Pultec EQP1A	Emmmm	£6,000
TC Electronic M5000	Choice of 3 prices from	£1,750
TL Audio EQ2	"Classic" 2ch mic pre eq	£850
Tube Tech EQ1A	beautiful mono eq	£1,900
Urei LA2-A	Be quick - 2 only	£2,500
Urei LA3		£850
Urei LA4	2' factory racked back face	£600
Urei 1176 Black Face	5 to choose from	£1,495
Yamaha Rev7	Classic reverb	£325
Yamaha SPX90 mkl		£295

AKG BX20E remote	spring reverb	£495
AMS DMX 15-80s	AMS delay	£750
AMS RMX 16	12 presets	£1,900
AMS RMX 16	9 presets	£1,900
Aphex Dominator	limiter	£495
API 525	compressor	£495
API 550B	lasty sandwiches	£495
Apogee AD1000	Digital conv-rtor	£850
BSS DPR402	2ch comp, de-ess, lim	£450
BSS DPR504	4 ch noise gate	£375
DBX 161		£225
DBX 160X	classic compressor	£250
Drawmer M500	Multi dynamics	£350
Drawmer DS201	Compressor	£175
Focusrite ISA215	2 ch mic-pre eq	£1,850
Focusrite Red 3	2 channel comp	£1,495
Helios Modules	2" mic-pre and eq	£600
Joemeek SC2	Version 1.05 - classic	£750
Klark Teknics DN780	Reverb	£850
Klark Teknics DN360	30 band Graphic EQ	£695
Klark Teknics DN332	16 band Graphic EQ	£495

NEW GEAR SPECIALS
WE ARE MAIN STOCKING DEALERS
FOR ALL NEW PRODUCTS

FOR THE BEST PRICES AROUND CALL
OR BUY DIRECT FROM THE WEB SITE

WWW.BIG-BOYS-AUDIO-TOYS.CO.UK
BUY ON LINE

EXPORT ANYWHERE IN THE WORLD
WE ARE ALWAYS LOOKING FOR QUALITY USED GEAR.
PART EXCHANGE WELCOME. IF YOU ARE LOOKING
FOR THAT ELUSIVE BIT OF KIT, LET US KNOW, WE WILL
FIND IT FOR YOU.

WE CAN SELL EQUIPMENT ON A COMMISSION BASIS THIS
IS A VERY EFFECTIVE AND FAST WAY TO GET PROPER
RETURNS FOR YOUR UNWANTED EQUIPMENT

WE CAN NOW TAKE THE FOLLOWING CREDIT CARDS EITHER
OVER THE PHONE OR THE WEB



ALL PRICES ARE EXCLUDING VAT. E.80E.

"Nick Ryan is the first person I call when I want quality used equipment"

Terry Britten, Producer - Song Writer



25 YEARS OF EXPERIENCE COMBINED WITH FIRST
CLASS KNOWLEDGE AND PERSONAL ATTENTION
NICK RYAN IS THE FIRST PERSON YOU SHOULD CALL

TEL + 44 1892 861099
FAX + 44 1892 863485
WEB http://www.soundsinc.co.uk

OTHER SATISFIED CUSTOMERS

STING, TREVOR HORN, ROGER TAYLOR, CHRIS REA, PHIL COLLINS, OCEAN
COLOUR SCENE, THE COCTEAU TWINS, PETER GABRIEL, ALAN PARSONS,
JEAN MICHEL JARRE, VANGELIS, CHRIS DIFFORD, SARM STUDIOS,
METROPOLIS, FISHER LANE FARM, EDEN STUDIOS, JACOBS STUDIOS,
PARKGATES, STRONGROOM, REAL WORLD, BRIT ROW, SONY MUSIC,
WARNER CHAPPELL, GREAT LINFORD MANOR, MCA, KONK STUDIOS,
STUDIO MULINETTI, HIT & RUN, MAYFAIR STUDIOS, BEARTRACKS.



The Digital Village

Macintosh and Outboard Specialists

New G3 in stock.

Call Gavin Beckwith -
London's leading Mac guru.

Avalon - Focusrite - Lexicon - Summit -
TC Electronic - TLA - Eventide -
Massenberg - Alan Smart -
AKG Solid tube in stock

Mackie Main Dealer

Call Nick Melville-Rogers
0181 440 3440

STOP!!

DON'T BUY ANY NEW AUDIO EQUIPMENT
WITHOUT TALKING TO US

WE CAN OFFER THE BEST PRICES AND
TAKE YOUR UNWANTED EQUIPMENT
IN PART EXCHANGE!!

LTF are agents for all the following:-

Audio Ltd, Audio Developments, beyer, Audio-Technica,
Trantec, Soundcraft, HNB, Micron, Fostex, Shure,
Neumann, Sennheiser, Schoeps, AKG, Rycote, Sony, IDX,
PAG, Garwood, Porta-Brace, Hawk-Woods, KT Systems,
VDB plus many, many more!!

Call, fax or e-mail for a quotation. We will beat any
written quote and take part exchange if required!

Equipment Wanted We will purchase your unwanted
gear outright.

Equipment For Sale Good selection of used gear always
for sale.

Contact: Will Blackham @ LTF Ltd
Tel: 01895 813698 Fax: 01895 813701
Email: ltf@ffd.co.uk
Website: ffd.co.uk/ltf/ltf-list

product & services

jbs records MUSIC and SPEECH

REAL-TIME/HIGHER-SPEED Quality Cassette
Duplication and Blanks from 1-1000.
Computer printed labels.
Solo, 1/2" reel, Sony Betamax or R-DAT
recording. Fast Security Delivery service.

FILTERBOND LTD, jbs records division
19 SADLERS WAY, HERTFORD, SG14 2DZ
01992-500101

STOCK LABELS FOR COMPACT DISK VHS VIDEO & AUDIO CASSETTE

- On A4 sheets for computer printing by laser printer.
- As continuous roll with holes for dot-matrix printers.
- Supplied blank white with next day delivery from stock.
- 48 hour delivery on a wide range of coloured labels.
- Custom printed labels supplied to client specification.
- Telephone for overnight delivery of FREE samples.

Superfast
Labels Ltd

Unit 15, Church Road Business Centre
Sittingbourne, Kent ME10 3RS England
Tel (01795) 428425 Fax (01795) 422365
World Wide Web - http://www.superfast.co.uk/label/

comparative
Leading
Used
Equipment
Specialists
THRESHOLD
Suppliers
of the
Best in
New
Equipment
Worldwide
Export
Facilities



USED EQUIPMENT LIST
PHONE +44 (0) 1225 447222 • FAX +44 (0) 1225 447333

CONSOLES

- Neve VRL 60 - loaded 48, Flying Faders, dynamic metering RH p/b as new!!! £175k
Neve V3 - 48 channels in 48 frame, ext. p/b, Uptown 2000 moving faders, plasmas... £call
Neve 5116 - 32 channel, all mono, 8 aux., direct outs, V1 electronics, Necam 96 £call
Neve 8108 - 48 frame, 44 channels, in-line Necam 96, LHPB, Plasmas £30k
Neve 54 series 16/2 table top version £3,500
AMS Neve Logic 2 - 52 frame, M24 Spectra, MAD1, Taxi, Massive spec, call for details. £call
SSL 100 input G+ with Ultimotion £call
SSL 6058E/G - 56 channels, G computer, 48 mono, 8 stereo, VU, RHP, LH prod. TR £95k
SSL 4056E/G - 48 mono, 4 stereo, all G centre section, TR, VU metering, Excellent £95k
SSL 4048E/G - TR, Plasmas, RH p/b 1981 £10k
SSL 4032E/G - 1981, TR, Plasmas, 242eq. £40k
Soundcraft 3200 - 56 channels, all with 48 eq. gates etc. 32 buss, 32T metering, One helva console for the money, cost new is £65,000!!! 3.4m - big willy, RH patch £12,500
Soundcraft TS 12 - 28 frame 24 fitted, in line £2,500
Harrison Series 10 - 28 channels amazing!! £15,000
Amek Hendrix - 40 frame, 22 fitted + 4 stereo, Supertrue Auto, 3 extra p/b BARGAIN!! £11,500
Amek Mozart - RM 56 channel fully loaded, cost new £95k £30k
Amek BIG - 40 Im, 28 mono, 4 stereo, Supertrue Auto, Recall, Clean £9,995
Amek Anglia - 48 channels, in line, VCA's later grey model, external p/b superb £15k
Amek Anglia - 24 channels, in line, VCA's £6,500
Amek BCC - broadcast console, 8 mono, 8 stereo, 24 frame, patchbay £6,000
DDA DGM 232 - 56 frame, 56 fitted, Uptown 2000 auto, Plasmas, 144 extra tie lines £25,000
DDA CS-3 24 channels good 'n cheap £1,500
DDA D series 36/8/24, 24T metering £3,995
MULTITRACKS & DOLBY
Studer D827 - 48 tk digital, 1994, 2400 hrs, rem / loc, full m/b, AES/EBU interface, max RAM, noise shaping, 1 owner, Excellent £55,000
Studer A 820 24T rem/loc, Dolby SR, 1,800h £22,500
Studer A80 Mk2 - 24T, narrow, audio remote £4,495
Studer Dyaxis 2 - complete system, multi control surface, optical drive etc BARGAIN!! £3,995
Olari MTR 90 Mk2 - remote & locate, 2,000h well maintained £9,995
Olari MTR 90 Mk2 - rem & loc. + overbridge with 24 channel Dolby SR rack £15k
AMS Audiofile M16 - call for full details £call
Timeline Lynx - one Lynx 1 module left £750
Timeline Lynx - one Film module left £750

AK Eclipse editor + 4 x Es-1.11 buss modules + SSU Complete system £call
Dolby SP 24 - rack of 24 A's, lovely £995

2T MACHINES

- Sony PCM 7050 - Top of the range, kitchen sink time-code DAT £3,500
Ampeg ATR 100 - 1/4' 6' available, the ultimate. £1,250
Panasonic SV 3800 DAT - NEW £775
Tascam DA 30 Mk II DAT machine £595
Studer C 37 - 1/4' classic tube (as seen) £1,250
Studer A 812 - 1/4' CTC, no meters £995
Studer A 810 - CTC, no meters, rack mount £750
Studer B 67 - 1/4' with console £495
Studer JLS 4000 - synchroniser £295
Revov G96 tube 1/4' 2T - Checked by Tim de Paravicini, near MINT condition, lovely £500
Revov B77 HS - LS several available from £400

FX EQUIPMENT

- EMT 250 - R202 sought after digital reverb £4,500
Lexicon 480L with LARG, 2yrs old latest ver £5,000
Lexicon 300 - excellent condition £2,500
Lexicon 1200 - Time comp / harm, stunning!! £495
Roland DEP 5 - Underated versatile multi fx £195
Yamaha SPX 90 - classic! £295
Yamaha REV-7 - another classic £450
Ursa Major SST 282 Space Station £495
Klark Teknik DN780 - Ion reverb, 4 in stock £850

OUTBOARD

- SSL G 384 - Stereo compressor £1,595
Urel 1176LN - Black & Silver available £1,495ea
Urel LA-1 - single unit, classic £450
V65 - sought after tube mic amp, 5h 237... £695
Focusrite ISA 131 - 1U dynamics package £1,395
DBX 162 - stereo version of classic, 16U £595
Phillips IS5022 - Sound Enhancer, 20 bit AD / DA, plus de-clicker, de-jitter, de-clid-tickler, £695
Neve 1081 - NEW mic amp, 4 band eq £2,249
Neve 33609J - J series dual channel compressor / limiter, NEW £2,217
Neve Neil Perry 1272 mic amp conversion, racked, psu, pair - sounds brilliant £1,100
Avalon 737 - tube mic amp, eq, compressor, A total peach of a unit, NEW £1,395
Avalon 737 SP - Improved headroom at low frequency and with silver knobs, NEW £1,595
Cranesong S178 Comp/Limiter £1,195
DBX 160x - most useful £250
RCA BACG - large lovely tube limiter £2,500
MR Eq - dual channel 4-band eq £395
Meyer CP-10 - 5 band, 2 channel eq £995
Drawmer DS 221 - dual compressor limiter £225
Drawmer DS 201 - dual gate, 2 coming £225
Drawmer MX30 - dual comp/lim/gate £120

- Aphex Compeller 300 - 2 ch compressor £450
Klark Teknik DN 332 - dual 16b graphic £495
BSS Varicurve - remote £call
TC 1128 - 28 band graphic/analyser £395
Leevers Rich A-501 7b graphic eq, balanced £19,99
Urei 5274A - 27 band graphic, tally £195 ea

MICROPHONES

- AKG C-12 - Classic tube, just serviced £3,000
Telefunken / Schoeps - M221b/934 sweet sounding AC701 tube mics - 2 left £595
AKG 451/CK1 - always popular £175
AKG 451/CK8 - shortie schocky £225
AKG 5A1/B1B - metal stand adapter - loads £35 ea.
STC 4038 - classic fig-8 ribbon £350
Neumann KM 85 - multi patt, 2 in stock £495
Neumann EA891 - elastic suspension for U89 £100
Lomo 19A19 - 60's Russian tube mic - looks weird, sounds stunning! Try one out £795

MONITORING

- Genelec 1029A - NEW pair £450
Genelec 1030A - excellent condition £750
Genelec 1025 - 2 x 15 drivers, huge speakers with amps £7,995
ATC SCM 200 ASL - Yew wood finish - look great in your bedroom! Bargain at only £7k5
Apogee 4 x SSM system + controller £695
Apogee AE-1 pair £395
Yamaha NS 10M - love them or hate, vgc £175
DynAudio M3 - Chord SPA 1032, stands etc MINT and still under guarantee £6k5
DynAudio A2 - 500 w/ch amplifier £495
Tannoy MIM 1000 - 15' Super Golds £895
Tannoy PBM6.5 - cute little monitors £100r

MISCELLANEOUS

- Rainbird 24 channel, 6 way surround sound matrix L C R L S R S SW outputs v. useful £495
Yamaha MSS1 - mtl synchroniser £95
Audio Design Pro Box 14 - timecode reader / generator £595
w/CD timecode translation £750
Sony PVM 21300M - 27" broadcast monitor £550
Sony PVM 21300M - 21" broadcast monitor £195
Window sampler - 16 bit £495
EMT 948 - broadcast turntable £95 ea
Amek Recall RL-1 modules, NEW 20 in stock £95 ea
Tektronix Tek Meter model THM565 portable scope £295
Thera DS Pro - DA converter £495
GPO 316 M&M jack-fields, various £call
Drake DA switching units x 8, Sir Francis £295
VINTAGE GUITARS
Fender Princeton 1962, brown Tolex, Oxford 12" Amazing sound ND VAT £495
Gibson Les Paul Junior, 1957, 100% original, sunburst.

- 8.5/10 condition, NO VAT £1,300
Gibson Les Paul Junior, 1958 double cut, P-90, 100%, 7/10 condition NO VAT £1,200
Gibson Les Paul Junior 50's, single cutaway, refinished, bad arse bridge NO VAT £550
Gibson SG Special, 1963 original 8/10 condition, cherry, P90's NO VAT £800
Gibson J-50 1968 acoustic, NO VAT £500
Martin 0-15 acoustic, 1958, lovely picker, all mahogany NO VAT £600
Complete 2-studio complex For Sale - situated in SE Asia. Neve & DDA consoles, Studer B27, 820 24T machines, 48T Dolby SR, 2 x Lexicon 480L's etc. Complete with 2 buildings, 800m2 and land, 500m2, Diesel automatic 400kVA generator etc, etc BARGAIN Call for full details.
Audio Toyshop Ltd Tel: +44(0)1225 447222.
Fax: +44(0) 1225 447333.
E-mail: toyboys@audio-toyshop.co.uk

This is just a selection of what is currently in stock, or available, many items are sold before we have a chance to put them on the list! If you are looking for anything specific, call or fax to be put on the database, similar equipment always wanted, part exchange welcome.

We are also dealers for a wide range of new equipment, including Focusrite, TC Electronic, AMS-Neve, SSL, API, Studer-Revov, Amek, AKG, Tube-tech, Manley, Soundcraft, Smart Research, TLA, Genelec, Eventide, Tascam DA 88, Panasonic DAT etc.

All prices are in £ Sterling and unless for export: exclude the dreaded VAT, at the prevailing rate

All items subject to availability, E. & O. E.

VISA, Mastercard, Access, Eurocard and AMEX accepted (A small surcharge applies to most credit card transactions)

Audio Toyshop Ltd
Tel: +44(0)1225 447222,
Fax: +44(0)1225 447333,
E-mail: toyboys@audio-toyshop.co.uk



505-507 LIVERPOOL ROAD,
LONDON N7 8NS
Tel: 44 (0) 171 609 5479
Fax: 44 (0) 171 609 5483

Mark Thompson
Helen Rider
Steve Lane
Clive Richards

THE MILLENIUM BUG
AN ANNOUNCEMENT

Following detailed research and in-depth discussions with various manufacturers, it has become clear that at the turn of the century, all modern digital equipment will spontaneously combust, causing aircraft to plummet from the skies, plagues of locusts and herds of marauding drummers to populate the countryside.

Here at Funky Junk, we ensure that all our used equipment is thoroughly checked and serviced by Boffin Island, is exorcised by Ghost-Busters and that all lurking Millennium Bugs are dealt with by Rentokill.

Equipment purchased from us will therefore continue to function happily well into the next century.

To find out more, call, fax or E-mail now for our latest three page list of millennium bug-proof used equipment and stunning deals on new equipment and DON'T FORGET; the new copy of FUNK JUNK BAZAAR hits the streets on October 1st, so make sure you get your copy.

TONY LARKING
PROFESSIONAL SALES LIMITED

WORLDWIDE DELIVERY

QUALITY USED EQUIPMENT!!

CALL NOW FOR THE LATEST LIST OF USED GEAR ON **01462 490600**
OR FAX US YOUR ORDER ON **01462 490700**
OR VISIT OUR WEB SITE AT **http://www.tlaudio.co.uk/used.htm**



Professional movers of studio equipment within the UK and Europe - Experienced, reliable, fully insured and always on time.
Call Graham Cook on 0181 450 9127 - (mobile: 0385 290754)
134 Cricklewood lane, London NW2 2DP - Fax: 0181 208 1979 - Storage facilities also available

Lockwood Audio

THE
Authorised **TANNOY** Specialists

SPARES AND REPAIRS
SPEAKER BARGAINS GALORE

Phone: +44 (0) 181 - 207 4472
Fax: +44 (0) 181 - 207 5283

www.primecds.com

Satisfied with your latest recording?
We can dramatically enhance your sound
in our digital mastering studios.
Albums by St Etienne, Aerosmith and
Marc Bolan have benefited from our skills.
Save money on your CD productions with
our new unbeatable prices

Stop Press... Limited Offer... Phone Now!

Your music promoted free to UK
A&R departments on the Net

Tel. 0171 700 3060
Fax. 0171 700 5544

PRIME CDS

CD Audio • CD Rom • One-Off CDs
Cassettes • Vinyl
Artwork • Graphic Design • Web Design
Tel. 0171 700 3060 Fax. 0171 700 5544

MUSIC LAB **DIGITAL SERVICE CENTRE**

72/74 Eversholt Street
London NW1 1BY
contact Alan Meech, Service Manager:
phone 0171 388 5392 fax 0171 388 1953
website www.musiclab.co.uk
email service@musiclab.co.uk

ALESIS **FOSTEX** **ADAT** **TASCAM** **DA-88**
adatt **SONY**

PLEASE CALL FOR
GENERAL SERVICE
INFORMATION
AND FREE FLYER

the digital service centre

Officially Authorized Central London service agents for ADAT, DA88 and most professional DAT recorders
NATIONWIDE COLLECTION AND DELIVERY AVAILABLE • FAST TURNAROUND • MAINTENANCE CONTRACTS AVAILABLE

DA88 & ADAT Specialist Service Centre

Expert Repair and Servicing for DA88 & ADAT
Call Aspen Media Service for details:

01442 399 949



ASPEN

MEDIA LIMITED 222 Maylands Avenue, Hemel Hempstead, Herts HP2 7TD

AIR CONDITIONING & VENTILATION TO SOUND STUDIOS IS OUR SPECIALITY

We provide design only or design and installation for many well known clients. Whether it be for displacement free cooling, V.A.V., V.R.V., split, unitary or centralised call Mike Hardy of

Ambthair Services Ltd on
01403 250306 or Fax 01403 211269

Web: <http://www.pncl.co.uk/~mhardy/as.html>
Email: mhardy@pncl.co.uk

5.1 MONITORING

Adgil Surround Sound Monitor System

- 5.1 or 7.1 From Your Stereo Console
- 200+ Inputs By Up To 8 Outputs
- Fully Programmable
- Mute, Dim, Mono, Solo & Cut Controls
- Pec / Direct Switching
- Use As Mixer For Stems & Sub-mixes
- Insert For Encoding / Decoding Matrixes
- Modular, Expandable Design
- Noise -96dBu @ 22Hz to 22kHz
- 24 In by 6 Out System Under \$6k

www.sascom.com

Ph 905.469.8080 Fax 905.469.1129

**Pro Tools &
Sonic Solutions
Editing & Mastering**
Contact Chris
Tel: 0171 483 3506



FINANCE SOLUTIONS FOR BUYING AUDIO EQUIPMENT & SOFTWARE

All products (new and used) from Soundscape to Scenaria
Payments tailored to your budget, eg:
Nothing to pay for 3 months after installation
Or matched to your contracted income
Raise cash by refinancing your existing kit
Sales aid packages for equipment suppliers
10 years in the industry. APRS & PLASA members

Call: Mike Reading
APT Finance, 25 Queen Street,
Maldenhead SL6 1NB
Tel: 01628 789769 Fax: 01628 771257
E-Mail: aptfinance@msn.com

MAXELL-QUANTEGY

Do you use 456, 499, DAT's or DTRS. We offer these and much much more on free next day delivery.
Call for a catalogue.

Carousel Tapes

CALL: 0800 731 6964 - FREE



HEADS FOR EUROPE

AM BELGIUM
REPLACEMENT HEADS
FOR TAPE AND FILM
PROFESSIONAL
HEAD REFURBISHMENT



SUMMERTONE LTD
98 SCATTERDELLS LANE
CHIPPERFIELD
HERTS WD 4 9EZ, UK
TEL: (44) 01923 263220
FAX: (44) 01923 260606

mastering & duplication products & services



HILTINGROVE
where sound advice counts

The Hiltingrove Business Centre,
Hatherley Mews, Walthamstow,
London E17 4QP
3 Mins walk from Walthamstow Central
(Victoria Underground/ BR Main Line),
11 mins from M25

Tel: 0181 521 2424
Fax: 0181 521 4343
Email: info@hgrove.demon.co.uk

- Compact Discs
- Pro Mastering
- 5 Studios
- 32 Bit Technology
- Cedar
- Sound Restoration
- Video Production
- Digital Video Editing
- Enhanced CDs
- One-off CDs
- In House Design/Print
- Digibin Cassettes



ZIPPER MOBILE STUDIO
TEL/FAX (UK) 0181-450 4130
EMAIL zipmob@dial.pipex.com
WEB http://ds.dial.pipex.com/zipmob/

CD Mastering £50ph
CDR Duplication £3 each
Copy Masters and Editing
Real Time Cassette Copying
Free Glassmaster: 1000 CDs c.£650

CD-audio & CD-ROM
Printed labels & inlays
Every copy individually checked
Excellent quality & presentation
Best prices, ultra fast turnaround



**Repeat Performance
Mastering**

6 Grand Union Centre
West Row
London W10 5AS

Tel. 0181 960 7222
Fax. 0181 968 1378
www.repeat-performance.co.uk

HEAD TECHNOLOGY
NEW TAPE HEADS
Supplied for most makes.
Tape Head Re-Lapping/Re-Profiling.
Same day turn round.
HEAD TECHNOLOGY
11 Britania Way, Stanwell, Staines,
Middx TW19 7HJ.
TEL: 01784 256046

products & services

DAT PRICES SLASHED!

DATR05 - £2.20 + VAT	AND YOU DON'T HAVE
DATR15 - £2.35 + VAT	TO BUY HUNDREDS!
DATR30 - £2.50 + VAT	THESE ARE 1-9 RATES!
DATR45 - £2.85 + VAT	WE GIVE DISCOUNTS
DATR60 - £3.20 + VAT	FOR QUANTITIES!
DATR90 - £3.75 + VAT	ACCESS / VISA / MASTERCARD
DATR122 - £4.30 + VAT	TEL: 01223 208937 FAX: 207021

MAXELL TAPE - RATED FIRST IN STUDIO SOUND SURVEY (COPIES AVAILABLE)
DAT STORAGE RACK (HOLDS 10) - £2.50 + VAT
CALL FOR PRICE LIST
 NORTH ROAD, WENDY, ROYSTON, HERTS SG8 0AB

PROFESSIONAL ORCHESTRAL RECORDING SERVICES FROM

Condor Music Ltd

- From Classical to Pop
- Music to picture recordings

UNBEATABLE PRICES GUARANTEED
 For an information package fax your details to:
 Condor Music Ltd, Mayfair House,
 72 New Bond Street, London, W1Y 9DD, UK.
 Tel: +44 - (0) - 171 - 514 5813 Fax: +44 - (0) - 171 - 499 3417
 Mobile: +44 - (0) - 410 - 505952

40 Clarendon Rd West, Chorlton, Manchester M21 0RL

A New Control Room?
 • Whatever the scale of your project, almost any control room can benefit from the design principles of the Early Sound Scattering room.
 • Instead of relying on creating a reflection free zone, in this new configuration of room the unwanted reflections are masked by many randomized low level reflections from the front of the room, allowing consistently accurate response and imaging throughout the room regardless of equipment layout.
 • This means that very different rooms can be made subjectively, identical, providing the closest thing yet to absolute reference monitoring.
If you're serious about your new control room, you should be talking to

ANDREW J PARRY
on +44 (0)8700 788346

ELECTROACOUSTIC SYSTEM SPECIALISTS



DREAMHIRE

From A to Z there is only one Pro-Audio Hire Company

DIGITAL/ANALOGUE MULTITRACKS, HARD DISK RECORDERS, TIMECODE DATS, PRO TOOLS, MIXERS, OUTBOARD, MICROPHONES, KEYBOARDS, BACKLINE, COMPUTERS, TAPE COPYING, BROADCAST & VIDEO EQUIPMENT

Apple • Apogee • Avalon • Apple • AKG • BSS • B & K
 Contour Systems • Decisions • Evox • Focusrite
 Gears • Gears • Gears • Korg
 Kurzweil • Kurzweil • Kurzweil • Macintosh
 Massey • M... • Nord • Otari
 Opcon • Pison • Roland • Sony
 SAE • Studer • Seagate • Sennheiser • Tascam
 Tubelink • Urei • Vox • Wurlitzer • XRI • Yamaha • Zoom

On Site, All Day, All Night.

Tel: 0181 451 5544 Fax: 0181 451 6464
 www.dreamhire.com

FOR ALL YOUR RECORDING NEEDS

AMPEX-BASF-MAXELL-3M-SONY-KAO
 AUTHORISED NATIONAL DISTRIBUTOR

Spools, boxes, blades, splicing and leader tape
 Custom wound cassettes C1 120, labels, library cases, inlay cards.
 Bulk audio C-0s, cases, pancake, Broadcast cartridges.



SOUND & VIDEO SERVICES
 Shentonfield Road, Sharston Industrial Estate,
 Manchester M22 4RW. Tel: 0161 491 6660
 FOR QUALITY PRICE AND SERVICE

Mark Griffin Furniture
CUSTOM STUDIO FURNITURE



"Creative Sound" Shepperton
 Design and installation of racking,
 storage and accessories

Please call for a brochure
 Contact: MARK GRIFFIN
 Byrebrook Studios, Lower Farm,
 Northmoor, Oxford OX8 1AU, UK.
 Tel: 01865 300171 Fax: 01865 303071

CD MASTERING £50 p.h.
 Editing Waves MultiTrack
 Sound Designer II MaxxBass
 PQ Cds from £60 CDRs from £3

CD MANUFACTURE
 500 CDS fr. £560 3000 CDS fr. £1950
 CD Rom MC Vinyl Artwork Video

RECORD / MIXING £250pd
 ADAT ProTools VST Waves
 AVID EDITING Voice - Over

All this under one roof and used by:
 Apple BMG
 Creation
 Computer Assoc.
 Edel Extravaganza
 Fresh Music of Life
 N.M.C. Pony
 Canyon and Warner Brothers.



for appointments quotes and brochures, t: 0181 968 7080 f: 0181 968 7475
 or pop in for a drink, Unit 5 Barley Shotts, off St. Ervans Rd., London W10 5YG
 www.sound-discs.com.uk e-mail:sound.discs@virgin.net

US: Nashville Redux

Whether it is nature or nurture, certain family lines seem more suited to running recording studios than others, writes **Dan Daley**

IF IT'S difficult to see individual trees when in the middle of the forest, it's equally hard to see individual studios from the centre of such a dense environment as Nashville. And any introspection is hampered by the fact that this is no peaceful glen here, but rather a swirling vortex where the wind can and does rip trees out by the roots and, like the tornado that passed through downtown Nashville in late spring this year, leave those on the ground wondering what the heck happened.

The biggest problem with Nashville recording studios is that there are simply too many of them in too small a place. Being the hub of an entire genre of music is a double-edged sword: there is a massive supply of music projects generated within Nashville; even with the pared-down rosters of artists of the mid-1990s, the eight major labels and subsidiaries and independents located here churn out close to 300 country records a year, plus one-offs such as the tribute records that have remained so popular ever since the country-does-The Eagles recording in 1993, despite the fact that most fare dismally in the market. And that's just country; Nashville's very good altrock scene is one of its best-kept secrets, understandable when it must exist in country's large shadow.

All this work would make one think that Nashville is studio heaven. Well, it was, once.

But the delicately balanced ecosystem of studios and records was upset — probably forever — by the wild and ultimately unsustainable success country music experienced in the early 1990s. In response, the number of studios increased dramatically, as did the level of their capabilities. An entire new generation of facilities was launched in late 1993 when Masterfonics opened The Tracking Room, a large 20Hz Tom Hidley room with Nashville's first SSL 9000J and the first major new facility to hit town in well over a decade.

That debut was followed in short order by a coterie of other upscale rooms, including three brought in by a joint venture between Ocean Way owner Allen Sides and House of Blues Studios maven Gary Belz. The city is up to five 9000J desks and now has a growing population of new Neves and Euphonix boards. But for every palace that opened, there were a half-dozen other less dazzling, but quite credible new studios hot on their tails.

Then the bubble burst. As country music's sales began to decline in 1994, so did label rosters and thus followed studio bookings. In short, the studio building and upgrade momentum hit its stride just as the very phenomenon which sparked it was running out of steam. Four years later, both the music and the studios find themselves on mixed trajectories.

For starters, the number of studios continued to increase throughout those years, despite plenty of evidence that the fields of Middle Tennessee were not as fertile as they once were. A friend who is an executive at the Music Row branch of a large regional bank continues to be astounded at how many loan applications he continues to get for studio ventures here. Applications which come from everywhere including Nashville itself, where many studio people prove they are as capable of self-delusion as the would-be country music recording artists who still flood Nashville on a daily basis. Many new facilities are project studios: many of those are owned by major producers in Nashville, which has pulled thousands of hours and millions of dollars a year out of existing for-hire facilities. Some, such as Loud Recording, owned by producer James Stroud, former head of Giant Records, now head of the DreamWorks label and who has always negotiated the right to produce records outside of those deals, is probably responsible for upwards of two dozen records a year, as a producer, co-producer or executive producer. That's a substantial number of major-label projects that are no longer feeding a studio community that continues to grow.

THE MATH is inescapable. Yet when studios do go down — and they are beginning to do so with increasing regularity — their sites are often occupied by another studio venture before the first one is cold.

Despite appearances, these are not technologically advanced lemmings. Close inspection of many of the new arrivals shows that they are using in-house production, music

Europe: Digital duelling

The evolution of television promises a bloody struggle between providers of digital services—with the usual costly penalties for the consumer writes **Barry Fox**

EUROPE IS DREAMING of a digital Christmas. France and Germany already have digital satellite transmissions and Rupert Murdoch's BSkyB goes digital into the UK on October 1st. The BBC and ONdigital, previously called British Digital Broadcasting, will start the first full-blown digital terrestrial services in the world soon after.

In theory, the mass of new channels should create more work for sound and vision studios. In reality there will be a bitter standards battle that will sap the rivals' resources. The British government has now admitted that it has failed to ensure that first-generation satellite and terrestrial boxes would be 'interoperable' (convertible). The pay services' money will go on sport and movies. Only the BBC, with a guaranteed income from the compulsory licence fees, and, perhaps, the existing analogue terrestrial channels, will have money to spend on original programming. The depressing model is Channel 5, Britain's fifth analogue service, which already has a very cheap look.

The war of words has already begun. Issue 1 of Sky's Digital broadsheet newsletter blames ONdigital for incompatibility between terrestrial and satellite receivers. ONdigital sees Sky as trying to kill it at birth. Digital service will come from Astra's new satellites at 28° East. All existing Sky dishes point at 19° East and very few have LNBS which can handle the high-frequency digital band. So all existing dishes will need modifying or replacing. Sky has now offered free installation. The Sky set-top-box receiver contains a modem that must be connected to a phone line, to control billing and impulse pay per view. European Union legislators have insisted that Sky pay-the-box subsidy (of at least £200, UK) as soon as the viewer connects the set to a phone line. Viewers are not obliged to sign up to pay a subscription.

Sky's chief executive Mark Booth (who once ran Robert Maxwell's satellite division) admits that aerial installation will cost Sky £80 per home. This means that Sky will be buying subscribers at a price of around £300 each.

When pushed on the cost to Sky of converting 3.6m existing satellite dish homes and winning the several million new subscribers Sky hopes for, Booth said something meaningless about 'if people aren't subscribers it won't cost us anything' and called for the next question. 'We have one chance to make a first impression,' he says. 'Digital terrestrial is analogue TV masquerading as digital.'

Sky will be able to offer Near Video on Demand, with one movie running on several channels, at staggered start times. ONdigital does not have the channel capacity to do this. But ONdigital's more limited and simple choice may appeal to some viewers. Sky promises comprehensive interactive services, such as teleshopping. But it is not yet clear how many people want this from a living room TV.

The big advantage of digital terrestrial TV is that existing UHF aerials will often be adequate for its reception. Even setup rabbit-ears may deliver perfect pictures, without snow or ghosting. But where an aerial is misaligned or blocked by an obstacle, and currently delivering very snowy or ghosted pictures, a digital box may give no pictures at all. If the new digital transmissions are at widely differing frequencies from existing analogue services, viewers may need a new wide-band aerial.

In Europe analogue terrestrial TV has nationwide cover. But it won't be the same with digital. Initial cover will be less than 70%. This is why the BBC will simulcast from satel-

publishing and new media such as DVD as at least a partial basis for a business foundation. That's radically different for Nashville, where the separation of such categories as creative and technical had generally been observed in years past.

What does the future hold for this studio community? One thing is certain: that the fortunes of the studio business in Nashville will no longer be so closely and inexorably linked with those of country music. Between more aggressive marketing to non-country clients and more reliance upon in-house revenue as their financial basis, the current generation of Nashville studios has learned not to trust their eggs in a single basket.

A good thing, too, because what's just as inevitable, I think, is that the tendency towards in-house revenue streams is going to open up Nashville's horizons well beyond country music. Just as independent record labels have collectively superseded all but the largest one or two major distributors, the fragmentation of the music market is going to ultimately leave less market share for the big genres of music.

It's interesting to sit back and watch the very fabric of the studio environment in a city change. This is Darwinism at work, and an organism is responding to external stimuli. It's a painful change, too, for many who have been a here a long time and who have made the commitments that built Nashville to the status of Third Coast. But come 2000, things are going to look even more differently than they do now. And who knows, Music Row might just stretch all the way to Memphis by then.

lite for free viewing. Copyright clearance deals prevent the terrestrial broadcasters from transmitting across Europe. So their satellite transmissions will be scrambled and a smart card needed.

The public has been promised better sound and pictures from DTV. The pictures should indeed be better, for those who get them, but as previously reported, the digital sound for DTV in Europe is MPEG stereo with matrix surround, not Dolby AC-3 multichannel. The technical specification is very similar to Nicam as used for analogue TV in many PAL countries. Nevertheless, Booth recently volunteered the promise that digital satellite will have 'CD quality sound'. MPEG stereo at 192 or 256kbits/second is not as good as PCM CD at 1.4Mbits/s. If Sky uses this phrase in its adverts there will surely be complaints to the Advertising Standards Authority.

Even before they launch, Sky and ONdigital are in a price battle over subscription fees—both promise basic packages of below £10. Their survival depends first on winning subscribers, and then on persuading them to sign up for more expensive subscription packages. At the same time the BBC and other terrestrial broadcasters will be offering free programmes, in wide-screen.

With so many variables in the equation, it is impossible to predict which pay service will win, or whether both will lose. Only one thing is clear. There will be no rich pickings for programme makers.

Who wants wide-screen?

One of the qualities of leadership is to make decisions, right or wrong—but it is better if they are right, writes **Kevin Hilton**

IT'S ALWAYS dispiriting when one is forced to find fault with something or somebody that you once admired, promoted or believed in. In many respects, it's probably just as well that we are forced into this kind of re-examination where technology is concerned because hype can be a distraction.

Long ago and far away, I contributed to a home cinema magazine. Its twin preoccupations were surround sound and wide-screen; everybody who worked on the title believed in the way and the readers followed our evangelicalism and were similarly convinced by our vision of a multichannel, true aspect ratio future. Most of them, anyway. There were the few who did not care whether film directors had decided to shoot their masterpieces in CinemaScope, VistaVision or Panavision; all they wanted was ordinary, vanilla TV pictures, the ones they had been used to ever since their parents had first propped them up in front of the set when they were children.

What they knew, probably subconsciously, was that the programmes shown on TV were made for the particular dimensions of the screen that were dictated by the shape of the original cathode ray tubes, which letter-boxed material was not. Cinephiles, like the people who wrote on the magazine and the readers who shared our opinions, were more into the aesthetics, inspired by such masterpieces of wide-screen cinema as *Lawrence of Arabia* and *2001—A Space Odyssey*. With a big enough telly and appropriate letter-boxing, we could recreate the Roxy in our living rooms and see everything that David Lean and Stanley Kubrick intended us to see.

Wide-screen fans knew that the coming of digital TV would make it the standard aspect ratio, so all other types of programming that we saw on the little Cycloptic monster in the corner of the room would have to be broader as well. Some production companies became pioneers, shooting new dramas on Super 16 stock that would give the 16:9 wide-screen picture, which could be shown in the compromise 14:9 frame size to appease the bulk of viewers. Acclaimed programmes like *Cracker* and *Prime Suspect* in the UK looked good in this style but, watching them again, one can see that the constraints of shoot and protect—where the image is concentrated on the portion that will form the central 4:3 picture—meant that directors could not be as adventurous as their feature film counterparts.

Broadcasters deem 14:9 to be a successful compromise, avoiding the complaints where viewers are convinced that there is

something wrong with their set because all they are seeing is a narrow picture across the middle of their screens. The thin black bands of this interim format are becoming a familiar sight on many TV stations; more movies are being screened in something close to their original ratios. But there is now doubt within the industry as to why it is being done.

At a recent Moving Image Society seminar designed to update producers and technicians on the progress of the technology, there was obvious dissent. One delegate made the point that with the transition from black and white to colour, the viewer got something for their money. 'But with wide-screen, the picture is misframed for both 14:9 and 4:3. Who are we doing this for? Us or the viewers?' Producers are also concerned that wide-screen increases costs, particularly as manufacturers and hire companies are not unnaturally charging more for wide-screen equipment, at a time when commissioning TV stations are expecting the same, if not better, quality and content for the same, if not less, money.

The coming of digital TV, and therefore of wide-screen, is written in law. The broadcasters are following the lead given to them by government, which is no doubt considering how it can spend the money it makes from selling the freed-up analogue frequencies to mobile phone companies. As much as people think that this is a conspiracy designed to allow manufacturers to sell new TV sets, it is going to happen anyway and everybody is being pulled along in some form.

Some producers feel that wide-screen is changing how TV is made, moving away from the screen shape and style that has suited it for so long. There are others who believe that it poses new challenges. Both views are correct and things will only become clear once the compromise situation caused by simulcasting analogue and digital is over, although it will probably go on for some time.

There are issues here because, despite the number of wide-screen movies and the majority of new programmes being made in the format, there is still a vast library of material made for the old rectangular picture. This is not only vintage programming but also news footage and the huge number of movies that were not shot for the wider frame. All of this will have to go through some kind of aspect ratio conversion. Good news for manufacturers of such equipment but it means that some form of compromise will always exist.

Once again, TV parallels real life.

Who wants wide-screen?
The picture is misframed for both 14:9 and 4:3.
Who are we doing this for? Us or the viewers?

Space: the final frontier

With multichannel considerations forcing their way into almost every discussion and development of audio technology, **Francis Rumsey** questions our preconceptions of stereo

AFTER 30 OR 40 YEARS of dealing with 2-channel stereo recording and reproduction, it is possible that we have become relatively entrenched in our views about what 'stereo' is intended to deliver. This short article is designed to get recording engineers thinking again about the spatial aspects of reproduced sound, especially as we grow in understanding leads from conventional 2-channel to multichannel stereo. It is suggested here that some concepts of what may be called 'spatiality' mean different things to recording engineers than they mean to the average listener or concert-goer, and that the industry may have dug itself into a position concerning what is 'correct' in sound reproduction. Of course, nothing is likely to spark more argument than statements about 'correctness', but it is possible there may be common features relating aspects of spatiality to listener preference, as has been found in the field of concert-hall acoustics.

In my limited experience, one encounters two rather polarised groups in the industry, with regard to the aim of sound reproduction. There is what we may loosely term the 'acoustic holography' or 'soundfield reconstruction' school of thought, usually populated by the more scientifically-minded of the community, who might claim that our aim should be to get as close as possible to a reconstruction of some natural acoustic experience. On the other hand there is the group which might claim that reproduced sound is a totally different experience to natural listening, and should not be concerned with any attempt to recreate 'reality'—it being an entertainment medium to be manipulated at will. Somewhere between these extremes lies a useful compromise that will enable us to deliver some of the desirable spatial cues apparent in natural listening using reproduced sound.

This is not meant to be an exhaustive review of the development of stereo (what a task), but it is noted that most of the historical research work relating to loudspeaker stereo reproduction concerns itself almost exclusively with the idea of recreating some of the directional cues needed for sound localisation. It seems natural that this should be the case, since an ability to deliver directionally accurate sound images is normally considered to be one of the main reasons for using stereo as opposed to mono.

Various models of spatial hearing have been used as the basis for the design of stereo systems, some based on mainly interaural time differences, some on amplitude, some principally on low-frequency mechanisms, some on spectral

cues, some on various forms of precedence cues. The most successful with regard to directional localisation of individual sound sources have tended to be those that satisfy more than one localisation mechanism, thereby leading to less potential confusion of the hearing mechanism. But the concentration on source localisation, or 'imaging accuracy', has tended to obscure equally important aspects of spatial reproduction, such as perspective, envelopment, and those many attributes that relate to reflected or ambient sound. Even the late Michael Gerzon, who attempted a 'General Metatheory of Auditory Localisation' in 1992 as a basis for designing future stereo sound systems, had to admit that the theory did not yet take into account ambient sound.¹

Real spaces, unless they are anechoic, give rise to involved patterns of ambient or reflected sound, and our day-to-day subjective experience of spatiality is as much governed by these features as it is

We should not kid
ourselves that suddenly
we are going to be free
of the various spatial
compromises inherent
in 2-channel stereo

by our awareness of the directionality of direct sound sources. When we attempt the simulation of acoustic spatiality in reproduced sound we presumably wish to deliver some of the acoustic cues that influence subjective impressions of 'space', recognising the vital fact that unless we adopt a system involving a very large number of channels (millions have been suggested) we are unlikely to be in a position to undertake truly accurate 3-dimensional soundfield reconstruction that allows for the listener to adopt a wide range of different positions within the soundfield. This limitation rules out the accurate directional imaging of all reflections in a diffuse soundfield, requiring us to find other ways of delivering impressions of space or ambience to listeners. The idea that reproduced sound might somehow be able to render the acoustics of natural environments accurately has fascinated audio specialists for years, but it is contended that for most practical purposes relating to consumer audio this is a Holy Grail not worth pursuing. The best we can expect to achieve is a limited compromise solution to the problem of deliv-

ering spatial sound to the living room (or kitchen, or wherever), and it is both in recognising the compromises we are adopting and then optimising compromise solutions to maximise listener satisfaction that our responsibilities lie.

(At this point I should perhaps say that I specifically exclude implementations of binaural and transaural 3-D audio from this discussion, since I believe they are not suitable for general purpose, multi-listener consumer sound reproduction, where listeners cannot be expected to adhere to a very limited range of physical positions or wear particular headphones. Such approaches are capable of good results particularly when using individualised transfer functions, when the listener's position with relation to the transducers is known, and this has been used successfully in virtual reality, computer applications and simulators.)

As we make the gradual move from 2-channel stereo to some form of multichannel surround there will be more flexibility available from a spatial point of view, but we should not kid ourselves that suddenly we are going to be free of the various spatial compromises inherent in 2-channel stereo. It is nonetheless possible that the priorities may change, and aspects of spatiality considered vital in 2-channel situations may be lower down the pecking order in multichannel environments. We have to discover what aspects of spatiality in different modes of reproduced sound relate most closely to listener preference, and then design the recording and reproduction approaches to deliver appropriate signals.

ONE OF THE TERMS used most widely in discussions about spatial reproduction is 'imaging'. It is well known that 2-channel stereo reproduction is capable of delivering phantom images of individual sources in positions between the loudspeakers. The precise location of these phantom images depends on a variety of factors, including where you are sitting, the arrangement of the loudspeakers, how the images were sourced, the room you are in, and so on. Although I am quite willing to be shouted down on this matter, I would contend that many sound engineers and hi-fi buffs regard precise imaging as a positive factor in sound reproduction. The more precisely defined the phantom image the better, they might say.

A second point to consider is that any ambient-reflected-reverberant sound present in a recording is reproduced from the same loudspeakers as the direct sound sources. Consequently the majority of the

ambient sound, that in natural environments would have been widely spatially distributed, is constrained to a relatively limited reproduction angle with two-channel stereo. Now this does not necessarily mean that one cannot perceive an enveloping spatial impression from such a system, since, as David Griesinger points out in his recent AES paper 'Spatial Impression and Envelopment in Small Rooms', a variety of mechanisms can still result in degrees of spaciousness, including interaural fluctuations resulting from the direct sound at mid frequencies, the decorrelation of recorded reverberation, and interactions with low-frequency modes in the listening room. Nonetheless, it is acknowledged that the spatial impression from only two loudspeakers is quite limited. A more satisfactory spatial result can be obtained if the reverberant component of the signal is reproduced through laterally decorrelated multiple loudspeakers.

It is interesting to ask the question about whether pinpoint imaging is in fact appropriate, since there is some evidence from research in concert hall acoustics that almost directly contradicts this assumption. Ando's Listener Preference Index for concert hall acoustics was a means of relating a weighted sum of four acoustical parameters to listener preference for different hall simulations.¹ One of the parameters he varied, IACC (Interaural Cross Correlation), is known to relate closely to that subjective attribute of spatiality termed ASW (Apparent Source Width) by Morimoto and others, particularly when considering early IACC (up to around 50ms). ASW relates to the space that a source image appears to occupy, or the apparent 'size' of a source, and is found to be largely independent of another spatial attribute, LEV (Listener Envelopment). It was apparent from these subjective experiments that larger values of ASW were considered preferable to smaller ones, possibly suggesting that pinpoint imaging in a concert-hall context is less desirable than sources which appear to occupy a larger space. Informal conversations and personal experience in any case suggest that 'imaging accuracy' in concert halls is not particularly good in many seats, and does not feature very much in discussions about the subjective goodness or badness of different halls. (See Leo Beranek's recent fascinating book: *Concert and Opera Halls: How They Sound*).

THIS APPARENT contradiction has led me to surmise that perhaps we have got used to expecting over-precise imaging in 2-channel stereo precisely because the spatial compromises are so great. Is it possible, perhaps, that in order to separate direct sources subjectively from ambient information in such a situation we find we need them to have an almost unnatural degree of directional definition? If this is true it leads to the proposal that when we are able to distribute the ambient information more appropriately around the listener, using multiple channels, the need for such precise front

imaging may decrease. Recording techniques that produce phantom images with a larger ASW may then be considered more appropriate.

It is not suggested that the concert-hall-derived parameter of ASW is necessarily the same attribute as the sense of 'air' or 'space' around sources quoted by listeners as features of high-quality reproduction systems, but it is certainly an interesting attribute that relates to the preferred size of sound images. In some recent experiments reported at the 103rd AES, Morimoto⁴ was able to show a clear application of the ASW and LEV attributes in the subjective appraisal of reproduced sound. (As an aside one may note that most of the concert hall simulations used in previous experiments were also conducted using forms of reproduced signals, either on headphones or loudspeakers). He found that one could alter ASW without necessarily needing the rear loudspeakers in a multichannel arrangement, but that greater LEV (the listener's sense of envelopment by the ambient sound) required the presence of the rear loudspeakers. He also found that ASW did not alter even if the front-back ratio of the surround setup was changed, provided that the DICC (related to the early IACC mentioned earlier) was kept constant.

Informal discussions with people that have experimented with making 5-channel music balances raise the question of what to do with the centre channel. The view is often expressed that panning a centre signal, such as a vocal solo, to just the centre loudspeaker creates an unnatural, spatially constricted effect. Spreading it over a slightly wider angle, using the left and right channels, leads to a more pleasing effect. This is perhaps anecdotal evidence of the value of a broader source image in multichannel reproduction. It also raises questions about differences between phantom and real centre images in multichannel reproduction.

One often hears audio enthusiasts talking about certain convertors or systems giving rise to a greater sense of 'depth' or 'air' or 'space' around the sources. These are all spatial terms, with meanings that are more or less understood by the people who use them, and they imply that there are subjective aspects of sound reproduction that are not characterised well by currently available measurements relating to frequency responses or distortions. In the ongoing debate about the merits of high resolution audio systems with greater bandwidth and dynamic range, the subjective effects that are noted by people when discussing differences are often these subtle spatial ones, rather than timbral, noise or distortion issues.

IT IS INTERESTING to note the experiments of Bernd Theiss and Malcolm Hawksford, reported recently.⁵ Subjective experiments were conducted to determine whether there was any noticeable difference in localisation accuracy between 96kHz and 48kHz sampled audio

signals, using relatively standard psychoacoustic techniques to detect minimum audible angle discrimination. (In fact 96kHz was used all the time, but the effect of bandwidth restriction to 24kHz was tested using computer-generated noise signals.) They were unable to show any statistically significant differences in discrimination. In a subsequent experiment using randomised stimuli, listeners attributed characteristics to the stimulus they identified as having the higher sampling rate such as: 'more focus, more body, more air, better ambience retrieval, and the sound stage was more to the front', or 'enlarged body... and the greater spaciousness of the 96kHz reproduction'. Although there were only a few subjects, the three they tested identified the high resolution reproduction accurately on between roughly 61% and 99% of occasions. This experiment includes a number of potential biases, though, and the conclusions need more careful investigation, since aspects other than bandwidth alone may have affected the result.

MEDUSA, and forthcoming conferences, and other issues are ongoing work that forms part of research into sound recording and reproduction at the Institute of Sound Recording, University of Surrey. Much of this work is conducted under the auspices of EUREKA project 1653, known as MEDUSA, a website for which may be found at www.surrey.ac.uk/Music. The author is indebted to his colleagues in MEDUSA for valuable discussions concerning the spatial attributes of reproduced sound. Two forthcoming Audio Engineering Society international conferences have a major emphasis in this area: the 15th International Conference on Audio, Acoustics and Small Spaces, at Snekkersten in Denmark, 31st Oct–2nd Nov 1998; the 16th International Conference on Spatial Audio Reproduction, at Rovaniemi in Finland, 10th–12th April 1999. Information on registration, programme, and so on, can be found on the AES website: www.aes.org (15th International) or www.acoustics.hut.fi/aes16/ (16th International). ■

References

- 1 Gerzon, M (1992). *A general metatheory of auditory localisation*. Presented at the 92nd AES Convention, Vienna. Preprint 3306
- 2 Griesinger, D (1997). *Spatial impression and envelopment in small rooms*. Presented at the 103rd AES Convention, New York. Preprint 4638
- 3 Ando, Y (1985). *Concert Hall Acoustics*. Springer-Verlag, Berlin
- 4 Morimoto, M (1997). *The role of rear loudspeakers in spatial impression*. Presented at AES 103rd Convention, New York. Preprint 4554
- 5 Theiss, B and Hawksford, M (1997). *Phantom source perception in 24 bit@96kHz digital audio*. Presented at AES 103rd Convention, New York

Pearl

CC22

Cardioid
Condenser Microphone
For studio and live
applications

The CC22 uses the classic Pearl rectangular dual membrane capsule. To the ear, the mic sounds very natural and uncoloured which makes it an excellent choice for capturing the nuances and timbre of musical instruments and vocal performances.

*...when the sound quality
is the final decision!*

Pearl Microphone Laboratory AB
SWEDEN
Tel. +46 42 588 10 - Fax. +46 42 598 90
Email: pearl@pearl.se - Internet: www.pearl.se



**RICHMOND
FILM
SERVICES**

Tel: +44 (0)181 940 6077 Fax: +44 (0)181 948 8326

THE HIRE COMPANY
OTHER HIRE COMPANIES HIRE FROM !

NAGRA-D

Only
£60
per day



£240 per
week

**96 KHZ SAMPLING FREQUENCY
NOW AVAILABLE!**

the complete
audio routing
solution



a truly flexible audio router

The MCX2's 48 audio circuits can be specified, in groups of four, as either inputs or outputs, giving many possible matrix sizes, even multiple matrices, in a single 1U case. DC switching modules are also available for logic routing.

OUTSIDE SOURCE
and **REVERSE CUE** switching
TRANSMISSION switching

Example sizes:
32x16 mono
24x24 mono
12x12 stereo
16x8 stereo

REMOTE AND PC CONTROL OPTIONS

A simple and intuitive front panel control option is complemented by a range of remote control modules and PC control options. The MCX2 can even be interfaced with third party software packages.

FOR MORE DETAILS CONTACT WILL EATON AT:
AUDIONICS LTD

PETRE DRIVE, SHEFFIELD S4 7PZ TELEPHONE 0114 242 2333
FACSIMILE 0114 243 3913 Email info@audionics.co.uk
http://www.audionic.demon.co.uk



Grace Design

HIGH FIDELITY.

microphone
preamplifiers
reveal all the
subtlety and
detail found
in music.

MODEL 801 EIGHT CHANNEL

MODEL 201 TWO CHANNEL

GRACE
d e s i g n

Boulder, Colorado 303.443.7454 fax 303.444.4634
http://www.gracedesign.com/pre

Mixing for surround

The rising profile of 5.1-channel surround systems is causing increasing concern over their use in music mixing. Dolby's

Tony Spath offers some insights and suggestions

FOR THE FIRST TIME, DVD offers us a practical means to deliver discrete high-quality multichannel audio to the consumer. The concept of 5.1-channel audio originated in the film and cinema world so it is inevitable that some of the terms used will be carried over. These guidelines are an attempt to give some basic starting points for mixing music in 5.1, by explaining the relevance of these terms and pointing up some of the areas where there are alternative courses of action where the outcomes may not be immediately apparent.

Unlike virtually any other recording and playback format for consumers, film sound is mixed in the same environment as it is reproduced. All aspects have been standardised and calibrated to maintain uniformity between what the mixers create on the dubbing stage and what is heard in the cinema. For purposes of this discussion, this includes the recording levels on the film soundtrack itself and the overall loudness during playback.

When it became important to improve the sound in cinemas years ago, the level and calibration standards had to be maintained to ensure uniformity and interchangeability. Even though it became possible to produce a higher quality of sound in the cinema due to the continuous evolution of power amplifier and loudspeaker technologies, strong bass was still not easy to deliver or reproduce. The best soundtracks of the day (70mm magnetic) were already recorded to their maximum capability, so it was not possible to significantly increase the amount of bass they carried without causing overload. Additionally, the main screen speakers used in cinemas do not reproduce much below 40Hz even today, so if the main soundtracks carried more bass to the amplifiers, the speaker systems would not necessarily reproduce it. To supplement the bass capabilities of the screen speakers, subwoofers were installed. To get the bass signals a separate channel was added in the soundtrack. This is known as the LFE (Low Frequency Effects) channel and handles bass created especially for subwoofer 'boom' effects and may also be used to carry bass derived from the other channels in order to help enrich the overall soundtrack presentation.

Consumer delivery formats like CD differ in some significant ways from a cinema system. CDs do not have a cal-

ibrated loudness when played - the consumer decides where to set the volume control. Nor do CDs have a calibrated recording level—if a music producer wants to add more bass to a recording, the overall levels are simply adjusted accordingly to ensure the bass can fit without causing overload. The CD and LD digital audio formats have proven very capable of delivering substantial bass when desired for a particular programme, whether it be music or a movie soundtrack.

Each main channel in the Dolby Digital system is likewise able to carry substantial bass content. So why is there an LFE channel in a consumer audio delivery format? Quite simply, it allows movie soundtracks to be transcribed directly and without alteration to the home video format. Does this mean the LFE channel should not be used for music recordings? No. But it does suggest that the LFE channel may not be the only, or even the best way to provide loud, deep bass in a music recording. This point will become clear as you begin mixing multichannel music in a studio with a properly configured and calibrated monitor system.

THERE ARE some aspects of multichannel studio monitor setup that are well understood and accepted, but others that are still under discussion and debate as to the best approach. Herewith are some basic suggestions.

Instead of one pair of stereo speakers, there are now three speakers across the front. They should be identical in the same way the LR pair in conventional stereo must be matched to promote good imaging. If they cannot all be the same model, the centre speaker could be a smaller speaker from the same product line.

The speakers ideally should all be at the same height and distance from the listener. If the centre speaker is not the same distance as the LR pair, time delay may be used to obtain coincident arrivals. The front speakers must exhibit the same acoustic polarity through the entire monitor-amplifier chain.

Ideally, the surround speakers will sound the same as the front speakers. This may be most easily achieved by using the same speakers all around. If this is not possible, the surround speakers may be smaller than the front speakers but should maintain the same

character—they could be smaller speakers made by the same manufacturer.

The surround speakers should again achieve coincident arrival with the front speakers either as a result of equal path lengths or through alignment with time delays. The surround speakers must be in phase with each other and with the front speakers.

Assuming some or all of the speakers used do not adequately cover the deepest bass found in recordings, it is important to include one or more subwoofers and proper bass management in the monitor system. The bass from each and every channel that is not reproduced in the main speaker for that channel must be redirected to the sub-

Using the centre speaker alone creates a stable centre image for every listener no matter where they sit. To prevent the centre image from sounding too focused or narrow, its reverb can be spread to the LR channels

woofer(s). There are now various products that handle bass management (crossover filters, bass mixing, and combining with the LFE channel in the proper mixing ratio) that can be used to achieve a proper monitor setup in the studio. It is important to have the LFE channel reproduced in the proper relation to the other channels.

The ITU-R has a specification for listening room layout intended for critical evaluation of multichannel programmes. These recommendations also appear to be a good starting point for mixing room setup, and have been informally adopted as such. Aside from time alignment, a specific geometry is described. With the centre speaker directly in front, the LR speakers are each positioned 30° away from centre, forming a 60° angle. This angle may be reduced somewhat (say, 45° to 50°) and give equally successful results. The surround speakers are each positioned 110° off centre. This puts the surround speakers to the sides and somewhat behind the listener, which is not only what often happens in typical homes, but has proved to be a good way to achieve overall front-back soundfield integration and envelopment. If the surrounds are too far to the rear, the listener finds himself lost somewhere between two separate soundfields, rather than wrapped inside one cohesive soundfield.

All 5 main speakers are calibrated in the same way. Once each speaker is in position and equalised (if necessary), >



sound broadcasting equipment show

4/5th November, 1998
National Exhibition Centre
Birmingham, UK

Sonifex
Denon
PRECO Broadcast
Systems
Radiomation
NICRAL
The UK Office
Audio Media
Glensound
BEYER DYNAMIC
TEAC
Miller Freeman
Nagra Kudelski
Line Up/IBS
IMAS
Systembase
HBA
SOUNDCRAFT
AMEK
AMS NEVE
OZAN
Radica
Sony Broadcast &
Professional

Barcode
ASC
NTL
RPL
RCS
MARANTZ
Harbeth Acoustics
Kelsey Acoustics
AUDIO ENGINEERING
Studio Audio &
Video
ASPEN MEDIA
Ravencourt
Audio Ltd
KW ELECTRONICS
Digital Audio
Research
Plasmec
Audix Broadcast

*These are only
some of the exhibitors
lack of space and
continuing bookings
prevents us
listing them all*

BBM Electronics
Fairlight
Studer UK
EMO Systems
sbs
Calrec
Alice Soundtech
3dB Broadcast
Nova Electronics
Neutrik
Industrial Acoustics
Company
Audio Developments
CTI
HHB Communications
Lindos Electronics
Studio Schemes
Radio Communications
Agency
Stirling Audio
The RADIO Magazine
Harris Studio Products
Sennheiser UK
CLYDE BROADCAST
PRODUCTS
CANFORD AUDIO
Britannic Telecom
DALET
Dyer Audio Systems
Et Cetra Distribution
SCV London
IABM
Digidesign
The Audio Connection
PASS
Timelord

To register contact the organisers:

Email: sbes@pointproms.co.uk

URL: <http://www.i-way.co.uk/~dmcv/sbanno.htm>

POINT PROMOTIONS

31 Battleton, Dulverton, Somerset, TA22 9HU, UK

Tel: +44 (0) 1398 323700

NOTE NEW ADDRESS AND PHONE NUMBERS

< the balance among the channels is adjusted such that equal signal levels in each channel at the output of the console results in equal loudness at the listening position. There are no dictates regarding the SPL on a system must deliver, but the power amplifiers and speakers should be chosen to allow all of them to play as loudly and as cleanly as is required by the mixers. The subwoofer system and its power amplifier must be capable of the same result.

Use of a surround setup presents music mixers with opportunities and problems. Here are some insights and suggestions concerning both.

In a stereo programme there has previously been only one way to obtain a centrally placed sound image - to mix the signal equally to the LR channels. In a multichannel system, there are three ways to achieve this. The first is to create a phantom centre just as with stereo, the second is to use the centre channel alone, and the third to use all three front channels equally or in some varied proportion.

Reasonably enough, each approach offers advantages and drawbacks. The phantom centre is well understood, as it has been used since stereo began. Its main disadvantage is that the centre image is dependent on the listener being seated equidistant from the LR speakers. This is not always the case in domestic setups and is never possible in an automotive environment. One other disadvantage is that the timbre is not the same as from a direct speaker source due to cross-cancellation effects.

Using the centre speaker alone creates a stable centre image for every listener no matter where they sit. To prevent the centre image from sounding too focused or narrow, its reverberation can be spread to the LR channels, for instance. Using all three front speakers in combination can allow the range of spatial depth and width to be controlled. A phantom centre can be reinforced by some additional signal in the centre channel, or a centre channel signal can be enhanced with some additional signal spread into the LR pair. As more channels are used to carry the same signal, the more likely side-effects caused by these signals interacting with each other, or the phantom image conflicting with the true centre image, become. In systems using dissimilar speakers or in cases where the listeners are seated off the central axis, the sound arrivals from all three speakers may not blend well. Differences in arrival time can lead to a comb-filtering effect, shifts in tone colour, or a smearing of the image, for example. It is advisable to consider this when placing identical signals in all three front channels. To counteract this, the additional signals may first be processed somewhat to change their spatial character, timbre, or prominence relative to the main centre signal.

Whereas centre signals were always part of mixing for stereo, the surrounds are a completely new dimension to consider. There is lots of room for experimentation, so no-one knows where multichannel music will ultimately lead. One thing we can say is that it does not take too much to enhance the sense of depth over what conventional stereo could achieve. The subtle ambience and room reflections of a concert hall delivered from the surround speakers can change the listener's perspective from that of peering through a window to actually sitting in the concert hall.

Popular music often benefits from a more creative use of the surrounds, such as with background singers or instruments, but as with any new tool or effect, it can be overdone and become tiresome if used to excess. Maybe the principle that has served so well for the film industry can also work for music mixing: don't use the surrounds to distract the listener's attention away from the story.

What's the difference between the LFE channel and the subwoofer signal? The LFE channel is a separate, limited frequency range signal created by the mixing engineer and delivered alongside the main channels in the mix. A brick-wall filter at 120Hz in the Dolby Digital encoder limits its use to handling the bottom two audible octaves. Dolby generally recommends limiting the signal to 80Hz in the con-

A question of balance

Keeping a clear vision of your dream installation can be hard once the retail arena is entered. **Philip Newell**, gives advice on withstanding the assault

READERS may wonder why I occasionally make some rather blunt attacks on studio equipment manufacturers. Do I get some sense of satisfaction by pointing out the mistakes of others; or is it some Freudian way of compensating for my own errors? I hope that neither is the case. Almost anyone who knows me well will surely testify that I am neither cynical, sarcastic, nor nit-picking by nature, and that I rarely speak badly even about those who may have unjustly maligned me. I hope that I have too much of an inbuilt sense of honour to allow myself to fall into such ways.

One thing that does rile me though, is seeing others suffer. I am a vegetarian, solely by virtue of the fact that I cannot countenance the thought of animals going through any suffering just so that I can enjoy the taste of eating them. I am in no way a religious person, but perhaps some of my character is because I was brought up by caring parents. I care about rats and worms, but especially, I care about my friends. Around the World, on average, I design and (usually) supervise the building of about six or eight studios every year. I am, by no stretch of the imagination, a businessman, so clients, in almost all cases, become my good friends, and their frustrations become my frustrations.

The face of the recording industry is changing rapidly, and the speed of expansion is ensuring that the number of people with in-depth knowledge of studio design are becoming ever more thinly spread throughout the industry. I'm a very lucky person to have been able to spend over 30 years working in an industry which I find fascinating, and with some really special people. One aspect of the expansion that I find rather sad, though, is the way that the manufacturing has changed from cottage industries, run by small groups of dedicated people, into what is largely a mass production industry which is more or less solely governed by financial motives. In itself, this is not necessarily a bad thing, but it becomes a bad thing when customers are seen to be an irritation, rather than the valued clients on whom the industry is ultimately dependent.

Twenty years ago, I built studios almost exclusively for clients with a good knowledge of the industry, and who usually had a staff of well educated person-

nel. Now, I would say that around 70% of the studios I build are for owners of little technical education, and who often (if they do have staff at all, and who don't entirely rely on freelancers of dubious abilities), are asking me to build a dream. They have child-like faith in the abilities and the integrity of manufacturers and dealers, yet time after time, I see them being led like lambs to the slaughter.

My writing of books, technical papers, and countless articles tends to be driven out of either sheer enthusiasm, or in order to signpost the areas of quicksands, to try to prevent people from inadvertently falling into them. Unfortunately, in so many instances, the unwary are led directly into those quicksands by the hype of the half-truths of many glossy advertisements, and the unscrupulous profit seeking of many equipment dealers.

When clients commission me to design a studio, then they engage my services as an adviser on how to achieve a complete recording system. Dealers, on the other hand, are often desperately trying to influence them in other directions. There are reputable dealers out there, but unfortunately, on a world-wide scale, they tend to be in a minority. The majority, it would seem, do not care one jot about my problems of building the integrated system which I believe to be in the best inter-

ests of my clients. Head-on conflicts between designer and dealers seem to be on the increase. Beware of the dealer who six months ago told you that the products of manufacturer A, who they then represented were the best, but now that they have either lost the dealership, or changed their allegiance to the more profitable range of manufacturer B; say that manufacturer A's products were really not very good. Beware also the dealers who always want to sell the next most expensive unit to the one which the designer has specified. The designer will most likely be thinking about the best overall end result, the dealers will more likely be thinking only of the profits.

It's a tough world out there. Manufacturers put pressure on dealers to sell a minimum amount of product each year, or risk losing their dealerships. Remember that fact if you find yourself confronted by dealers who try to sell you not what you were asking for, but what they want to sell you. This is especially true if they seem to be treating your initial requests with disinterest, or trying to make you feel ignorant. Rarely take the advice of dealers over that of designers. Designers are probably considering a balanced system. It seems to be intuitively obvious to Ferrari owners that if a Porsche agent tries to sell them a new-style Porsche gearbox, it is unlikely that it will fit comfortably into a Ferrari, for which it was not designed. Unfortunately, however, it does

not seem so obvious to many studio owners that much equipment may not be suitable for an environment for which it was not designed. In the recording world, the question of balance extends to each differently designed recording system. Balance is not exclusively an issue of musical instrument relationships.

Any absurdities happen due to the insecurity of many studio owners and operators about their beliefs in their own ears and musical judgements, and it is on these insecurities that many parasitic operators thrive. The only real solution to the insecurity problem is experience and education, and hopefully, via the pages of *Studio Sound*, more of this can be shared out, which will hopefully lead to a healthier recording industry; and that is something else that I care about greatly. ■

The Audio Line Tester for every toolbag.

whirlwind

Built-in mic, oscillator, speaker.

Clips on your belt.

The Qbox®.

CABLES • SNAKES • PANELS • MIXERS • AMPLIFIERS • ADAPTERS • CONNECTORS

SELECTION (UK) LTD. • PHONE: 01 474-320-445 • FAX: 01 474-839-762

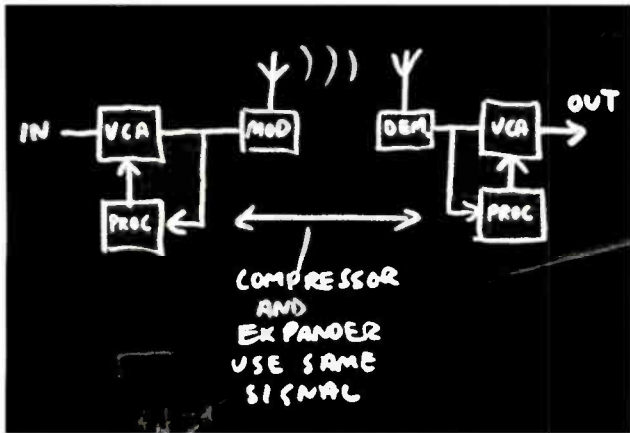


Fig.2: Companding

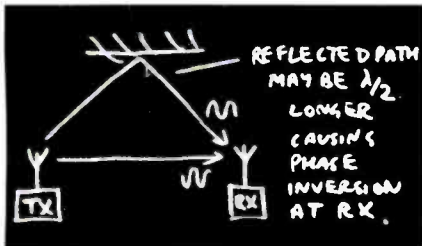


Fig.3: Fading due to reflections

mium have lower capacity than primary cells so many radio mics use alkaline dry batteries. In live performances a battery running down can be a disaster so the engineer may fit a fresh battery whenever possible irrespective of the estimated state of the previous battery.

Newer rechargeable technologies such as lithium may be useful for radio mics because in addition to much greater capacity than nickel cadmium or nickel metal hydride they are extremely light for their capacity. Rechargeables do require rigid discipline in battery management so the state of every battery is always known. In a short-term rental scenario, charging time may not be available and dry batteries will be the best bet.

There are two physical approaches to radio microphone design. In the first, everything is packed into a single hand-held unit. This may resemble a conventional hand-held microphone except that the cable coming out of the end doesn't go anywhere because it's the antenna. This is an advantage where production constraints require the microphone to be passed from one user to the next, although getting microphone, battery and electronics inside an enclosure that is robust enough is quite a challenge.

In the second approach the microphone itself is on a short lead and everything else is in a small box that can be pocketed or clipped to the wearer's belt. This technique means that almost any self-powered microphone can be turned into a radio microphone. Another advantage is that if the wiring to a miniature lapel microphone is routed inside the wearer's clothing a very discreet installation results. Miniature microphones can be affixed to the forehead above the hair line with sticking plaster

and a very slim cable can be routed to the control box resulting in an installation which is all but invisible.

Conventional condenser microphones are out because they need a polarising power supply. The moving coil microphone is robust, but the magnet makes it heavy. The electret principle answered the radio mic designer's prayer because it has many of the quality attributes

of the condenser mic, but needs no polarising supply, is very small, and weighs next to nothing. A simple FET amplifier drawing very low current is enough to interface the capsule to the audio circuitry.

Radio microphones have been built to work on a number of wavebands, including VHF and UHF. VHF units require a fairly long antenna which is usually a trailing wire. In UHF a short flexible rod is sufficient. The precise frequencies and licensing requirements vary from country to country and present a huge administrative problem for international artists. Clearly where several microphones are to be used in the same venue each must work on a different radio frequency.

There is very little control of the radio frequency environment and radio microphones are forced to use low power to allow reasonable battery life. The transmitter has to be omnidirectional because the wearer cannot be expected to aim a directional antenna at the receiver. Consequently multipath reception and shading are major problems and it is very difficult to avoid dead spots where there is so little signal that the reception is noisy. Fig.3 shows how multipath reception causes fading. A reflected signal from some metallic object arrives later than the direct signal, and at some time the delay will be half a cycle at the radio frequency in use. This means the receiver sees a pair of antiphase signals which suffer cancellation.

One solution is to use diversity reception in which two or more receiving antennae are used. When the signal picked up by one antenna fades the chances are that the other antenna is still receiving a strong signal. In low-cost equipment, the two antennae may be at opposite ends of the receiver box. Better performance will be obtained if the two antennae are several metres apart. Suitable stands can be used to elevate the antennae. In general the antennae should be at least a metre and preferably two metres from any other object as this helps to reduce the intensity of reflections and reduces fading. ■

Advertisers Index

360 Systems	101
A&F McKay	96
Akai	25
Allen & Heath	51
Amek	65
Amptec	24
AMS Neve	IFC
Aphex	0BC
Apogee Electronics	107
Aspen Media	10
Audio Developments	59
Audio Ltd	98
Audio Technica	63
Audionics	132
Behringer	55
Brauner	67
Broadcast India	135
BSS Audio	49
Calrec	56
CreamWare	19
Digidesign	9
Digisam	95
DPA Mics	82
Drawner	11
Emtec	81
Euphonix	87
F.A.P.	86
Fairlight	27
Fletcher Electro Acoustics	100
Focurte	37
Genelec	76
Grace	132
Graham Patten Systems	120
HNB	21, 79, 97, 112
Interbee	121
Jungo	88
LA Audio	33
Lab Gruppen	110
Lawe	92
Leitch	102
Mackie Designs	139
Magslen	39
Manley	66
Max 1	72
Medeform	58
Microtech Gefell	114
Munro Assoc	18
Mytek	17
Neutrik	94
Otari	84
Pearl Mics	132
Preco	104
Presonus	68
Project Audio/Schoeps	115
Richard Film Services	132
Roland	60/61
Rorka Data	74
Sadis	47
Sourc Technology/Alesis	29
Sourcraft	31
Sourcscapc	93
Sourctracs	23
Spencer	69
Spirit	43
SSL	5, 89
Studer	70
Tapomatic	111
Tascam	53
te electronic	15
TDK Europe	40
Telex, EVI Audio	75
That Corp	45
TL Audio	64
Total Audio Solutions	83
Unity Audio	80
Weiss Engineering	135
Westlake Audio	32
Whirwind	138
YouCam	71
Zonal	35

sole to ensure best uniformity no matter how the program is delivered.

The subwoofer signal is created in the decoder product based on the use of bass management crossover filters as needed for the particular speaker complement in use. A subwoofer is present, the bass (including the LFE channel if present) will be redirected to the speakers best able to handle it, usually the main stereo pair.

In most music productions, there is unlikely to be a technical need to use the LFE channel. Since the overall programme level may be adjusted to allow for any proportion of bass to be perfectly rendered, the LFE channel might only be an advantage for something like the famous cannon shots in the *1812* overture. In such a case, the overall programme level might have to be reduced several dB just so the last few minutes can make the desired impact without overload. By using the LFE channel, the orchestra can be recorded at a more normal level, with some of the loudest, deepest bass of the cannons carried in the LFE channel. Of course, the main channels must still carry the cannon shots so that they will be heard from the appropriate locations.

There is another benefit to using the LFE channel when carrying explosive bass signals, in that smaller stereo systems may not be able to handle such high levels of deep bass without sig-

nificant stress. Since the LFE signal is discarded in the Dolby Digital downmix process, these bass signals will not present any difficulty. The remaining portions of the cannon shots mixed into the main channels will convey the essential aspects of the performance for the downmix listener.

While it may be of no particular consequence for cannon shots, the fact that the LFE channel is separate from the others means that its ability to blend seamlessly with the higher frequencies from the other channels can be affected by filters used to generate the LFE signal, for example. The best way to ensure a cohesive audio signal across the entire audible spectrum is to keep the entire signal together in the main channel or channels.

Even with the popularity of 5.1-channel systems, there will always be a need to address stereo reproduction. There are three basic ways to do this: prepare a new stereo mix from the original multitrack elements, prepare a studio adjusted downmix from the multichannel mix, or let the decoder derive a stereo downmix.

The first option is no different from today's conventional stereo mixing sessions. The second option takes advantage of all the work that has gone into the mixing of the 5.1-channel version, and allows the mixing engineer to quickly derive a stereo version while

retaining flexibility in the exact proportions of each channel represented in the final stereo mix. The third option is to make no separate stereo mix at all.

In this case, the decoder will derive a stereo downmix based on preset formulas in the decoder. Consumer decoders can apply a degree of dynamic range reduction during the downmix process if necessary to prevent overload. The downmix options are all able to be previewed in the production studio, and a range of adjustments are possible.

One other aspect of previewing how the production will sound to the consumer has to do with checking the mix on a 'budget' surround system, in the same way that small speakers have traditionally been used in stereo mixing to check TV and small stereo playback compatibility. Having a 'home style' surround system on hand may prove useful in evaluating how well the mix translates to more modest playback systems. ■

Further information

For more information see the **Dolby Digital Encoding Manual** available from **Dolby Laboratories** or from the **Dolby web site at www.dolby.com**. Details include **Room Layout, Speaker Placement, Channel Calibration, Subwoofer Calibration, and Setting Centre & Surround Delays**.

MASTER'S TOOLS



EQ1: Digital Parametric Equalizer (96kHz optional)

Highly ergonomic with 22 touch sensitive knobs • seven bands, each switchable to peaking, hi/low shelf, hi/low cut, each spanning a 16Hz to 20kHz frequency range • frequency response display • fully MIDI controllable • 128 snapshots • extremely low noise filter architecture • 40 bit floating point processing • 24 bit AES/EBU Input/Output with switchable dithering • peak meter • excellent price/performance ratio
"Outperforming the best analogue equalizers"



DS1: Digital De-Esser / Compressor / Limiter

Highly ergonomic with 12 touch sensitive knobs
 • lowpass/bandpass/highpass switchable linear phase crossover filter with crossover frequencies between 300Hz and 20kHz • fully MIDI controllable
 • 128 snapshots • 40 bit floating point processing • 24 bit AES/EBU Input/Output with switchable dithering • compressor input/output metering
 • gain reduction metering • static transfer function display • variable soft knee • programme dependent release • oversampling sidechain and gain multiplier • auto gain makeup feature • monitor feature for "compressed band only" listening • excellent price/performance ratio
"The best De-Esser / Compressor"

Weiss Engineering Ltd. • Florastrasse 10
 8610 Uster • Switzerland
 Phone +41 1 940 20 06 • Fax +41 1 940 22 14
weiss@weiss.ch • <http://www.weiss.ch>



For

- TV
- RADIO
- VIDEO
- AUDIO
- FILM
- CABLE
- SATELLITE
- COMPUTER GRAPHICS
- MULTIMEDIA
- TRANSMISSION
- MASTERING
- REPLICATION
- DUPLICATION
- ALL THEIR ALLIED AND ASSOCIATED TECHNOLOGIES

Move into the Money making zone

THE 8th CONSECUTIVE
BROADCAST INDIA '98
 EXHIBITION & SYMPOSIUM
 27-31 OCT 1998
 EXHIBITION DATES : 29-31 OCT 1998
 SYMPOSIUM DATES : 27-28 OCT 1998
 VENUE : WORLD TRADE CENTRE, BOMBAY

The only broadcast show of India which can boast of millions of dollars worth of floor sales

For more details contact the organisers or visit our website at www.saicom.com/broadcastindia

Organised by

SAICOM TRADE FAIRS & EXHIBITIONS PVT. LTD.

148, Admiralty House, Colaba, Bombay - 400 005, INDIA
 Phone : (91-22) 215 1396, 215 2721 • Fax : (91-22) 215 1269

E-mail saicom@bom2.vsnl.net.in • Website : www.saicom.com/broadcastindia

Radio microphones

Modern production values often preclude the use of a microphone requiring a cable link to a preamplifier. **John Watkinson** looks at the radio microphone

IN MOST RECORDING applications, the microphone is stand mounted and the presence of a microphone cable is no great problem. The same is true for the outdoor recordist who will be carrying microphone and recorder. However, in many applications the microphone cable is an unwanted constraint and microphones are used in conjunction with radio transmission. An example of use might be a single camera ENG team consisting of camcorder operator and reporter. The reporter has a radio mic and the receiver is mounted on the camcorder so that reporter and cameraman don't need to be connected by a cable as this is fraught with difficulties in public spaces.

In many modern musicals the artists are too mobile to trail cables. Artists don roller skates and swing on trapezes, yet the audience demands clear amplification. The musical could not exist in its modern form without the radio mic.

It is not easy to obtain high quality with radio microphones—not least because of the potential for noise and interference in the radio link. In general radio microphones should never be used without good reason simply because a cabled microphone is always going to sound better. In order to minimise noise, techniques such as pre-emphasis and companding are used in the audio frequency domain and FM (frequency modulation) is used in the radio frequency domain.

Fig.1a shows that in frequency modulation, the frequency of the carrier is driven up and down by the audio waveform. The receiver contains a device called a discriminator that produces an output proportional to frequency to recover the audio waveform. The advantage of FM is that interference is additive, and so it may change

the amplitude of a signal, but it cannot change the frequency. As a result, FM gives better signal-to-noise ratio than AM: although it does require more RF bandwidth than AM because the sideband structure is wider. This requires wireless microphones to use VHF bands or above.

It is a characteristic of FM systems that the noise in the channel is proportional to frequency. Stated differently, the signal-to-noise ratio is triangular and so the upper sideband contributes more noise than the lower sideband. Fig.1b shows the reasoning behind the problem. An ideal demodulator removes amplitude disturbances by clipping the received signal. This eliminates amplitude modulation, but it doesn't remove all forms of noise. The discriminator works by analysing the position of zero-crossings in the FM signal with respect to the time axis.

In the RF domain the transmitted signal has finite bandwidth so the transitions in the signal cannot be vertical. Instead they are sloping. Fig.1b shows that noise added to a sloping signal can change the position of a zero crossing, and cause the estimated frequency to be in error, resulting in noise in the demodulated baseband signal. Fig.1c shows that as frequency rises, the period of a signal becomes smaller. As a result, a given disturbance on the time axis assumes a greater proportion of the signal period at high frequencies than it does at low frequencies. As a result, the noise is proportional to frequency. Stated in audio industry terms, the SNR deteriorates at 6dB per octave.

Pre-emphasis takes advantage of the fact that most audio-programme material has lower signal levels at the extremes of the audible range. High frequencies can be boosted prior to transmission and given a corre-

sponding reduction at the receiver which will reduce hiss. This is particularly useful against the triangular noise spectrum of FM radio. In some cases audio signals have exceptional levels at frequency extremes. In these cases pre-emphasis is not beneficial as it could result in overloading. This is unlikely to arise in radio mics used for

level is reduced, it is no longer constant and noise pumping may be audible with heavy companding.

The pre-emphasis, compression and modulation parameters of the microphone have to have matching de-modulation, de-emphasis and expansion at the receiver so the overall response is correct. In practice this means

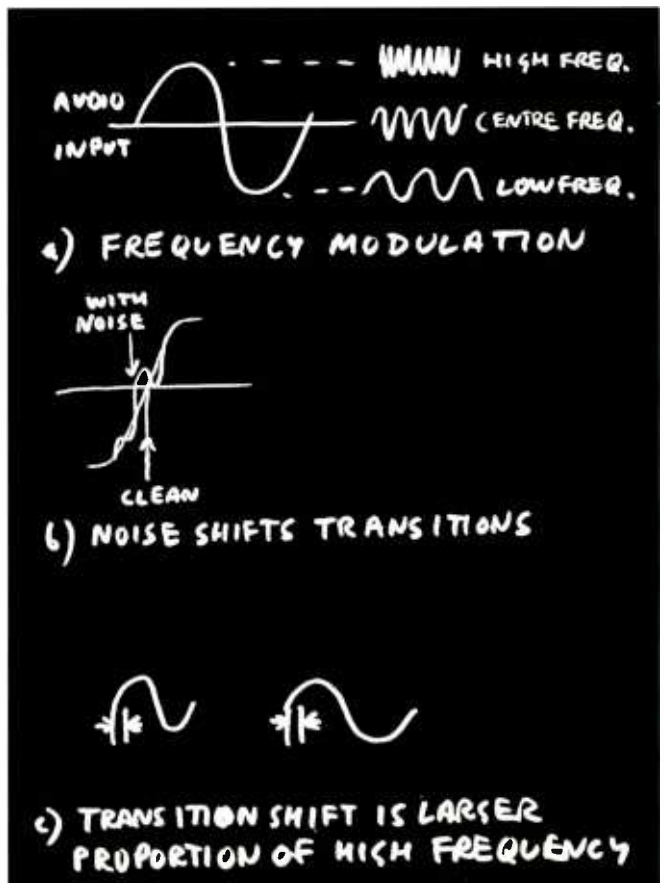


Fig.1

vocals, but should be borne in mind in other applications.

Companding is another useful technique to cut down noise. Fig.2 shows the details. The transmitter is preceded by a recursive compressor—that is, one which takes gain control decisions based on its output. This approach means that the encoder and the decoder see the same signal so that the decoder can reverse the compression. Companding of this kind cannot be used to excess because, although the noise

that the microphone and receiver will be supplied as a matched pair.

Designing a radio microphone is challenging because there are limits on size and weight yet complex processing at AF and RF is necessary. Surface-mount technology was a godsend because it allowed more complex processing at the microphone without an increase in size. Power is limited because it has to be supplied from a battery. Traditional rechargeable batteries such as nickel-cad-

INTRODUCING THE MACKIE D8-B. DIGITAL MIXING DEFINED.



The most powerful, intuitive, creative digital console ever offered at any price. Twenty-four-bit definition. The superb sound quality and intuitive interface that Mackie's famous for. Expandable with cards and software plug-ins. The Digital 8•Bus. Well worth the wait.



Woodinville, WA, USA
Phone 800/998-3211
www.mackie.com

"I was wary of putting a speaker in my ear..

...until I used the
Aphex Dominator."

"Although I was glad to get rid of stage wedges, I was apprehensive about switching to in-ear monitoring—I was wary of putting a miniature speaker in my ear. After we added the Aphex Dominator I felt much better about the system. It has been flawless in brick-wall limiting the stage mix and sounds really clean."

The Dominator is the only brickwall limiter that will give you the absolute peak protection you need while maintaining the fidelity you demand. Don't gamble with your ears—they're your most precious instruments.

Michael Bolton



APHEX
SYSTEMS

IMPROVING THE WAY THE WORLD SOUNDSSM

11068 Randall Street, Sun Valley, CA 91352 U.S.A.
818-767-2929 • Fax: 818-767-2641 • <http://www.aphexsys.com>

The Dominator is covered by U.S. Patent #: 4943628. Foreign patents issued or pending. Aphex and Dominator are trademarks of Aphex Systems Ltd.