

SEPTEMBER 1993

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# STUDIO SOUND

AND BROADCAST ENGINEERING

THE INTERNATIONAL  
PRO AUDIO MAGAZINE



## RADIO MICS

Working Without Wires

## Console Games

Amek 9098: Rupert Neve's Swan Song?

Otari Concept 1: Conceptual Ecstasy?

## DAT On Trial

DAT Tape Ageing Test Results

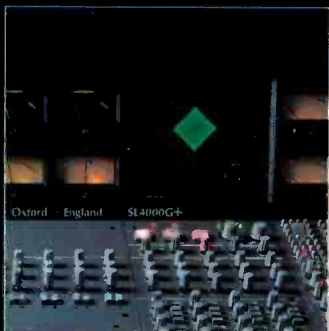
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# STUDIO SOUND

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Postpro the French way. See page 45

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Falling equipment prices may not be the good news many would have us believe. What happens when gear is too cheap to sell?

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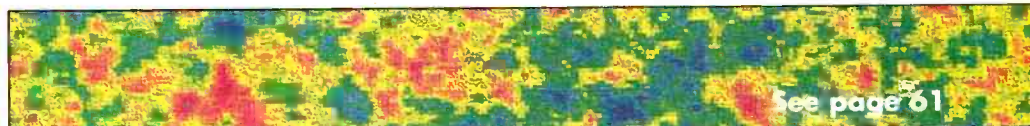
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The concluding part of *Studio Sound's* DAT test examines the performance of DAT tapes after accelerated ageing

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Barry Fox on the DCC enigma and 'backwards compatibility'



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# "YOU WANT TO DO WHAT!?!?"

**So** there he was, this *client*, for want of a better word, telling me, in no

uncertain terms we needed a piece long ago

consigned to the bin. I could see myself burning the

midnight oil again, desperately trying to find this 3

second out-take from the 2000 feet on the cutting

room floor.

And what about the night before! I'd mixed down a

couple of nifty, if a little time-

consuming crossfades,

then realised I had a

problem - all

the edits

from earlier that evening also needed crossfades to

cover the gaps. Oh well, Sleep's overrated anyway!

It's just something else to do in bed!

I should've listened to Jim! I'd just replaced my

ageing tape deck with a gleaming new machine when

he said, "You could get a complete SADiE system for less than

that - real-time crossfades, non-destructive editing and so fast to

use, it's incredible!"

What next! I need more tape,

more time *less grey hair*.....



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# STUDIO SOUND

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## Secret service

One of the undisputed consequences of technological progress is that of 'more flash for less cash'. Performances previously associated with equipment priced exclusively at a 'professional' level are now readily available to the semipro and even purely amateur recordist. The accessibility of such equipment to lower levels of the recording market does not, of course, prohibit its use in fully professional facilities—a couple of cases might be those of certain digital signal processors and consumer DAT recorders. Yet while many of the repercussions of such 'budget' equipment have received much worthwhile discussion—both privately and through the press—there is one particular aspect I have yet to see aired.

In our understandable excitement over the advances which make products such as those mentioned above a commercial viability, we should constantly bear in mind that the initial outlay involved in incorporating a piece of equipment into a recording studio is only part of the financial consideration necessary before purchase. In the past we have been accustomed to levels of service commensurate with both the cost of professional equipment and the demanding use to which it is put. But what should we expect of equipment designed—and priced—to have an altogether different appeal? Tie this up with the fact that fewer studios are providing on-site maintenance departments, and we have a recipe for disaster.

The situation is complicated further when we consider equipment deliberately pitched to find itself in both pro and nonpro applications. Take the Alesis ADAT and the Tascam DA-88 as a couple of very topical examples—what level of reliability can we reasonably expect from them and, more pertinent to this discussion, what should we reasonably expect in the way of backup and service?

Without wishing to suggest that any of the gear I have mentioned is unreliable, both DAT machines and the new breed of tape-based digital multitracks are inherently mechanical in operation, and carry with them a mechanical level of failure liability. True, the same can be said of preceding generations of professional analogue tape machines—except that these were unequivocally presented, priced and supported as professional. Can we reasonably expect the same consideration when using this new genre of equipment?

Let us look at the situation from the point of view of a pro-audio distributor who, responding to the demands of the pro-audio fraternity, adds a consumer DAT machine to the catalogue. The machine sells—in some cases as a cost-effective backup to a pro DAT machine, in others as a cheap alternative. Presented with the rigours of professional use (a condition for which it was not designed), it proves less reliable than the rest of the gear in the studio. The studio repeatedly return the machine to the distributor who, by now, is making a comfortable loss on the deal. Worse for the studio, is that sessions are now dogged by the machine's frequent failure. Who is to blame?

Perhaps the solution lies with service contracts; the acceptance of these would give the supplier the confidence to carry lower-priced items without running the risk of having either to provide an inappropriate level of support or disappoint customers by declining to provide a satisfactory service. If we feel reluctant to run something as mundane as photocopier without a service contract, how can we reasonably hope to run multitrack machines through the night without a safety net?

Before rushing into your next 'budget' purchase, it may be a worthwhile exercise to recall the initial reluctance with which you consigned your first digital watch to the trash can on the grounds that it was simply not a financial viability to have it repaired. Perhaps this is closer to the mind-set required to deal with the next generation of audio technology. ■

Tim Goodyer

Cover: Shure Beta 87 radio microphone

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**In-brief****● 12-day month charging FX**

FX Rentals is now offering a '12-day month' charging scheme, as well as its existing '4-day week' option, on all rental equipment apart from digital multitracks—customers who hire any such item from FX Rentals list for four weeks will pay for only 12 days hire.

**● Mikros Image win internationally**

Paris-based video postproduction company Mikros Image has taken three major prizes at the International Monitor Awards in Los Angeles. The International Monitor Awards, America's leading showcase for the electronic postproduction industry, attracts competitive entries from around the world, notably Europe and The Pacific.

**● ISDN user show doubles in size**

Rapid growth in demand for ISDN services and products, as witnessed in figures recently announced by BT, has led the organisers of The ISDN Show to double the available exhibition space for the 1994 show, which was held for the first time in February this year.

**● Skillset launch research project**

Skillset, the industry training organisation for broadcast, film and video is working on an important research project looking at employment trends and training needs in the industry. The results will show how freelancers and those working in the Set Craft and Radio sectors entered the industry, their employment histories, the training they have received in the immediate past and most importantly, what training they feel they need for the future. Employers in the industry will be asked at the same time for their views.

The results will then be analysed and made widely available in February 1994.

**● AESCC Computer Committee meet**

The Audio Engineering Society Standards Committee working group SC-10-2 met in June working on their computer-controlled sound system application protocol. Fifteen people were present, representing 11 companies: Altec Lansing, Crest Audio, Crown International, ETA Lighting, IED, Lone Wolf, Rane Corporation, THAT Corporation, The Golder Group, Theatre Design Associates, and White Instruments.

**● Ted Snider receives NAB award**

Ted Snider, owner of KARN-AM, AR, was named the 1993 recipient of the National Radio Award. The National Radio Award recognises significant contributions and a lifetime of service to the radio industry.

**● 25 years for Record Plant**

The Record Plant, Hollywood is 25 years old. It is 25 years since the studio was launched as a creative workshop.

# International News

## Harman International buy AKG

Harman, in an official press release announcing fourth-quarter results also confirmed in principle the purchase of AKG, the Austrian microphone manufacturer, ending speculation about the takeover. The agreement includes an option to acquire a remaining minority interest. The ultimate acquisition is subject to approval by the respective boards of directors.

Dr Harman commented on the acquisition. 'The acquisition of AKG will represent a significant step in the continuing development of Harman International's strong capabilities in the professional audio business. AKG's combination of world class products, excellent engineering and manufacturing facilities throughout the world and its splendid reputation will provide significant support for our very strong professional audio group.'

That group now includes AKG, dbx, Orban, BSS, Quedest and Turbosound as well as 30% of Amek consoles. Harman already own Soundcraft, JBL, MBI, Allen & Heath, EAW, DOD, and Urei, making it the biggest pro audio distributor in the world.

## The Firm posted by Fairlights

Production dialogue for this Autumn's hit movie *The Firm*, was completed at Todd AO Glen Glenn Sound using Fairlight MFX2 digital audio workstations. A total of three 24-track systems were leased for the project.

Audio from digital source recordings was auto loaded using 'Film EDL' process developed by Todd AO. 'Film EDLs' were loaded into MFX2 via *Shotlister*, a video edit management system. Loading via 9-pin-controlled DAT machines proved to be extremely fast method for acquiring the necessary production takes.

Additional editing was then carried out on the Fairlights. This involved cleaning up the picture editor's work tracks in order to deliver smooth tracks to the dubbing stage. Playback and editing was possible from both mediums simultaneously. A third



Tele-cine's Michael Narduzzo uses the recently installed Logic 2 digital mixing desk to complete audio postproduction of the new BBC documentary series, *The Skipper*. The facility carried out all postproduction including telecine, video editing and dubbing for the six programmes.

## Lakeside scene

Lakeside Associates are to design a new postproduction complex for Cutters in Chicago.

The new facility will comprise two mix-to-picture and music recording control rooms, a large studio recording area, a common voice narration booth, a Foley recording area, and a technical machine room. All rooms are scheduled for a November opening.

Cutter's audio director John

Binder commented, 'The new addition to our facility will expand the type of all-digital system designed to work with BTS D1 component digital VTRs, and a variety of digital audio recording formats. Each control room will offer full LCR and split surround monitoring.'

'For today's all-digital audio-video projects, you can't cut corners on the soundtrack.'

## Turbosound and Funktion One sign technology deal

Turbosound and Funktion One have signed an agreement licensing Turbosound to manufacture and market a new range of enclosures, collectively known as 'Floodlight', incorporating Funktion One's new Axehead technology.

The Floodlight format of 'Axehead' technology uses Turbosound Flashlight's dynamic ability, but in a smaller package, with twice the horizontal dispersion angle of Flashlight. Another feature of the new product is the absolute physical time alignment of the transducers giving even greater extraction of detail and information from the source signal.

The system has already been used by Britannia Row on the Peter Gabriel *Secret World Tour* and on recent shows with Depeche Mode and Neil Young.



Tom Cruise in sentimental mode

machine was used during the pre-dub and mixing process for *The Firm*. The project was heralded as a huge success considering the fact that this was an 18-reel film loaded with intensive dialogue.



## Sonosax buy StellaDAT company

Sonosax SA of Switzerland have just announced the takeover of Digital Audio Technologies SA, the manufacturer of the *StellaDAT* professional R-DAT recorder who recently ceased trading. Sonosax commented that they have taken up the challenge to 'optimise the *StellaDAT* product' which was first announced by DAT several years ago but not finally delivered until 1992.

Without changing the basic concept of the machine, Sonosax intend to undertake significant modifications in the power supply and the analogue audio sections. This, they claim, will result in a machine that does not overheat. The time code board has been finalised and can be delivered immediately.

At this stage Sonosax cannot

confirm definite delivery dates for the machine, but the AES Show in October is one possible deadline for presenting the first *StellaDAT* in its

new modified form. Sonosax forecast a delivery schedule, starting January-February 1994.



*StellaDAT*—in its old, familiar guise

## Sony at the Poles

Poland's radio station, Radio Opole has voted for a digital future with the purchase of two Sony *DMX-B4000* on-air consoles.

The consoles are to be installed at the station's new studio complex sited at the former Palace of Culture building and should be operational around the end of October.

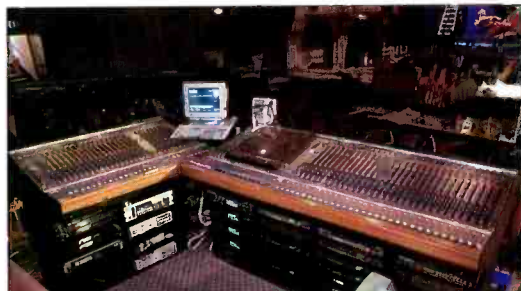
Sony have a further stake in the Polish operation in the form of CD players, auto disc loader/players, DAT machines, a converter system and distribution amplifiers.

A 'second stage' in the digital radio project is described by Sony's Damir Begovic as an all-digital complex to be built in Warszawa.

## Carousel evolves for Theatre Projects

Theatre Projects Sound has won the sound system hire contract for impresario Cameron Macintosh's

West End production of *Carousel*. The classical musical open's at London's Shaftesbury Theatre in



*Carousel*'s 65-input front-of-house CADAC J-Type with 12 x 24 matrix and 12 VCA masters

September after an acclaimed run earlier this year at the National Theatre.

Theatre Projects had supplied Sennheiser radio mic systems for the National Theatre run.

For the new production, the

same sound design team, Mike Walker and Paul Groothuis, awarded TP the whole audio hire contract.

Theatre Projects is supplying a Cadac J-Type Series desk; Yamaha *PC4002M* and *P2700* amplifiers; Yamaha processors; BSS processors and 24 Sennheiser UHF radio microphone systems.

Loudspeakers comprise bi-amped Tannoy 3836s, Bose 302s, JBL *Control Ones*, and Canon *V100s* for surround sound.

'The contract,' comments Theatre Projects sound hire manager Rachel Henshaw, 'reflects the service we provide for the National Theatre production and our experience with complex West End theatre productions.'

**Theatre Projects.**  
Tel: 081 575 5555.  
Fax: 081 575 0105.

### Show Preview

## AES Technical Paper Sessions

The 95th AES Convention in the Jacob K Javits Convention Centre in New York will have its usual round of technical papers. Some highlights promise to be in the Multimedia sessions. Subjects include *Future Human Interfaces to Computer Controlled Sound Systems* presented by Bob Moses of the Rane Corporation and Craig Rosenberg of the university of Washington; *Audio for Multimedia in Russia* presented by Alexandre Gorodnikov; and *The Role of Broadcasting in a Multimedia Environment* by Skip Pizzi, Editor of Broadcast Engineering magazine in the USA.

Other subjects being covered by

papers include *The Variability of Loudspeaker Sound Quality between rooms*; *Multichannel Sound Reproduction in Larger Rooms*; and *Nearfield Monitors: They May be Monitors but they are not Nearfield*.

Technical Tours include Channel 13/WNET/PBS; Rodgers and Hammerstein Archives of Recorded Sound. Workshops include Computer Control of Sound Systems; Professional Practices and Job Strategies in the Nineties and the Century to come; and Audio in the Age of Multimedia.

The AES will be held from 7th to the 10th October 1993.

### Contracts

● **TAKE THAT! and a DDA desk**  
Writer and singer Gary Barlow of the TAKE THAT! pop group has installed a DDA *Forum Composer* in his private studio in Cheshire, UK. Comedian Freddie Starr has bought a DDA *AMR24* console for his private recording studio in Berkshire.

● **Logic finally comes to the press**  
A *Logic 2* desk from AMS-Neve has been bought by Seikyo Newspaper in Tokyo. This will be installed in the postproduction facility of their Buddhist organisation. Pioneer have also ordered a *Logic 2* for its Laser Active Project which will produce high definition laser disks.

● **Stirling Audio supply Oasis**  
London pro-audio supplier Stirling Audio has recently supplied Oasis TV with a wide range of equipment including an Otari *DTR-90* DAT machine, a Lexicon *300*, an Alesis *ADAT*, and some AKG *C414* mics.

● **AudioVision is first in Wales**  
TaranStudios has become the first studio in Wales to buy Avid's *AudioVision*, their newly launched digital sound editing system

● **Sony 48-track from FX Rentals**  
FX Rentals has added a Sony *3348* 48-track DASH digital multitrack recorder to its stock.

● **SoundStation—born to cut**  
Cut! A fully digital video and audio postproduction facility in the Dusseldorf area, has installed a 16-channel DAR *SoundStation Sigma* digital audio workstation.

● **Revox Studio package to Russia**  
ASC have recently sold a complete Revox Studio package to a new radio station in Russia. The package includes ASC *DART* floppy disc cart machines as well as the Revox *MB16* desk and system furniture.

● **Sennheiser's 27 channel Blvd.**  
Sennheiser's *EM 1046* switchable frequency-diversity radio system is part of Andrew Lloyd Webber's hit musical *Sunset Boulevard*.

27 channels of the new Sennheiser system fulfil the total radio requirements for the show.

▼ **Aja aim for new artists**  
Aja Productions have set up a studio to attract new artists for production and recording deals. Its a 24-track *ADAT* digital facility. **Aja Productions.**

Tel: 0252 344029



Aja's studio waiting for your call

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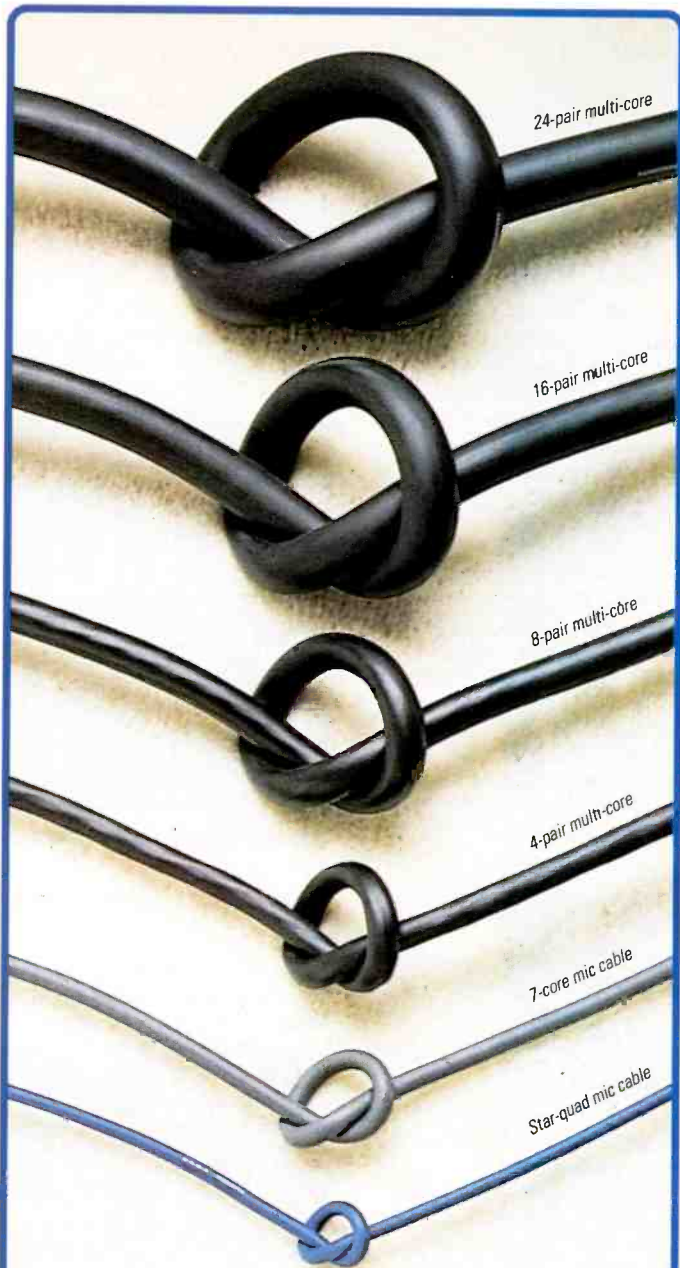
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## Beyer Wireless

BeyerDynamic have introduced a range of three new wireless systems, all operating on approved frequencies and offering a choice of single or diversity operation. The single channel system, the *S150*, features a tuned multipole front end which reduces the possibility of drop-out, RF and audio LED indicators, a rear mounted telescopic antenna and unbalanced output via a 1/4-inch jack socket. Transmitter options are a newly designed hand-held mic, mini mic and belt pack, or guitar.

Both the *S250* and *S350* are diversity systems, the latter being true diversity with two independent receivers. Features include a tuned multipole front end, RF, audio and A-B indicators, all metal heavy duty construction and unbalanced high level output via a 1/4-inch jack.

Additional features of the *S350* are a MUTE switch, balanced output via XLR connector, rack ears, and its own aluminium flight case. The *S250* boasts the same transmitter options as the single channel *S150*, while the *S350* offers, in hand-held format, the *TG-X480* head.

**UK:** BeyerDynamic (GB) Ltd, Unit 14, Cliffe Industrial Estate, Lewes, Sussex. BN8 6JL. Tel: 0273 479411. Fax: 0273 471825

**US:** Beyerdynamic, 56 Central Avenue, Farmingdale, NY 11735. Tel: +1 516 293 3200. Fax: +1 516 293 3288.

## Sennheiser dynamics

Sennheiser have launched a new series of professional quality dynamic microphones in the UK. The MD series of musician's mics combines tough construction, reliability and good sound reproduction.

*MD511* and *MD512* are cardioid general purpose models while the supercardioid *MD515* and *MD516* provide even higher levels of feedback rejection and ambience elimination



The tough MD Series



The new Wireless act from BeyerDynamic

for live vocal and spot miking applications.

The *MD* series benefits from computer optimised design techniques, used to exploit the intense field strength of the neodymium-ferrous boron rare earth magnet system. The polyimide construction ensures low levels of handling noise further reduced by a new elastic suspension which isolates the capsules.

**UK:** Sennheiser UK, Knaves Beech Business Centre, Loudwater, High Wycombe, Bucks, HP10 9QY, UK. Tel: 0628 850811. Fax: 0628 850958.

## Black Box stands

Recording Architecture makers of the *Black Box Acoustic Conditioning System*, have developed a 'professional' monitor stand. Designed through exasperation with readily available product, they have been producing these stands as one-off items for incorporation into their acoustic treatments in projects where flush-mounting of monitors is inappropriate or just too expensive.

The *Black Box Monitor* stand has been designed with maximum rigidity and damping in mind. With a stand of over 1m in height, the footprint must also be in the order of 1m to maintain stability but by maximising rigidity in the plane of speaker diaphragm motion they have kept the footprint down to manageable proportions.

The stand is designed to be inert—incapable of imposing any of its own characteristics (for example resonances) on the perceived output from the loudspeaker. To achieve this,

the metal rectangular tubes which comprise the legs and uprights are double sections welded at crucial points, allowing frictional contact between the two sections, this together with the MDF saddle damps any significant potential resonances in the frame.

**Recording Architecture, 21-23 Greenwich Market, London SE10 9HZ. Tel: 081 858 6883. Fax: 081 305 0601.**

## Micron Transmitter

Audio Engineering, manufacturer of the Micron range of radio microphone equipment, announces the launch of the *TX631*, a switchable-frequency pocket transmitter. The new unit could be of especial interest to independent operators and hire companies, as it can be specified with a choice of three frequencies within a 1.2MHz band, selected from any one of the nine standard frequency groups.

The switchable frequency options, available across the 150MHz to 300MHz range, allow users to cater for broadcast, independent production and fixed site applications. The *TX631* exhibits a wide bandwidth and a 110db dynamic range, achieved by its switchable CNS compander system.

**Audio Engineering, 3rd Floor, Fitzroy House, Abbot Street, London. E8 3LP, UK. Tel: 071 254 5475. Fax: 071 249 0347.**

### In-brief

● **DGS Pro-Audio connectors**  
Deltron Components, the UK-based manufacturer of audio connectors and cable assemblies are launching an extension to the *7000 Series Panel Mount Multipole (XLR)* connector range, a 1/4-inch jack plug programme and an extensive offering of phono (RCA) plugs.  
**Deltron Tel: 081 965 5000.**

● **Digital Companion upgrade**  
Troisi Inc are offering the first of a series of upgrade modules for its *Digital Companion* series A-D and D-A convertors. The newest plug-in module is a 5th-order sigma delta 18-bit A-D convertor. **Northeastern Digital Recording Inc. Tel: +1 508 481 9322.**

● **Vitalizer goes stereo**  
Sound Performance Lab of Germany have launched a 'true stereo' version of the *Vitalizer*. The new unit will appeal to people who want the *Vitalizer* sound with no stereo drift.

**The Home Service. Tel: 081 9434 949.**

● **VSP expands Digital Domain**  
Digital Domain expands its problem solving product line with the *VSP*, available in two models. This digital audio control centre features a record and monitor selector, external processor loop, sample rate converter, and crystal-locked jitter eliminator. The *VSP* reclocks digital audio signals with a crystal oscillator, stopping jitter. It minimises or eliminates sonic differences between CD transports, DAT machines and jittery digital signal processors.

**Digital Domain. Tel: +1 212 369 2932.**

● **JVC mini DAT**  
After last month's smallest-ever DAT contender from Sony, comes JVC's *XD-P1 Pro* weighing in at 12.5 ounces. The unit's integral package boasts a DAT recorder and M-S microphone with digital output. The *P1* features a 1-bit A-D converter with a fourth-order noise shaper and 64x oversampling digital filter and dual D-A convertors are featured. The main unit measures 77.8mm x 36.9mm x 119.1mm. The supplied rechargeable battery provides 3 hours of continuous playback and 2.5 hours of continuous recording. Running on the optional long-hour rechargeable battery, the *XD-P1* plays for 6 hours and records for 5 hours.

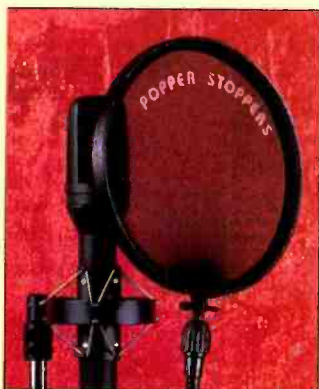
**In-brief**

● **Aware Speed of Sound Library**

Volume 1 of Aware's new Library is SFX. Seven hours of audio on one CD-ROM disc, with over 1,200 digitally recorded stereo sound effects and on-board *BrowsFX*, interactive search and audition software. **Aware Inc.**  
Tel: +1 617 577 1700.

● **Software for DDA Pro-File**

DDA's 24-track recording and production console *Profile*, has a new release of enhanced software for its own *Pro-File* automation system. The new software allows machine control either via MIDI using the MMC code, or via an Audio Kinetics *PACER* synchroniser.  
**DDA.** Tel: 081 570 7161.



▲ **Popper Stopper beats tights**

The *Popper Stopper* could put an end to the traditional tights-on-a-hanger school of pop filters. It has a 4 or 6-inch double-sided screen with nonreflective black hardware. Its clamp-and-gooseneck design allows easy attachment to stands.

**Stirling Audio.** Tel: 071 624 6000

● **Otari's ProDisk BackUp station**

Otari's *BackUp* station provides a low cost solution to time consuming backing up and restoring files for Digital Work Stations. It consists of a storage unit chassis which can hold up to five of Otari's removable disk drives and an Exabyte 8500 8mm tape drive. The system is controlled by a *Classic II* up.

**Otari US.** Tel: +1 415 341 5900.

● **Denon Pro use cassette deck**

Denon have launched the *DN-720R* cassette deck built from scratch with professionals in mind. Features include long life amorphous heads offering up to five times the life of conventional ones; 19-inch rackmounts and external access to the tape transport logic for integration.

**Hayden.** Tel: 0753 888447.



After years of one-offs the **Black Box Monitor stand** arrives

## Four-way Nady

Nady Systems have introduced the *RW-3* UHF wireless system. The system features four user-switchable channels on the receiver and transmitters. Nady also claim the first truly quiet RF link in UHF wireless. Their director of sales Howard Zimmerman explains: 'Due to physical problems inherent in designing UHF wireless, other systems suffer from noisy RF links. Therefore it is not uncommon for a wireless company to offer a UHF system that is 5-10db noisier than the same company's VHF systems.'

The *RW-3* uses Nady's patented companding circuitry to deliver a dynamic range of 120db and also features True Diversity reception, balanced and unbalanced output, three-way power option and rack compatible.

Also new from Nady is the *950GS* UHF wireless system available with 40, 100 or 160 user-selectable channels. The system is rackmount and features True Diversity frequency synthesis and Nady's exclusive hiss mute circuitry which helps maintain audio quality as the user moves to the outside limit of the systems operating range.

The *Nady 2000* is the company's top of the range VHF system available in instrument, hand-held

and lavalier configurations. The *2000* supersedes the well established *1200* series.

The *750 VHF Dual Discrete Channel* wireless system consists of one compact, rackmount unit featuring two complete true diversity receivers operating on two different VHF high band frequencies, and a choice of two transmitters—lavalier, hand-held microphone or musical instrument body pack.

**Nady Systems Inc, 6701 Bay Street, Emeryville, CA 94608, USA.** Tel: +1 510 652 2411.  
Fax: +1 510 652 5075.

## Carver protects

Carver Professional is introducing a new *PM* Series of stereo power amplifiers, each one designed from scratch for professional use. One of the first models is the *PM-420*, rated at 200W at channel into 4Ω suitable for musical instrument amplification, home studio or small club use.

The unit features comprehensive protection circuits including DC fault, thermal overrun, and output short. Loudspeakers connected to the *PM-420* are protected by a clipping eliminator circuit and output muting relays for on-off transient suppression.

Carver backs the amp with an impressive five-year parts-and-labour warranty.

**Carver Professional, PO Box 1237, 20121 48th Avenue W, Lynnwood, WA 98046, USA.**  
Tel: +1 206 775 1202.  
Fax: +1 206 778 9453.

## Studiomaster STAR

The *STAR* system from Studiomaster is a versatile console design for recording, club installations, and keyboard mixing. There are 38-inputs of which ten are stereo. Additional features include two assignable parametric EQs; four AUX buses; choice of PFL and SIP monitoring; two-track copying facility and balanced left-right outputs. Stereo *STARFX* signal processors can be fitted in the two front panel effects ports.

Retail prices in the UK are £920 plus VAT for the *STAR* system and £75 plus VAT for the *STARFX* stereo gate and compressor.

**Studiomaster, Studiomaster House, Chaul End Lane, Luton, Beds. LU4 8EZ.**  
Tel: 0582 570370.  
Fax: 0582 494343.

## Gambit Series

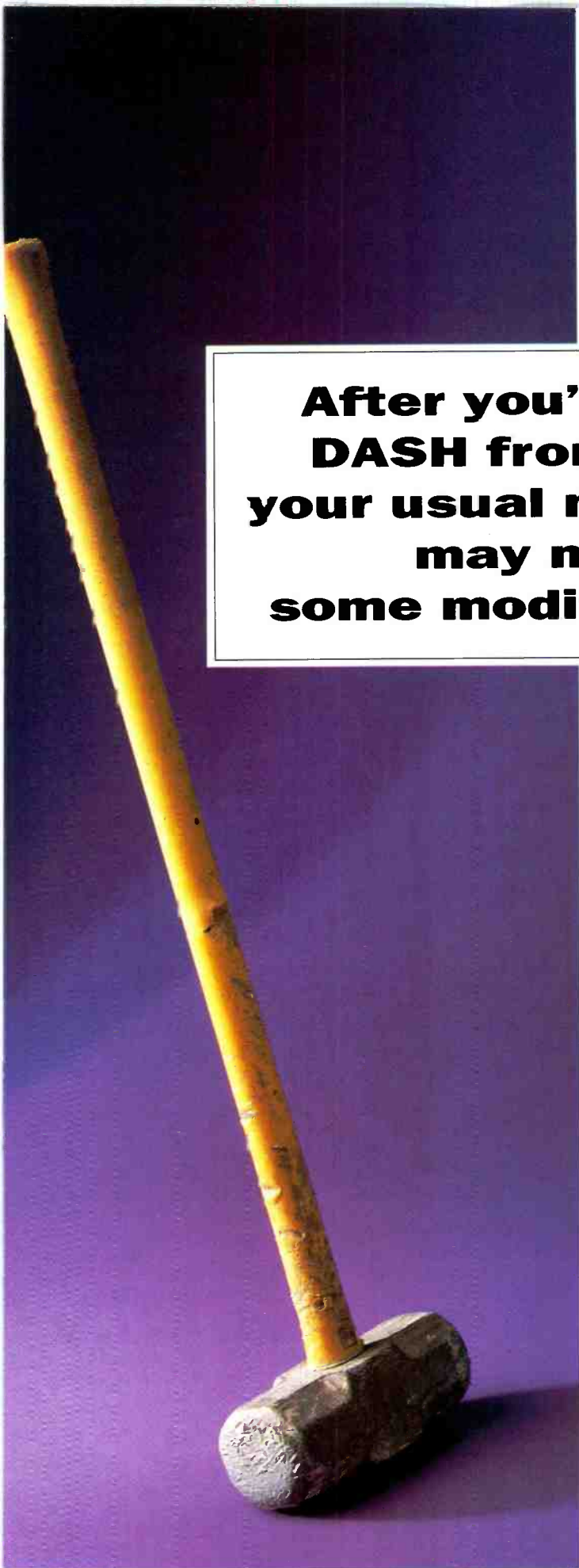
Daniel Weiss Engineering, designer of the *Harmonia Mundi Acustica bw102* modular signal processing system, has now launched the *Gambit Series*. The first products available are the Advanced Noiseshaping Redither (*ANR*) and the Sampling Frequency Convertor (*SFC1*).

The *ANR* smoothly reduces the wordlength from up to 24 bits down to 16, 18 or 20 bits without introducing any quantisations or noise modulation. The residual noise is shaped according to the human hearing curve, making the dither noise less audible.

In addition the *ANR* serves as a format convertor between AES-EBU, S-PDIF, SDIF-1 and SDIF-2 formats.

The *SFC1* converts between arbitrary and even time varying sampling frequencies. The *SFC1* model incorporates an Advanced Noiseshaping Redither (*ANR*) at its output while the *SFC1A* model comes without the *ANR*.

**Daniel Weiss Engineering, Florastrasse 10, 8610 Uster, Switzerland.** Tel: +41 1 940 20 06.  
Fax: +41 1 940 22 14.



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International 

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# Yamaha SPX990

It is becoming difficult to remember a time when there was no such thing as a Yamaha *SPX* effects box. There can be few people in this business who have not at some time been on fairly intimate terms with one, and the various models are so much part of the furniture that it is easy to overlook the fact that, in terms of operational ease and programming flexibility, they are in danger of looking dated.

Yamaha, however, are awake to the danger, and have replaced the *SPX900* with the *SPX990*, behind whose deceptively familiar front panel lie enough up-to-date features to bring it in line with the current competition. Two areas in particular have progressed considerably as the various companies have vied with each other to produce the ultimate toybox. The most obvious is the huge selection of effects often provided, together with the endless ways in which they can be combined. The *SPXs* have always required that a new program be created by editing a similar existing one rather than building one from scratch, which can be limiting and frustrating; for instance, you can not even change from a hall reverb to a plate without starting again on a different program. This is substantially changed in the *990*, although not without retaining a few constraints.

Yamaha have adopted the multiple block approach, with a Main effects block sandwiched between Pre and Post blocks. The Pre and Post sections offer a choice between 3-band EQ, compression and a Harmonic Driver (flexible enhancement); in addition, the Pre effects block has a Distortion option, combining variable distortion with compression and EQ. All these can be freely changed

around within any program, but this is not the case with the main effect block, which (as before) is fixed for each program. This means that any new effect must use an existing program containing the required main effect as its starting point, although this is less of a bind than it used to be because the reverb algorithm (hall, plate, room and so on) is selectable within each basic reverb type.

The other area to which passing years have brought changes is the method of persuading the unit to do what you want. The advent of ever bigger display screens, rotary encoders and dedicated keys has left Yamaha's nudge buttons looking fiddly and laborious by comparison. This is perhaps the biggest departure on the *SPX990*, which now boasts a rotary control, more informative display, and six soft keys whose functions change with each display page. This new front panel makes access to the unit's parameters faster and more intuitive; programming is logical and enjoyable rather than a chore. The memory capacity is substantially increased, with 80 factory presets, 100 user memories and the provision of a memory card facility giving 100 more memories per storage card.

Improvements are not confined to the ergonomics, however; taking their cue again from developments elsewhere, Yamaha have incorporated new effects into the *SPX990*, making it substantially more powerful than previous models. Two in particular are noteworthy.

The pitch shift presets now include an Intelligent Pitch function, which attempts to harmonise monophonic input signals sensibly in accordance with a selected key and scale.

Preprogrammed scales include major, minor, whole tone, pentatonic and several modes, and you can program your own scales, which dictate what interval will be added to each pitch of the original scale. Thus, to take the simplest variant, selecting the major scale will add the relevant thirds (some major, some minor) to properly harmonise a simple melody line.

Anyone who has tried to use a pitch-to-MIDI convertor (or in the old days, a pitch-to-voltage convertor) will not be surprised to learn that the success of this function very much depends on the nature of the input signal. Clean sustained guitar lines and accurately-pitched pure vocal sounds work very well, while the further away from these ideals you get—more vibrato, more breaths, more overtones—the more trouble the unit has in trying to determine the intended pitch, and therefore what shift it should be applying. Used carefully, however, this adds a whole new dimension to the usefulness of pitch shifting.

The other new feature, again very musically-orientated, is the method of controlling delay times in the various delay algorithms. The delay can now be directly entered as a note value linked to a given tempo, so that the delay will always be, say, a dotted quaver, automatically changing its actual value in milliseconds as the tempo is altered. The tempo can be entered manually, or tapped in using the soft keys, or read directly from an incoming MIDI clock, eliminating the need for those little bpm-delay time calculators.

It is indicative of the progress made in the area of effects boxes over the years that the sound quality of the *SPX990* can virtually be taken for granted, with its functionality probably being of greater interest. The quality is indeed as excellent as one would expect, with 20-bit convertors and a 44.1kHz sampling rate. Reverbs are crystal clear and breathtakingly natural, and even old

Yamaha chestnuts such as Symphonic (where do they get these names?) have more life and sparkle than before. Surprisingly, no digital I-Os are provided, although the analogue connections are at last via XLRs alongside 3-pole jacks.

I have two causes for complaint. Firstly, the sampling (or Freeze) program remains in mono despite the full stereo operation of the unit (including some proper stereo reverbs) and only has 1.35 seconds of memory, just like the *900* it replaces; I had hoped to see something more along the lines of the *SPX1000*. This is a minor point; the manual is not; it never ceases to amaze me that a company of the size and stature of Yamaha can consistently turn out such appalling manuals. It cannot possibly have been read by anyone whose principal language is English before going to print. And while some of the mistranslations are quaintly amusing, some are misleading, others are plain wrong, and whole chunks are little more than gibberish. Simplifying the operation of the *SPX990* does not remove the obligation to provide a clear, informative manual.

This, however, given the will, is easily remedied, and does not detract from the *SPX990* itself. While there is nothing earth-shatteringly new about the unit, it represents an important step forward for Yamaha, offering a competitive range of features and up-to-date operating procedures while retaining the unmistakable air of Yamaha quality at a sensible price. I have little doubt it will soon become as ubiquitous as its predecessors.

**Dave Foister**

**UK:** Yamaha-Kemble Music (UK) Ltd., Sherbourne Drive, Tilbrook, Milton Keynes MK7 8BL.  
Tel: 0908 366700. Fax: 0908 368872.  
**USA:** Yamaha Corporation of America, 6600 Orangethorpe Avenue, Buena Park, CA 90620.  
Tel: +1 714 522 9011.  
Fax: +1 714 739 2680.



Yamaha *SPX990*—the ultimate 'toybox'?

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AMS Neve Plc, Billington Road, Burnley, Lancs BB11 5ES, England. Telephone: (44) 282 457011. Fax: (44) 282 39542.

T H E L O G I C 2

# The sound and the fury

Following the furore in the audio press over their 4D Audio Recording system, Deutsche Grammophon recently called an 'Open to Question' press conference chaired by *Studio Sound's* Editor Tim Goodyer.

A group of journalists, some of whom have already written extensively about 4D Recording, were invited to meet five representatives from DG's

Hannover Recording Centre in order to query the technical issues surrounding 4D 'straight from the horse's mouth'.

Klaus Hiemann, the Centre's Director, and Stefan Shibata, Head of Audio Engineering, expressed their concern about some of the comments made in the press since DG's initial press conference held at London's Henry Wood Hall

in March this year (reported in the April edition of *Studio Sound*). Hiemann felt that many of the comments made at that conference had been taken out of context, and that some of the finer points

concerning the operation of 4D Recording had been misinterpreted—both by the press and by certain other recording engineers.

It was reiterated that 4D is the marketing name given by Deutsche Grammophon to what is, in effect, their proprietary digital recording system. This system comprises various items of commercially-available equipment (modified in some cases) and two 'black boxes' built in DG's own workshops. The latter are what DG call the stageboxes and the requantising unit. And it is the operation of these which appears to have caused most of the confusion.

The stageboxes contain 21-bit delta-sigma A-D convertors adapted from Yamaha's AD8X model to DG's own specification. The absence of any 21-bit linear convertor technology has dictated the use of a floating-point technique employing two 18-bit convertors; it is therefore correct to observe that the 4D system does not offer true linear 21-bit audio. However, DG's engineers consider the results obtained to be audibly indistinguishable from the original, making the use of floating-point convertors acceptable for their needs and, in their opinion, considerably better than results obtained from linear 18-bit conversion.

It is here that DG should perhaps be permitted to hold their own views without undue criticism from outside. They have pointed out all along that 4D is a system developed entirely for their own use, and that they presently have no intention of marketing any part of the recording system as a commercial product.

DG were also at pains to point out that their ABI (Authentic Bit Imaging) requantising unit—which reduces the digital signal to 16 bits for the final CD master—is not a competitor to any similar devices currently being sold by other companies (Sony's SBM, for example). Hiemann and Shibata would not be drawn to comment, either positively or negatively, on any other requantising system—or, for that matter, on any other piece of equipment not employed in the 4D chain.

The methodology of the requantising box was explained, although DG reserved the right (quite justifiably, it could be argued) to withhold precise

## As tough as the road



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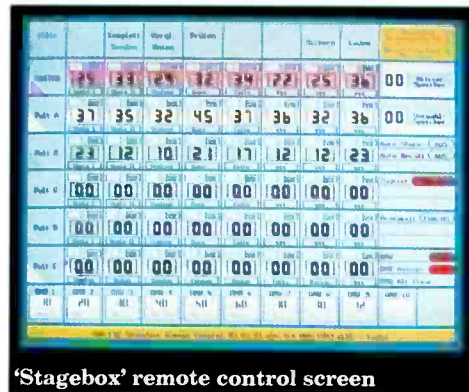
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'Stagebox' remote control screen



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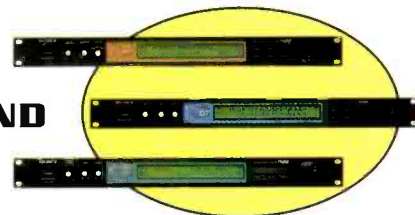
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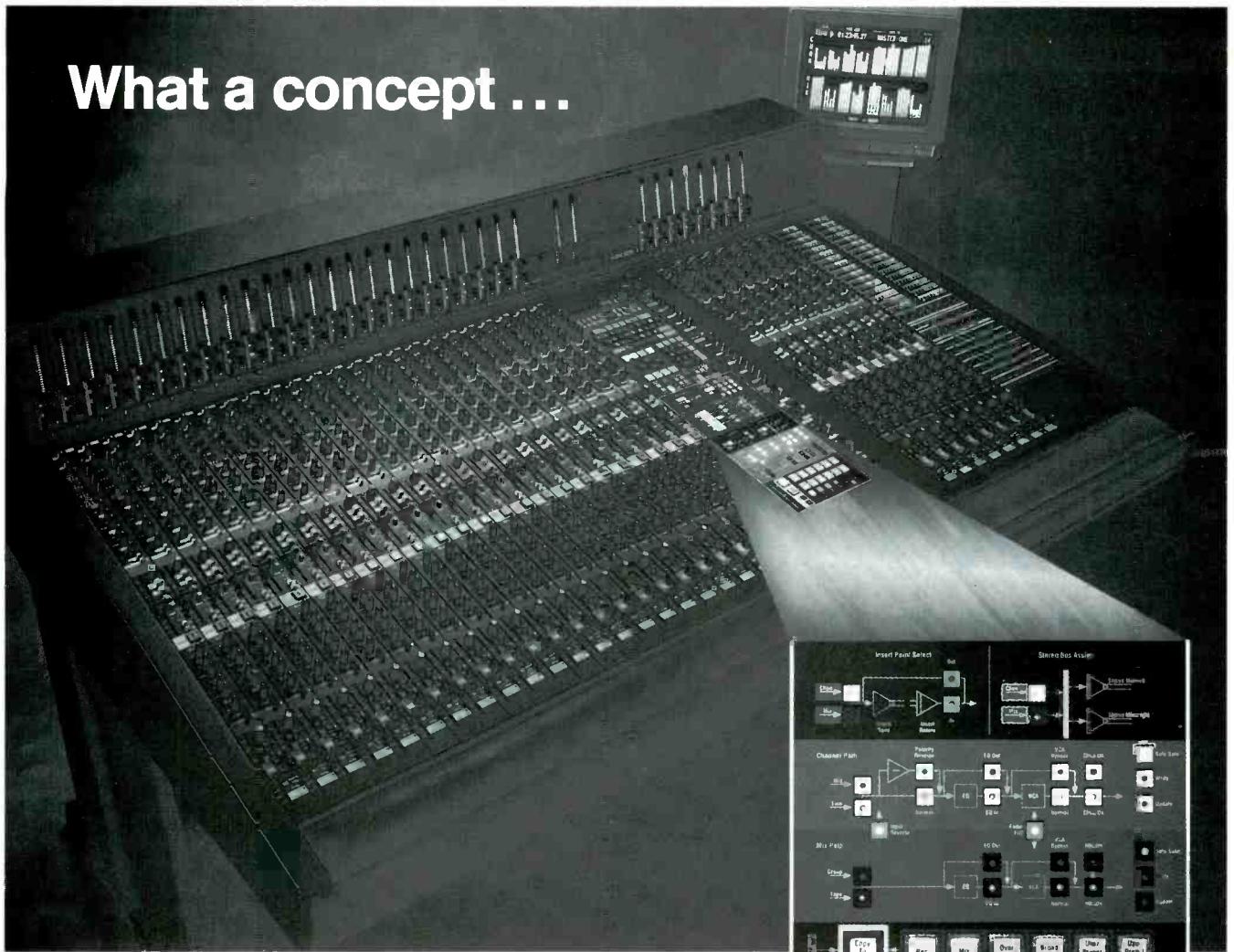


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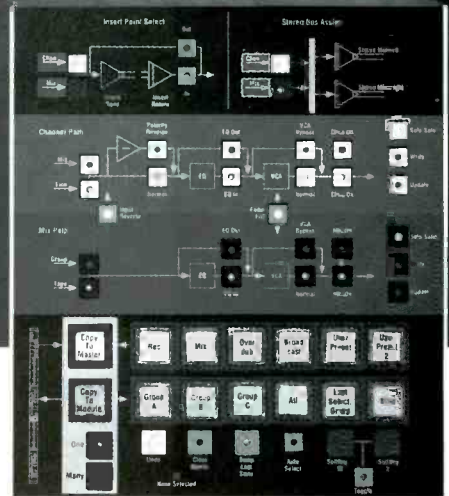
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# What a concept ...



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**4D in operation**

details of the processes involved. The design is based on the pioneering work carried out by Stanley Lipshitz and John Vanderkooy of the University of Waterloo, Canada—and is openly acknowledged as such.

Using Lipshitz and Vanderkooy's findings as a starting point, subsequent research has been carried out by DG's design team. It was stressed that the current design, and indeed the whole 4D project, is an evolving process with adjustments and refinements continually being made in collaboration with the engineers from the recording department.

At the conclusion of the meeting it was abundantly clear, to me anyway, that certain ill-conceived documents handed out earlier this year in a misguided attempt to explain 4D at too simplistic a level—coupled with comments from the DG staff that probably suffered in their translation from German into English—have insulted the intelligence of those charged with the task of spreading the word to both the audio professional and the consumer. The natural reaction of any journalist or commentator worth their salt has been to question those statements.

As a fairly neutral observer, I came away from the meeting with the distinct impression that the staff of Deutsche Grammophon's Hannover Recording Centre are making quite genuine attempts to improve the quality of their product. They are doing this through a combination of good engineering practice, carefully selected items of

commercially-available equipment and some proprietary technology where off-the-shelf products do not meet their requirements.

This policy is, of course, hardly new—almost everyone of note in the business of audio, from Edison and Berliner onwards, has done the same thing. DG's mistake, if it can be called that, is to have taken undue credit for 'reinventing the wheel'. The result has been to keep the pages of this magazine alive with contentious comment, but ultimately no-one has



**The 4D 'Stagebox'**

come out a 'winner'.

Perhaps it is now time to close the debate of 4D by commending Deutsche Grammophon for trying to improve the digital recording chain, and to express the hope that their efforts, when racked alongside other 'extended bit range' recordings now appearing, will serve to elevate the overall quality of compact discs.

In the long term, this must surely be a good thing for the recording industry as a whole. ■

**Bill Foster**

# DL241

*a u t o  
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*"The DL241 is a user friendly unit that sounds good and has a per channel pricing that should put a scare into the competition"*

George Peterson,  
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*"I should not be at all surprised to see the DL241 join Drawmer's original DS201 gate among the ranks of the classics"*

Dave Folster,  
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*"In twenty years of reviewing products I have seldom come across such a good product"*

Martin Homberg,  
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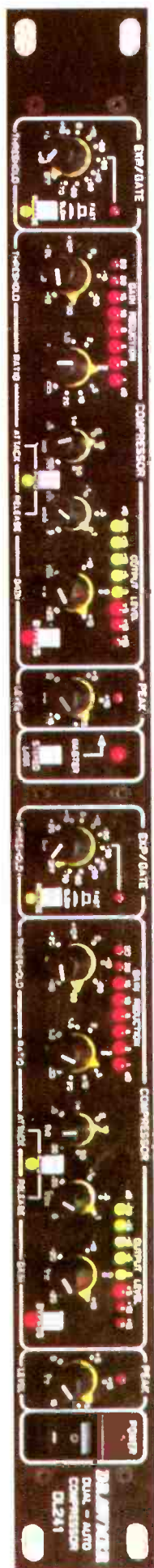
*"Once again Drawmer have hit on a winning formula based on flexibility, ease of use and true innovation. The DL241 is destined to become a modern classic amongst compressors"*

Paul White,  
Recording Musician, Audio Media

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# Rocktron Chameleon

It really is becoming increasingly rare these days to take a piece of kit out of a box, plug it in and honestly believe you really understand it all immediately, that it is built by people you can relate to and that they talk your language. Most of the time it is a case of having seen something like it before—usually on the device that the new one replaces—and this faint recognition bolsters the 'Captain Kirk spirit'. So you have a go while the Spock on your shoulder tempers your actions with a smattering of logic until you eventually kind of work it out for yourself and get it to do what you want. However, this working mastery of the device is short lived and it gradually slips from your command as much through neglect as through an inability to retain all those small operational peculiarities required to bring it to heel. And then there are all those dark and hidden menus that you have never gone near and the power supply will probably give in before you ever do.

It is true of a lot of outboard gear but similar emotions can also be aroused by your average guitar processor. This is alarming given that their target audience is less likely to be conversant with all the intricacies of 19-inch strip mystery. Guitarists can be more susceptible than most to bewilderment—they never got a manual or explanatory booklet with their amps or their strings—and I would hazard that it is still far too common to encounter a player with an effects unit that is being driven badly or is emitting a limp whimper simply because they have not got their head around the metering or got around to delving into the device to taper something as basic as the EQ to suit their playing or instrument.

It is a development of the 'my first fuzz box' syndrome which continues because many players feel obliged to get into the tech because everybody else is and once you get toy fever then there is no end to the number of boxes, pedals and processors that promise to change your life. Sure, if a

guitarist wants to get more flexibility into his sound then a 'box' is a good way along that road but it is the manufacturers' responsibility to make ensure that these products are as accessible as possible to people who generally are not that conversant with the unspoken code of presentation of modern processors.

This brings me onto the subject of the Rocktron *Chameleon*. While it is unlikely that a complete novice to this type of unit would hit it off immediately with this 24-bit preamp-effects unit with digital Hush circuitry without some quite private moments alone with the manual, its presentation is about as friendly as you can currently get. You get it out of the box, you plug it in and you understand it. What is surprising is that it does not actually conform to some of the more accepted principles of a digital preamp-effects operation and it has come at the whole problem from a distinctly different tack. It behaves strangely because it tries to assist.

The front panel is relatively plain yet the device is immensely powerful and at no stage do you get the impression that you are being compromised or short changed by the simplicity of the control. Yet it is not an entry level unit, the price tag and the appearance of balanced XLRs in addition to unbalanced connectors on the stereo output plus the provision for an as yet unreleased foot controller for the processor confirms this. Does this mean that you have to get a pro unit just to be able to have operational simplicity?

The front panel is an exercise in clarity and reveals a great understanding by the manufacturer of how the *Chameleon* will be used. Matters revolve around a paltry, by modern standards, 16-character single line display but it talks English. Presets, there are 254, are recalled by turning a dial marked Preset and striking a button called RECALL when you get to a title that takes your fancy. If you are a little slow, every time you pause while dialling through presets the display flashes to advise you to press RECALL to retrieve the current preset. This level of simplicity and assistance is carried throughout the unit.

If you want to edit a sound you twirl the Function Select dial until you reach the bit of the sound you

want to alter then turn the Parameter Select dial to scroll through its parameters. Values are adjusted using, of all things, (you've guessed it) the parameter Adjust dial. That is all there is to it. To store the preset strike STORE, the display will ask you to find a preset location which you do with the Preset dial and then press STORE again.

The basis of sounds within the *Chameleon* are called Configurations which are 12 fixed assemblies of made up of among others high-gain or low-gain distortion types, chorus, delay, reverb, flange, pitch shift, wah and phase shift in various combinations and orders. The Configuration of presets can be viewed by pressing a CONFIGURATION button and then scrolling with the preset dial and Recalling the selected patch in the normal manner. This is important because a preset's configuration gives a good idea of its character—certainly more than you would ever glean from a preset title of the 'Goat Throttle' ilk, for example.

Constituents of a Configuration can be edited freely and all presets have a mixer page for balancing the guitar tone to the effect. It is worth pointing out that the tone you are left with when you bypass a preset is the preset tone minus any digital effects like reverb and delay, for example. This makes sense to me.

Things certainly worth mentioning include the high-gain section with its Variac simulator which gives the creamiest sustain I have ever heard from a 1U-high unit plus familiar 3-band EQ and presence. The Low Gain block permits super clean settings with the sort of body you know is not your own—everything from fat-cat jazz through to the skinniest of acid rock tones. You have also got four distortion types to choose from: one solid state and three valve. All are superb, and can get fairly hot. It is beyond the High Gain circuit to go anywhere near as transparent as the Low Gain can but it defaults at its lowest gain setting to a definitive solid chord sound.

Two sets of EQ—one 2-band with a parametric mid and swept LF positioned before the distortion stage and one 4-band fully parametric after—offer simply staggering control. There is a ridiculously realistic wah effect, stunningly sophisticated phaser and flange

capability, a delicious chorus, which when matched to one of the *Chameleon's* clean sounds is pure class, and a single pitch shifter which is ideal and unfoolable—eat your heart out Zoom.

There is also a dual delay, a compressor, a jolly tremolo and some simple but appropriate reverb. All presets in the unit use the Hush single ended noise reduction system and low level expander which in this instance is digital. It works unobtrusively and that is probably the best thing you can say about it.

You can interact with the *Chameleon* using eight MIDI controllers and, of course, initiate program changes and dump and load memory and there is also provision for a tap delay.

Where ever you go in this unit things are presented clearly for your convenience. With just a little application you will become proficient in manipulating sound quickly and to your satisfaction. The scope is phenomenal and adjustments make a difference—the speaker simulator has a mic position parameter which simulates very convincingly the change in character interpreted by a microphone moving across the radius of a loudspeaker. It also approximates different speaker sizes well and has a reactance parameter which mimics the interaction between the valves in an amp and its speaker cabinet. These are not gimmicks, the people behind them are quite obviously players—and I can relate to them. This device is the best guitar preamp-effects processor I have ever heard. Period.

If you are a guitarist then you will appreciate a unit that is designed for the instrument you play and designed for you as a player. Vote with your feet. This is it.

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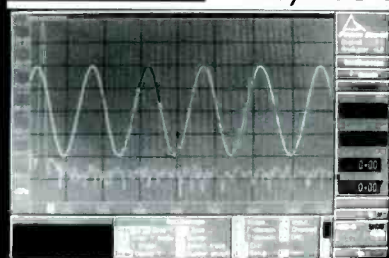
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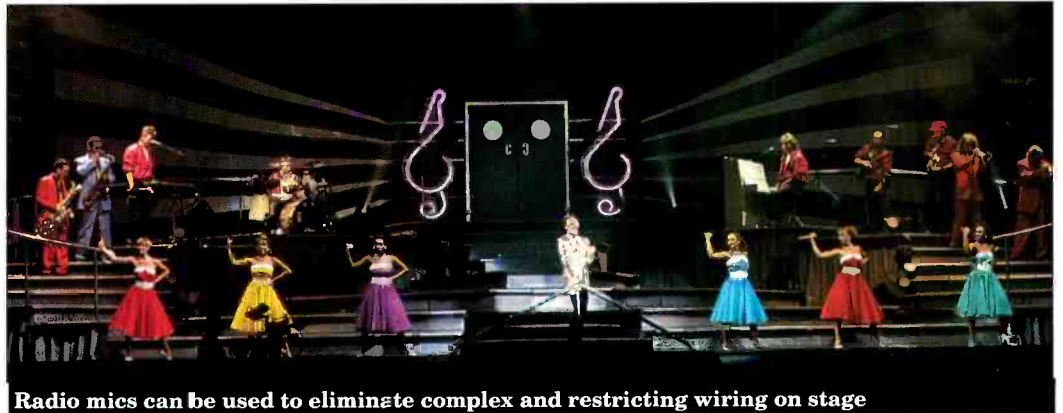
# OF MICS AND MEN

It is not so long since a microphone using a radio—as opposed to cable—link to an amplification system was something of a novelty. Of course, the advantages of such a system for concert, theatre and broadcast work are both obvious and plentiful. But as with most things, it is not as simple as it might seem. In fact, the legal issues of using radio systems can be sufficiently involved to be off-putting in their own right.

Aside from arguments about which type to use, radio microphones have built a good niche for themselves. Whatever the application, they are ideal for a more 'natural' style of presentation, allowing the user to move from area to area on set. Lapel-worn Lavalier radio systems give complete freedom to move unencumbered.

The standard of presentations, from TV broadcasts to corporate events has gone up immeasurably over the past few years and radio microphones are ideal for this trend—they are the hi-tech answer to chat-show-style presentations. In more formal situations, principle speakers can speak seated or standing, from the same position. Lavalier radio mics avoid the need for unsightly extensions to desk mics and ensure a balanced signal level.

Another broadcast radio microphone niche is the ubiquitous 'question and answer' session where the speaker invites questions from the floor. Use of up to eight roving hand-held radio mics, when properly administered, guarantees that the speakers on stage and the audience are all able to hear the



Radio mics can be used to eliminate complex and restricting wiring on stage

questions regardless of where they are coming from. Use of microphones in this situation also allows the taping of the Q&A session in its entirety, an important consideration at press conferences and politically sensitive presentations.

An interesting and positive variation of the use of radio microphone technology, is the 'radio earpiece'. This reverse radio mic system, where the user receives signals through an earpiece rather than transmitting them via a microphone, is typically used on large shows to update presenters, give them stage directions or feed them responses.

## In use

To get the best performance out of your radio microphone you do need to follow a few rules. To start with, the positioning of the antenna is highly important.

When using a stand-alone unit, it will generally be employed with its antenna of antennas fixed on to the receiver. The main points to bear in mind are to ensure that the receiver antenna is kept in line of sight as far as possible; that it is not obstructed or positioned close to large pieces of metal (as this can seriously untune or alter the polar characteristics of the antenna); that, should you need to remove the antenna, do not use the quarter-wave rod normally supplied with the unit as it will not work without a ground plane. Instead use a dipole antenna,

which should be placed as high up as possible and normally in a vertical plane. Make sure that it is free from any metal obstructions and, again, as close in line of sight as possible.

In some circumstances it may be advisable to use an antenna with a cardioid response to avoid interference. This may be applicable in a theatre where the antennas are fixed to the circle and only need to 'look' in a forward direction.

In an ideal situation, each receiver should have its own set of antenna tuned to its incoming frequency. But very often this becomes impractical as the number of receivers mounts up. The solution to this is to use an Antenna Distribution (ADU). A typical ADU will allow you to connect four diversity receivers normally requiring eight antennas, to just two.

In RF systems, as opposed to audio systems, impedance matching is very important. Most receivers are designed to work with a RF impedance of 50Ω. Simply wiring all the antenna inputs in parallel will severely impair the operation of the units and reduce reception range to virtually nothing.

A well-designed ADU unit will incorporate a front end band-pass filter to ensure only the signals in bands are passed on to the RF amplifier which in turn feeds the antenna splitting device which ▶

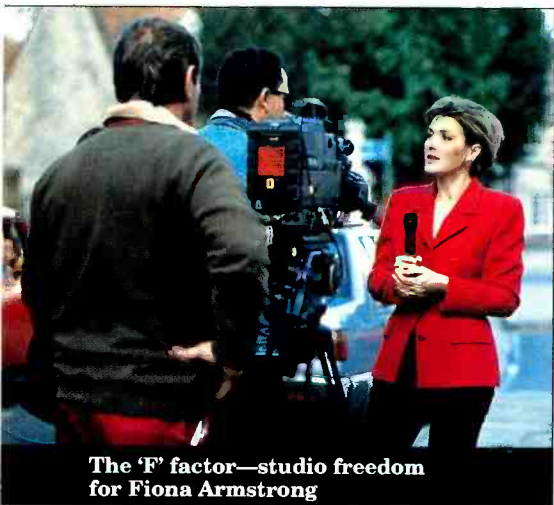
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**Nigel Orange of Presentation Technical Services takes a look at the practical, technical and legal considerations of radio microphones**

---



Cliff Richard with headset radio mic



The 'F' factor—studio freedom for Fiona Armstrong

provides eight isolated 50Ω outputs.

Most ADU units only provide a nominal amount of gain to overcome the losses in the antenna cable and splitter unit, so as not to aggravate possible intermodulation problems. Occasionally, when a user encounters interference problems they are of his own making. A common example is the result of a coiled microphone cable which creates audio interference problems because it is more prone to picking up larger RF field strengths which are induced from the RF antenna.

Even though the Radio TX (transmitter) pack is normally well RF filtered and decoupled to prevent any RF break through at the audio input, some particular types of microphone, although now only a minority, are completely devoid of any lead filtering or decoupling at the microphone end. This can lead to Gate Source rectification on the internal FET which results in some interesting audio effects or lack of level. The solution to this problem is to avoid leaving cables in the mic cable, especially near the antenna and try to ensure that the microphone cable and antenna are physically well separated.

Another of the most common mistakes is users who ram the receiver into a pocket which may be full of change or bunches of keys, which will obviously create interference. All users should check their pockets are free of lumps of metal and that the aerial is clear.

One should also be aware that different brands of hand-held microphones vary considerably in sensitivity. Obviously some users need highly sensitive microphones because of the distance that they hold them from their mouths, but you need to weigh that up against handling noise. Some microphones are immune to handling noise but are prohibitively expensive.

A surprise for first time radio microphone users is the wild fluctuation in sizes of supposed standard batteries. The PP3 batteries which we use in Trantec microphones vary as much as 5mm or 6mm according to brand. If the make you use is too large, it can cause the battery terminals to be flattened to the extent that they will not spring back, which can then cause an intermittent problem on the transmitter. If it is too small, you will get intermittent sound caused by the break in connection as the microphone is moved around. The usual solution is to get the appropriately-sized battery or bend the contacts, which of course eventually weakens them. However, I've lost count of the amount of hire microphones which come back with bits or cardboard stuck in them.

Another point to note is that battery life varies considerably across different manufacturers. A lot of artists run endlessly on one battery and expect it

to last at top quality. In reality they should use fresh batteries for every show.

We always use branded alkaline batteries which have a much longer life and also a long shelf life. With our Trantecs, we commonly get 12–15 hours work from one battery, although some other radio microphones with the same battery will only give about three hours use. We always fit new batteries before the start of any show to avoid the risk to transmitter failure. Although it is tempting, for economy reasons, to use rechargeable batteries, we have found that their end point is too high and you can only expect a couple of hours use before the system dies.

## Frequency considerations

With the radio microphone frequency spectrum currently available, many users have been tempted to stray outside the authorised band. Should you be tempted to follow suit, however, you could quite easily lose out three times over.

As well as the now widely-known UK fine of up to £5000 through prosecution under The Wireless Telegraphy Act, there are two other equally daunting possibilities.

If your frequency interfered with the yuppie's favourite toy, the mobile phone, you could also be prosecuted under the Telecommunications Act. Notwithstanding the unlikely coup of a live broadcast of a new 'Squidgy' conversation, you could also really encounter some crowd trouble if the interference ruins your show.

In theory no one should encounter these problems, the UK has the maximum amount of frequency available in any European country. Any problems that there were, were greatly alleviated by the introduction of band-edge licensing.

You are technically OK in the UK, what about that European tour you were planning?

At present there are 20 different specifications around Europe, for type approval, of radio microphones. ASP FM Ltd, the UK company set up to license exclusive radio frequencies for the entertainment industry, is currently working alongside manufacturers such as Trantec and Sennheiser within the ETSI, to produce a single standard which should be introduced in 1994. The prime objective of the standard is to help manufacturers to produce devices which do not interfere with other users.

Another Euro nightmare is which frequency to work at. ASP FM are also currently pushing the idea of freeing up regulations around Europe and are trying to get some common frequencies agreed. As part of this work, it has already carried out a frequency survey of Europe, but standardisation will take time.

In the meantime, with international work, you have to be very careful to check the local frequencies available. It's often useful to speak to local technicians or at worst let them know in advance what frequency you intend to work on. The worst case is having to switch on just to see...

Certain countries, Saudi Arabia for instance, will not let you take radio microphones in under any circumstances—because it may interfere with military activities. To avoid the inevitable confiscation at the airport, it is wise to check first.

Sometimes, even when you use the legal frequencies, you can encounter unwanted interference. Quite often freelancers, who have not been commissioned by the broadcasting organisations with allotted legal channels, may use the same frequency as you are working on. ►

## BRITISH LEGAL ISSUES

Relatively recently, over 80% of manufacturers did not have what the British Department of Trade and Industry call Type Approval. More recently, this percentage has been reversed. However, the key point of the law effecting RF users—the Wireless Telegraphy Act—puts the onus on the user to take care of the legalities. Despite high-profile campaigns by the DTI, manufacturers and ASP FM, around 50% of customers are still not aware of the issues. A recent straw poll of 1000 of the UK's top theatre and conference venues showed that just 20% are licensed.

Fortunately, yet another pressure is coming to bear on the sale and hire of illegal mics. A lot of production and broadcast companies, particularly those with a view to BS5750, have issued an edict to their production managers instructing them to only use legal radio mics.

Another looming threat to those who would prefer to ignore the legal situation is the forthcoming report to Parliament by the Spectrum Review Committee, which is scheduled for November. It takes us back to the original issue with the licensing of radio microphones—with so few users requesting licenses, the government could not see the demand for frequency space. If users do not register their use by purchasing licenses, the frequency spectrum will be reduced because of an unrepresentative perceived lack of demand.

The general 'why should I do anything?' attitude may also soon be forced to change by a stricter attitude on behalf of the government. Although there have been no prosecutions over the last couple of years, changes in the system make it very likely that enforcement is about to begin in earnest. And in case you were not aware, changes in The Wireless Telegraphy Act in October last year, put the fine for contravening the Act up to £5000 with a possibility of six months in jail.

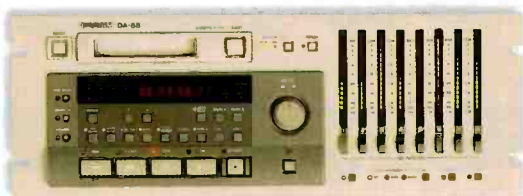
Predictably, the changing situation in the rest of Europe will effect us more in the future too. ASP FM are working closely with the European Telecommunications Standards Institution (ETSI), a body made up of administrators, manufacturers and users with a brief to produce standards when required on telecommunications and equipment in conjunction with European organisations. The current brief of Brian Copsey (of ASP) is to produce a standard for radio microphones and audio links.

Another aspect of legislation which we will all need to be aware of soon is concerned with Electro Magnetic Compatibility. It came about because more and more household electrical devices were interfering with radio microphones. In the 1980s, the Government intention was to restrict the ability of these items to transmit by encouraging manufacturers to change designs and incorporate filtering. This was due to be enforced by law by 1992, making it illegal to sell such products. However, the deadline has now been extended to the 1st January 1996—watch this space. ■ Chris Gilbert

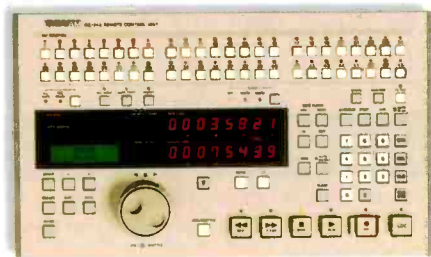
**Chris Gilbert is a Director of Trantec Systems, the largest manufacturer of DTI approved radio microphone systems in Europe**



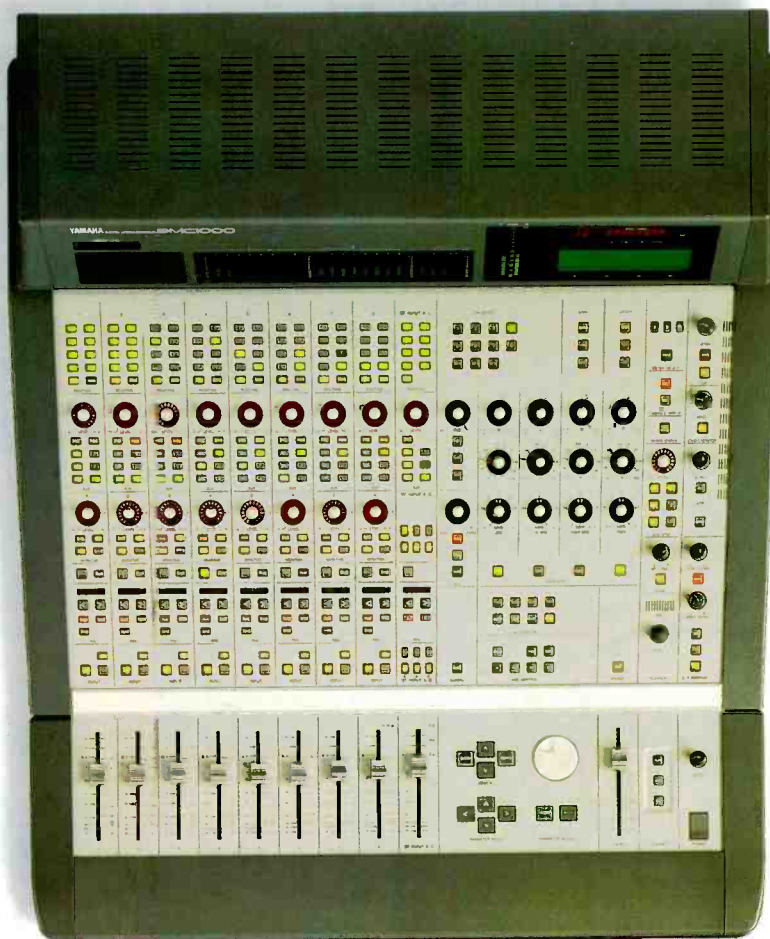
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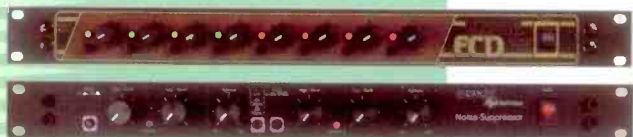
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For example, Presentation Technical Services have supplied the complete sound system on the last two Liberal Democrats pre-national election tours. During the shows there is a lot of press activity and very often the sound recordists began an interview in one corner not realising that he is using the same frequency as the politician on the platform. On another occasion, PTS were working with various radio earpiece links on the American Ice Hockey tour at Wembley Arena when a film crew began working elsewhere in the complex on the same frequency. We had to find them among 6000 people and remove their equipment.

The introduction of UHF mics has greatly increased range available, but it has not been without controversy. In the beginning, UHF microphones were temporarily allocated channel 35 until the government decided that it needed the channel for its proposed new National Channel 5 and introduced Channel 69. The situation has been in abeyance lately, particularly with Thames Television failing to secure the franchise. Many people thought that the whole idea had been scrapped.

Before you begin a production using Channel 35 beware, as there are moves afoot to re-advertise the frequency later this year and the IBA are already beginning tests on these frequencies to confirm coverage. So it is official: all radio microphones have to change to the replacement Channel 69 frequency or be blown away by high power TV transmitters.

As more manufacturers introduce Channel 69 radio microphones, it's worth discussing the difference between UHF and VHF is increasingly the source of comparison. See Table 1.

At present most radio microphones are operating on VHF between 173,800MHz and 216,100MHz.

TABLE 1: COMPARISON OF VHF AND UHF

	VHF	UHF
Audio performance	Similar	Similar
RF performance	Very good	Good but generally needs diversity reception and careful antenna placement
Battery life	Varies —but generally better than UHF	Varies
Price	Less complex —therefore cheaper	Additional, more expensive components push prices up
Immunity from external interference	Increasingly effected by digital electronics	Far better than VHF
Available channels	VHF channels are very congested and not all are intermodulation free	Channel 69

From a stand-alone point of view, there is very little to fault in a VHF radio microphone system, we have been successfully hiring out Trantecs for years. VHF systems offer a good quality-value for money ratio.

The main problem with VHF stems from the ever increasing amount of interference generated by ever faster pieces of digital electronics, most notably PCs.

UHF offers the user an entirely new chunk of radio spectrum up on Channel 69 (858MHz nominal) liberating 16 or more channels. It offers relative freedom from other band users and the dreadful digital equipment hash.

Of course, there is a price to pay. Many radio microphone manufacturers originally feared that one of the main drawbacks would be the effective range of the systems and severe multipath reflection, making diversity reception with two antennas a necessity. The former concern turned out to be, to a large extent, unfounded, although

antenna placement is in general more critical. One reason for this is the relative high efficiency of the transmitter antenna which is a lot shorter, typically 3-4 inches as opposed to 15-16 inches at VHF, allowing the transmitter ground plane to do its stuff.

Perhaps one of the biggest negatives of UHF is cost. A typical VHF radio microphone system needs fewer parts in manufacture. Not only does the component count increase with UHF, so does the expense of the type of components, which are certainly more esoteric than the more normal VHF types. And this is only the receiver.

Surely the most interesting aspect of radio microphones, however, concerns the use of lapel microphones. It is a typically human failing that leads people to wander offstage forgetting that they are still 'wired-up'. Everyone has a story to tell, my only 'clean' one involved about five minutes of the most horrible noise which thankfully turned out to be nothing worse than Roy Castle's hair dryer! ■

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The Amek 9098 is one of the most keenly awaited consoles for some years. Many people have been keen to see what Amek could do at the very top end given its new interpretation of the price-performance/expectation equation in the redefined middle market that it started with the *Mozart* and has since swept down-field. However, everyone wants to see what designer Rupert Neve has come up with since joining Amek some four years ago, because it has been a well-publicised secret that he has been putting together something special between work on the *RN Mozart* variant and the *Medici* equaliser.

In a sense, Neve believes it is the desk he has always wanted to build but qualifies the statement by adding that at Focusrite the *Forte* generated similar sentiments. 'Since Focusrite I've moved on a bit and squeezed better performance out of my designs and benefited from the economies that I've learnt from Amek manufacturing and using very extensive CAD systems,' says Neve. 'It's difficult to say it's the desk I've always wanted to build because I've always tried to build desks that customers would find useful. I'm not a systems person, I like to design circuitry that does a particular job that would ideally be triggered by a customer request.'

Requests in the case of the 9098 would seem to substantiate a call for a true all-rounder as it is stacked with features that spread its appeal across different sectors in common with other contemporary designs. Thus the 9098 comes with 48-bus routing, four stereo buses, 16 auxes, mono and stereo inputs, surround capability for film and post, mix minus for broadcasters and a split architecture that employs dual monitor modules. Advanced features include Amek's *SuperMove* moving fader automation (running on IBM 486 rather than *Atari* computer), a recall system, 16 automated switches per strip, *SuperLoc* machine control and Virtual Dynamics.

Traditional values retained include a 1.8-inch wide strip (it looks like a Rupert Neve design), classic EQ and circuitry and remote mic amps.

The appeal is deliberately broad to span the areas occupied by the limited success of Amek's *APC1000* and the shelved *Media* console—the concept was popular, comments Neve, but the budget required to purchase one wasn't.

'You can get bags of free advice from people who are not anxious to place an order,' he explains. For the 9098, Neve gained feedback from 'old friends' on both sides of the Atlantic but admits that the greatest input came from the UK. He believes that any initial doubts in the market about Amek's ability to build to his

high standards have been eradicated.

'The *Medici* ranks with the top three EQ modules in the world,' he states. 'The fact that Amek got it together is a credit to them and should be proof enough for any customer that they can get anything together. The 9098 will be spot on.'

Despite its applicability to different market sectors Neve claims the initial concept was straightforward.

'It started off as a music recording console and there was a phase when Nick Franks (Amek Chairman) said we ought to reconfigure one of my old-style consoles like the 8078s, 8068s and so on because so many people were talking about them and buying them at ridiculous prices.' However, he adds that such a console would not have suited Amek as part of the 'hype', as he puts it, of the old desks is the way they were made—hand-loomed cable forms and discrete components on the front panel—all of which is expensive by today's standards and contrary to the Amek PCB approach.

'If you tried to regurgitate a golden oldie on one PCB nobody would believe it but that is what has happened with the 9098,' explains Neve. 'The circuitry is advanced, the devices are advanced but the philosophy of audio is the same. It's made much more efficiently and surprise, surprise the price is somewhat less than you would expect to pay for an equivalent.'

A desk with recall, moving-fader automation, 16 automated channel switches, 48 mono modules, 24 dual monitor modules, four stereo modules, total Virtual Dynamics and an onboard patch field will command in the region of £300,000. He is categorical in underlining his belief that the 9098 performs better than anything he has ever designed and adds that the package and demand is right especially for those who favour old Neves.

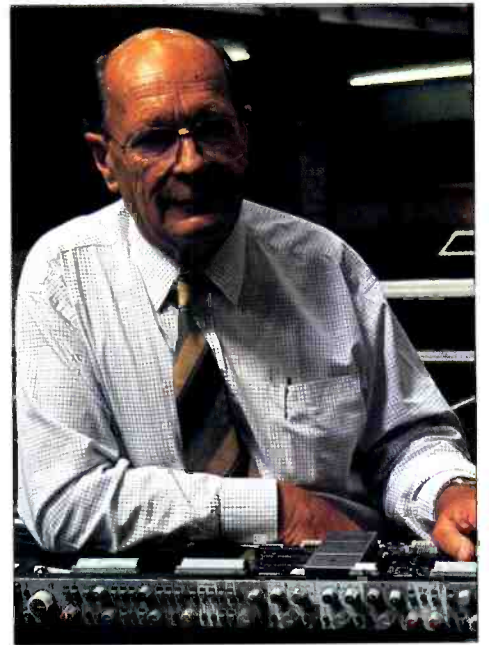
'When they eventually put a 9098 beside an old one they will find what the real differences are,' he suggests. 'They will wonder if they can sharpen up their old one to sound like the 9098 but will come full circle and realise that they will have to go for the new one. The character is the same, many things are similar, the feel is the same, the sound is a quantum step better.'

So how do you 'regurgitate a golden oldie'? Do you mimic componentry effects or just do the best that is possible?

'It's a bit of both. The best that's possible is very personal. Any good engineer can configure a bunch of ICs on a bench to a given performance but whether it will sound right when it comes up as section of EQ on console is really what it's all about. It comes back to almost personal handwriting, the shapes of the EQ curves, use of transformers and certain bees in my bonnet which I freely confess to.'

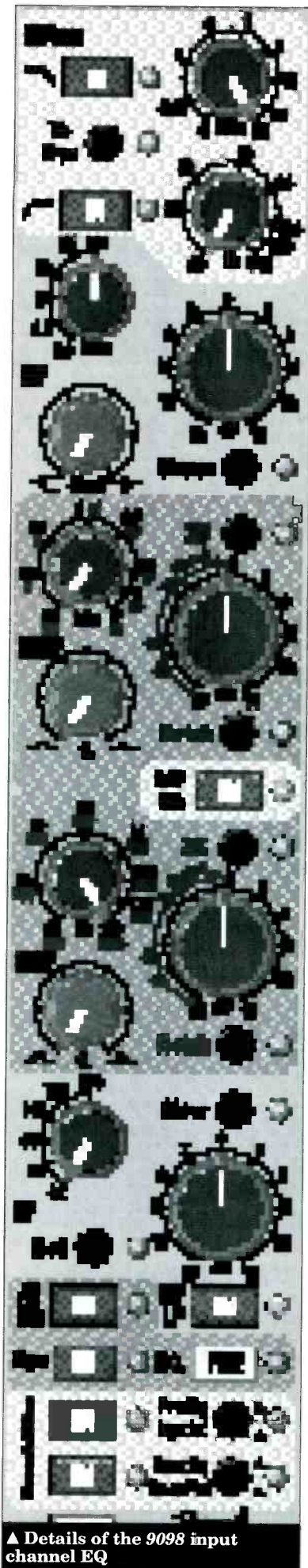
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# THE CIRCUIT JUDGE

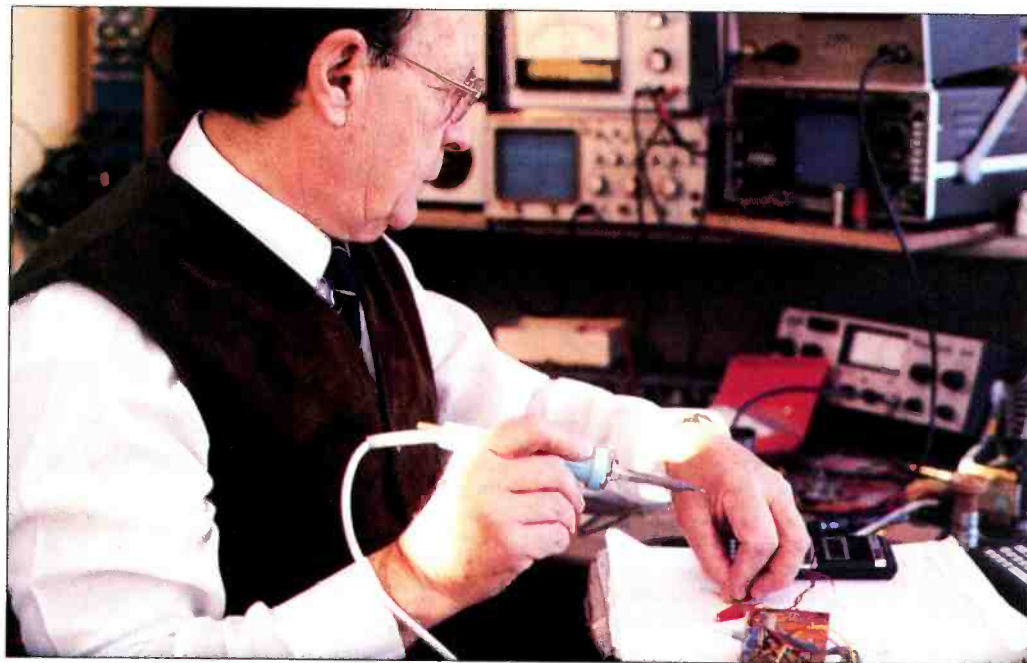


Zenon Schoepe asks Rupert Neve about the design of the Amek 9098 audio production console and the motherboard connection

◀ Amek 9098 input channel



▲ Details of the 9098 input channel EQ



'And transformers as well. All the main bus outputs, the two insertion points and the stereo outputs are all transformer outputs. The transformer is a new one and smaller than I've done before for this performance and a typical case of new materials and time to research being available. I'm really pleased with it. It has a bandwidth with a 3dB point at just over 200kHz and very low leakage inductance, maximally flat and at the lower end it will give full output at +26dB down to 24Hz. At +20dB it goes down to well under 20Hz.

There is no restriction that you'd normally think of with transformers and the reason is that the output transformer can be controlled by the amplifier that drives it. I used tertiary winding, which I've done for years, to control the way in which the transformer works. The secondary winding that looks at the outside world is totally floating and balanced.

'On the input I used TLAs. Again if you think of a transformer and you feed a signal to one leg and don't terminate the other leg you won't get much output—maybe a bit of breakthrough at high frequency. That is one of the great advantages of using a transformer.

'Now, for an input transformer I have no control over the source—you connect domestic hi-fi and expect it to work and the transformer's behaviour at low frequencies depends on the source impedance and at

the high frequencies the frequency response depends on that too. So you've got distortion at the low end and frequency response at the top end and you need to define the source impedance from which the transformer's going to work. It all gets very difficult.

'You also end up with a very large transformer because you can't get any tertiary feedback grounded. The moment you want to reference it to the incoming signal you've inevitably tied that incoming signal to console ground system and you've lost your isolation which the transformer supposedly would have given you. The TLA is simply a bridging input where the input impedance has been made extremely high between either leg and ground and the two legs are tied together with the appropriate resistor—10kΩ.

'Because of the high impedance, if you leave one end open and you feed the other end you're actually feeding both ends with a common mode signal—very nearly but not quite because one is being fed through a 10k resistor. You get an enormous amount of rejection and the TLA action is about as good as you get with a transformer certainly at high frequencies.

'We've had TLAs on the *Mozart RN* for a couple of years, so this is proven circuitry. It's tidied up for 9098 but it already has a track record.'

What reference did you make in the 9098 to the ▶

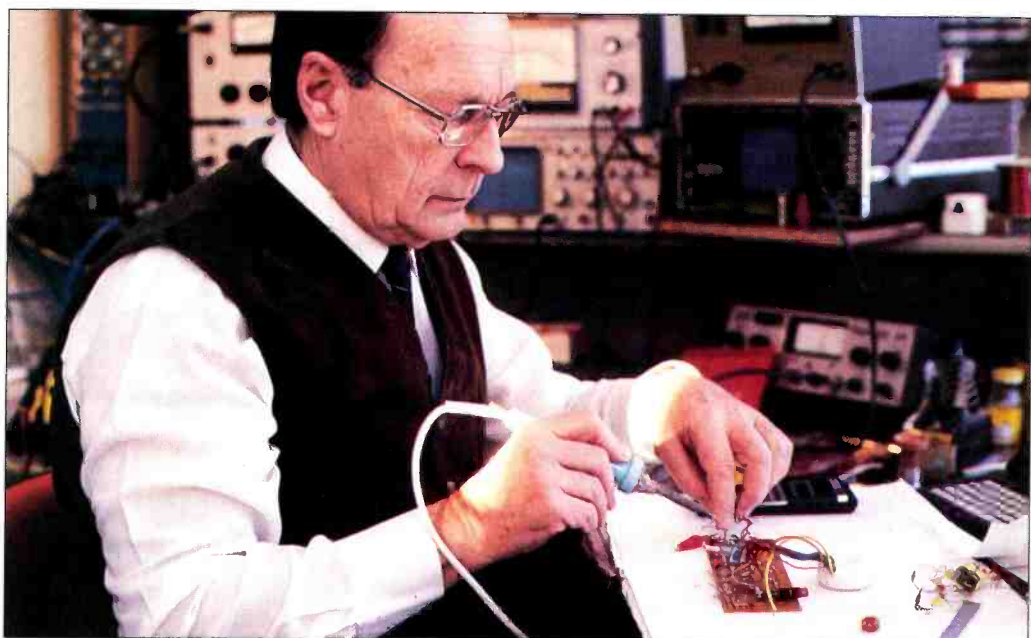
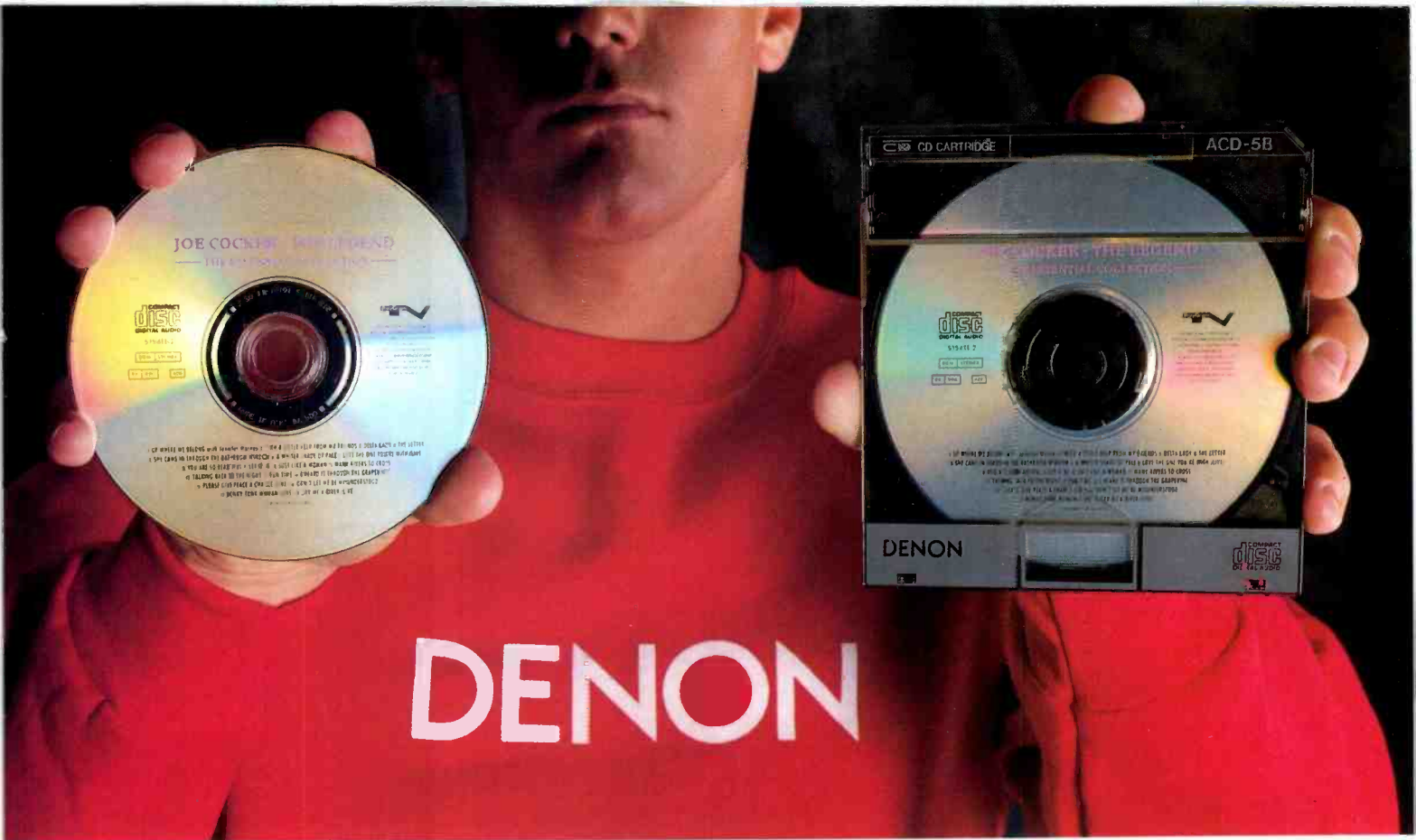


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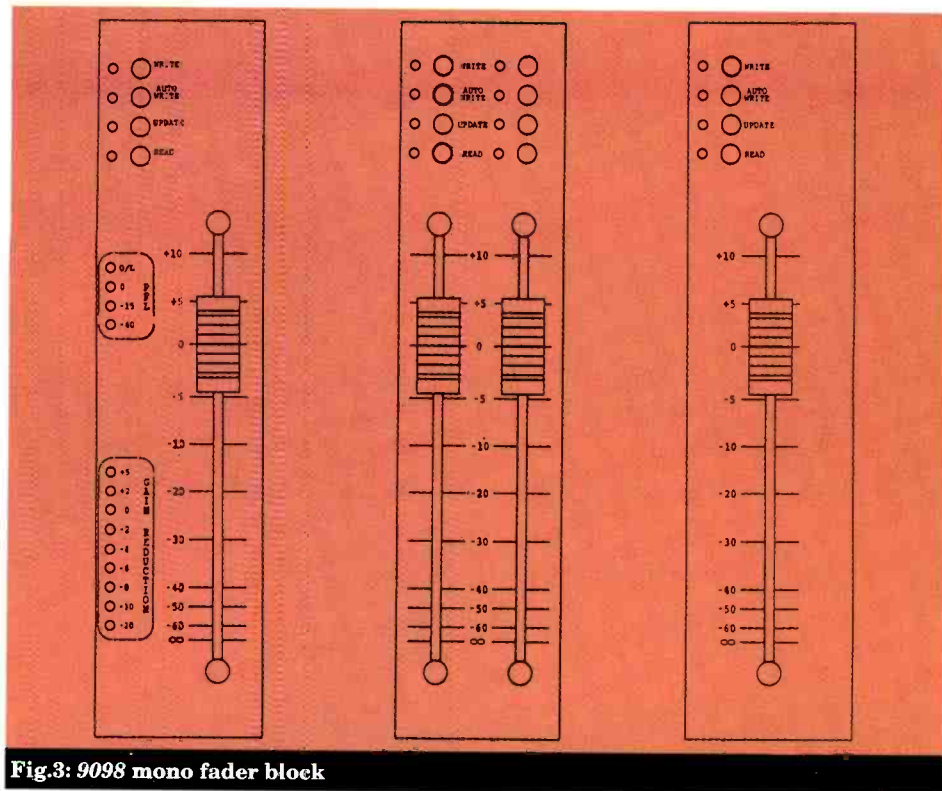


Fig. 3: 9098 mono fader block

8078 et al?

There is a similarity in the nature of the sound. I've tried to get the same solid, reliable feel from the 9098. I did it with the *Medici* equaliser and listening to the first modules of the 9098 they are in advance of the sound of the *Medici*. It's very satisfying indeed.

It's down to exceptionally low noise, exceptionally low distortion, no crossover distortion—I'm using a biasing system on the main path ICs which puts them into a quasi Class A mode. We're talking of overall distortion on any one circuit block which is way down in the 0.0003% total and that's only second and third harmonic, there is nothing above that.

The other thing is the EQ curves and shapes; a lot of work went into confirming some of the things I've done before and improving them. Making the

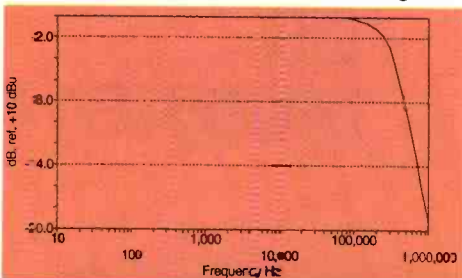


Fig. 1: 9098 transformer output stage. Frequency response

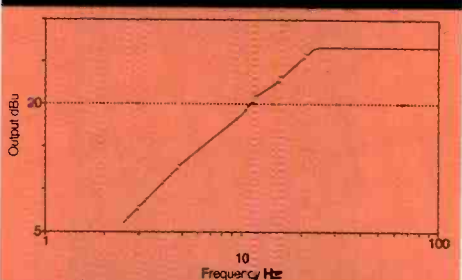


Fig. 2: 9098 transformer line output stages. Maximum output at low frequencies

curves even more like I thought they ought to be and making sure things that had happened by accident 20 or more years ago and were acclaimed were now built in.

Are the SHEEN and GLOW buttons on the EQ section injectors of selected harmonic distortion as on the *Medici* EQ?

No. The *Medici* WARMTH control introduces quite large amounts of second harmonic, about two percent. I was asked by some users to increase this value because they couldn't hear it and we went to around six percent before some people were aware that something was happening. If second harmonic isn't particularly audible, it explains a few things and also raises some mysteries.

What does it explain?

It explains why things like loudspeakers don't sound as bad as they should when you look at the distortion.

Provided second harmonic is present in reasonably small quantities it's quite benign, it also perhaps tells us a bit about old valve amps. If you go back to pre-push-pull days the triode valve was a wonderful generator of second harmonic. There are other ways of getting that but if you do it people don't like it because it hasn't got the charisma of glowing elements and iron mongery.

The *Medici* SHEEN control changed the rate of change of the slope of the EQ curve. People had said to me that some of my old equalisers had a particular sound to them and I discovered that some of the modules went out without the steep top end curves that we used to give them—and I more or less reproduced this in the SHEEN control.

The 9098 GLOW is a mirror image of the SHEEN for bottom end. Instead of the curves being steep 6db/octave slopes shelving or peaking they become much gentler between 3-4dB/octave.

How much of Graham Langley's work (an Amek designer) is in the 9098?

The audio path is mine alone, but Graham is a fantastically good designer and he and I work together well. I've had a lot of practical suggestions from him such as if I used two ICs and he could see a way of using one. As far as the console automation and the system is concerned there is ▶

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**Rupert Neve and codesigner Graham Langley**

a lot of Graham in that.'

Is the equaliser better than anything you've ever done before?

'I like the sound of it better than anything I've done before. It is both powerful and sweet. I think this is to do with it effectively working in Class A and that I've been extremely careful with the noise. It's not particularly different to the Focusrite or indeed the famous AIR consoles that I did back in 1978 for George Martin.'

Presumably the switched HF and LF frequency controls give reproducible and controllable curves?

'I would agree with that but to be honest you can actually get quite close setability with a continuous pot. But it's traditional and it's the sort of thing people expect of me. This console will be the last time I will use these switches because they're £20 each while a pot would be £1.50. We made the decision to go for a switch because I was leaning over backwards to not become too Amek-ised and

they were leaning over backwards to not depart too much from my tradition.'

You've included a selectable notch on the mids.

'That's a nice bit of spir-off, though I say it myself. The mid-band Q is increased when you push that button in—if the level is at the mid point, which would normally read flat, that now becomes a 6dB dip and if you want to get to fully flat you turn it fully clockwise. Anticlockwise movement gives an increasing dip. You can get down to about 30 null in the extreme with only about 10Hz between the 3dB points at the shoulders.'

Are the frequencies ranges similar to your previous designs?

'Yes. They're odd-ball frequencies which are an age-old compromise with origins back in the 1950s when I was asked to do specific things like lift guitar out of a mix when there was no multitrack.'

You've gone for a bell-shelf switch on the LF but

use a pot on HF.

'It goes from bell to shelf giving a graduation. Boosting on a peak, as you move the pot towards the shelf the right-hand side of the bell swings its arm up and that makes some difference to the harmonic content of the signal.'

But the top frequency is 22kHz.

'I was asked for even higher. It's still a mystery, but a lot of respected people have asked for curves that peak at well outside the audio band. One of the things we've had to accept is that people can perceive those frequencies—there's the well-documented story of Geoff Emerick detecting 3dB at 54kHz on an odd channel of a Neve at AIR.'

How do you feel about putting the VCAs of Virtual Dynamics into a 200kHz bandwidth desk?

'The VCAs are the same as everybody else's.

They produce more noise than I want, they do not produce more distortion—only a bit of second and a tiny trace of third. Its bandwidth is perfectly good to 100kHz but it's not inserted unless you put it in circuit. As you're wanting to mutilate your signal—you're going for fast rise times and controlled decay times—by definition you're changing the shape of the waveform and you're generating distortion so in practice it doesn't matter.'

Many are hailing the 9098 as the last great analogue console, what is your opinion?

'All I can say is that I hope so! I think this will be the last word in analogue using this sort of technology.' ■

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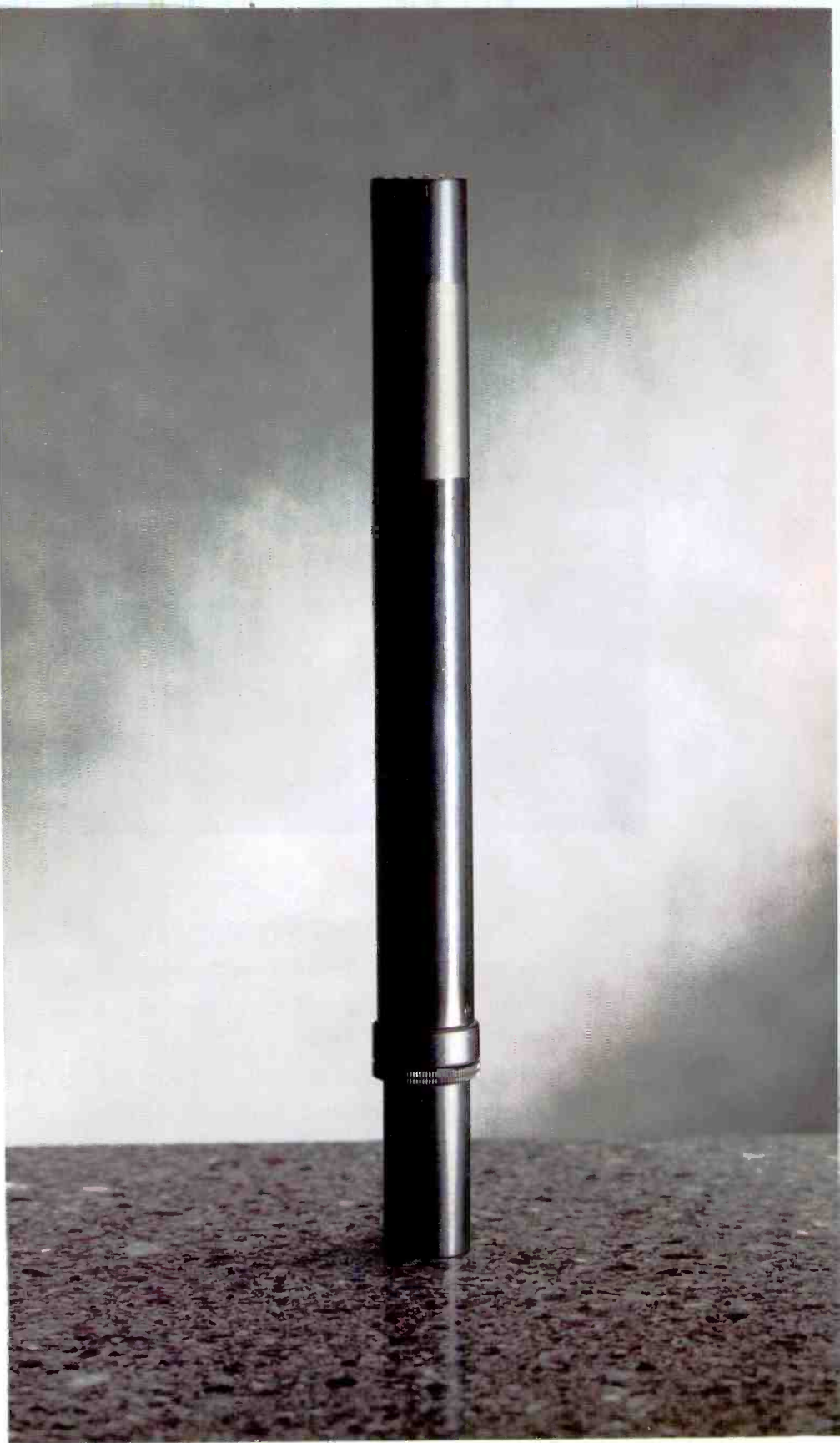
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# ROOM TO ZOOM



A two-handed approach is needed for the 9200

**Z**oom's new flagship effects processor is an all-out assault on the serious end of the market. The admittedly large price tag the unit carries is easier to justify when you consider that the 9200 can represent up to four totally independent mono processors or various stereo configurations—this also accounts for the presence of four XLR ins and four XLR outs on the back panel.

Physically, the 9200 is a very handsome box (like most Zoom units) and comes with a card slot to facilitate saving 99 additional user programs. A cluster of eight buttons deal with the business of getting in, out and around menus, plus access to the Utilities section for MIDI and other setup procedures. Visual feedback is delivered by a large LCD and an LED program number read-out and, as the unit resides in a type of Play mode when not being edited, patch selection comes courtesy of a dial or the dial followed by a press of the EXECUTE button. The 9200 supports MIDI commands appropriate to an effects unit.

The front panel picture is completed by an architecture, or program structure, display. The four inputs and outputs can be assembled into four architectures that encompass three different effect categories—A, B and C—which correspond to different degrees of complexity. Architecture 1 is effectively the 9200's best shot at an all-out stereo-in stereo-out processor with access to the most intricate effect categories; Architecture 2 yields twin stereo in and outs; Architecture 3 gives a stereo and two monos while Architecture 4 transforms the device into four mono processors.

## Editing

With 99 factory presets and an equal number of user programs, the effect blocks slotted into the chosen architecture can additionally be dropped into series or parallel

configuration. Input attenuation for a given channel is controlled within software by pressing one of the four input buttons above the related LED bargraph input displays on the left-hand side of the front panel and spinning that dial. Surprise—these same input selector buttons are also used to select parameters for adjustment via the dial in Edit mode.

A quick look at the geography of the 9200 front panel in the photo and you've guessed it—Zoom expect you to use both hands when fiddling with this thing. This is perhaps the single biggest oversight on the unit, because the two areas of maximum activity are at opposite extremes of the rackmount. It took the 9200 to make me realise that I tweak my outboard with one hand and even my best attempts at continuing this tradition yielded unsatisfactory results. Accuracy is the first thing that goes, aggravated by the time it takes to move your hand 15 inches between adjustments and the fact that you also have to scroll through pages using the Edit UP and DOWN buttons.

Eventually you swear, turn around in the chair and face the unit head on. One hand on the left of it the other on the dial and, for a while, your whole life revolves around this pretty box until you get what you want.

Having extolled the virtues of Zoom ergonomics, a £1500 plus unit with this sort of shortcoming is an embarrassment. It is all the more unfortunate because the 9200 is one of the finest-sounding boxes I have ever heard. And once you literally get to grips with the way Zoom expect you to Edit, then the product is satisfying and immensely powerful.

Up to four of an effect's parameters are displayed at once (the SELECT button accesses the different effect types) and selected for adjustment by dial, which can be assigned increasing degrees of coarseness by the DIAL button, via the aforementioned input-function buttons. The level of editing

available, particularly in the most sophisticated C category effects, is considerable and instantly gratifying—once you have got the hang of the two-handed routine—and I did not have a problem with the way parameters are organised.

## Sonics

The three effect categories contain modulation, delay, pitch shifting, EQ, early reflection and reverb blocks in varying incarnations and complexities. Wherever stereo becomes an issue, the 9200 does a marvellous job of keeping things solid and intact. Of special interest is the ability to insert what is effectively a crossover between layered reverbs which translates into the paring-off a spectral segment of the signal and endowing it with completely different ballistics. Thus a controlled and short reverb time can be made to sing and open up on the highs by employing a 'Hi-multiply' parameter which can as much as quadruple the reverb time on a frequency selective basis. If you can imagine this, then you will probably be able to find a use for it. EQ also deserves mention and ranges from in-built reverb equalisation to a stand-alone 3-band sweepable affair.

You would not expect the modulation effects from the top-of-the-range Zoom unit to be anything but exemplary given its track record further down the market. The 9200 takes chorus in particular onto another level with an incredible degree of controllability and a practically 'seamless' character. Phasers are presented from traditional boxiness right though to what can only be described as an advanced stereo form. But it is reverb that this ▶

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Zenon Schoepe zooms in on two signal processors from the Zoom Corporation

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box is all about, and in this area the Zoom is up there with the greats. Listening to the processed signal in isolation becomes a pleasure and so believable.

There is an intelligence to the algorithms that spares any cheap feedback tricks even at the longest reverb times. The coherence is such that you can throw whatever you like at it and while it gets on with the business of creating the room you can decide whether it is the right program. Its incredibly unfussy and this is basically what a modern reverb processor ought to be doing for you.

It is difficult to make the reverbs sound naff basically because their fundamental characters are so pleasant and wholesome. Even A and B category reverbs are excellent but admittedly do not have the intricacy of the C category types which are quite simply of the highest calibre. B category early reflections are worthy of special mention for their variety and programmability. This box has all the modern top-end sheen that you could want and it is controllable at source.

Perhaps I have not made enough of the fact that there are up to four channels of processing on tap here, so providing you have got your patch sorted and you understand your Zoom architectures, you are laughing. There is still a place for mono effects so its 4-in, 4-out structure is valid while the dual stereo mode with extremely respectable performance puts the not inconsiderable price tag into perspective. It is not a multieffects unit in the accepted sense but many still prefer to run separates anyway.

The way this device operates in Edit mode will be an insurmountable problem for those who are unwilling to adjust to the requirement of using both hands to get around the 9200 quickly. However, do not let this put you off. Get to hear

some CDs played through it before you condemn it and feel that quality. The 9200 is an outstanding reverb processor that is marred by a certain operational quirkiness but on balance this is wiped out by its sheer sonic elegance.

## 9120

The 9120 is Zoom's entry-level rackmount studio processor. It assumes this role without so much as nod to the guitarists that have become the company's core audience. The 9120 is also something of a distillation of Zoom ideas with regard to front panel controls and unit operation.

Patches are stored in 99 locations and consist of ten fundamental effect types selected from a ten-position pot with LEDs corresponding to hall, room, plate, gate and early reflection reverbs, chorus delay and pitch shifting plus two special effects categories. Subdivisions within these types are accessed through the editing process to add to the device's reverb characters, for example.

Central to all affairs is a large LCD which interacts with three soft continuous controller pots to its right and a PAGE button that scrolls through up to three pages of program parameters. Parameter values in threes are displayed numerically and their corresponding soft pot's position is approximated on a circular zone on the LCD. Unless you take the time to clock a numerical value before you twiddle its pot, the knob's continuous nature is likely to change it radically—care is advisable.

This aside, operationally the unit is child's play; Zoom have got this business well and truly sorted now. It is good to encounter real knobs for input, output and balance controlling the rear panel jacks for a change and its admirable that the

device is effectively always in Edit mode and has a straightforward store procedure. Patches are recalled with up-down increment buttons or by MIDI command (Zoom-style patch mapping is also implemented) and real-time control is administered via MIDI or foot controller.

Points of note include the 9120's quiet operation and simple but effective delay time calculator which converts bpm to ms with transferral of this value to the delay setting. The front panel TRIGGER button or a footswitch can also be used to tap enter delay time.

There is a stunning sweep flanger that just goes on and on and is available in five flavours, and the chorus patches are to Zoom's usual high standard. Meanwhile, I found the gate very difficult to set with precision and repeatability. Plate reverbs are convincing, but in general I found the reverbs lacklustre and the early reflections none too sparkling. They are passable approximations of reality but are too dim and dark to make them true all-rounders. And there is not a great deal that can be done about this with the rather limited editing offered.

In summary the 9120 impresses as a very fast multieffects unit that could be pressed into service wherever results are required quickly. Its considerable talents, especially in terms of modulation effects and its quietness, would be a handy supplement to more heavyweight devices. ■

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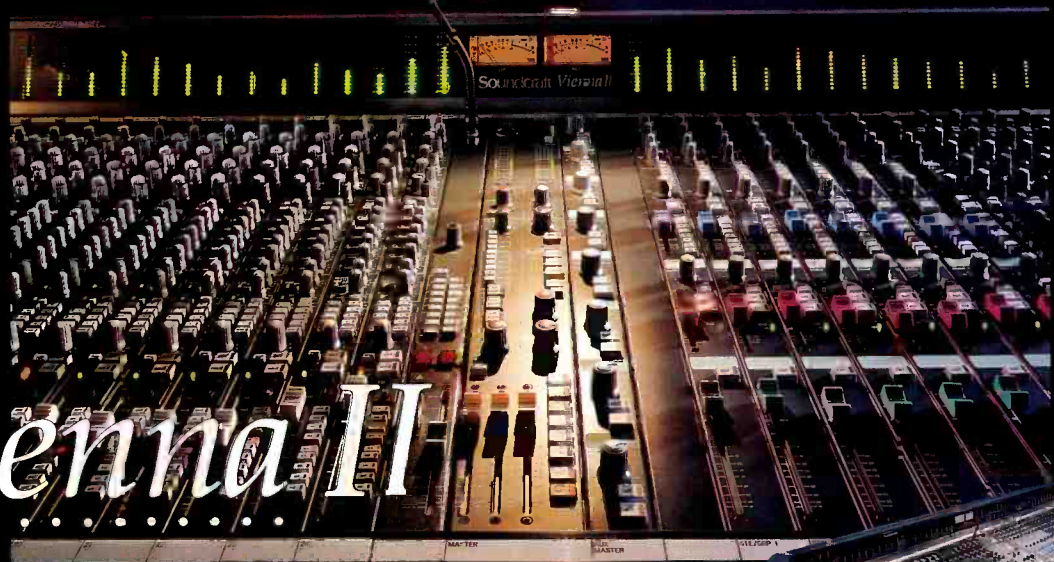
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in-line inserts by designing equal channel and mix paths per module; to significantly reduce console size and streamline operation by digitally

automation functions and master status switching for a variety of console functions. The Analogue Master governs

## Otari Concept 1

(buses 7-8 and 9-10 being individually selectable). The dual concentrics provide four mono and two stereo sends, with Sends 3 and 4 having access to the multitrack routing matrix. Channel and mix sections are identical apart from their input source stages (Mic-Line or Group-Tape), and the absence of phase reversal in the mix path.

The Input module is assigned to the Digital module in one of two ways, either from a large SELECT key positioned between channel and mix sections, or by AUTO SELECT which will attach a module once any of its digitally controlled buttons are locally activated.

The central control area is perhaps the most eye catching part of the console, being laid out in block diagram form. There are seven sections dealing with various aspects of signal flow for both paths, and to make identification easier, the same colour labelling that exists in the Input module is used: channel functions in green, mix functions in purple. Each section contains flush-mounted function buttons with inset LEDs, which are placed in direct relationship with the block diagram layouts. This arrangement serves the double purpose of clarifying operation, and providing a detailed view of module configuration in a single intuitive display.

Certain keys are duplicated between the Input module and Digital module, such as EQ IN-OUT and automation buttons, and can be accessed from either area. Module switching functions under digital control are as follows:

Input Select (Mic-Line, Group-Tape), Input Reverse, Phase Reverse (channel path only), EQ In-Out, Auxiliary Send (On-Off, Chan-Mix, Pre-post, Routing), Fader Flip, VCA Bypass, Mute, Solo Safe, *Diskmix* Status, 24 Track Assign (either direct from channel or mix, or via bus pairs from Channel, Mix or Aux 3-4), Stereo Bus Assignment (from Channel and-or Mix).

Once a module has been configured or edited, it may be copied to another module, group of modules, or the whole desk. Setups can also be stored as user presets, and the console is supplied with factory presets for Record, Mix, Overdub, and Broadcast modes which can all be modified by the user. Unlimited numbers of presets are available being stored in banks of 12 to the console's hard disk—personalised presets can be transferred to floppy as backup, or to set another *Concept 1*. Globally setting a status preset, such as Overdub, to the control surface is a simple three-button operation: PRESET(OVERDUB)-COPY TO MODULE-ALL. There are also three user-definable module groups, for fast sectional configuration of the console.

The last module configuration is always saved and can be recalled by selecting Swap Last State; this is a useful facility if, for example, a configuration has been copied to the wrong module which will then require reinstatement. Additionally all changes made to a module can be systematically undone stage by stage.

Each Input Module contains two programmable soft keys—S1 and S2. These may be used to set or toggle one or a group of digitally controlled switches within the module by a single key press. Soft keys also appear on the master section of the console where they operate globally.

Also set from the Digital module are solo and metering modes. The console offers three solo modes—AFL, PFL, and SIP—which are path selectable and can function as additive, interlock or temporary. Solo Clear and Defeat (toggles on-off all AFL-PFL selections) are included.

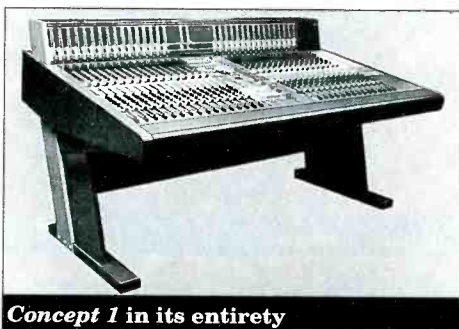
All console bargraphs are VU-Peak selectable with a Maximum Hold facility available for each. The module meters are switchable between the

channel path, mix path, the tape return and the group output. These 24-segment bargraphs are also used for another important function—track routing indication. By selecting the TRACK ASSIGN key, the meters will briefly stop displaying levels, and show bus assignment with each lit LED segment representing an assigned group—a double press of the TRACK ASSIGN key will cause the display to lock-on. To backup this facility, an Assignment LED at the base of the meter will light once track selection has been made, thus providing permanent confirmation of routing.

A separate LED module status display is positioned under each meter which shows all the switchable information not displayed on the Input module itself (apart from phase reverse). By referring to this and the other local function indicators, the operator can extract the majority of module configuration information without further console interrogation.

Source for the control room monitor, studio speakers, and cue-effects output are individually selected from two groups of buttons (MONITOR SELECT A and B). Each have 12 identical source buttons for the stereo mix, external machines, and the ten paired aux buses, which can all be summed.

Control room monitoring is divided into nearfield and main sections. Both sets of speakers can function independently having separate on-off switches and level controls. The nearfield level can also be selected to operate pre or post the main level control. Two TALKBACK buttons are provided:



**Concept 1 in its entirety**

one connects the built-in electret mic to Slate, the other opens the mic to Slate, Studio, Aux and Cue-Effect simultaneously with individual talkback gain control and on-off switching.

## Automation

The console is fitted with two types of automation as standard—Otari's *Diskmix* system governing all faders and their mutes, plus a snapshot system for all faders and digital switches.

Snapshots are stored in banks of 99 to hard disk and can be recalled within one frame. User-definable crossfades can be set up to 'ease-in' fader settings, and a Mask facility is included to block-out specified data—this could be certain switches in a module (Module Mask), or entire modules and global functions (Console Mask). As a safety feature, a current desk-wide snapshot is always stored in nonvolatile RAM to allow last state recall.

The snapshot system also supports MIDI, so that when a snapshot is recalled an associated MIDI Program Change message will be output through the console's MIDI port. In the same way the console will accept Program Change messages to allow external recall of snapshots; by linking the console to a sequencer, MIDI controlled snapshot automation is possible.

*Diskmix* controls faders and mutes on both channel and mix paths as well as the main stereo

bus fader. The system also has an event controller that will trigger module or console snapshots along with MIDI and GPI events.

*Diskmix* operates with a mixture of local controls, central master controls and screen-based commands which are accessed via a built-in trackball. A high-resolution video display shows bargraph levels and status for all paths, with a separate screen showing stereo master fader information; snapshots and various other console functions are also displayed from the screen. Full off-line facilities have been implemented including Fader Trim and Set, Mute Trim, Mix Merge, Mix Copy, Insert Time, Delete Time, Write Zone, Extend Mix and so on.

A VCA grouping facility is provided that can operate independently of the dynamic automation, and faders can be designated as slaves, masters or grand master. As mentioned a VCA bypass facility is included, which in the standard console will entirely disconnect the fader and pass the signal at unity gain. This is not always ideal, and so a Penny & Giles fader option is available that will retain manual control during VCA bypass.

*Concept 1* includes an autocalibration system that Otari have called *CompuCal*, which automatically aligns VCAs and meters. Another console feature is extensive self-diagnostics.

## Future options

Four main options will be available for *Concept 1* in the near future. The first is a moving fader option for *Diskmix* operating on both channel and mix faders. Audio will remain routed through the VCA and all other *Diskmix* functions remain unchanged.

Two stereo modules will be offered—a stereo input module and stereo submaster output module. The stereo module features two stereo inputs which can be routed directly to the stereo mix bus or to the multitrack buses. The *Concept 1* standard equaliser becomes fully stereo with the addition of a swept high-low pass filters section. The Stereo Output module derives its input from the multitrack buses and is equipped with the same equaliser as the Stereo Input module. Its output is either to the mix bus and-or an additional stereo Main output, providing mix-mix minus sends, or extra stereo feeds for tape, satellite, video truck lines and so on. Both stereo modules will be controllable from the central Digital module, and the Stereo Input module will be fully automated.

The fourth option is a screen-based virtual dynamics package, offering limiting, compression, gating and expansion for one signal path on each input module.

## Conclusion

Otari's *Concept 1* is an intriguing mix of traditional design and digital control technology. Much effort has gone into maximising facilities while shrinking the control surface, but without losing the operator in the process. The desk has the potential to suit many different ways of working and can be operated at varying degrees of complexity—although it is as well not to be over ambitious to begin with. As Otari themselves say, this is not a console you will get bored with. The all-American *Concept 1* offers extremely good value for money, and is a welcome newcomer to the mid-priced console market. ■

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**F**rance has a long and illustrious tradition in cinema film—indeed, its film industry remains among Europe's most active and prolific. Critically-acclaimed French film releases score regularly on the international circuit, in a manner that must be a cause of some envy to countries with film industries that are, perhaps, most kindly described as 'under siege'.

However, film is an area of audio production that is widely regarded as remaining relatively firmly ensconced in traditional methods. It is, therefore, surprising to discover a modern technology-based facility like COPRA lurking in Paris. The use of the word facility is somewhat misleading when used in the context of COPRA, for it is actually a good old-fashioned co-operative, created by like-minded individuals to serve the purposes of their trade in the creation of film sound—in fact, it is refreshing to see such laudable principles being upheld and made to work in these times.

COPRA has amassed a wealth of experience at its premises in the Boulogne suburb of the French capital and assembled the biggest collection of SSL *ScreenSounds* in Europe. Period. It has also become very committed to the SSL approach to digital technology, and, with the installation of a *Scenaria* in January, it became one of the first facilities in Europe to offer the company's digital mixer, hard disk recorder-editor and random access picture package.

*ScreenSound* has enjoyed significant success in the US but strangely has failed to match this performance in Europe, an observation that COPRA MD Alain Lachassagne explains with reference to the health of the respective film industries.

'I have to say that there is no correlation between the sort of money involved in films in America and in France, it's just not the same,' he comments. 'In France people are more accustomed to working with individual digital systems like the Akai *DD1000* and *Pro Tools* but these machines, while adequate, are not really ideal for editing film sound on.'

COPRA's move is therefore as bold as it is far-sighted, but this is a common thread in the co-op's activities and history. Its premises were originally hired in 1971 but a fire created an opportunity to buy the land and commission a purpose-built complex which in honesty is beginning to look rather cramped.

'In the beginning it started as a group of location recordists, and together we bought and rented equipment that we needed,' explains Lachassagne. 'We needed to be able to perform high quality transfers in first mono and later stereo, and we developed our own sound effects library. As there were ten of us, we had the opportunity to create a very rich collection of sounds from the variety of films we had worked on.'

The ability to create original sound effects was added as a natural extension of the library, and as the years passed, COPRA started to look towards ways of editing and compiling sounds for soundtracks which culminated in the *ScreenSound*

# FRENCH ART



direction. The organisation is now involved with around 30 freelance sound professionals who turn to COPRA to use its facilities. 'It started as a co-operative and it has remained one. It's the only one in the field of films in France,' adds Lachassagne.

'We started to look seriously at digital editors about three years ago and investigated the AMS *AudioFile* and SSL *ScreenSound*. Most of the time we are involved with film and we felt that *AudioFile* was more video orientated,' he says.

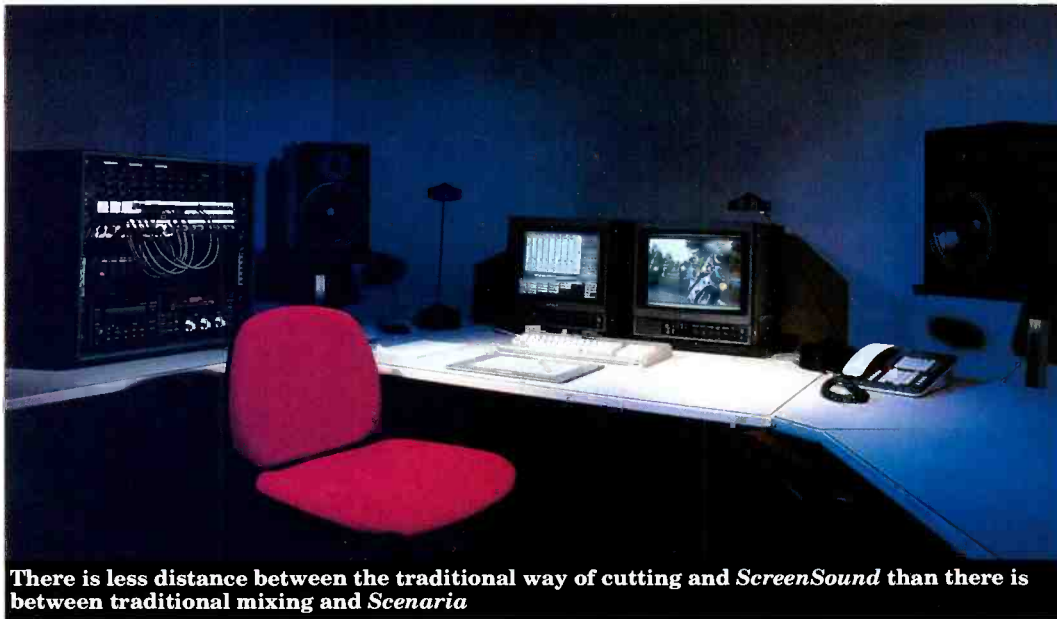
A *ScreenSound* was acquired on test and the high level of interest and positive response from COPRA sound editors caused the first system to be installed in July 1991. It was used on commercials and film sequences before a four-month job on the American cartoon series *Doug* tied the system up and necessitated the need for another if COPRA wanted to be seen to be promoting its new technology.

'We realised that the way to make the system catch on was to get it used,' explains Lachassagne. 'Again, we organised meetings with the users and gave training courses to allow them to ▶

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Zenon Schoepe visits a postproduction facility in Paris and discovers the largest collection of SSL *ScreenSounds* to be found in Europe

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**There is less distance between the traditional way of cutting and *ScreenSound* than there is between traditional mixing and *Scenaria***

become familiar with it. The result was that some of these sound editors were then in a position where they could suggest the use of *ScreenSound* on a film production.'

The approach quite obviously worked because two more *ScreenSounds* had to be bought to handle the work load—two installed at COPRA and two mobile systems to fit in with the on-site requirements of film production companies.

'Two things are important about the philosophy of *ScreenSound*,' observes Lachassagne. 'First, the way editing is performed is very near in principle to the traditional way of cutting the interface is simple—and the second is the network. With many rooms at COPRA for transfer, the sound library, editing, and autoconforming, *SoundNet* allows a very economical use of our resources and equipment for any situation. We can, for example, have two editors working on sounds simultaneously if that's what we need.'

He agrees that the *Scenaria* adds to the value of COPRA's sound chain, 'Using *Scenaria* without *ScreenSound* doesn't make sense,' but adds that the same cautious approach was taken with its adoption as was taken with *ScreenSound*. Time has been invested in introductions to the system for operators. 'Two engineers who are used to mixing on traditional desks have learnt the system.

'They have been astonished,' he observes. 'However, it has become apparent that there is less distance between the traditional way of cutting and *ScreenSound* than there is between traditional mixing and *Scenaria*.

'When you spend money on equipment such as this there is always a quiet period to let people get accustomed to it—because it is new technology, after all,' he says.

'*Scenaria* also represents a new area of activity for COPRA so it all takes time. It takes time for the right people to learn that we have such a system and we have actively to create our new clients to show them the benefits of these new tools. It's important to remember that in the production company's mind they still think that virtual editing is more expensive and they have to be persuaded that this in fact is not the case.'

Lachassagne states that COPRA's work load currently stands at around 80% film and 20% TV, but he is confident that in the months to come the ratio will alter to

a half-and-half split with the increased work that will be attracted through the *Scenaria*. TV productions are COPRA's targeted area of expansion as a response, in part, to market forces. 'There is now less work in cinema films these days while television film production is increasing,' Lachassagne explains. 'The big difference between cinema and television is that in cinema freelancers are always used, while in television films the producers are looking for a package and they appreciate new technology better than they do in cinema.'

He adds that there is a move in TV films back towards 35mm picture because of its concern for HDTV; 'As it stands *Scenaria* is not very suitable for doing cinema films but it is very good for handling TV films and commercials, which is what it will be used for. With a lot of luck and a lot of

money, the logical thing would be to follow through our ideas about equipment to something like the SSL *Omnimix* which would give us the ability to mix to a number of different formats.'

He points out, however, that space is restricted at COPRA HQ, and that all this talk about new technology cannot detract from the fundamentals of sound production. 'The sound mixer undoubtedly appreciates the editing facilities available on a hard disk system but the most important point is that he's working digitally and that there is no degradation,' summarises Lachassagne. 'But that in itself does not constitute quality. Quality is created by the operators—the sound editors and the mixer. In the traditional way of working the sound at the end is never as good as what you start with whereas now if the original sound is good then at least there is a chance that it will remain so. And that is down to the skill of the people involved.' ■

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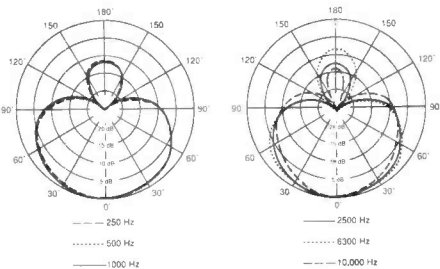


**'There is now less work in cinema films while television film production is increasing.'**



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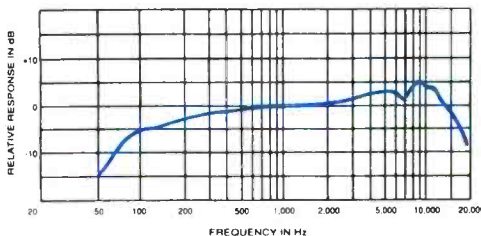
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# DIGITAL AUDIO INTERCHANGE CONFERENCE

The opening session of this year's UK AES conference, appropriately termed *Review Session*, provided an insight into current approaches and operational requirements for programme interchange, networking and storage media. **Francis Rumsey (Surrey University)** introduced the three key areas of digital programme interchange as recording formats and physical media, real time point-to-point interfaces, and computer networks. Rumsey explained how it was vital to consider each of these areas separately to establish the need for standards.

**Paul Lawrence (Rothwell Group)** examined the use of computer networks and explored the differences between a dedicated digital audio link and a connection over a network. With a dedicated link, the bandwidth is sufficient for real time transfer (normally 75kBytes per second per channel); audio is transferred as a single stream and the time taken for the transfer depends on the track duration. With a computer network however, data can only be transferred as soon as possible, with a maximum transfer speed dependent on the computer's network interface. Hence computer networks cannot guarantee real-time transfer of digital audio. In addition, a computer network interface must be able to split and reassemble the signal, and sending and receiving computers need to be able to decode a common interchange format. Lawrence went on to explain the Open Systems Interconnect (OSI) Seven Layer Model and network topologies and components [see sidebars]. He concluded by emphasising the use of networks for transmitting data between nodes but not for replacing direct links in studios, and that transfer in a specified time over a computer network is never likely to be possible.

**John Watkinson (Watkinson International Communications)** discussed the considerations involved in using physical storage media for interchange. For interchange between media, standardisation of physical size and layout, magnetic-optical parameters, file structure, channel coding, error correction, sampling rate, word length and data reduction would be necessary. Watkinson pointed out that standard interfaces may be more important than media compatibility. He also suggested that standardisation of working-editing media was not likely or desirable, but that there may be a need for a standard basic medium for interchange purposes. However, standardisation of protocols and recording structures on the media was a practical goal. Watkinson added that since generic computer hardware was becoming cheaper, professional

dedicated audio equipment was no longer always viable and 'according to Shannon's Theory, a bit does not know if it's professional or not!'

**John Emmett (Thames Television)** chaired a panel discussion of users and manufacturers under the theme *The View from Here*. **Andrew Hingley (Sony Broadcast International)** looked at the quality requirements of different applications. **Serge de Jaham (Studer Digitec)** explained how a typical digital audio system currently uses a dedicated audio network which is often only point-to-point, and a control and data network using standard computer hardware and software. He described how new networking technologies will provide high-speed transfer of high-quality audio, be capable of handling multimedia and mixed data types-formats, and will use open standards which will make them more adaptable and cost efficient. He concluded that these new networks will have an impact on the whole system organisation and functionality.

**Bill Foster** described how the issue of programme interchange would be easier if sampling rates and word length were standardised and commented on how the concept of a central machine room with access around the facility was alien in the recording industry, and that record companies want everything now, making fast access to material essential.

**Nick Butt (formerly TV-am)**, explained how he was given the task of finding replacements for cart machines for live radio. After appraising suitable options, a system based on PC hardware and storage, with *PCX3* audio cards and software from Digigram UK was chosen for flexibility. A broadcast quality reporter's phone-in system was included and networking the systems was an obvious progression. The *PCX3* cards used Musicam 4:1 compression, so a simplified view of the audio coding was analogue-Musicam-analogue-Nicam 728-analogue. Butt pointed out that the double decompression process was never perceived to degrade sonic quality. In conclusion, he claimed to have been able to replace tape-cart media with a networked hard disk system without fuss and at comparable cost to current tape systems.

The discussion settled on applications, limitations and coding schemes for data compression. The *View from Here* was to use compression and exploit networking, or to process off-line. However, for mass storage, compression could be a temporary issue, since storage capacities of media are bound to increase and prices decrease. Equipment turnover and how the timescales for replacement no longer provided value for money was also raised, and that the time taken by some

broadcasters to evaluate new equipment meant it would be out of date by the time they ordered. It was pointed out that equipment was only really obsolete when it no longer performed the job required and that companies such as Decca, solved this problem by making their own equipment. Unfortunately, broadcasters no longer have the engineering personnel to be able to do this. Other subjects discussed included mass storage and handling of libraries and archive material, the need for routing and networking of data in addition to audio.

**David Ward (Pro-Bel)** presented the first paper in a session entitled *The All-Digital Broadcast System*. He highlighted some of the requirements when designing digital audio systems using the AES-EBU digital audio interface standards. Considerations for signal routing included numbers of sources and destinations, the need for bitstream continuity and silent switching (on-air), whether inputs are synchronous or asynchronous, the ability to handle inputs with different sampling rates or formats and economics. He concluded that there have now been enough large scale installations, including BBC Television and Thames, for organisations to be confident that using the AES-EBU interface is a reliable way of satisfying the demand for higher audio quality.

**Steve Lyman (CBC)** described how two experimental audio production studios were built to gain experience with digital tools and their effect on production techniques and studio construction. The TV sound suite in Montreal has a Lexicon *Opus* while the radio production suite in Toronto has an *AMS AudioFile* and two Yamaha *DMP7D* consoles (now replaced by a *Logic 1*). The tool which made 'going digital' worthwhile was the random access recorder with nondestructive editing. As a result, the total time required for ►

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This year's UK AES conference was as popular as it was topical and addressed many aspects of digital audio. Stella Plumbridge reports

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most programmes dropped by 30%–50%, although in some cases production time remained the same but quality improved. Lyman pointed out that all digital equipment in a studio needs to be locked to a digital audio reference signal (DARS) to solve sync problems. Furthermore DARS generators are now available and manufacturers are beginning to include a DARS input on equipment.

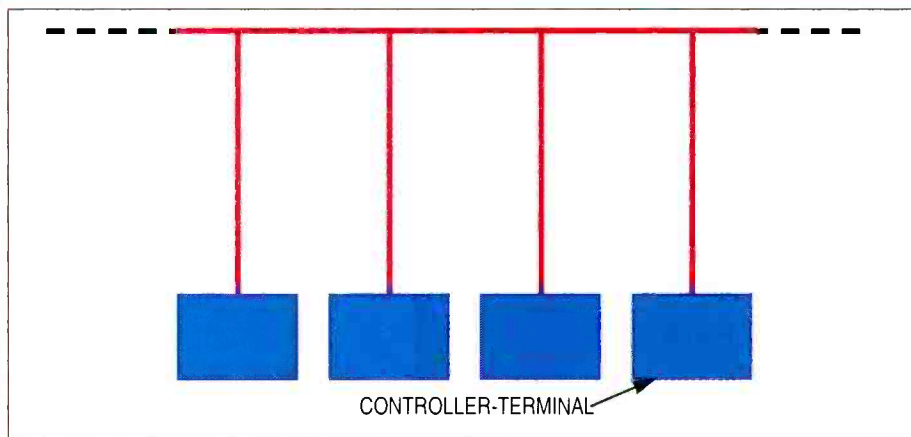
**Nick Cutmore (BBC Development Group)** described the development of a distribution system based on the Multichannel Audio Digital Interface (MADI) and optical fibres, concluding that the routers developed using the format have provided excellent switching element density at reasonable cost, and further developments include interfaces for nonaudio signals.

**Bernhard Grill (Fraunhofer Institute)** described the coding structure of ISO-MPEG Audio Layer 3 and its performance. Grill claimed that Layer 3 provided good sound quality even at 60–64kbit/s, so allowing a point-to-point stereo link using ISDN lines to be easily established. Applications for this include using digital phone lines as a commentary link to the broadcasting studio.

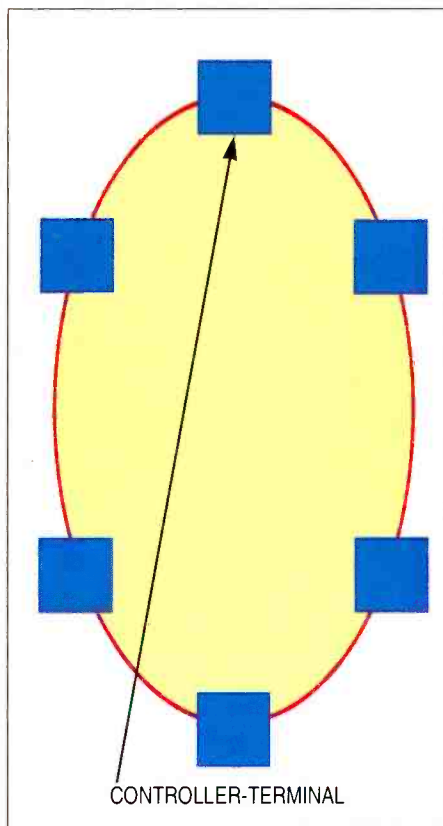
**Dave Gooding (BBC World Service) and Jeff Cohen (BBC News and Current Affairs)** presented their experience of digital transmission and news applications using telephone networks. In 1986 a 64kbit/s circuit with G.722 coding (the most widely used CCITT standard for transmission giving a bandwidth of 7kHz) was used to distribute the World Service English language programme for rebroadcast in Australia. Despite initial problems with synchronisation, the circuit is still in use. In 1990 the World Service Japanese Section tested the exchange of audio contributions via Integrated Services Digital Network (ISDN) again using G.722 coding. Results showed that exchange of 7kHz audio was practical and simple. Musicam was first used in 1991 to broadcast *Last Night of the Proms* to NPR in Washington; tests showed that a clarinet solo had undesirable artifacts, and clapping and background noises sounded 'unusual', but this was improved by using a low-pass filter. Although 128kbit/s has been used for distribution to transmitters where there has been no other option, currently World Service uses 192kbit/s for distribution to rebroadcasters. Cohen explained how the code-decode delay is 160ms, or 2 x 160ms for a question and answer situation, and that delay can also build up if sending via satellite. This has caused problems in syncing audio to picture since the delays were beyond the picture synchronisers being used. The second day began with the session *Workstation Networking and File Interchange*.

**David Pope (Cambridge Digital)** looked at networking workstations in film sound applications and noted that all of the user requirements surveyed could be achieved with current technology, so why isn't networking widespread? Pope suggested that there does not seem to be an urgent need for networking. However, it is becoming unusual for a film dubbing or video post suite not to have a workstation and the missing component which would make networking essential is the final playback mixdown medium. So far, all systems have been a mixture of analogue and digital therefore requiring a real-time transfer of programme material at some point. However, ►

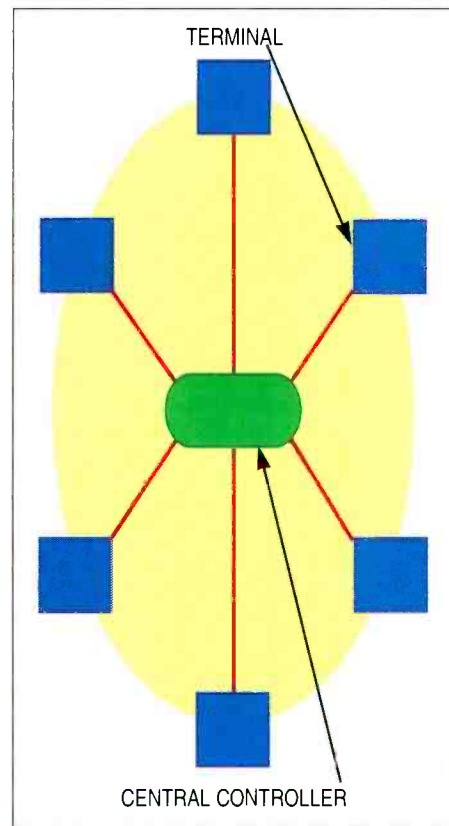
NETWORK TOPOLOGIES AND COMPONENTS



▲ **Bus configuration:** if the network is broken at any point, the network would not function and all the computers attached to it would be affected.



▲ **Ring configuration:** if the network is broken at any point, the network would not function.



▲ **Star configuration:** if the network is broken at any point, only the computer connected to that spur would be affected and the network would continue to function.

**Repeater:** when a network segment reaches its maximum length (or maximum number of nodes) it may only be extended by adding another segment. A repeater is the simplest device for joining two or more segments, it receives signals, then resyncs, regenerates and retransmits them.

**Bridge:** this isolates the network segments attached to it by only transmitting data across the bridge when its destination is in another segment.

**Routers:** these can pass data between different network types, for example, FDDI and Ethernet, and when forwarding a packet uses optimising algorithms to minimise the time taken for a packet to reach its destination. ■



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once the whole chain is digital, networking will offer dramatic improvements in efficiency.

**David Anderson (Sonic Solutions)** explained how it is possible to use current technology to construct a network suitable for professional digital audio. Looking at bandwidth requirements, Sonic considered a range of applications and showed that most workgroups could be satisfied by a network of 10–12MByte/s. Considering the arrangement of storage, this could be centralised (where most data is on a central server), or distributed (where a significant amount of data is kept locally under the control of individual workstations). Sonic found that for most audio applications, the network should support distributed storage.

**Mark Yonge (SSL)** explored a hybrid solution to networking. SoundNet uses point-to-point SCSI for audio disk assignments to individual workstations and a separate Ethernet network for control data. Yonge maintained that since there is a one-to-one relationship between each workstation and each disk, there is never any resource conflict and this arrangement allows projects to be switched to a different workstation in seconds.

**Richard Eliot (BBC Radio)** looked at networking personal computers for both audio and business data, using Novell Ethernet networks in particular. Eliot pointed out that although PCs provide a ready platform for developing digital audio systems, with the advantage of familiar hardware and widely supported standards, it is

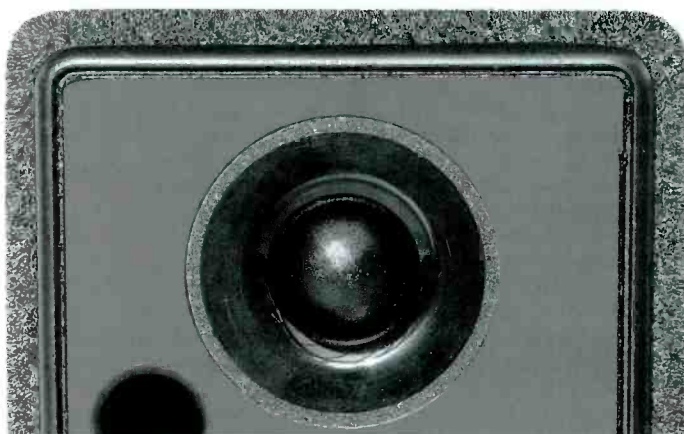
essential to examine the function of each PC on the network, and workflow and traffic patterns. In practise a Novell Ethernet network can only deliver 40–50% of the 10Mbit/s data rate, giving the ability to transfer production quality audio three times faster than real time. However, with several users on the network it is unlikely that ►

## THE OSI SEVEN-LAYER MODEL

The Open Systems Interconnect (OSI) model defines seven layers of operation necessary for communications using computer networks.

- **7 Application Layer**  
Initiation of all communications
- **6 Presentation Layer**  
Operating system, what is seen on screen
- **5 Session Layer**
- **4 Transport Layer**  
These can be collectively considered as the protocol layers. They form the network packets, addressing and error checking. Appletalk
- **3 Network Layer**  
This is an example of such a protocol suite
- **2 Data Link Layer**  
Determines the bandwidth (potential speed) of the network by defining rules for access to the physical medium. The two most common access control methods are token passing and collision detection. In a token passing network, several token packets are sent round a ring network and data is transmitted by attaching it to an empty token and passing it on to the next computer in the ring. Token ring and Fibre Distributed Data Interface (FDDI) use token passing and have maximum bandwidths of 16Mbits/s and 100Mbits/s respectively. With collision detection, the transmitting computer tries to transmit packets onto the network when it is ready. If the network is in use a collision occurs, this is detected and the packet is retransmitted. Collision detection is used by Ethernet which has a maximum bandwidth of 10Mbits/s.
- **1 Physical Layer**  
Cabling; the electrical properties, cross sectional areas of conductors and insulating materials all determine the maximum length of the network. Physical connections can be twisted pair, coaxial or optical fibre with potential network segment lengths of 100m, 500m, and 1km respectively.  
All network communications are initiated by the application layer. The data then passes downwards through the layers with each layer performing its function on the data. At the physical layer the data becomes an electrical signal which is transmitted over the network to its destination. On arrival at its destination, the electrical signal passes up through a similar model where the data can then be used by the receiver. The sending and receiving models will not necessarily be identical. ■

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this transfer rate would be regularly achieved. Hence, without using faster technology such as FDDI, networking of production workstations is unlikely to offer practical benefits over removable media. With combined audio and business networks there is no need for multiple PCs, however, the risks are that audio and business traffic will be competing for space on the same medium. Eliot concluded that there is limited experience of handling audio over a PC network, whether separately or combined with business data, and there are no general solutions.

**Erik Hardeng (Tandberg Data)** described data reduction for multiuser storage and archiving. Tandberg have developed a high capacity storage system based on 2.5GByte tape streamers using

ISO-MPEG Layer 2 coding to give 24 hours storage per tape. The loggers are rackmounted PC units each with two tape streamers for recording one stereo audio programme and are controlled from a master PC. The tapes are recorded with an index making it easy to search for a particular time frame or recording session, and searching for any particular spot typically takes 20–30s.

The final session of the conference was *Multimedia Networking*. **Nigel Charters (BBC News and Current Affairs)** started by giving an enthusiastic look at what might be possible in the future—the ability to view and listen to incoming material, order archive, graphics and stills as required and combine it all with a script from one terminal. Charters hoped that compression would

not be an issue within a few years and gave the key points for any multimedia broadcast system as reliable, easy to use, provide maximum streamlining of operation and, of course, not be too expensive.

**Crispin Jewitt (National Sound Archive)**, described the current and future scope and services of the Archive. The NSA is involved in several information technology projects to improve this, including an EC funded initiative to design and test a prototype system for providing real-time access to sound archives. The next step on from this prototype will be to provide images of record sleeves and labels, and even video material (although transmission overheads would be considerably greater).

**Peter Lambert (Avid Technology)** described how the new disk-based editing workstations, such as Avid's *Media Composer*, can process audio, video, graphics and captions, and are the forerunners of integrated multimedia production systems. Barry Stevens (Avid Technology) then demonstrated the user interface of the *Media Composer* and its editing capabilities.

**William Storm (Digital Equipment Corporation)** explained how multimedia means different things to different users, and why there are limited multimedia systems which meet the needs of commercial broadcasting, production and studio recording where requirements for storage, resolution, network speed and database structure are very demanding. Cataloguing and indexing issues are also significant particularly given the rate of media production, and tools for automatically cataloguing and archiving are required.

The conference ended with issues including the need for data retrieval and management tools and here was concern that cataloguing is treated as a separate process rather than being integrated. However, the discussion again settled on data reduction. One delegate commented that, 'its seems that the recession has hit the audio industry—gone is the talk of getting more bits, now we're talking about reduction'. It was generally agreed that the use of compression for storage purposes will not be necessary in the foreseeable future, but achieving cost-effective distribution without compression was uncertain. ■

**Further reading**

*The Digital Audio Interface Handbook* by Francis Rumsey & John Watkinson, Focal Press Available from AES Ltd, PO Box 645, Slough SL1 8BJ, UK. Tel: 0628 663725.

*OMF Interchange Specification—Version 1.0* Available from OMF Developer's Desk, Avid Technology Inc, Metropolitan Technology Park, One Park West, Tewksbury, MA 01876, USA. Tel: +1 800 949 6634.

*A Broadcasters Guide to Using ISDN and Switched 56 Worldwide*, ISDN Publications Ltd. Available from SYPHA, 216A Gypsy Road, London SE27 9RB, UK. Tel: 081 761 1042.

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## Pro MIDI

Dear sir, I found your editorial in the January 1993 issue 'Mo' MIDI, to be 'rite on'. Today, the so-called professional studio owner is having to rethink what the word 'professional' means. The technology available requires experience with a computer of some type. At the same time, the analogue techniques that have spawned so many great records in the past will—hopefully—not become lost in the glut of technology that keeps one reading manuals until severe eye strain is invoked. The ingenuity that kindled a great pop record like *Sgt. Pepper* may have just been felled by musicians that applied the technology of their time—I wonder if less is really more?

With MIDI sequencing, and now hard-disk recording, capability of home computer workstations, musicians and songwriters can make a recording of unparalleled quality, that is, if they can get anything done. It's easy to fiddle with this stuff, creative decisions can be put off for later—sometimes good, sometimes bad.

Recently I have seen the recording scales tip both ways. As a source for the 'feel' of a track, fine tuned sequenced preproduction is used as a platform for live musician performances. Other projects are complete MIDI keyboard tracking

sessions, using the studio only for vocals, guitars and percussion.

My own Andora Studio recently had the pleasure of Polygram artist Oleta Adams and producer Stewart Levine for the duration of their entire project. I'm sure when you hear the finished album, you will be impressed. Oleta is a great pianist and singer-songwriter. Just at the tracking date, she came to my office and asked if she could use my Mac. Slipping a disk into the computer, she proceeded to print her music for the entire album on my LaserWriter: drums, bass and guitar charts. She performed the piano parts from memory and did her vocals at the same time!

In an economic climate of less than optimum conditions, and after nearly two years of construction, the doors of Andora were opened with GRP Records jazz artist Don Grusin in January of 1992. Located in the Cahuenga pass between Universal City and Hollywood, the facility has attracted an impressive list of clientele for its first year of operation. Studio A features 23-foot high ceilings and solid hardwood maple floors. The control room boasts Genelec 1035A 3-way monitors that deliver a very smooth response and imaging that must be heard. Seen from the 1,800ft<sup>2</sup> lounge above control room A, staggered oak diffusers hand from the studio ceiling. The artist lounge is elegantly furnished, and can double as a second

performance area with its Steinway grand piano and audio-video interface. A private dressing room and bath as well as an 18-foot kitchen can accommodate plenty of extra people if necessary.

The control room A Neve VR-72 console is fitted with GML fader automation and Graphics Total Recall. Dual 24-track Studer 827s with 24 channels of Dolby SR lock via Lynx synchronisers. Andora studio B will house a custom Neve 8078A, also fitted with Massenburg automation. This console was previously installed at Smoketree Studios. A second Neve 8078A is currently under modification, and will eventually mate with the Smoketree console. (The Smoketree desk was originally purchased from Sound Push Studios in Belgium, and the second came from Singapore.)

Both consoles boast modifications that

maintain the great sound discrete Neves are known for, but offer signal flow, metering and monitoring parallel in flexibility to today's newer IC desks. Control Room B also has Genelec 1035A monitors as well as Studer tape machines.

But as well as this, both control rooms offer extensive facilities for handling large MIDI systems. Only with a range of equipment from our new digital editing capability and in-house extensive MIDI system, can we hope to offer a 'full circle' of recording capabilities, from basic tracking to digital editing.

**Doug Parry, Andora Studios, Hollywood, California, USA.**

## Suspect stereo

Dear sir, Barry Fox is certainly very persistent in his writings on the possibility of extracting 'pure stereo' from certain of Elgar's recordings. He appears to write on the subject at two-monthly intervals in a number of journals. This has been going on since his article in *New Scientist* of 2nd November 1992. If only he could take in what Richard Abram of EMI and myself said, this could have ended long ago.

I imagine the original EMI announcement that Elgar's *Kingdom Prelude* in 'true stereo' would be issued in *Vol. 3* of the *Elgar Edition* was made by some enthusiast as EMI who had no practical experience of 'pseudostereo' recordings and what they could achieve. Perhaps he was even fired by Barry Fox's writings and broadcasts, and especially with the experiments of Brad Kay in the USA. I have asked Mr Fox if he thinks Kay's efforts are 'true' or 'pseudo'. His reply was that he kept an open mind on the question. In other words, he is sitting on the fence ready to drop down on whichever side wins the argument. I myself have heard these experiments, and to my mind they are no more than 'pseudostereo', and have a fair amount of experience in this field.

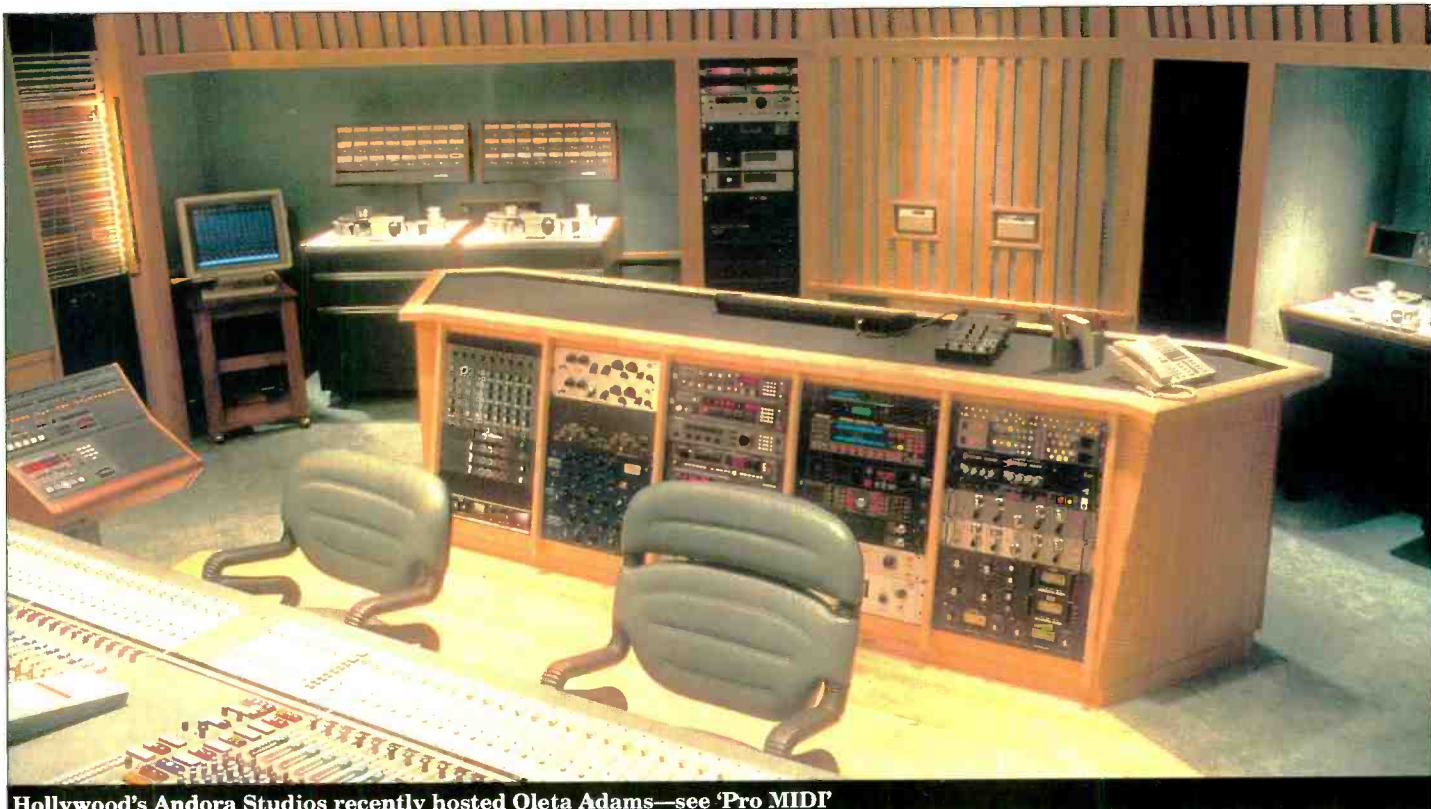
Barry Fox says in his article ('Business', *Studio Sound*, May 1993) that it would make sense to feed identical signals to both cutters. And then he goes on: 'It would also make sense to use different microphones as added security against possible electrical failure.' What a strange remark from a journalist of his reputation. Spare microphones, amplifiers etc, are always available on all sessions at home and on location. The extra security was needed to provide reserve waxes. These were easily damaged and the mortality rate among them was very high.

Barry Fox says that I refused to release my report which formed the basis of EMI's decision not to go ahead with this project. Instead of releasing this report which had been commissioned by EMI, I wrote a detailed reply to Mr. Fox's article in *New Scientist* covering all the points in my report. I then heard from him that before publication it would have to be shortened and he wanted all references to himself and Brad Kay removed. Very strange seeing that he had mentioned both Richard Abram and myself in his article.

Barry Fox says that engineer Mike Dutton, who was responsible for the *Elgar Edition Vol. 1*,



SHURE  
GENIUS



Hollywood's Andora Studios recently hosted Oleta Adams—see 'Pro MIDI'

wanted to see if 'true stereo' was attainable using the latest techniques. Richard Abram has said repeatedly that he would not stand in his way. Now, judging from his advertisements, Mike Dutton has his own 'laboratories' and should be in an excellent position to resolve this matter. Perhaps in the months to come, if we don't hear of any 'true stereo' from Elgar, we may assume that this is not possible.

Final words of warning to anyone who is tempted to try some work on this, there is no guarantee that the two cutter heads would be in phase to start with. Also each cutter head had a very elaborate equaliser comprising many inductors and capacitors. These would be individually adjusted to their head and so almost certainly provided more phase changes.

I have at the back of my mind a memory that someone once told me that work had been done on this at Abbey Road using digital equipment, but was abandoned as no 'true-stereo' effect could be produced.

Perhaps now Barry Fox will climb down off his fence and call it a day.

**Anthony C Griffith, Totnes, Devon, UK.**

## Hallmark

Dear sir, Tony Faulkner is right in saying that: 'Lyndhurst Hall has a beautiful acoustic' (*Studio Sound*, June 1993), but he need not worry about the acoustics being wrecked.

Lyndhurst Hall has the advantage that it is a big hall providing natural liveness without the disadvantage of too loud reverberant sound, which would confuse and mask the recorded sound. However, Lyndhurst also has to provide the right acoustics for a variety of users, some of whom require particular acoustic conditions not provided by the hall in its natural state.

It is precisely because we wanted to keep the natural acoustics that we decided to use movable and removable acoustic elements to modify the natural acoustics to meet clients' individual

requirements. What Tony Faulkner saw and described as, 'all sorts of flying saucers and acoustics tile dangling all over the place', were actually temporary experimental elements used for particular sessions as part of a series of tests to confirm what acoustic elements should be provided for the use of clients.

These will soon be replaced by a purpose-designed system of acoustic elements to enable each client to be given the acoustics required—they will be able to use the Lyndhurst Hall in its natural state, to have it less live, to adjust the loudness of the reverberant sound, and to make acoustic adjustments such as compensating for the absence of a chorus during part of an orchestral recording.

The problems Tony says he finds with sound isolation in churches have also been dealt with at Lyndhurst Hall—it is isolated from the noise of the outside world using over a ton of glass in each window—so he can rest assured that he won't be troubled by, 'Routemaster buses, Jumbo Jets and somebody reversing a Securicor van', at Lyndhurst.

No longer will Tony Faulkner have to fly

around the world to find the acoustics he wants—he can do it all at Lyndhurst Hall!

**Richard Galbraith, Acoustic Consultant  
Sandy Brown Associates, London, UK. ■**



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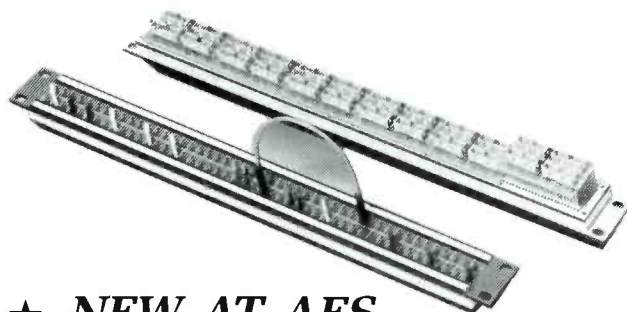
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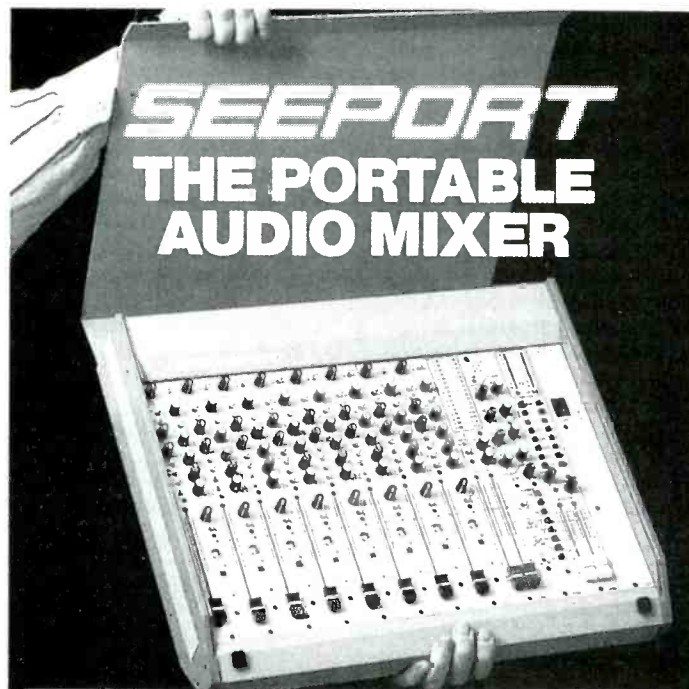
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**D**uring a recent survey of studio personnel, a relatively new problem was identified surrounding availability and cost of replacement parts. The root of the problem seemed to be that where replacement parts were formerly universally available, today there is no ready way of knowing if a part is readily available and if not, how long the wait for it will be.

At the root of this problem is a move in the audio world (and every part of hi-tech) away from discrete components towards the macromodular world of microelectronics. Instead of capacitors and resistors, we now use specialised circuits with components integrated in silicon and being measured in thousandths of a micron. Many manufacturers have also begun to design ICs around a new product and then ordering ASICs (Application Specific Integrated Circuits) or other exotic chips from a chip manufacturer, rather than adopting the 'traditional' approach where a product would evolve from the published specifications of units in a standard catalogue. ASICs and other custom chips are specific to their application and cannot be purchased from the chip maker in small numbers or by any one other than the firm placing the original order. They usually are made in custom runs, and even if the chip maker kept the necessary 'masks' to produce additional chips—the quantities required for a short production run would be prohibitive.

In the past, a console or multitrack recorder could be stripped down and an offending component down and replaced. Today, circuits and parts are grouped onto glass epoxy boards and wave soldered in place. Frequently these components cannot even be repaired on-site. Return to the manufacturer is the expected option.

To be more specific about the problem, we must begin with the studio equipment manufacturing process as it has been 're-engineered' in Japan. Since the Japanese frequently set the pricing standard for the rest of the world, what they innovate in manufacturing techniques is quickly copied by their worldwide competitors to achieve fiscal parity. Today, most firms in and out of Japan have adopted the 'JIT' (Just-in-Time) system of manufacturing—or some approximation thereof.

JIT is a logistical engineering scheme that places the business of product assembly in an on-line mode. Needed parts and assemblies delivered from suppliers, subcontractors and other divisions of the equipment manufacturer, arrive within a very narrow time window of the construction process; through the logistics of JIT manufacturing, the need to maintain inventory of parts on site is virtually eliminated. The process of manufacturing by creating a large inventory of component parts for a continuous production line has been generally superseded by the use of demand-specific production scheduling, where the forecast product demand is the predictor of the length of time that the JIT-fed production line is run for a specific product.

Basically, JIT means that parts are delivered on the day of use in manufacture—sometimes within the hour. For the manufacturer, it means no inventory of assembly parts, no warehouse space for assembly, no financial investment in parts to

**Martin Polon**

## When equipment spares become scarce, the hi-tech cannibals come out to play

amortise over a longer time frame—but no substantial store of spare parts available either.

The methodology adopted by many companies is to separate the replacement parts process from the manufacturing system. These parts are cost accounted separately from the equipment manufacturing process, including creation, storage, packaging, computer inventory, and pricing. All of this increases the cost of a part. Add to this the cost of shipment by air, when frequently the transportation charges for a spare part can equal that of an entire unit sent by surface transport.

The next issue confronting studio operators who keep equipment for extended periods is the availability of parts in any way, shape or form—while it is true that both prevailing legislation and industry practice virtually guarantee a five-year window of parts availability after purchase and many companies exceed this significantly, there are no written guarantees. What can happen with a parts order varies from a wait of four months to the shipment of the wrong part, to slight changes in the correct part that renders the device unusable in older models... After five years, or if the company goes out of business or is merged into another, then frequently only divine intervention seems likely to procure spare parts.

Because of this, equipment cannibalisation has become a much bigger issue than at any time in the past. Quietly, studio owners are purchasing companion units to existing consoles (especially those who have gone out of the business or been superseded by new ownership that hikes the price tag for specific spare parts into the stratosphere), guaranteeing a relatively affordable uninterrupted supply of replacement parts of all kinds. Said one studio owner, 'Now that we have to some extent put behind us the Console of the Month Club, we are attempting to keep certain items in use for a longer time frame than we did during and at the end of the 1980s. Many of our clients value the analogue sound; even in the 1990s, over 5096 of all original recordings are made in the analogue domain. So a classic older console is worth keeping and supporting even if the

console's maker cannot or will not support it.'

If all of this makes the original audio equipment makers look like a gang of thieves, one has to consider the costing dynamic attached to the spare parts business. If a product costs \$M to manufacture and \$D to distribute the spare parts for that same unit cost all of the above plus at least \$W to warehouse those parts, and sometimes \$F to finance the spare parts inventory. Rest assured that very few audio manufacturers show a profit on their spare parts business, especially when you add the paperwork for thousands if not tens of thousands of parts, schematics, parts lists, repair manuals and operating manuals.

There is a new direction for the studio industry emerging as the computer world gradually becomes as one with the world of audio. As more functions are placed on high-speed computing platforms such as those utilising 'next generation now' microprocessors like the Apple-IBM *PowerPC*, the Intel *P5* and the DEC *Alpha*, audio users are going to have to accept the parts vagaries of the computer industry.

Computers generally are assembled from more-or-less standardised parts supplied by a variety of vendors at a substantially reduced OEM price; this is especially true of clone systems. Components may well be made by different contractors and the product manufacturer accepts responsibility for parts and service during the initial warranty period. A 'follow on' warranty is usually available, but does not always guarantee rapid turnaround or ready parts availability.

Even manufacturing units of majors like IBM and Apple have their problems in meeting demands for parts. In one case, a new system has significantly upgraded capability of an earlier model. The earlier model can be brought up to the spec of its new sibling but the necessary logic board is unavailable since sales demands for the current unit devour all available production. In addition, major computer makers rely like everybody else on major providers of virtually interchangeable components like drives or connectors that are not cost-effective to manufacture in-house.

The bottom line is that parts availability for computer-based audio systems will probably not be significantly better than for current-generation equipment. If there is a solution, and especially where there is no latitude for downtime, the maintenance of a large parts store in-studio or in-house could be the most effective solution; certainly, cannibalisation fits part of this picture.

It would be helpful if equipment dealers carried spares but the wave of business failures at the end of the 1980s mandated the survivors to run lean and mean. 'There is no financial incentive to tying up as much as half your investment in parts that may not "turn" for as long as five years,' commented one dealer, 'and if the unit becomes obsolete and virtually worthless as the lemmings in our studio world rush on to the next buzz product, you are left holding the bag.'

Remember the days when a trip to the parts house for about \$200 (£100) worth of resistors, capacitors and inductors plus an investment in vacuum tubes would take care of studio problems for months if not years of service? ■

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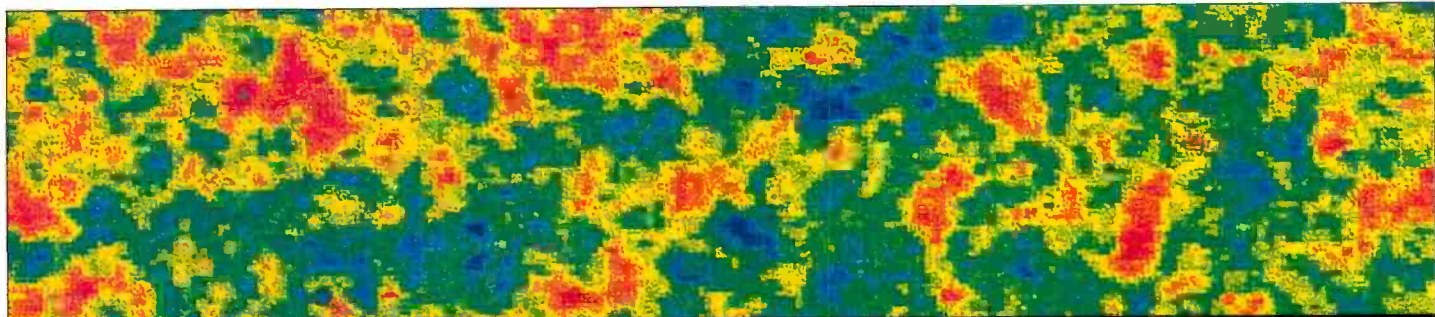
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# DAT TAPE AGEING



Extract from a map of the surface of a DAT tape. Red indicates the peaks and blue the pits

One of the prime concerns about digital audio tapes in general, and DAT tape in particular, is the expected life of the tape. Many very important recordings are now mastered onto DAT, in some cases recorded directly onto DAT. When the tape is in good condition, the digital advantage is that copies can be made without any degradation. But once serious deterioration sets in, the digital storage medium is no better than analogue—in fact worse, since the degradations become very audible.

## The ageing method

For this reason, the DAT tapes which have been a part of this ongoing review (see *Studio Sound* May, July and August 1993) were subjected to a process known as accelerated ageing in an attempt to predict the likely outcome of long-term storage. To accomplish this, we built an environmental chamber based on a small chest freezer. To this was added a control system, air and water heaters, temperature and humidity measurement probes and a fan. This gave us the capability to cycle temperature from -5°C to 60°C, and humidity could be increased up to 95% RH.

Based initially on information from Maxell, which was confirmed by further information from KAO, we decided on an ageing process based on 60°C and 90% humidity. These conditions are derived from research undertaken by W.H. Abbott and D.E. Spelotis and published in US engineering journals. These indicate that 20 days under these conditions is roughly equivalent to 10 years at 25°C and 60% RH. This means that our measurement period of 28 days is roughly equivalent to 15 years of storage life.

KAO, who have been very helpful in providing us with information, chose to measure the decrease in tape output level, and the increase in error rate with respect to ageing time. Their findings represent about a ten-fold increase in errors over a 28-day period. The papers mentioned earlier may consider ageing properties of tape metal particles only, but the KAO measurements were definitely made on the finished tape, and were 'in-cassette', which is equivalent to our measurement method.

There are also further test methods detailed

which introduce the equivalent of environmental pollution. These so-called 'Battele' tests are beyond our capability in terms of complexity.

Maxell have published some information on test methods in an AES paper entitled *Study of Corrosion Stability on DAT Metal Tape* in which they state that 60°C/90%RH test conditions for one week correspond to four years in normal room conditions. They then decided to carry out their tests at 80% RH, 'because of instability of tape running at 90%RH due to the penetration of a large amount of water into the gaps of wound tapes after a long storage period'. There were also statements in their report relating to errors due to 'sticky phenomena'. We had disappointing results from the aged Maxell tape following excellent performance when new, but this degradation was almost entirely confined to Maxell, raising questions about their own evaluation of the problems they found. We cannot conclusively state that Maxell tapes in 15 years will have the problems which we found, but we can be relatively confident that the other tapes will not.

A publication from 3M entitled *Magnetic Tape Recording: Forever?* gives further information on the ageing process, looking separately at the magnetic signal, binder, and backing material. This paper mainly relates to video tapes, but does highlight some relevant issues. In the case of DAT, the first worry is degradation of the magnetic particles themselves, since unless they are protected in some way they will literally rust. But after this comes loss of magnetic information (demagnetisation), and problems associated with the tape coating and backing itself. In our tests it was impossible to entirely differentiate between these effects, but we can get some idea of the causes of failure from examining the tapes visually, and looking at the change in error rate over time.

3M make the point that for tape intended for rotary head use, the head is like a 'buzz saw' across the tape. As the binder ages, particularly under high humidity conditions, the molecules begin to break down, and eventually shedding and head clogging may occur. In part, our tests were intended to accelerate this process and to compare the results from various manufacturers. Many of them use metal particles from the same source, but

then add these into their own chemical mix and process to produce the final tape coating.

The backing, or plastic substrate, onto which the binder is placed is also plastic (typically polyester) and is subject to chemical changes at high temperature and humidity. The 3M figures for their stabilised backing for video tapes show an ageing acceleration factor which is very high as temperature increases, resulting in a 24-hour period at 52°C representing a 10-year life at 27°C (80°F). This means that for some tape types backing changes can cause more serious problems than the binder or coating changes.

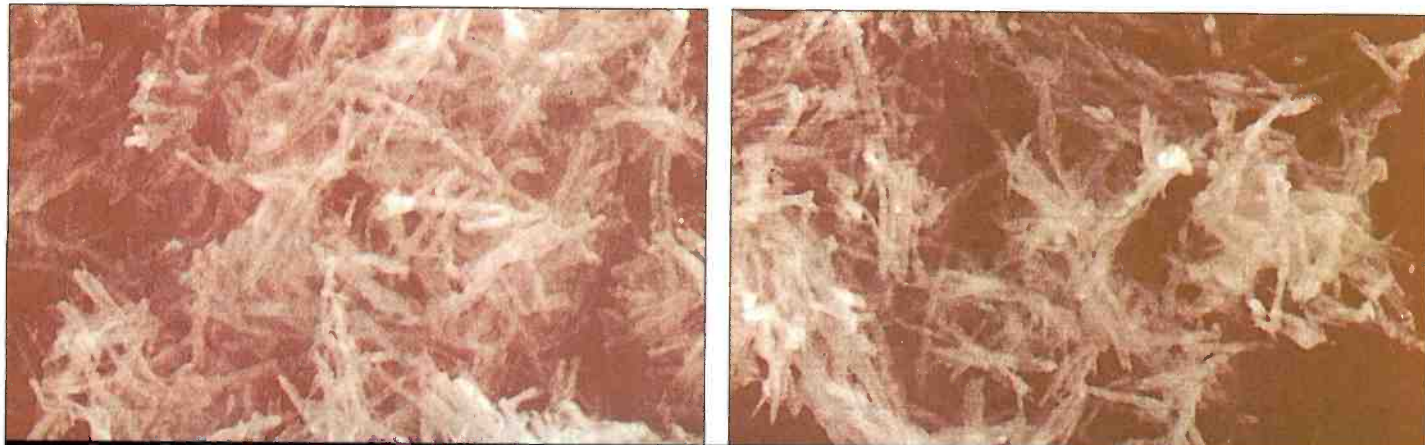
So, our test procedure was expected prove to be stressful to tapes but would represent at least a 15-year storage condition, and should at least give an indication of the tapes which are less likely to cause a problem after storage. These tests were also likely to produce failure modes in some tapes which would prove to be good after 15 years of storage under normal room conditions, but tape types which are good after this abuse are more likely to be good as well after many years of storage. Put another way, if the tape passed our tests well, it is statistically more likely to keep your valuable recording safe.

Three tapes were tested from each manufacturer, corresponding to the tapes in the previous review: Write Once-Read Eight Times ►

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Having been subjected to a period of accelerated ageing, Studio Sound's DAT tape samples went back on the test rig for final evaluation.  
Review by Sam Wise

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Scanning electron microscope images of anticorrosive metal tape particles; before (left) and after (right) storage at 60°C/90%RH for two weeks (x 50,000 magnification)

(1 and 2), and Write-Read Eight Times. Write Once 1 and Write-Read were aged within their cassette housing, and any other storage box provided. Write Once 2 was removed from its outer housing and the unenclosed cassette was placed within the test chamber. A few tapes showed minor differences between the boxed and unboxed cassette, but most did not. We did not find these differences statistically relevant.

## Visual inspection

After their 28-day period in the test chamber, tapes were removed and allowed to cool down for two days before any inspection or testing. After this, the cover of the cassette was pushed back, and the tape inspected where it was most exposed. You will find comments in the text below as to our observations. The tape was then pulled from the cassette sufficiently for inspection under a microscope. We intended to include microphotographs but felt that the visual differences would not show up well in the magazine. The images shown here are for illustration rather than information.

Some of the tapes definitely exhibited 'sticky phenomena' at this stage, requiring force to be applied to separate the tape from the lid or cassette body. We could discern little tendency for one layer of tape to stick to another, though some tapes did show evidence of uneven rotation in their error curves.

## Test method

Following inspection, the tape was rewound into the cassette, and wound on several turns manually, so that measurements would not be made on the exposed portion of the tape, or on a portion which might have been damaged while unsticking it or inspecting it. The DAT machine

was cleaned with a Maxell cleaning tape for about 1 minute between each tape (this time was found necessary), then quality checked by recording and replaying a five minute section of a quality assurance tape.

After this, each tape was played for five minutes to log C1 errors, followed by a further five minutes to log C2 errors. These sections of tape were consecutive, that is, C1 and C2 measurements were not made on the same portion of tape. Remember that C1 errors are a measure of the normal errors of DAT tape which have made their way past the first error correction level, and may be totally correctable by the second level. C2 errors, however, are those errors which remain uncorrected and may finally be concealed or result in muting. Remember too that there were no C2 errors resulting from any of these tapes prior to the ageing process. C2 errors can be caused by several problems, the tape can have lost the information, the tape surface can have become too rough for proper replay, the heads can become clogged from tape shedding, or the backing may have altered its length, giving problems with the DAT tracking mechanism.

Following ageing, many of the tapes exhibited C2 errors. The C2 error count sometimes appeared higher than the C1 error count. The exact cause of this is unknown, but the C2 error flag toggles very rapidly when C2 errors are occurring, and can count over 60,000 during one test set sampling cycle (about 0.1 secs). To take account of this, we have listed what we call 'C2 Error Clusters' in **Table 1**. These are a count of blocks or groups of C2 error occurrences, which often happened at only specific points on the tape. On many tapes, these tended to occur in blocks which looked like a dropout. For example, on the 3M tape, there is a count of 3,008 C2 errors, but this occurred at one point in the tape, the remainder giving no C2

errors. Where we say 'many' relating to C2 error clusters it is because C2 errors were more or less continuous and therefore it was difficult or impossible to isolate blocks of them.

In addition, the shedding of some tapes resulted in head clogging, which in turn began to produce C2 errors. A typical example of this is the most recent Apogee tape. Its C1 results showed a rapidly increasing curve of an exponential shape which led us to believe that the head was clogging. The following C2 test showed numerous errors. Cleaning the heads again reduced C2 errors to zero. While this tape is not ideal, it could be recovered in archive by playing in short sections with head cleaning between sections, and would produce an error free result. An alternative method with Apogee tape proved to be playing once, cleaning the heads, rewinding and playing again. The first pass seemed to smooth and clean the tape, and the second pass produced reduced C1 and no C2 errors.

## Results

The tapes are given in alphabetical order. Descriptive information is given in the test, with test results in **Table 1**.

### Ampex

Visual inspection revealed degradation of the exposed part of the tape, with visible corrosion for several turns into the pack. Further in the tape surface became more smooth, with corrosion only visible on some tape edges. There was a slight sticking to the cassette lid, which released naturally as the lid was opened.

Tests of Ampex 467 gave good results. Two tapes produced no C2 errors at all, while the third produced errors at several points in the tape, some of which were audible, with two mutes. This was the unboxed tape. A retest of this tape did not improve the measured results.

### Apogee

The Apogee tape type reviewed is the last version received, which is said by Apogee to be the one which is being placed on sale. In the last review, the C1 error level for this tape had been reduced to match the better tapes tested. A special corrosion resistant version is presently in development.

Visual inspection of the tape revealed no visible changes, there was no apparent sticking of the tape to either the cassette, cassette lid, or itself. The tape did not appear bowed or deformed.

On testing, the tapes produced an increased C1 error level following ageing, with substantial ▶

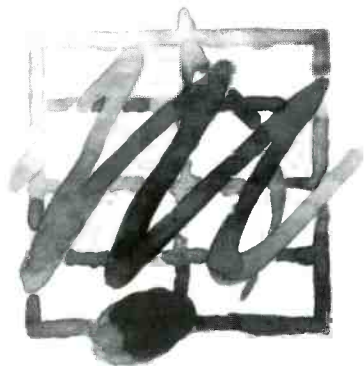
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C2 errors on the first pass. The heads were cleaned after the first playing of each tape and the tapes were measured again. Two of the three tapes produced no C2 errors over the five minute measurement period. The third tape produced three C2 error clusters over a period of 20 seconds which did not cause muting but were audible.

## Fuji

When we attempted to open the Fuji cassette lid, two of three tapes stuck strongly to the lid but were safely released, and one was broken trying to get it free. The tapes were bowed where exposed, and creased where they passed the sides of the cassette. Further on the tape looked a lot better, with minor defects on tape edges and some small rippling of the backing material.

Testing the tapes produced a variable result. The Write Once 1 tape gave a cluster of C2 errors within a 30-second interval, producing some muting. Write Once 2 produced substantial C2 errors more or less constantly, many of which resulted in audible problems or muting. Additional head cleaning did not improve the results. As mentioned above, the remaining tape was broken.

## HHB

The HHB tape showed no signs of stickiness to either cassette or cassette lid. The exposed portion of tape showed some signs of damage, curling and creasing where it passed over the cassette shell. There was visible corrosion on the tape surface, and on the edges of the tape further into the pack.

Test results were excellent, with no C2 errors on any of the three tapes, and low C1 error rate.

## Maxell Consumer

Maxell informed us that the tape used in both their professional and consumer versions was identical, with the addition of the outer box for the professional version. For this reason, only the consumer version was tested.

Visually, Maxell gave the most seriously worrying results. All three tapes were seriously stuck to the cassette lid following ageing. Two were damaged trying to release them, one of which split completely, rendering further testing impossible. All showed serious corrosion across the tape surface throughout its length, appearing as streaks on the edges and spots in the middle of the tape.

Testing also revealed the worst performance of any of the tapes. Essentially, the level of C2 errors, audible aberrations and mutes was almost continuous, rendering the tapes useless.

This tape produced the best results on initial testing, and is advertised heavily as being especially well protected against corrosion. But, one might note that Maxell engineers noticed problems at humidity levels above 80%RH and attributed them to water inside the cassette. Perhaps something else was happening and they should look again.

## Sony

Visually, the comments on Sony PDP series tape are similar to those given for HHB tape.

Test results were also excellent, with no C2 errors on any of the three tapes. However, the C1 errors showed a cyclic variation indicating possible small deficiencies in the design of the cassette shell or spools. Only the very beginning (exposed section) of the Sony and HHB tapes gave any C2 errors,

though deterioration of the tape surface was readily visible. These did not produce an audible error on the recorded pure tone.

## TDK

Visually, the TDK tape showed the least signs of damage. There was some curl on the exposed portion of the tape, but no visible evidence of corrosion at all.

Tests on the TDK tape were also good, though not as good as Sony and HHB. In fact six TDK tapes were tested, since we requested a new batch from them following disappointing initial test results prior to ageing. Two tapes had no C2 errors, three tapes had one cluster of C2 errors which were not audible, and one tape had several clusters of C2 errors, also not audible.

The TDK tape has continually trailed behind the others in C1 errors before ageing, with indications of tape shedding from new tape, but surprisingly, their performance actually seems to improve with ageing, producing some of the best results.

## 3M

Visually, 3M tape is very similar to Sony and HHB, and the same comments apply.

Tests gave generally good results, with two out of three tapes producing no C2 errors. The third tape (from a different batch) produced errors at a number of points, several audible, with one mute.

## Summary

If it were my recordings at risk, it is clear which choice I would make: HHB, followed by Sony. 3M follows closely, with problems associated with an earlier batch number. Apogee is nearly up with ▶

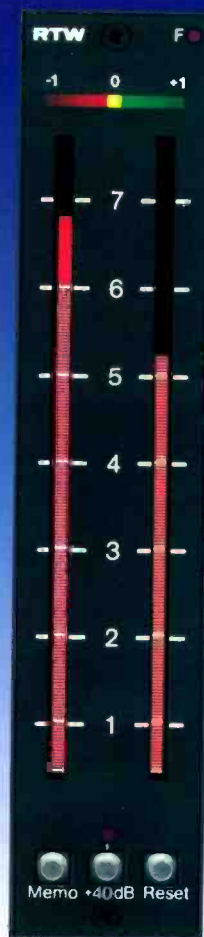
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TABLE 1

Tape	Manufacturer	Test Cycle	C1 Error Count	C2 Error Clusters	C2 Error Count	Comments
24	Ampex	WO1	1,999	0	0	There are portions with almost vertical slope.
25	Ampex	WO2	108,499	many	388,303	Cyclic variation visible in C1 and C2 count at 12, 4 second interval indicating binding within the cassette.
25A	Retest of 25	WO2	5,383	many	202,462	Improvement in C1 count, but C2 count stays large with many audible glitches and one mute.
26	Ampex	WR	2,859	0	0	Almost constant error rate.
27	Fuji	WO1	6,986	3	21,270	Generally gradual error count with one major jump. Three clusters of C2 errors, one audible.
27A	Retest of 27	WO1	n/a	3	25,515	No change on previous result.
28	Fuji	WO2	129,395	many	191,605	Error rate is high at beginning, reducing substantially after 2.5 minutes. Cyclic variation evident in C2 errors. Many audible plus muting.
29	Fuji	WR	n/a	n/a	n/a	Tape broke when trying to open cassette, stuck to lid.
30	HHB	WO1	726	0	0	There is little to say here except that once again HHB have proved to be the most consistent, and consistently good.
31	HHB	WO2	402	0	0	
32	HHB	WR	371	0	0	
36	Sony	WO1	3,131	0	0	Steady error rate.
37	Sony	WO2	1,180	0	0	Some large error increases.
38	Sony	WR	195	0	0	The second lowest count of all tapes.
40	TDK	WO1	796	0	0	Low error count from tape which previously gave a high result.
41	TDK	WO2	1,705	0	0	Steady error rate.
42	TDK	WR	1,106	0	0	Steady error rate.
43	3M	WO1	107	1	3,008	The lowest C1 count of all tapes. One C2 error cluster, not audible.
44	3M	WO2	1,876	0	0	12.5 sec cyclic variation in C1 errors indicates rotational problem with tape in cassette.
45	3M	WR	5,221	8	79,773	Cyclic variation again. Eight C2 error clusters at the 12.5 second intervals.
46	TDK	WO1	11,639	1	33,605	Cyclic variations in errors. One C2 error cluster.
47	TDK	WO2	3,068	1	324	Error rate is mostly constant. One C2 error cluster.
48	TDK	WR	1,047,180	many	449,570	Serious C1 errors on this tape. Retest produced consistent results. Cyclic variation in C2 errors, many audible plus muting.
48A	TDK	WR	n/a	many	151,750	C2 errors reduced on retest, but still result in audible glitches and one mute.
49	Maxell Consumer	WO1	1,617,491	many	2,228,897	Serious C1 errors. Retest produced consistent results. Some cyclic variation in C2 with almost constant errors. Tape would be unusable after ageing.
50	Maxell Consumer	WO2	1,128,655	many	1,994,506	Serious C1 errors. Retest produced consistent results. Tape split but did not separate. C2 errors at constant level with audible and muting problems would make tape unusable.
51	Maxell Consumer	WR	n/a	many	n/a	Tape broke in use.
53	Apogee Ver. 3	WO1	123,650	many	325,604	Rapidly increasing error rate slope possibly indicates head clogging. High C2 error rate with audible glitches and muting.
53A	Retest of 53	WO1	n/a	3	47,701	This was the only tape type which improved on retest. Three C2 error clusters, one of which was about .35 seconds in duration and produced audible artifacts.
54	Apogee Ver. 3	WO2	2,896	many	125,095	C2 errors occurred in sections on the tape, one of which was audible on pure tone.
54A	Retest of 54	WO2	7,098	0	0	This time C2 errors reduced to zero on retest.
55	Apogee Ver. 3	WR	6,688	1	45,586	One C2 error cluster not audible.
55A	Retest of 55	WR	n/a	0	0	Again C2 errors reduced to zero on retest.

Table shows the results of error testing on DAT tape following ageing for 28 days at 60°C/90%RH



the pack after it has been run through the machine once, and may get a different result once their new corrosion-proof version becomes available—that is if the process works better than Maxell's.

TDK might be considered since it produced excellent results following ageing, but in my opinion falls down due to the debris it tends to leave behind on the heads when new. More regular cleaning will be essential to maintain performance.

Judged by the outcome of this test, Fuji and Maxell present a potential risk when used as a long term storage medium, though both work extremely well when new.

## Protecting your investment

DAT tape needs to be treated with the same respect as its analogue brethren. Although open-reel analogue tape offers you no practical alternative to winding the tape onto one spool (usually the take-up spool) after a session, it is possible to leave DAT tape split between spools—and for ongoing projects this actually appears to be the best option to me. Given that I have yet to see a DAT machine with the medium wind speed often provided for winding prior to longer-term storage or archiving, and that a fast wind is more likely to leave the tape surface exposed and to cause tape weave and an increased risk of distorted cassette shell, playing on for two to five minutes after a recording leaves exposed the portion of tape which has no useful information on it, and protects the important recorded sections. For longer term storage, playing off onto one spool or the other would seem prudent.

If the tape has been stored a long time, inspect the tape just beneath the cassette lid for sticking, and release it carefully if stuck prior to rewinding. Be careful rewinding fully, some tapes might break with the force applied at the end of the reel by some transports. It would be better with an old tape to get within 30 to 45 seconds of the beginning and turn the rest by hand.

Store your tapes in a clean, dry and cool environment. Seal the outer box fully with waterproof tape if they are likely to be stored for a long period.

Finally, if you have important material which has been recorded on earlier generations of DAT tape consider making a direct digital copy now. We would suggest you kept the original as well, two are safer than one in any case. If these rules are followed, and a good tape is selected, it is my view that the present generation of DAT tapes provide a safe means of storing masters—much better, in fact, than I had expected to find. ■

Thanks to Raper & Wayman who have provided a Tascam DA30 on loan for several months while I completed this series of reviews, to KAO and 3M who have assisted with information, for comments from John Watkinson, to Bruce Jackson of Apogee for funnelling information and comment, and to Tascam America who answered questions we could not get answered locally.

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MOBILE RECORDING: 

RESIDENTIAL STUDIO: 

## AUSTRALIA

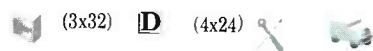
### NEWMARKET MUSIC STUDIOS

87-91 Arden Street, North Melbourne, Victoria 3051, Australia. 329 2877; Fax: 326 5282.



### STUDIOS 301

301 Castlereagh Street, Sydney, Australia 2000. 61 2 217 7701; Fax: 61 2 217 7799.



### TRACKDOWN STUDIOS

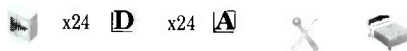
62-68 Church Street, Camperdown, N.S.W. 2050, Australia. +61 2 550 6890; Fax: +61 2 519 1258. Owner: Three's A Company Plc & Tave Film Plc. Studio/Bookings Manager: Geoff Watson. No. of studios & dimensions: Studio 1 control room 30sq.m/Studio 1 Record room 36 sq.m (daylight). Studio 2 control room 20sq.m/Vocal booth/Studio 3 editing 15sq.m. Mixing consoles: Raindirk Symphony, Tascam M-3200, Yamaha & Roland. Recorders: Otari MTR 90 MK II (with Dolby SR) Alesis A-DAT Tascam DAT, Revox etc. Digital audio workstations: Pro tools 8-track on MacIntosh. MIDI set-up: MacIntosh x 3 running CuBase, Performer - Fostex synchronisers/Kurzweil synths/Akai Samplers etc. Opcode. Monitors: Quedest 210's/NS 10s/Axis. Specified outboard: PCM 70/Urei comps/SPX 900's/TC2290, LXP15 - Lexicon/Drawermer gates of comps/Roland Reverb/Roland delays/Aphex. A/V equipment: U-matic/UHS fully lockable - TV monitors in all studios. Special services: Full audio - video post production including sound fx, foley, dialogue editing - etc. Pro tools compiling and editing and custom CD manufacture.



## AUSTRIA

### BLACK LAGOON STUDIOS

Hornbostelgasse 16-18, 1060 Wien, Austria. +43 1 597 1238; Fax: +43 1 597 1235 13. .



## BAHAMAS

### COMPASS POINT STUDIOS

PO Box N-4599, Nassau, Bahamas +1 809 327 8282; Fax: +1 809 327 8633. Owner: Chris Blackwell. Studio/Bookings Manager: Terry & Sherrie Manning. No. of studios & dimensions: 3, A: 38 x 30, 14ft. ceiling. B: 32 x 26, 14ft. ceiling. C: 12 x 15, MIDI Production Room. Mixing consoles: SSL + Neve. Recorders: Mitsubishi, Studer. Digital audio workstations: ProTools, SoundTools, Digidesign. MIDI set-up: Performer, MacIntosh, many modules. Monitors: Urei, Yamaha. Specified outboard: Beach front tropical setting, Apartments on premises; Total renovation and upgrade early 1993.



## BELGIUM

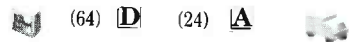
### IMPULS RECORDING STUDIOS

Wittevrouwestraat 26/B-3020 Herent, Belgium. +32 (0) 16 200003; Fax: +32(0) 16 290123.



### KITSCH RECORDING STUDIOS

15 Rue Wery, 1050 Brussels, Belgium. +32 2 640 0880; Fax: +32 2 646 3205. Owner: Bruno Stevens. No. of studios & dimensions: 2 studios - Daylight. Mixing consoles: Neve VR 60/Neve 8108 56/48. Recorders: 2 Mitsubishi x 850/Studer A820/24 / Ampex ATR100. MIDI set-up: EMU 3 - Memory M00G - DX7. Monitors: Genelec 2 x 15/Quested Q108. Specified outboard: Everything + Fairchild 670, 5 Pultecs, 3 Telectronix LA 2A, Publison (2). A/V equipment: Video Post. Special services: 40+ Valve microphones, pool table, large garden and espresso machine.



### PYRAMIDE RECORDING STUDIO

31, Heerweg, B-1.650 Beersel, Belgium. +32 02 377 5582; Fax: +32 02 377 9077.



## CANADA

### LITTLE MOUNTAIN SOUND STUDIOS

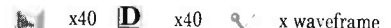
201 West 7th Ave. Vancouver BC, V5Y-7L9, Canada. (604) 873 4711; Fax: (604) 873 4718. Studio/Bookings Manager: Tilde Cameron. No. of studios & dimensions: Studio "A" - 33ft. x 50ft. 22ft.H (Plus loading bay). Studio "B" - 31ft. x 33ft. x 22ft.H. Mixing consoles: SSL G-Series 64 input E-Series 48 channel (studio). Recorders: 3 x Studer A-800III/Sony 3402 Dash Digital. Monitors: Urei 813C/NS-10M/Auratones. Specified outboard: AMS RMX/DMS/Yamaha Rev 1/Neve EQ, 1084/SPX-90II/TC2290/PCM 90/Neumann Tuve 47/Sony C-37.

Special Services: Mixing for three channel film L-C-R in studios "A" & "B"/Full album tracking & Mixing facility.



### McCLEAR PATHE RECORDING AND POST PRODUCTION STUDIOS

225 Mutal Street, Toronto, Ontario, M5B 2B4, Canada. 416 977 9740; Fax: 416 977 7147.



### METALWORKS RECORDING STUDIOS

3611 Mavis Road, Unit 3, Mississauga, ON L5C 1T7, Canada. +1 905 279 4000; Fax: +905 279 4006.



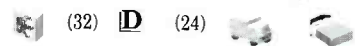
### MUSHROOM STUDIOS

1234 West 6th Avenue, Vancouver, Canada. +1 604 664 5850 (Tel.+Fax No.).



### PHASE ONE RECORDING STUDIOS LTD.

3015 Kennedy Road, Unit 10 Scarborough, Ontario, Canada M1V 1E7. +1 416 291 9553; Fax: +1 416 291 7898. Owner: Paul Gross. No. of studios & dimensions: 2 Studios, A 50 ft. x 30 ft. B 20ft. x 15ft. Mixing consoles: Neve. Recorders: Studer 24 Track A80 Mitsubishi 850 32 Track. MIDI set-up: Studio B MIDI Production Room. Monitors: JBL Custom. Specified outboard: Lex 480, Pultecs Ele, LA2 Limiters, AMS Rev, Hassenberg Ele, AMS Hardy Phaser, Lex 224. A/V equipment: Video 3/4" lock to Multitrack. Special services: Production, CD Manufacturing.



### PINEWOOD SOUND

1119 Homer Street, Vancouver B.C. V6B 2Y1, Canada. +1 604 669 6900; Fax: +1 604 669 0040.



## STUDIO MORIN HEIGHTS



201 Perry, Morin Heights, Quebec, J0R 1H0, Canada. +1 514 226 2419; Fax: +1 514 226 5409.

**Owner:** L'Equipe Spectra. **Studio/Bookings Manager:** Judy Smith/Peter Holmes. **No. of studios & dimensions:** Studio 44ft. x 30ft., Control Room 18ft. x 15ft. **Mixing consoles:** SSL 4056 G Series: + Total Recall, Events Controller plus 8 extra stereo patchable VCA's assignable to stereo bus. 1 Neve 12-4 with 1073EQ. **Recorders:** 1 Studer A800/II, 1 Otari MTR90/II, 1 Studer A80 1/2 inch. 2 Studer B67, 1/4 inch. 2 Studer A710 cassette. 2 Panasonic SV3500/3700 DAT. 1 Revox B225 CD player. 2 Timeline Lynx Synchronizer. **Monitors:** 1 pr Acoustic Research AR18S, 1pr Auratone 5PSC main monitors, 1 pr Quedest 412/II, 1 pr Yamaha NS10M, 1 MacIntosh Mc2300 (near fields), 1 Quedest DX3000E (main monitors), 2 Quedest A900E (main monitors), 3 Studer A68 (headphones), 2 BSS FDS360 (Modified) Crossover (main monitors). Instruments: 1 Hammond B3, 2 Leslie 122, 1 Yamaha 9'Concert Grand Piano.

**Specified outboard:** 8 Focusrite ISA110, 12 Assorted Equalisers, 1 AMS RMX16, 3 EMT 140 Plates, 1 Eventide H3500BV, 1 Lexicon 224XL, 1 Lexicon 480L, 7 Assorted Digital Reverb/FX, 7 Assorted DDL, 1 Gates M3529B Tube Limiter, 2 Neve 2254E, 3 RCA BA6A tube limiter, 2 Urei LA3A, 2 Urei 1176N, 8 Assorted Compressor/Limiter.

**Special Services:** The studio, our six bedroom guest house and cottage are situated in the heart of the Laurentian resort area, with panoramic views of our private lake and forest. However, we are only 10 minutes from St-Sauveur, the major centre of the region, and less than an hour from Montreal. We have a cappuccino bar, satellite dish, games room, band office, boats on the lake and can arrange participation in a multitude of seasonal sports including skiing, golf and horseback riding. A wide range of in-house catering can be arranged of alternatively there are over eighty restaurants within a few minutes drive. Our 'tech shop' is well stocked and equipped, including an Audio Precision System One. Apart from our spacious studio area, we can offer as an option the use of our large 'live room' for recording or as a real reverb chamber.

**Association Member:** SPARS.



## SUMMIT SOUND INC.

McAndrews Road, PO Box 333, Westport, ON, Canada K0G 1X0. +1 613 273 2818; Fax: +1 613 273 7325.



## VANCOUVER STUDIOS

3955 Gravely St., Burnaby, B.C. Canada. +1 (604) 291 0978; Fax: +1 (604) 291 6909. **Studio/Bookings Manager:** Tilde Cameron. **No. of studios & dimensions:** Studio 1: 34ft. x 27ft. studio - 23ft. x 26ft. control room. Studio 2: 24ft. x 17ft. studio - 19ft. 10inches x 17ft. 6inches control room. Studio 3: 23ft. 8inches x 11ft. 10inches - 20ft. 8inches x 16ft. 7inches control room. Studio 4: (attached to studio2) 39ft. 6inches x 38ft. 4inches. **Mixing consoles:** Studio 1 - Neve 8058 MK24 input with 4 inboard compressors. Studio 2 - SSL 4056 G-Series with total recall & plasma meters. Studio 3 - MCI JH-500 32 Input in-line console. **Recorders:** Otari MTR-100 Multitracks (3). Otari MX-80 Multitracks (1). Otari

MTR-12 1/2inches & 1/4inches CTTC 2-TRK. Panasonic SV-3700/3500 DAT recorders. **Digital audio workstations:** SSL Screensound Digital Edit Workstations (2). **Monitors:** Urei 813C/NS-10M/Tannoy FSM 215/Auratone Soundcubes.

**Specified outboard:** Lexicon 480L/Eventide H-3000/Drawmer DS-210 TC Electronics 2290/Lexicon PCM-70/Lexicon PCM-42 Yamaha SPX-90/AMS RMX-16/KORG DRV-3000, Aphex Expander - Gate/DBX-160X Compressors/ Valley Dynamite Expander/Gate/TC Electronics 2240 Preamp & EQ (Tube Tech Pe-IB EQ) John Hardy M-1 Mic Pre-Amps(4). **A/V equipment:** SSL Screensound digital workstations, JBL Projector/100" Screen, Timeline Lynx synchronizers with KCU controller, Sony BVU-900 3/4inches Video recorders(2), Sound ideas sound effects library, many other CD sound effects libraries in edit suites.

**Special Services:** Full Album Tracking/Mixing facility and feature film mixing and editing.



## DENMARK

### AIR PLAY RECORDING STUDIO

Montanagade 29D-E, 8000 Aarhus C, Denmark. +45 861 91212/+45 861 91272. **Owner:** Lars Alsing. **Studio/Bookings Manager:** Lars Alsing. **No. of studios & dimensions:** 1 studio, 300m<sup>2</sup> with daylight, 50m<sup>2</sup> controlroom, 100m<sup>2</sup> recording room, both with air condition, Mahogany floors. **Mixing consoles:** AMEK Angela 28/56 inline with automation. **Recorders:** Otari MTR 90 mrk. 2 -24 track. **Digital audio workstations:** Fairlight series III. **MIDI set-up:** Yamaha TG77, Ensoniq KMX 16, Roland A880, Atari Mega ST4 & Cubase, Fairlight series III. **Monitors:** JBL 4412, Dynaudio Acoustics M1, Yamaha NS 10M, Auratone.

**Specified outboard:** Tube Tech, Urei, Drawmer, DBX, Aphex, TC2290, Lexicon 480L, PCM 70, Klark DN780, Sony MUR201, Yamaha SPX90, Alesis Quadraverb, Eventide H3000S, SPL Vitalizer, Microphones: Neumann, AKG, Bruel & Kjaer.

**Special Services:** Inhouse engineers & producer, catering, leisure facilities, satellite TV, video, kitchen, acoustical design by soundtechnical institute or Copenhagen.



### KLING KLANG STUDIO

Kiekegaardsgade 3, 9000 Aalborg, Denmark. +45 98 166462 (Tel. No.)



### MEDIA SOUND STUDIOS

Sturlasgade 14 B, 2300 Copenhagen S., Denmark. +45 31 546 100; Fax: +45 31 543 539.



### PUK RECORDING STUDIOS - DENMARK

Kaerbyvej 65, 8983 Gjerlev, Denmark. +45 864 74600; Fax: +45 864 74611.



### SWEET SILENCE STUDIOS APS

85 Strandlodsvej, 2300 Copenhagen, Denmark. +45 3159 1200; Fax: +45 3284 0510.



## FRANCE

### DAVOUT

73 Boulevard Davout, 75020 Paris, France. +43 71 53 39; Fax: +43 72 44 83.



## GERMANY

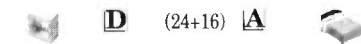
### BAUER STUDIOS GMBH

Markgroeninger Str. 46, D-71634 Ludwigsburg, Germany. +49 (0) 7141 2268-0; Fax: +49 (0) 7141 2268-99.



### DAVITON RECORDING STUDIOS

An der Mosebecke 1, 32758 Detmold, Germany. +49 05231 34548; Fax: +49 05231 21010.



### DIERKS STUDIOS

Hauptslr. 33, D-50259 Pulheim, Stommeln, Germany. +49 2238 92300; Fax: +49 2238 923021.



### KILLING SOUND RESEARCH

Lindenstrasse 97a, 40233 Dusseldorf, Germany. +49 211 691 2395; Fax: +49 211 691 2476.



### PILOT TONSTUDIO GMBH

Rumfordstr. 15, D-80469 Munchen, Germany. +49 89 296 396; Fax: +49 89 299 891. **Owner:** C. Cress, A. Volker, Mambo Musik. **Studio/Bookings Manager:** Hans Menzel. **No. of studios & dimensions:** Studio 1 - SSL 50 sqm 6m height. Studio 2 - Harrison Ten, 6sqm. Studio 3 - MIDI, 6 sqm, Studio IV/Hard Disk-Mastering. **Mixing consoles:** SSL 4000 G-Series 56 Channels Total Recall, Harrison Series Ten, fully automated, Sony Estec 32 channels, Studer Dyaxis. **Recorders:** 2 x s D820 48-track digital, 2x Otari DTR 900 32-track digital. 2x Studer A 820 24 track analogue with Dolby SR. **Digital audio workstations:** Studer Dyaxis. **MIDI set-up:** EMU XP 32MB, 105Mb internal, Akai S1100 HD 26 Mb, CD-Rom, 60 Mb Hard Disc Roland W-30 Sampler-CD Rom, Roland D550, Roland D110, Roland Super Jupiter + Programmer Prophet VS, Korg M1, Yamaha DX7 II, Yamaha TX 802, Yamaha RX 5, Yamaha RX7, Yamaha TG 77, JD 800, Korg Wave Station AD, 2 Atari Mega ST4, 2 Atari 1040 ST, 2 Atari Hard Disk 60MB. **Monitors:** Quedest Monitor System Custom made in Studio 1, 2, & 3. Westlake BBSM 4, Yamaha NS10 M, Tannoy Eclipse.



### SALA TONSTUDIO

Seewiesenstr. 14, D-73054 Eisingen, Germany. +49 07161 83510; Fax: +49 07161 814222.



## THEIN RECORDING MOBILE



Blumenthalstr. 8, 28209 Bremen, Germany. +49 (0)421 348048; Fax: +49 (0)421 348049.







**Owner:** Friedrich & Dorothea Thein. **Studio/Bookings Manager:** Martina Luning. **No. of studios & dimensions:** Control room 12m<sup>2</sup>, separate kitchen and cable room, daylight. **Mixing consoles:** ADT 5MT 48-channel, dynamic section per channel, master compressor, 5 VCA groups. **Recorders:** 2 x 24 multitrack AEG/Telefunken Analog/Dolby SR, Sony 3324, Sony 3348, Sony DAT 2300. **Monitors:** Manger Schallwandler, Genelec S30. **Specified outboard:** Lexicon 480, 300; Compressor, Eventide H 300B, BSS Stereo. **A/V equipment:** Adams Smith Zeta Three, AEG/Telefunken M20-TC, Telefunken 24-multitrack, Sony TV-monitor, Video-sync. PAL/NTSC. **Special services:** Full service from recording to CD, phantastic reference acoustic from 20kHz to 30Hz. In-house engineers and producers for pop and classical music.

 (24/48)   

## THEIN STUDIOS

Blumenthalstr. 8, 28209 Bremen, Germany. +49 (0) 421 348048; Fax: +49 (0) 421 348049.

 (24)  (24/48)  

## TOUCHDOWN STUDIOS







Kirchbergstrasse 25, D-8051 Kranzberg, Germany. +49 (0) 8166 5071; Fax: +49 (0) 81 66 7033. **Owner:** Terry Drivas. **Studio/Bookings Manager:** Barry Bonjovi. **No. of studios & dimensions:** Studio 1: control room, 30m<sup>2</sup>. Recording room 85m<sup>2</sup>. Studio 2: control room, 35m<sup>2</sup>. MIDI room, 20m<sup>2</sup>. Digital editing suite(SSL) 30m<sup>2</sup>. **Mixing consoles:** Studio 1: Neve VRP-60 /with 12 stereo channels. Studio 2: Neve VRP-72. **MIDI Room:** 32 channel Soundcraft 600. **Recorders:** 2 x Otari MTR-100, 1 x Sony 3348 Digital, 1 x Mitsubishi x -86 Digital 2 track, 16 tracks direct to disk, Numerous DATs. **Digital audio workstations:** 2 x SSL Screensound workstation with Soundnet, 2 x N.E.D. Synclavier Post Pro SD 6400. **MIDI set-up:** Wide range inc: EMU III Ex (8ms) with CD-ROM & MOD, Kurzweil 250, Kurzweil MIDI Board, Akai S-1000 (12 mB) with CD-ROM & MOD, Oberheim DPX-1 with CD-ROM; Oberheim Xpander, JL Cooper MIDI Patchbay plus a wide range of vintage & modern outboard expanders. **Monitors:** Control Room 1: Quedsted Q210 with 21" Subwoofer and Dolby surround. Control Room

2: Quedsted Q212 with Dolby surround/quested Q108. Assorted Nearfields including Yamaha NS10: JBL Control 5: Audix mm5, Westlakes. **Specified outboard:** Over 60 pieces including: 2 x Lexicon 480L; 2 x AMS DMX -15 2 x AMS RMX - 16, numerous Sony FX, 4 x TC 2290, Numerous Yamaha & Roland effects, Massenburg Mic Pre-Amp/EQ/ comp-Limiter. TUBE-tech Processors, Fairchild 670 Stereo Comp/Limiter, 2 x Neve stereo comp/limiter, Urei 1178. **A/V equipment:** 4 x Sony U-matic Recorders/Players, 1 x Sony HDVS-10 UNIHI video recorder, 55" Sony HDTV etc. projectors system, numerous colour monitors. **Special Services:** Catering, Jacuzzi, heated swimming pool. Also access to one of the largest sound libraries currently available. HDTV facilities. **Association member:** AES.

## WERYTON STUDIOS UND VERLAG WERNER RYGOL K.G.

Munchner Str. 11a, 85774 Unterföhring, Munchen, Germany. +49 (0)89 952007; +49(0)89 9579776. **Owner:** Werner Rygol. **Studio/Bookings Manager:** Andrea Moosbauer. **No. of studios & dimensions:** A 30/70m<sup>2</sup>, B 32/45m<sup>2</sup>, C24m<sup>2</sup>. **Mixing consoles:** SSL 48CH 32 Returns, Harrison 48 CH 24 Returns, D+R 32 CH. **Recorders:** Sony PCM 3348, Otari DTR 900, Studer A 820 Dolby SR, Studer A 800+A 80 Dolby S. **MIDI set-up:** Akai S 1100 Atari notator cubase etc. **Monitors:** Quedsted Q 312/Q 2126/Yamaha Tannoy. **Specified outboard:** Lexicon/EMT/AMS/ etc. **A/V equipment:** U-matic/Studer Syn System.

 (32/40)  (3x24)  



## HOLLAND

## CAVERN RECORDING STUDIOS



Van Diemen Straat 206, 1013 CP Amsterdam, Holland; 31(0) 20 6263367; Fax: 31(0) 20 6263368. **Owner:** Paul Downes.



**Studio/Bookings Manager:** Paul Downes. **No. of studios & dimensions:** 1 x control room, 1 x live room, 1 x editing (digital) room. **Mixing consoles:** Soundtracs Quartz 48 + Automation. **Recorders:** 24 track digital - Akai A-DAM. **Digital audio workstations:** Akai DD1000. **Midi set-up:** Akai S3000, Akai S1100, Akai S1000, Akai S1000 PB + library + sound. **Monitors:** JBL 4435, Yamaha NS 10, Visonic Little Davids. **Specified outboard:** Neve, Focusrite, Klark Teknik Equalisers. Tube Tech, SSL, Urei, Compressor/Limiters. Lexicon. Eventide, TC Electronic FX. **A/V equipment:** Available on request. **Special Services:** Analogue-Digital Transfers (D-A). **Studio Design By:** "Recording Architecture London" - incorporating their "Black Box Systems". Waterfront location, 5 mins from Amsterdam city centre. Air conditioned and ionised - catering - local bars and restaurants. Natural

light in all spaces. Satellite TV, video. **Associated Member:** APRS, AES.




## SAVE & SOUND STUDIO

H. Gerhardstraat 8, Zaandam, The Netherlands. +31 2990 49354; Fax: +31 2992 1620. **Owner:** Olof Bosma/Marc Christian. **Studio/Bookings Manager:** Marc Christian. **No. of studios & dimensions:** 1 studio, dimensions: 7.5 x 5 meters. **Mixing consoles:** TAC Matchless (Cmix), Side car: D&R 4000. **Recorders:** Soundcraft 760 111 (24), Tascam DAT, Ampex MM 1000 (16), Aiwa DAT, Teac(2). **MIDI set-up:** Atari 1040, Synchronizers, Trigger (Akai), Synth's, Sampler (Akai). **Monitors:** Tannoy Little Red's. **Specified outboard:** Boss multi effect Comp/lim's and gates: BBE Maximizer, Aphex Aural exciter, Master room reverb, Yamaha SPX 900, Yamaha R100, Lexicon LXP1, Beyer/Sennheiser. **Associated Member:** Owners: BRPG/APRS members.



## STONESOUND STUDIO

Nucleonweg 24, 4706 PZ Roosendaal, The Netherlands. +31 01659 45886; (Tel.+ Fax no.)

 (x24)  (x24)

## STUDIO 44

Herenstraat 44 - 2681 BH Monster, The Netherlands. +31 01749 13239; Fax: +31 01749 40526.

 (x24)  (x2) 

## STUDIO 150

Lauriergracht 150, 1016 RV Amsterdam. +31 0 20 625 95 85; Fax: +31 0 20 620 49 82. **Studio/Bookings Manager:** Peter Richeck. **No. of studios and dimensions:** 1, recording area 80m<sup>2</sup> control room 40m<sup>2</sup>. **Mixing consoles:** SSL 400G. Multitrack: Otari MTR-100 with Dolby A & SR. **Recorders:** 2 track analog recorders; Studer A810, Studer B67. 2 Track digital; Panasonic 3700 DAT, Fostex D20 DAT with timecode. **Digital audio workstations:** DAR Sigma with DSP, 16 channels playback and 16 trackhours recording capacity. **MIDI set-up:** Atari Mega ST with Cubase and 44MB Syquest. SMP24 synchronizer, various synths. Instruments: Yamaha C3D Grand Piano, Vox AC30. **Monitors:** Genelec 1034A, Nearfields; Genelec 1031A, Yamaha NS10, Tannoy Eclipse. **Specified outboard:** Lexicon 224XL, Lexicon 480L, Lexicon PCM70, Yamaha SPX900, TC Electronics TC2290, Lexicon Prime Time II, Roland SDE3000, A/DA STD1, AMS 2-20, AMS DMX 15-80 S, Urei 1178, Aphex Compellor, DBX 165, DBX 900 series compressor, gates and De-essers, Audio & Design Compex F760, Kepex II gates, Valley People Dynamite, Focusrite RED 1 pre-amp, Focusrite RED 2 Eq, Focusrite ISA 115 HD, Tube Tech MP1A tube pre-amp, Tube tech PE1C tube-Eq, Aphex Aural Exciter, BBE 882 maximizer, Behringer Denoisers, Klark Teknik DN 360 1/3 octave graphic Eq. Microphones tube: 4 Neumann U67, 1 Neumann U47, 1 Neumann SM23, stereo, 8 Neumann KM64, 2AKG C28, 1Telefunken CMV3. Microphones other: Neumann; 2 x TLM170, 2 x TLM50, 2 x U87Ai, 1 x U89, 4 x KM140, Neumann KMS. AKG; 1 x D12, 2 x 460 Sennheiser; 4 x 441, 2 x 421 Shure; 6 x SM57, 1 x Beta58, 1 x 55SH, Electro Voice; 1 x P120. **A/V equipment:** Sony 9600 U-Matic, Sony Jumbo Monitor, Adams-Smith Zeta-3 Synchronizers with remote, DAR Sigma Audiocomputer, House sync.

**Special Services:** Studio 150 is in the centre of

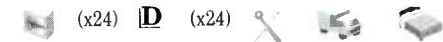
Amsterdam, on a canal.  
Association Member: AES.



## STUDIO ARNOLD MUHREN

STUDIO  
ARNOLD  
MUHREN

Noordeinde 103-104, 1131 Ge Volendam, The Netherlands. +31 2993 64431; Fax: +31 2993 66683. Owner: Arnold Muhren. Studio/Bookings Manager: Arnold Muhren. No. of studios & dimensions: 1 Studio; Control room: 6 x 5 Studio: 9 x 6. **Mixing consoles:** SSL 4040 G-Series computer & Total Recall. **Recorders:** Telefunken M15-A 24 track analog (Digital on request). **Digital audio workstations:** Akai DD1000 (with remote). **MIDI set-up:** Akai S1000/S900, Yamaha TX802, Roland JV880/Super JX10, Korg M1, Dynacord ADD-two, Alesis HR16, Atari 1040st 2, 5mB+45mB HD Adams-Smith Zeta 3, S1000 sound library on MO disks. **Monitors:** JBL4435, Dynaudio Contour I mk II, Yamaha NS10, Auratone 5c. **Specified outboard:** Lexicon 480L, TC Electronics M5000, Eventide H3000, Yamaha REV7/SPX90, Roland SDE3000/SRV2000, Dynacord DRP20, Alesis Quadraverb, EMT140s, AKG BX20, Aural exciters: EXR, D & R Aurex, BBE 802, DBX Boombbox, 'Vintage' equipment: Teletronix LA-2A limiters, Pultec EQH2 equalizers, Neumann U67/M49/U47/SM69, Sony C37A microphones. **A/V equipment:** Sony U-matic/Profeel monitor, Adams-Smith Zeta 3. **Special services:** Inhouse engineer, catering. Protected car parking. Guesthouse at no extra charge.



## HONG KONG

### POLYGRAM DRAGON STUDIO

Room 1001, Garley Building, 233-239 Nathan Road, Kowloon, Hong Kong. +3 852 7304 345; Fax: +3 852 7359 603.



## INDONESIA

### STUDIO 15 (SAGITARIUS RECORDING STUDIO)

Jalan Petojo Selatan VII No. 19A Jakarta 11001-9-Indonesia. +62 (21) 3865775-3857911-3450142; Fax: +62 (21) 3450141. Owner: Leonard Handhi Kristianto and Edward Indra Kristianto. Studio/Bookings Manager: Moh. Stev. Heru Purnomo & Tono Libel. No. of studios & dimensions: studio 1 control room, 16 m<sup>2</sup> (day light) recording room 20 m<sup>2</sup>, Studio 2 control room 16m<sup>2</sup>, recording room 16m<sup>2</sup>. **Mixing consoles:** Soundcraft 6000-44/24 & Soundcraft 2400 LED 32/24. **Recorders:** Studer 827 & Studer A80 Mk.IV. **MIDI set-up:** Akai S-1000, Roland S-770, McIntosh computer. **Monitors:** Auratone QC-66, Yamaha NS-10M Studio Monitor, Urei 813. **Specified outboard:** Lexicon 240 XL, Lexicon PCM 70, Klark Teknik Equaliser, Urei, Compressor/Limiter, Yamaha SPX 1000, Yamaha SPX 900-II, Eventide Harmoniser DHM 98, EMT 240. **Special Services:** Inhouse engineers and producers, Analogue-Digital transfer. Studio design by: Jeka Records, Jakarta-Indonesia. **Association Member:** ASIRI (Association Recording Industries of Indonesia)

## ITALY

### CAPRI DIGITAL STUDIOS

Via Tudro 11, Capri (NA), Italy. +39 837 5157/5158; Fax: +39 837 5141. Owner & Studio/Bookings Manager: Carloquinto Talamona. No. of studios & dimensions: Control room 80sq. metres. Recording areas 150 sq. metres. **Mixing consoles:** SSL 4072 G Series with Ultimotion. **Recorders:** Sony PCM 3348, 2 x Mitsubishi x 880, 2 x Studer A820. **Digital audio workstation:** MacIntosh and Sound Tools. **MIDI set-up:** Opcode Studio Vision, Notator, Cubase, Function Junction Plus, 16 x16 MIDI, Akai 1100, Proteus 1 x R, Yamaha TC 77, Roland R8M, Akai ME 35T, Real World M48. **Monitors:** Kinoshita with TAD components, Yamaha NS to M, JBL Tannoy. **Specified outboard:** Lexicon 480, AMS/Eventide, Roland, Yamaha TC Electronic, Drawmer, Focusrite, Neve, Valley, Orban, DBX, Urei, Aphex, Summit, Teletronix, Tubetech, Art. **A/V equipment:** Sony Projector, with 100 inch screen SVHS Multi Standard, Full Video Sync. **Special Services:** Residential studios, Dash PD Dash Digital domain transfer available. Association Member: World Studio Group.



### FONOPRINT RECORDING STUDIOS



V. Bocca di Lupo 6, Bologna, Italy. +39 51 5852 54; Fax: +39 51 3340 22. Studio/Bookings Manager: Nicolini Luciano. No. of studios & dimensions: Studio 1 Control Room 60 m<sup>2</sup> Recording room 85 m<sup>2</sup>. Studio A Control Room 26m<sup>2</sup> Recording room 56m<sup>2</sup>. Studio B Control Room 27m<sup>2</sup>, Recording room 30m<sup>2</sup>. **Mixing consoles:** SSL 4064 G Series with total recall, MC1 500 28CH with Automation, DR 8000. **Recorders:** 2 x Sony PCM 3324, 1 x Otari DTR 900 II, 2 x Otari MTR100. **Digital audio workstations:** Sound Tools with Macintosh II Ci. **Monitors:** Quedsted Q412B, Urei 813B, Yamaha NS10M. **Specified outboard:** Lexicon 480, 224, PCM70, AMS RMX16, 1580S Yamaha Rev5 Rev7 Eventide H949, H3000S, K.T. DN780, Prisma Neve. **Special Services:** Studio Design By: ADG Acoustic Design Group. Kitchen, Catering, Satellite TV, Billiard Table.



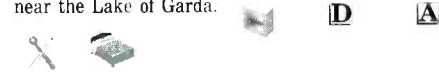
### LA MERIDIANA STUDIOS/HAVANA PRODUCTIONS



LA MERIDIANA

Via Modenese 6 - 37019 Peschiera D/G - Verona - Italy, Via Monzambano 9/A Ponti Sul Mincio - Mantova - Italy. +45 755 3612; Fax: +45 640 0752. Owner: Sergio Dall'Ora. Studio/Bookings Manager: Betty Zaglio. No. of studios & dimensions: 2 Studios - "La Meridiana" control room (daylight) 75 Mq - Live Areas 140 Mq - 30 Mq. "Havana Studio" control room 35 Mq Live area 50 Mq. **Mixing consoles:** 2 x DDA AMR

24 92 Chan. + automation/80 channel. **Recorders:** 24 Track analogue. Studer 827 + Studer A 80 - Digital available on request. **Digital audio workstations:** Sound Tools + DM 80 Roland + Mac Quadra 900. **MIDI set-up:** 2 Akai 3200, Emulator 3, Emu 2, JD 990, D50, Kurzweil 3200, Korg A/D, Emu Vintage, TG77, D50, Prophet T 8, Matrix 1000, Waldorf Juno 60, BIT 99, Alesis D4, SR16, HR16, TR 909. **Monitors:** Genelec, Tannoy, Yamaha NS 10. **Specified outboard:** 480 Lexicon, PCM70, AMS RMX 16, 200 Lexicon, Yamaha Rev1, Roland R 880, Eventide H3000, TC 2290, SPX 1000, Sony, M 500, Valley 510, Yamaha YD 2600, Korg SD 3000, Art + various gates compressors, delays, Aphex. **Special services:** Swimming pool, Billiard, Air conditioned, TV, Natural light in all places, private park 20.000 Mq with little river. Only 10 minutes from Verona Airport and 1 hour from Milano. Rural location near the Lake of Garda.



### MULINETTI RECORDING STUDIO

Mulinetti

Via Bordigotto, 5 - 16036 Recco (GE), Italy. +39 (185) 75017; Fax: +39 (185) 722525. Owner: Alberto Parodi. Studio/Bookings Manager: Alberto Parodi.

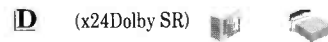


No. of studios & dimensions: 1 x control room, 1 x live room and all the villa. **Mixing consoles:** Neve VR 60 with flying faders and recall. **Recorders:** Mitsubishi X850, Studer A827 with SR. **Digital audio workstations:** Digidesign PROMASTER 20. **Monitors:** Quedsted 212b, Dynaudio M1, Genelec S30, Yamaha NS10. **Specified outboard:** Lexicon, AMS, Eventide, Roland, Quantec, Klark Teknik, TC Electronic, Bel, Yamaha, DBX, Urei, Summit Audio, Tube Tech, Aphex, Drawmer and more... **Special Services:** the studio is a residential facility located in a beautiful old villa by the sea with private beach, 5 bedrooms with telephone, TV, air conditioned and sea view, satellite, TV, gymnasium, good Italian food and hospitality.



### STUDIO 52 AUDIO VIDEO S.A.S.

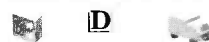
Via Guido de Ruggiero, 52 - 80128 Napoli, Italy. +39 81 579 2599; Fax: +39 81 579 2272.



## JAPAN

### AVACO CREATIVE STUDIOS INC.

3-18-2 Chome, Nishiwaseda, Shinjuku-ku, Tokyo, Japan.. +81 3 3203 4181; Fax: +81 3 3207 1398.



## ECHO HOUSE

B1, 6-15-23 Roppongi, Minato-ku, Tokyo 106, Japan. +81 3 3403 1569; Fax: +81 3 3403 2395.

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## HITOKUCHI-ZAKA STUDIOS INC.



### HITOKUCHI-ZAKA STUDIOS INC.

4-3-31 Kudan-Kita, Chiyoda-ku, Tokyo 102, Japan. +81 (0) 3 3263 1097; Fax: +81 (0) 3 3239 6759. Owner: Hideo Tanaka. Studio/Bookings Manager: Masahiro Araki. No. of studios & dimensions: Studio 1: studio 236m control room 92m. Studio 2: studio 138m control room 60m. Studio 3: studio 138m control room 60m. Studio 4: booth 10m control room 50m. Studio 5: booth 7m control room 50m. Fuji-san Studio: studio 152m control room 54m. Digital Mastering Room A&B: 25m. Mixing consoles: Studio 1: Neve VR 72 with Flying Faders Automation and Recall.



Studio 2: SSL 4064G G Series Computer. Studio 3: Neve VRL 60 with Flying Faders Automation and Recall. Studio 4: SSL 4056E G Series Computer. Studio 5: SSL 4056E G Series Computer. Fuji-san Studio: SSL 4056E G Series Computer with Total Recall. **Recorders:** (6) Sony PCM-3348 48-track digital. (2) Mitsubishi X-850 (1) Mitsubishi X-800 32-track digital. (7) Studer A800 24-track 2". (10) Studer A80 2-track 1/2 inch. (1) Studer A80 2-track 1/2 inch. (6) Studer A820 2-track 1/4 inch or 1/2 inch. (2) Sony PCM-1630 2-track digital. (1) Sony PCM-3402 2-track digital. (2) Mitsubishi X-80 2-track digital. (7) Tascam DA-30 DAT. (4) Sony 59ES DAT. (2) Sony 55ES DAT. **Digital audio workstations:** Digidesign Pro Tools (2GB, HD). **MIDI set-up:** Digidesign Sound Tools II, Mac IICI (1.5GB, HD) with Performer and Studio Vision, AKAI S1100. **Monitors:** Studio 1: Kinoshita Model RM-4B, Studio 2: Kinoshita Model RM-7V, Studio 3: Boxer 4, Studio 4: Kinoshita Model RM-6V, Studio 5: Boxer 4, Fuji-san Studio: Kinoshita Model RM-6V. Digital Mastering Room: Kinoshita Model RM-8V, Yamaha NS10M. **Specified outboard:** (6) Lexicon 480L. (2) 224XL, 300 M-97, (7) AMS rmx-16. (3) sdmx, (4) dmx 15-80s, (6) EMT 140ST, EMT 140ST by Martech, (2) EMT 240, (2) Sony DRE-2000, (7) MU-R201, M7, (6) Yamaha REV-7, REV-1, SPX-50, (5) SPX-90, (6) SPX-90II, (3) SPX-900, (8) SPX-1000, (6) Roland SRV-2000, R-880, (10) SDE-2000, (18) SDE-3000, (15) SDE-3000A, DEP-5, (6) Dimension SDD-320, SN550, (2) SBX-80, (2) Eventide H-3000SE, H-3500, (2) H949, (2) 2830 Omni Pressor, (2) URSA SST-282, TC2290, TC1210, Publison DHM-89B2, (7) 33609, (4) 1066, (16) Urei 1176, (6)1178, (2) 545, (6) dbx 162, 160XT, Fairchild 670, (2) Quad Eight CL-22, (4) Tube Tech CL1A, (2) CL1B, (4) PE1B, (4) PE1C, GML 8900, 8200, (2) PulTech EQP-1A3, (30) API 550A, (28) 560A, (32) Kepex II, (4) Drawmer DS-201, (5) Orban 516EC, 536A, (2) Focusrite EQ-115, (4) HA-116 K&H UE400, (4) MXR Phaser, (4) Flanger. EXR EX-2, (2)EX-3, (3) Marshal Time Mod. 5002, BASE. BBE-822. **A/V equip-**

ment: (3) Adams-Smith 2600, (3) Adams-Smith Zeta-3, Timeline Lynx, Sony DVR-18 D2 Digital VTR, Sony BVU-950 VTR. **Special services:** Hitokuchi-Zaka Studios located near the Imperial (Tennoh) Palace in the heart of Tokyo, has 2 mastering rooms and 5 major rooms including the unique Studio 1 equipped with 6 various isolation booths, space for 70 musicians and a large control room designed by Shozo Kinoshita, and the Studio 3 with newly furnished control room designed by Neil Grant, and provides with multi-track recording including all digital formats. Fuji-san Studio, a residential studio with full accommodation is located at the foot of Mt. Fuji in the comfortable surroundings. Recreational activities including golf, fishing, tennis, swimming and skiing are available. Association member: JAPRS, AES, WSG.



## MAGNET STUDIO

B1, 3-4-41 Motoazabu, Minato-ku, Tokyo 106, Japan. 813 3403 8495; Fax: 813 3423 4485.



## SOUND DESIGN



2-32-2 Sendogaya, Shibuya-Ku, Tokyo, Japan 151. +81 (3) 3423 0481; Fax: +81 (3) 3423 0480. Owner: Sound Design, Inc. Studio/Bookings Manager: Keizo Suzuki. No. of studios & dimensions: (1) W. 8m x H.3m x D7m. **Mixing consoles:** Focusrite Studio Console + GML MFA. **Recorders:** Sony PCM-3348 x 2, PCM - 7030 x 2, Studer A800 MKII-24, Sony PCM -3402 x 2, Panasonic SV-3700 x2, Studer A 80 1/2 inch, 1/4 inch. **MIDI set-up:** SBX-80. **Monitors:** Ray Audio



Kinoshita Original TAD. **Specified outboard:** Neve 1081, Tube Tec CL-1A, ME-1A, GML 8300, ELA-M251, V-47,67, C-12, 12A, John Hardy M-1, PulTec E2P-1A3. **A/V equipment:** Sony 8/4 Umatic, BVU-950, Victor VHS BR-7700.

Association Member: Audio Rents, Co. Ltd. (Tel: 813 3402 2291). Sound Design Inc. (Tel: 813 3423 0481).



## SOUND INN STUDIOS

Yonban-cho Annex, 5-6 Yonban-cho, Chiyoda-ku, Tokyo 102, Japan. +81 3 3234 4311; Fax: +81 3 3234 4385. Owner: Tsuneo Hayakawa. Studio/bookings Manager: Yoichi Aikawa.

No. of studios & dimensions: Four studios - Studio A: Cont. 92m<sup>2</sup>/St. 246m<sup>2</sup>, Studio B: Cont. 90m<sup>2</sup>/St. 101m<sup>2</sup>, Studio C: Cont. 90m<sup>2</sup>/St. 35m<sup>2</sup>, Studio F: Cont. 85m<sup>2</sup>/St. 25m<sup>2</sup>. **Mixing consoles:** SSL 4056G, SSL 4072G, Over quality OQM8180 + 8S(GML), OQM8196(GML). **Recorders:** Sony PCM 3348, PCM 3324, Studer A800. **Monitors:** Qested Q412, Yamaha NS-10M, Autotone 5C, Genelec S30NF.

**Specified outboard:** Focusrite 115HD, AMS rmx16, dmx-15-80S, Lexicon 224XL, 480L, Quantec QKS Neve 33609, Urei 1176LN, LA-4, LA-2, Eventide H-3500, GML 8900, TC 1210, 2290, Roland, Yamaha. **A/V equipment:** sony BVU-800DB; LINX/SAL.

Association Member: JAPRS, WSG.



## MALAYSIA

### ADDAUDIO POST PRODUCTIONS SDM BHD

11, Jalan 17/56, 46400 Pethling Jaya, Malaysia. +60 (3) 7560600; Fax: +60 (3) 75 60470. Owner: The Music Machine Holdings. Studio/Bookings Manager: Daniel Tang. No. of studios & dimensions: Studio 1, Studio 2, Studio 3. **Mixing consoles:** DDA DMR12, DDA D Series. **Recorders:** Studer. **Digital audio workstations:** 2 DAR Soundstation II. **MIDI set-up:** Atari, Emulator III, Akai S1100, Microwave, Proteus. **Monitors:** Qested H210. **Specified outboard:** SSL, Klark Teknik Equalisers, Summit compressors, EMT & Urei Compressors, Lexicon, Yamaha. Association Member: SPARS



## NEW ZEALAND

### VILLAGE SOUND RECORDERS LTD.

The Production Village, 26 Wright Street, PO Box 6593, Wellington, New Zealand. 64 4 385 0781; Fax: 64 4 384 3774.



## PORTUGAL

### TOUCHDOWN - PORTUGAL



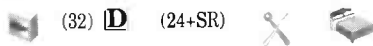
For Bookings contact Touchdown Munich: Kirchberstrasse 25, D-8051 Kranzberg, Germany. +49 (0) 81 66 5071; Fax: +49 (0) 81 66 7033. Owner: Terry Drivas. No. of studios & dimensions: Studio 1: Control RM 60m<sup>2</sup>, Recording Room 200m<sup>2</sup> with IDM ceiling. Studio 2: Control RM 60m<sup>2</sup>, Recording Room 75m<sup>2</sup>. **Mixing consoles, Recorders, Digital audio workstations, MIDI set-up, Monitors and Specific outboard** to be announced. **Special services:** The complex will house two impressive studios, 4 digital edit suites plus ancillary mix facility. Will offer full recording and post-production services. Fully residential, full catering plus option to self-cater, pool, jacuzzi, fully equipped gym, secluded beach, fabulous location. Association member: AES.

## SINGAPORE

### LION STUDIOS

115B Commonwealth Drive 02-00, Singapore 0314. +1 65 473 4627; Fax: +1 65 474 1273. Owner: Lion Studios Pte. Ltd. Studio/Bookings Manager: John

Herbert. **No. of studios & dimensions:** 2 studios. Studio 1: Control = 60 sq./m, Recording = 170 sq./m. Studio 2: Control = 32 sq./m. **Mixing consoles:** Studio 1: Polygram Custom 40/24/24. Studio 2: Studer 089 12/2/2. **Recorders:** Studer A80 24-track + Dolby SR/A80 2-track + Dolby-A/PCM1630 + DMR2000. **Digital audio workstations:** Studer "Dyaxis" - 1G/Byte HD + System Synchroniser. **MIDI set-up:** Akai S1000 + Library/Yamaha SY77 + Library/Oberheim Expander Yamaha DX7 + Library/RTL "Event" SMPTE to MIDI Synch. **Monitors:** Quedstedt 212bc/JBL 4333A/Phillips 587, Will, Harrison, Studer, Yamaha AMPS. **Specified outboard:** EMT-140, Lexicon-200, Rev-7, SPX-1000, SPX-90, AMS 15-80 S Drawmer-500, Eventide H-949, Polygram complimitors gates & de-essers etc. **Special services:** Multitrack music recording & mixing for album projects. 2 track digital editing, CD tape mastering & PQ-coding. In-house engineers. **Association member:** AES.



(32) **D** (24+SR)

## SLOVAKIA

### OPUS RECORDING STUDIO

Mlynske Nivy 73, 827 99 Bratislava Slovakia +42 7 223235; Fax No: +42 7 690 91.



## SPAIN

### CRASH

C/Forn, 4 08240 Manresa (Barcelona), Spain. +34 3 877 33 44 (Tel. + Fax). **Owner:** Miguel Oms. **Studio/Bookings Manager:** Imma Barrachina. **No. of studios & dimensions:** 3 x 4 m<sup>2</sup> and 10 x 6 m<sup>2</sup>. **Mixing consoles:** Soundcraft Shapphyre 64 Channels inline. **Recorders:** 24 Analog Tracks Tascam, 24 Digital Tracks Tascam, DAT Sony 7030, Cassette Tascam R2 MkII. **Digital audio workstations:** Pro Tools/Sound Tools/DINR. **MIDI set-up:** Digidesign, Sample Cell II, MIDI Time Piece II, Kurzweil K-2000, Akai S-3000, Roland VP-70. **Monitors:** Tannoy 12 DTM, NS10-M Yamaha. **Specified outboard:** Roland R-880, TC Electronic M-5000, Sony M-7, Quadra 950 24MS ROM, NEC 6FG Monitor & 24 Bits Card, Sony CDP-27000 CD. **Special services:** Courses: (Training) - MIDI, Professional Sound, Engineer Recording.



## SWITZERLAND

### CONCEPT STUDIO

Leman 7, 1020 Renens, Switzerland. +41 21 634 5000; Fax: (same).

**Owner:** Patrice Collet. **Studio/Bookings Manager:** Patrice Collet. **No. of studios & dimensions:** 1 studio - 60m<sup>2</sup>. **Mixing consoles:** Soundcraft 6000 - 36/24. **Recorders:** MCI JH-24 Analog 2 inches/Sony DT55, Denon DTR 80-DAT. **Digital audio workstations:** Akai DD-1000. **MIDI set-up:** Notator Logic on Mac/Intosh/C-LAB creator on Atari/Akai S-1000/EMU-systems EMAX, Vintage key, performance, Roland D-550/Yamaha DX-7...**Monitors:** Westlake BBSM-6/Yamaha NS-10/AKG LSM-50. **Specified outboard:** Lexicon 200/PCM 70/PCM 60/PCM 42/LXP-AS/Valley GateX/ Dynamite /DBX 902/ 903/Aphex Type-C/Dominator II/Neumann U-87...**Special Services:** Recording/ Mixing /Pre-mastering/



## GAMMA RECORDING

Gamma Recording



Bahnhofstrasse 50, 4663 Aarburg, Switzerland. +41 62 414 470; Fax: +41 62 414 471. **Owner:** Lachmann/Schwitler & Co. **Studio/Bookings Manager:** Martin Lachmann. **No. of studios & dimensions:** 1 x control room: 25m<sup>2</sup> (daylight) with separate machine room, 1 x recording room: 250m<sup>2</sup>, 1 x booth: 16m<sup>2</sup> (daylight). **Mixing consoles:** Harrison MR-3 (aux-update, 10 discrete sends), Optifile 3D computer, separate effects-returnmixer. **Recorders:** Studer A820/24 with Dolby SR. **Digital audio workstations:** Sonic Solutions (available from autumn '93). **Midi set-up:** Proteus "World", TG77, D50, Matrix 1000 etc. Atari Mega 4 computer and SRC AT synchronizer. **Monitors:** Andy Munro M3, Yamaha NS-10M, Auratones. **Specified outboard:** Lex 300, Lex 224 (2), Lex PCM70 (2), EMT 240, Eventide H3000SE, TC 2290, TC 1210, Dynacord DRP20X, Yamaha SPX 1000 plus many more.... Focusrite ISA 115, Tube Tech PE1B, CL1A, Summit TPA200A, UREI LA4 (6), 1178, Publison Relief Enlarger plus many more... Fine collection of Mic's including Calrec Soundfield, B&K's, Sennheiser MKH's etc. **Special Services:** Very large recording room complete with Bosendorfer grand piano, experienced house engineers, producers-office, fully equipped kitchen/lounge and a hotel just next door to the studio. **Association Member:** AES, Re-Pro Associate.

**A** X24



## MASTERS STUDIOS



Dreilindenstr, 42, CH-9011 St. Gallen. +41 71 255 666; Fax: +41 71 254 098. **Studio/Booking Manager:** Victor Waldburger. **No. of studios & dimensions:** 2 Studios: Studio A: CtrR: 28m<sup>2</sup>, RecR: 75m<sup>2</sup> divided in 3 rooms by glass doors: Live-Room, Stone-Room, Dead-Room. Studio B: CtrR: 22m<sup>2</sup>, RecR: 35m<sup>2</sup> divided in 2 rooms by glass door: Live-Room. Flat-Room.



**Mixing consoles:** Studio A: SSL 4048 G + Computer/Total Recall, Studio B: 36CH. & MasterMix Soundcraft TS 24. **Recorders:** 1 Studer A812 1/4", 1 Sony PCM 7010, 1 Sony PCM 2500 2 x Studer A820-24 Tracks Dolby SR, 2 x Akai Adam 12 Tracks digital. **Digital audio workstations:** DigiDisign Soundtools. **MIDI set-up:** Emulator III, Yamaha DX7, Roland D50, MiniMoog, CD-ROM & SyQuest Soundlibrary with 4 Gb Sounds, Mac Iix with Performer. **Monitors:** Studio A: Andy Munro installed Dynaudio Acoustics M3 active System. Studio B: Andy Munro installed Dynaudio Acoustics M2 passive System. **Specified outboard:** Lexicon: 480L, PCM 70, Super Prime Time, Prime Time, PCM 60. AMS RMX 16, EMT 246, Yamaha: Rev7, SPX90, Eventide: H 949, 3000 SE, Drawmer Gates, Urei 1178. TUBE-tech: CIA, PE1B, Focusrite Rack: 2 x EQ, 2 x Comp/Gate/DDEE, Neve Prism Rack, Valley People

Rack. **A/V equipment:** Sony U-matic. **Special services:** Inhouse Restaurant, Swiss Chalet for Accommodation (10 Pers), small lakes at the studio for swimming/Ice Skating. Very beautiful view to the lake of Constance and the santis mountains. Daylight in Studio A, half daylight in Studio B. **Association member:** Action CH-Rock.



## PINK TONSTUDIO



Luzernstrasse 123, 4528 Zuchwil, Switzerland. +41 (0) 65 25 24 88; Fax: +41 (0) 65 25 30 31. **Owner:** Jurg Naegeli AG. **Studio/Bookings Manager:** Jurg Naegeli. **No. of studios & dimensions:** a) Studio 40m<sup>2</sup>, Control room 30 m<sup>2</sup>, c) ProTools & MIDI room 24 m<sup>2</sup>. **Mixing consoles:** a) Soundcraft 2400 28/24/2, Bargraphs, c) Yamaha DMP 11. **Recorders:** A: Otari MTR 90 MkII; Studer A 812, Dolby SR; Studer A 812 TC; Studer D780 DAT; Studer D 740 CD-Recorder; Sony & Tascam DAT's & Cassette's. **Digital audio workstations:** DigiDisign PROTOOLS. **MIDI set-up:** Akai S 1000 KB, 12 MB, HD; Emulator II; 2 x Emu Proteus I; 2 x Emu ProCussion; Korg M1 & M1R; Yamaha DX 7; Roland JX8P & D110 & Juno 60; ARP Odssey; Oberheim Matrix 1000; Hohner String Ensemble; Alesis HR 168 Atari 1040 ST, 4MB; C-Lab Notator; Mac Quadra; Opcode Studiovision. **Monitors:** JBL 4313; JBL 4315; Yamaha NS 10M; Auratones. **Specified outboard:** Lexicon 480L & PCM 70; AMS RMX 16; Roland SRV 2000 & DEP-5 & 3x SDE 2000 & Dimension D & PH 830 & SBF 325 & SVC 350 & 2x Chorus Echo; 3x Yamaha SPX 900 & 2x SPX 90; AMS dm 2-20; Eventide 910; DeltLab DL-2; SPL SX-2; Aphex Compellor & Dominator & Exciter III & C; Alesis Quadraevb & Midiv. III; Ibanez DM 1000; 2x DBX 160; DBX 120X-DS; SCAMP-Rack w. Comp., gates, param. EQ's, De-Essers & Drawmer gates; Klark Teknik graphic EQ's; Yamaha graphic EQ's; T.C. param. EQ's, Behringer Composer; a.s.o. **A/V equipment:** Sony U-matic Hi & Lo Band; Sony Monitors; Fostex Sync. Roland SBX 80 SyncBox. **Specials:** Bosendorfer Grand Piano; Hayman Drums; Hammond A 100 & L 100 with Leslies; selection of rare Gtr. - & Bass Amps & -Cabinets; selection of Gtr. - FX - Pedals.



## SOUNDVILLE RECORDING STUDIOS AG

Grimselweg 5, CH-6005 Lucerne, Switzerland. +41 41 44 98 44; Fax: +41 41 98 42.

## UK

### ABBEY ROAD STUDIOS



3 Abbey Road, St. Johns Wood, London NW8 9AY, UK. +44 (71) 286 1161; Fax: (071) 289 7527. **Owner:** Chairman- Ken Townsend MBE. **Studio/Bookings Manager:** Colette Barber. **No. of studios & dimensions:** Studio 1: 94ft. x 55ft. x 42ft.H, Studio 2: 58ft. x 37ft. x 28ft.H, Studio 3: 28ft. x 23ft. x 24ft.H. Penthouse: 20ft. x 20ft. x 9ft.H. **Mixing consoles:** Studio 1 - Neve VRP Legend 64ch. Penthouse - Neve Capricorn Dig. Desk, Studio 2 - SSL 4000E G Series computer. Studio 3 - SSL G Series W Ultimatum. **Recorders:** Studer A820, Sony 3324A, Mitsubishi 32T, Sony 3348 1630 and

Mitsubishi 20 bit. **Digital audio workstations:** Sonic Solutions. **MIDI set-up:** Atari Mega 4 with cubase & Notator software. Akai S1100 & S1000. Keyboards on request. **Monitors:** Studio B&W 801 series 3, studio 2 & 3 - Quested, Penthouse - JBL's. **Special Services:** Sonic Solutions no-noise and hard disc editing systems. CD prep/PQ Encoding, Digital mastering, Lacquer cutting, DMM, Digital remastering, cassette duplication, digital editing, digital copying, Cedar, 3X location recording units, accommodation, bar and restaurant. **Association Member:** APRS.

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## BUNK JUNK & GENIUS (BJG)

18b, 101 Farm Lane, Fulham, London, SW6 1QJ, UK. +44 (0) 71 381 6298; Fax: +44 (0) 71 385 6105. **Owner:** BJG Productions (UK). **Studio/Bookings Manager:** Paul Brewster. **No. of studios & dimensions:** 1 x Control Room 500 sq. ft., 1 x Live Area 700 sq. ft., 1 x Live Area 300 sq. ft. with Vocal Booth, 1 x Per Prod./Digital Edit Room. **Mixing Console:** SSL 4056 with E or G Computer and Total Recall. **Recorders:** Otari MTR 90 Mk 2 x 2/ Mits X-86/Akai DD 1000. **Digital audio workstations:** Sonic Solutions/ProTools/SoundTools. **MIDI set-up:** Apple /IBM/Atari with all current software respectively with over 45 keyboards/samplers etc. **Monitors:** DynAudio M4 Main Monitors (4 x12) with Digital X-Over, DynAudio M1 Near Field with ABES Sub Woofer, Yamaha NS 10M/Auratone/JBL/AR 18. **Specified outboard:** Neve, Focusrite, API, Amek, Lexicon, Urei, Summit, Drawmer, Yamaha, UrsaMajor, Roland, Eventide, AMS, etc. **A/V equipment:** U-matic, Zeta 3, with full projection and Dolby Surround. **Special Services:** Full catering/Audio Restoration/Digital Editing/SFX Library.



## CHIPPING NORTON RECORDING STUDIOS LTD.

26-32 New Street, Chipping Norton, Oxfordshire, UK. +44 (0) 608 643636; Fax: +44 (0) 608 644771.

 (24,40)  

## THE CHURCH STUDIOS

145H Crouch Hill, London, N8 9QH, UK. +44 (0)81 340 9779; Fax: +44 (0)81 388 3346.



## COMFORTS PLACE STUDIO

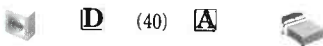
Tandridge Lane, Lingfield, Surrey, RH7 6LW. +44 (0) 342 893046; Fax: +44 (0) 342 893562. **Owner:** Andy Hill. **Studio/Bookings Manager:** Sandie Reid. **No. of studios & dimensions:** 500sq. ft. Live area 1. 210 sq. ft. Live area 2. **Mixing consoles:** SSL 4000E. **Recorders:** Sony 3324, Studer A800, Studer A810 1/4 inches Sony DAT PCM 2500. **Monitors:** Westlake BBSM 12, Yamaha NS10, Aurotones. **Specified outboard:** Lexicon 224SL, AMS RMX16, Quantec QRS, 2 x SB x 90's, Rev 7 2 x AMS-DMX 15-805, 2 x Urei 1176, 2 x DBX 160x, 2 x Keepep. 2 x Drawmer Gates, 1 x BSS De-esser, 2 x EAR 822Q Valve EQ, Yamaha Rev 1. **Special services:** Have completed extensive refurbishment, which includes enlarging the studio area to 30ft. x 29 ft. x 30ft. high (including gallery), with natural day-

light in all areas. Fully residential, including floorlit tennis court swimming pool, satellite TV in all bedrooms. **Association member:** APRS.



## EDEN STUDIOS

20-24 Beaumont Road, London, W4 5AP, UK. +44 (0) 81 995 5432; Fax: +44 (0) 81 747 1939.



## THE FACTORY SOUND (WOLDINGHAM) LTD.

Toftress, Church Road, Woldingham, Surrey, UK. +44 (0)883 652386; Fax: +44 (0)883 652457.



## FALCONER STUDIOS

17 Ferdinand Street, Camden, London, NW1. +44 71 267 7777; Fax: +44 71 284 2022. **Owner:** R. Falconer. **No. of studios & dimensions:** *Studio 1:* 1 x control room 400 sq. ft. 1 x live area 600 sq. ft. 1 x stone room 200 sq. ft. 1 x vocal/overdub room 100 sq. ft. *Studio 2:* 1 x control room 400 sq. ft. 1 x live room 375 sq. ft. 1 x overdub room 250 sq. ft. *Studio 3:* overdub room 160 sq. ft. control room/prog. suite 160 sq. ft. **Mixing consoles:** DDA 'D' Series, Soundcraft 2400, Soundcraft Spirit. **Recorders:** MTR 90, Otari MX80, Postex G16/E16. **MIDI set-up:** Akai S1000, Akai S900 & Libraries, Atari 1040's with cubase & Pro 24 Software. C-Lab, Notator. Various Keyboards and Soundmodules. Atari Mega 4ST. **Monitors:** Reflection Arts 235, Tannoy Super Reds, Yamaha NS10s. **Specified outboard:** Lexicon PCM70, PCM60, PCM42, Yamaha Rev7, Yamaha SPX50D, Alesis Midiverb & Quadraverb. Drawmer dual gates & compressors, Urei's, Aphex Aural Exciter. Yamaha 7 ft. Grand Piano, Kawai 5ft. 6 " Grand piano, Hammond Organ. **A/V equipment:** Sony U-Matic V05630, Postex 4030, Sony Profeel. **Special services:** Experienced in house engineers, good local bars and restaurants, free private parking and natural daylight in all facilities.



## GT EDEN STUDIO

97 Scrubs Lane, London NW10. +44 (0)81 995 5432; Fax: +44 (0)81 964 1253.



## HELICON MOUNTAIN STUDIOS

The Station, London, SE3 7LP, UK. +44 81 858 0984; Fax: +44 81 293 4555. **Owner:** Jools Holland. **Studio/Bookings Manager:** Richard Holland. **No. of studios & dimensions:** 1 studio. **Mixing consoles:** Soundtracs "Quartz" 48 Channel In Line Desk. **Recorders:** Saturn-824-24 track (Dolby SR) by arrangement. Revox PR99, Casio DA1 DAT/DA2 DAT. **MIDI set-up:** Atari 1040 STE - Seiberger: 24/C Lab 3.00 XR300 SMPTE Synchroniser. **Monitors:** JBL 4430 Studio Monitors, Yamaha NS 10M's. **Specified outboard:** Lexicon 480L, PCM 70, Rev 7, RV 1000, SPX90 etc. **Equipment:** Yamaha C5 Grand Piano - Lesley 145.





## THE HIT FACTORY

31-37 Whitfield Street, London W1P 5RE. +44 (0)71 636 3434; Fax: +44 (0)71 580 0543.

## HOUSE IN THE WOODS

The Yews, Whitehill, Bletchingley, Surrey RH1 4QU. +44 (0) 883 343027; Fax: +44 (0) 883 341108.

 (x24) 

## JOE'S GARAGE RECORDING STUDIO

95-99 North Street, Clapham, London, SW4 0HF, UK. +44 (0) 71 498 0781; Fax: +44 (0) 71 498 1526.



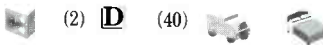
## R.G. JONES RECORDING

Bevel Road, Wimbledon, London, SW19 3SB, UK. +44 (0)81 540 9883; Fax: +44 (0)81 542 4368. **Owner:** Robin Jones. **Studio/Bookings Manager:** Gerry Kitchingham. **No. of studios & dimensions:** 1 Control Room 40sq.m. (with daylight). 1 Recording Room 90sq.m. 2 Isolation Booths. **Mixing consoles:** Solid State Logic 4000E with Total Recall. **Recorders:** 32 Track Digital Mitsubishi X-850, 24 Track Analogue, Studer A80 MKII. **Monitors:** Eastlake Monitors: comprising of JBL and TAO drivers. **Specified outboard:** Lexicon 224 X, Lexicon PCM70, Yamaha SPX90 MKII (x2). Roland DEP 5 (x2) AMS DDL with Harmoniser cards (x 2) Alesis Midiverb II. Equalisers include: Focusrite ISA with mic amps Massenburg 8200 (pair) Amek PMO1 (pain) BBE Sonic Maximiser and Dolby spectra processors.



## LILLIE YARD STUDIO

6 Lillie Yard, 19 Lillie Road, London, SW6 1VB, UK. +44 (0)71 385 9299; Fax: +44 (0)71 385 1711.



## LOCO STUDIOS

Llanhennock, Caerleon, Gwent, NP6 1LU, UK. +44 (0) 633 49603; Fax: +44 (0) 633 49666.



## MILO MUSIC

43/44 Hoxton Square, London N1 6PB, UK. 071 729 4100; Fax: 071 729 7400. **Owner:** Henry Crallan. **Studio/Bookings Manager:** Nick Young. **No. of studios & dimensions:** Studio 1: Control room 31m<sup>2</sup>, recording room 33m<sup>2</sup>; Studio 2: Control room 20m<sup>2</sup>, Recording Room 48m<sup>2</sup>, Studio 3: Control room 30m<sup>2</sup>, recording room 35m<sup>2</sup>. **Mixing consoles:** Studio1: Amek G2520 + Automation; Studio 2: Soundcraft 400; Studio 3: Amek G2500. **Recorders:** Analogue - Studer A80 MKIV, Postex E16. Digital: 2 x 12 track Akai Adam. **MIDI set-up:** Akai S1100, Akai S1000, Atari 11040, Atari Mega 4, Korg SG10, Korg MIR, Kurzweil 100PX, Roland D1101 SH101, Korg M3 R, Roland MKS 50, Yamaha TX802, Roland Jx8P/PG800, Roland D50, Casio C25000, Casio C2101. **Monitors:** Sean Davies LS841, Eastlakes, Yamaha NS10S, AR1815, Auratones, Tannoy Golds. **Specified outboard:** AMS RMX15, Lexicon PCM 70, Yamaha SPX90, Roland DEP5, Alesis Quadraverb plus, Urei 1176, DBX 165, Drawmer DL221/LX20, Eventide 910 Harmonizer/H949, AMS 15805, Roland SDE 2000, Aphex exciter B, Roland dimension D, Delta Lab DL-2CR. **A/V equipment:** Adams-Smith Zeta three, Sony U-Matic, XR1300, Synchroniser, Unitor Synchroniser. **Special Services:** Yamaha and Steck BabyGrand Pianos, Rhodes 88 Piano, Hammond 101. Full range valve mics. **Association Member:** APRS.





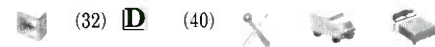
## NOMIS STUDIOS

45-53 Sinclair Road, London, W14 0NS, UK. +44 (0)71 71 602 6351; Fax: +44 (0)71 603 5941.



## ORINOCO

36 Leroy Street, London, SE1 4SS, UK. +44 (0)71 232 0008; Fax: +44 (0)71 237 6109.



## PALLADIUM

7 Loanhead Road, Edinburgh, Scotland. +44 (0)31 440 1084 (Tel. No).



## PAVILION STUDIOS

20 Middle Row, London, W10 5AT, UK. +44 (0) 81 960 0751; Fax: +44 (0) 81 969 2474.



## RONNIE SCOTTS RECORDING FACILITY

47 Frith Street, London, W1V 6HT, UK. +44 (0)71 439 6975; Fax: +44 (0)71 437 5081.



## ROOSTER

117 Sinclair Road, West Kensington, London W14. UK +44 (0)71 602 2881; Fax: +44 (0)71 603 1273.



## SAWMILLS STUDIO

Golant, Fowey, Cornwall, PL23 1LP, UK. +44 (0)726 833752; Fax: +44 (0) 726 832015. Owner: Dennis Smith & Simon Fraser. Studio/Bookings Manager: Ruth Taylor. No. of studios & dimensions: One Studio 250sq ft. Control room 700 sq ft. main room. Mixing consoles: Trident 80B 54-24-24 & Automation. Recorders: Otari 24th & Ampex ATR 102 1/2inch. Digital audio workstations: Sound Tools. MIDI set-up: Extensive. Monitors: Queded. Specified outboard: AMS (15.80) & Lexicon 480L + Neve, Urei + BSS + EMT. Special Services: Fully residential including good food. Association Member: APRS (Full member).



## SHAMBLES STUDIO

The Shambles Westhorpe Road, Marlow, Buckinghamshire, SL7 1LD, UK. +44 628 891003; Fax: +44 628 485363. Owner: Chris Rae. Studio/Bookings Manager: Adam Vanryne. No. of studios & dimensions: 1 studio, 18 ft. x 12, Phil Newell Design Granite Room. Mixing consoles: SoundCraft 3200. Recorders: SoundCraft. MIDI set-up: Atari & Cubase. Monitors: Reflexion Arts. Specified outboard: Lexicon, Yamaha, Roland, Drawmer Gates & Compressors. A/V equipment: UMatric/Betacam (1inch Sony). Special Services: Music composition. Production.



## STRONGROOM

120, Curtain Road, London, EC2A 3PJ, UK. +44 71

729 6165; Fax: +44 71 729 6218. Owner: Richard Boote. Studio/Booking Manager: Siobhan Paine. No. of studios & dimensions: 2 x 24 track analogue studios, 8 x Pre Production/programming rooms. Mixing consoles: Studio 1: 1 x Neve V3 with Flying Faders, Studio 2: 1 x SSL G+ with utimation. Recorders: 3 x Otari MTR 90 MKII. MIDI set-up: Studio 1: Akai S3200 16 Meg. JD800. MIDI routing matrix. Studio 2: Akai S3200 16 meg. extensive range of keyboards, vintage keys. MIDI routing matrix. Monitors: Neil Grant Boxer Five System in Studio 1 and 2. Yamaha NS10's. Specified outboard: Studio 1: 480L Eventide H300SE, Massenberg, EQ, Neve compression. Studio 2: 224 x L. Eventide DSP4000. Massenberg EQ, Reverbs etc. A/V equipment: Studio 2.

Special Services: Studio 1: Large live room. Naturally lit Grand piano.

Association Member: APRS and Accord.



## SURREY SOUND STUDIOS

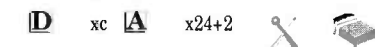
70 Kingston Road, Leatherhead, Surrey, KT22, 7BW. +44 (0) 372 379444; +44 (0) 372 363360.



## TURNING POINT RECORDING STUDIO

turningpoint

The Hall Farm, St. Nicholas - At - Wade, Birchington, Kent CT7 0PZ. 0843 43304; Fax: 0843 48028. Owner: Trevor Vallis. No. of studios & dimensions: One, Control Room - 70 Square metres, Studio: 31 Square Metres, Live Area: 100 square metres. Mixing consoles: Amek Angela in line 36 ch console. Recorders: Studer A800 24 track. Studer A807 Stereo. Sony PCM 2500. Technics & Nakamichi cassette recorders. MIDI set-up: Atari 1040 computer with C Lab notar software. Kurzweil MidiBoard S1000, Kurzweil PX 1000, Yamaha TX81Z, RTL Event Synchroniser, Sycologic M16 Midi Patch System. MIDI Tie Lines throughout studio. Monitors: Munro M4 Monitors with Carver PM1.5 AMPS (x5) with BSS crossovers. Munro M2 Mid field monitors with Adcom Amps (x2). NS10's with Yamaha PC1602 stereo AMP. Specified outboard: Lexicon 480L, Yamaha SPX 90II (x2), Lexicon LXPI(x2), BEL BD 80S St. Sampler/Delay, Alesis Quadraverb, Lexicon PCM 42. DBX & Drawmer Compressor/Limiters. Drawmer & Valley Gate Noise Gates. DBX De-Essers. Special services: Yamaha Grand Piano, Hammond A100 (B3) Organ with Leslie speakers. Full Board Accommodation. Pick up from stations and airports. Arrangements can be made to fly direct by helicopter to the studio.



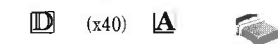
## WESTSIDE STUDIOS

The Olaf Centre, 10 Olaf Street, London, W11 4BE, UK. +44 (0)71 221 9494; +44 (0)71 727 0008.



## THE WOOL HALL STUDIOS

Castle Corner, Beckington, Somerset, BA3 6TA, UK. +44 (0) 373 83073; Fax: +44 (0) 373 830679.



USA

## AL JOLSON ENTERPRISES, INC, MASTERLINK STUDIOS I & II.

114 17th Avenue, South Nashville, TN 37203, USA. +1 615 244 5656; Fax: +1 615 242 2472. Owner: Al Jolson. Studio/bookings manager: Johnny Drake. Dimensions: Studio 1, 40 x 40 ft., control room 1, 15 x 17 ft., control room 2, 25 x 30 ft. Mixing consoles: control room 1, Sphere Eclipse C 40 x 32 with automation. Control room 2, Trident Series75 28 x 24. Audio Recorders: Otari MTR-100A 2 " 24 track with CB-131 synchronizer & Dolby HX-Pro, Ampex MM-1200 2 " 24 track with 16 track headstack. Studer A-810 1/4 inch 2 track with centre track time code, Studer A-80 1/4 inch 2 track or 1/2 inch 4 track, Studer B-67 1/4 inch 2 track, Scully 1/2 inch 3 or 4 track, (2) Ampex AG-440-C 1/4 inch 2 tracks. Sony 2500 R-DAT. Digital Workstations: NED Synclavier 64 voice, MIDI, SMPTE, VITC, Macintosh II 5-40 with performer. Monitor speakers: (4) Westlake TM-1, (2) Westlake BBS-M10, (4) Meyer HD-1, (2) B & W DM-100, (2) Yamaha NS-10-M. Outboard Equipment: (2) Aphex type B Aural Exciter, API-5502 parametric EQ, (2) DBX -160 compressor/limiters, Eventide H-910, Eventide H-949, Eventide 3000 Ultra Harmonizer, (2) Gatex noise gates, Sontec parametric EQ, Summit leveling amplifier, (2) Teletronix LA-2A, (2) Urei 1176-LN, Valley People Rack with (2) Keepeex, (2) Commander, (2) Gain Brain, (2) DSP De-Esser. Echo Reverb & Delay Systems: AMS RMX-16, Lexicon 200, (2) Lexicon PCM-70s, Lexicon Super Prime Time, Roland DEP-5, Yamaha Rev-5, (2) Yamaha SPX-90s. Microphones: AKG C-414-EB-P48, (2) AKG D-224-E, Altec 21-D, Audio Technica AT-803S, Audio Technica-ATM-11-R, Beyer M-88N-C, (4) Countryman EM-101, (5) Electro-Voice RE-15, (3) Electro-Voice RE-16, Electro-Voice RE-20, (2) Electro-Voice 666, Neumann KM-54, Neumann KM-56, Neumann U-47, tube, (3) Neumann U-48 tube, Neumann U-67 tube, (6) Neumann U-87, (5) Sennheiser MD-421, (3) Sennheiser MKH-415-T, (2) Sennheiser MKH-40-P48, Shure Unidyne 55-S, Shure 580 SB, Shure SM-57, Sony C-48, (3) Sony CM-22P, (2) Sony ECM-50, (2) Western Electric. Monitor Amplifiers: (2) McIntosh MC-250, (2) McIntosh C-2100, (2) Studer A-68, (3) Yamaha P-2050. Video Equipment: Sony VO-9800 3/4 inch U-Matic with address track time code, (2) Sony 27 inch monitors, Otari EC-201 time code reader. Cassette Recorders/Duplicators: Nakamichi MR-1, JVC KDV-6, Denon DRM-500. Noise Reduction Equipment: (2) Dolby SR, (2) Dolby A-361, (2) DBX. Other Musical Instruments: Baldwin 9 ft. 5 inches grand, Kawai 5 ft. 10 inches MIDI grand, Hammond B3 with Leslie, Wurlitzer, Rhodes 73, Horner D6 Clavinets, Pearl & Slingerland drums, Gretsch drums with MIDI pickups. Other MIDI Equipment: Akai 900 sampler, E-mu Emulator 11+ with hard disk, GM-7 guitar controller, JL Cooper 16 x 20 MIDI matrix, Linn 9000, Oberheim Matrix 6, Roland DDR-30 digital drums, Roland Octapad, Roland Super Jupiter with programmer, South West Music Systems Jam Box 4. Specialization & Credits: Masterlink 1 is a spacious 40 x 40 ft. tracking room with a 28 foot ceiling. This room features a 4 channel active cue system for smaller tracking dates in addition to 25 new CLHR 4 channel passive cue boxes driven by (2) Crown MicroTech 1000s to accommodate the larger orchestra dates. Mogami audio cable as well as Belden & Canare coax is run through the entire facility linking all rooms. Masterlink 2 is a great MIDI production room featuring a 64 Voice FM/Poly NED Synclavier system. This room is also ideal for light overdubs as well as 24 track mixing. Regular clients include: TNN "On Stage", "American Music Shop", BMG Music, Etc.



## ARDENT STUDIO

# ARDENT®

2000 Madison Avenue, Memphis, TN 38104, USA. +1 901 725 0855; Fax: +1 901 725 7011. Owner: John E. Fry. **Studio/Bookings Manager:** Susan Allred. **No. of studios & dimensions:** Studio A - control - 20 x 24, studio - 25 x 40. Studio B - control - 25 x 20, Studio - 24 x 17. Studio C - control - 18 x 25, studio - 25 x 35. **Mixing consoles:** Neve VR 48 x 48 with Flying Fader Automation, Neve V Series 40 x 48 with Necam, Solid State Logic 6056E with G Computer 56 x 32. **Recorders:** Mitsubishi X-850 32 track (3), Mitsubishi X-80 2 track (3), Mitsubishi X-800 32 track (1), Studer A827 24 track (1), MC1 JH24 24 track (1). **Digital audio workstations:** Studer Dyaxis. **MIDI set-up:** Fairlight Series III.



**Monitors:** Audio Consultants/JBL, JBL 4435, Yamaha NS-10 KEF. **Specified outboard:** Lexicon, Quantec, SSL, Publison, Summit, Fairchild, UA, Pultec, Drawmer, Yamaha, Eventide, Aphex, dBx, Urei, Marshall, Valley People, DOD, Deltalab. **A/V equipment & Special Services:** *Consoles:* Studio A - Neve VR with Flying Fader Automation 48 x 48. Studio B - Solid State Logic 6056E with G Computer 56 x 32. Studio C - Neve V Series with Necam 96 Automation 40 x 48. *Tape Machines:* (2) Mitsubishi X-850 digital 32-track, (1) Mitsubishi X-800 digital 32-track, (3) Mitsubishi X-80 digital 2-track, (1) Studer 827 analog, MCI JH24 (16 track available for both machines), Dyaxis digital disc editing system. *Monitor Amplifiers:* Studios A & B - Main Speakers: Audio Consultants/JBL Custom, Studio C - JBL 4435, Minis - Yamaha NS-10, KEF. *Outboard Gear:* Lexicon: (1) 480L, (1) 224XL, (1) LXP 15, (1) Prime Time 93. Quantec: (2) Room Simulator. Solid State Logic: (1) Infernal Machine 90. AMS: (1) RMX 16. Summit: (1) DCL 200. Fairchild: (1) 670 Stereo Tube Limiting Amp, (2) 660 Mono Tube Limiting Amp. UA: (2) 176 Mono Tube Limiting Amp. Pultec: (1) EQP1A Equalizer. Drawmer: (1) DL 251 Spectral Compressor. Yamaha: (6) Rev 5, (1) Rev 7, (2) SPX 90 I, (2) SPX 90 II, (2) SPX 1000. Eventide: (2) H949, (1) H3000ES/95 sec. mono sampling Mod Factory, (1) H3500/23.7 sec. mono sampling. Aphex: (2) 612 Gate. dBx: (7) 165 Compressor/Limiter, (2) 160 Compressor/Limiter, (4) 263 De-esser. Urei: (1) 1176. Marshall: (2) Time Modulator 5002. Valley People: (2) 440 Compressor. DOD: (2) EXR SP II Projector R860. Delta Lab: (1) Effectron II. *Microphones:* AKG: (4) C451L, (2) C460B. (1) C422, (3) D112, (3) C452L, (4) C414, (1) D12. Sennheiser: (1) MD441, (15) MD421. Shure: (1) SM53, (1) SM58, (1) SM56, (13) SM57. Electro Voice: (3) RE20, (1) PL20. Neumann: (1) U47 FET, (1) KMI, (4) U87, (3) M249 tube, (2) KM84, (3) U64 tube, (2) KM86i, (1) U67 tube. Beyer Dynamics: (2) M201. Crown: (6) PZM 3OR13. Altec: (1) 150A.



## BATTERY STUDIOS

137-139 West 25th Street, New York 10001, USA. +1 212 627 8200; Fax: +1 212 627 5285.

## BEARSVILLE STUDIOS



Box 135, Bearsville, New York, NY 12409, USA. +1 914 679 8900; Fax: +1 914 679 4284. Owner: Sally Grossman. **Studio/Bookings Manager:** Ian Kimmet/Mark McKenna. **No. of studios & dimensions:** Studio A 60ft. x 40ft. x 38ft. (high). Studio B 30 x 24 x 26 ft. (high). The Barn 30 x 30 x 14ft. (high). **Mixing consoles:** Studio A = Neve 8088, Studio B = SSL 6056E with 6 computers, Born Neve BCM-10, Audio Media Research. **Recorders:** Analog multi's one Studer console A-800's in all rooms. **MIDI set-up:** MacIntosh IISI with performer. **Monitors:** A=Urei 813-B with subwoofers, Baru Yamaha NS10m's. B=Urei 813 A's with subwoofers. **Specified outboard:** EMT 140's(2), EMT 240, Live Chamber, Lexicon 224XL, PCM 70, AMS RMX16, 15-80s. **Special services:** 3 complete studios with complete accommodation. We can handle any project from pre-production to recording to performance in the 350 seat Bearsville Theatre. **Association member:** World Studio Group.



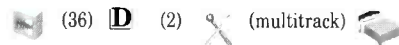
## THE BENEFIT HOUSE

134 Fourth Avenue North Franklin, TN 37064, USA; +1 615 790 8696; Fax: +1 615 790 9034.



## BLUE MOON STUDIO

28205 Agoura Road, Agoura Hills, CA 91301, USA. +1 818 889 8929; Fax: +1 818 889 1208.



## CRYSTAL CLEAR SOUND

4902 Don Drive, Dallas TX 75247, USA. 214 630 2957; Fax: 214 630 5936. Owner: Sam Pavlos. **Studio/Bookings Manager:** Keith Rurt. **No. of studios & dimensions:** Multitrack room: 1400 square feet. Digital editing room: 10 ft. x 12 ft. **Mixing consoles:** DDA 224V with uptown moving fader and comprehensive switch automation. **Recorders:** Studer 827 24-track with Dolby SR, MC1, Studer & Tascam 1/4 inch, 1/2inch & DAT machine. **Digital audio workstations:** 4-track, 1.3 gig, Pro Tools running on a Mac Quadra 700 with 20 megaram. **MIDI set-up:** Akai S-1000 with meg ram, Ensoniq VFX-SD, Roland R-8m, Akai MG-35, Adam-Smith & Mark of the Unicorn, MIDI/SMPTE Synchronisers. **Specified outboard:** T.C. Electronic M5000, Ensoniq DP/4, AKG 68k, Eventide H3000, Yamaha SPX-900 and SPX-90 multi-effect processors. Lexicon model 200 digital reverb processor. Korg SDD-3000 and Lexicon PCM-41 digital delay units. Tube Tech Pe1B, API 5502 and Orban 622b parametric EQs. Summit Audio LA100 tube, JBL 7110, DBX 160 & 165 compressors, Aphex 612 gate/expanders and Compellor. Valley DSP de-esser. Baldwin SD-10 concert grand piano, Hammond B-3 & Leslie cabinet. **Monitors:** KRK, Tannoy, Urei, Yamaha, Auratone. **Special Services:** Digital editing/marketing. CD-R recorder. KABA Realtime cassette duplication with imprinting and packaging. CD manufacturing. Regional music distribution. **Association Member:** Texas Music Association, NAIRD.



## EMERALD SOUND STUDIO

1033 16th Avenue South, Nashville, TN 37212, USA. +1 615 321 0511; Fax: +1 615 329 9417.



## EASTSIDE AUDIO AND VIDEO

216 East 45 Street, New York 10017, USA. +1 (212) 867 0730; Fax: +1 (212) 867 0426.



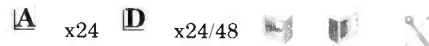
## GREENE STREET RECORDING

112 Greene Street (basement), New York, U.S.A. +1 212 226 4278 Tel. + Fax. Owner: Steve Loeb. **Studio/Bookings Manager:** Dave Harrington. **No. of studios & dimensions:** 2 Control Rooms, 1 Recording Room, 1 Overdub room. **Mixing consoles:** AMEK/APC 1000/GML and API Legacy. **Recorders:** Studer A-800, Studer A-820, Studer A-827, Studer A-80 2 Trk, Studer A-820 2Trk., Studer A-80 VU 2/4 Trk. **Digital audio workstations:** Digidesign Pro Tools. **Monitors:** Quested 412, John Meyer 833 Monitors, Yamaha NS10's, Tannoy PBM6.5. **Specified outboard:** Pultecs, GML, API, Mavec, Teletronics LA2, Urei LA3, Langs, AMS RMX, TC 2290, Publison Infernal Machine Lexicon 480, 224 x, PCM 42, 60, 70, Eventide H3000, and lots more. **Special services:** Studio is located in downtown Manhattens' Landmark Soho District - NYC's best art galleries, bars/restaurants and shops. Architectural classic, "Prince Streethotel" opening in October '93 and just around the corner.



## HOWARD SCHWARTZ RECORDING INC.

420 Lexington Ave., Suite 1934, New York NY 10170, USA. (212) 687 4180; Fax: (212) 697 0536. Owner: Howard Schwartz. **Studio/Bookings Manager:** Beth Levy-Davis. **No. of studios & dimensions:** Seven Audio form video Post Production suites and recording studios. **Mixing consoles:** SSL and Sony. **Recorders:** Studer, Sony, Otari. **Digital audio workstations:** SSL Screen Sound (5) and Slynlevier Comp. post production SD. **Monitors:** Urei 813's and 811's; Yamaha NS10. **A/V equipment:** Time Code DAT; 3/4inch, 1inch, Beta SP and D-2 Video. **Special Services:** Satellite up and down link; Edne & T-1 fiber and switch 56 digital communicators capability. **Association Member:** AES, SPARS, ITS.



## IN YOUR EAR MUSIC & RECORDING SERVICES

I.Y.E. Inc., 1300 West Main Street, Richmond, VA 23220, USA; +1 804 359 3937; Fax: +1 804 358 2256. **Studio/Bookings Manager:** Gay Chapman. **No. of studios & dimensions:** 2 Studios, 2 MIDI rooms. Studio A- 28 x 20 x 13 ft. with variable acoustics, Control room - 20 x 11 x 14ft. Studio B- Studio 10 x 13 x 10ft., Control room - 10 x 14 x 11ft. **Mixing consoles:** (A) Euphonix CSII 56 fader system, (B) DDA "D" Series 20 IN x 8 x 2. **Recording Equipment:** (A) New England Digital 16 Track Post-Pro with DSP (time compression), Sony 7030 DAT with SMTE, Panasonic 3700 DAT, Otari MTR-15 1/4inch tape with centre track time code, JVC 3/4inch VCR, Ampex VPR6 1inch type C video recorder. (B) New England Digital B track Post-Pro with DSP option, Panasonic 3700 DAT, Otari 1/4 inch Tape Machine with Center Track Time Code, Yamaha Cassette Deck. **MIDI set-up:** Comprehensive MIDI/MacIntosh Quadra 950 based setup equipped with

Sound Designer II Samplecell, Performer, Alchemy and Opcode Librarians. **Sound Modules:** Akai 100HD, Akai 1000PB, Roland S770, Roland S550, Proteus 1, 2, 3, Roland R8, Roland MKS 30, Yamaha TG-77 and Yamaha TX7. **Keyboards:** Korg SG-1D, Roland D50, Hammond XB2 and Kurzweil K2000. **Outboard Equipment:** (A) Sony, Yamaha and Alesis Reverb Units; Brooke-Siren and dbx compressors; Drawmer and Kepex II noise gates; Tube-Tech, API, and Klark-Teknik equalizers; Technics CD Players. (B) Yamaha and Alesis Reverb Units; Brooke-Siren compressors; Symetrix Telephone Interface; Technics CD Player; Valley International Noise Gates. **Microphones:** AKG, Shure, Neumann, Sennheiser. **Monitors:** Yamaha and JBL, video: Sony VO-9800 (3/4) (A&B) Digital Patch System (Ednet). 15 SFX Libraries: 5 Music Libraries: **Special Services:** Comprehensive digital audio facility featuring audio for video, original music composition and sound design.



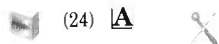
## LAST CHANCE STUDIOS

914 Madison Place, Merrick, New York, NY 11566-120, USA. +1 516 485 5853 (Tel. No.).



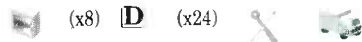
## MANNA - ALL DIGITAL

7811 La Cosa, Dallas, Texas 75248, USA. +1 214 239 9636 Tel.+Fax.



## MODERN AUDIO PRODUCTION INC.

1650 Market Street, 3FL Philadelphia, PA 19103, USA. +1 215 569 1600; Fax: +1 215 569 1685.



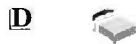
## NEW RIVER STUDIOS, INC.

408 South Andrews Avenue, Fort Lauderdale, FL 33301, USA.  
+1 (305) 524 4000; Fax: +1 (305) 524 3999. **Owner:** New River Productions. **Studio/Bookings Manager:** Virginia Cayia. **No. of studios & dimensions:** 2 studios: "A" 35 x 25 ft. Live Tracking area with tall ceilings in center. "B" MIDI Studio: 15 x 15 ft. with ISO booth (6 x 9 ft.). **Mixing consoles:** "A" Neve 8108 56 in 48 out with Flying Faders. "B" Trident Series 65 32 in 16 out. **Recorders:** 1) Mitsubishi X850 with Apogees, 2) Studer A800 Mark III 24 track Analog. **MIDI set-up:** Studio B: MacIntosh plus computer with performer software, Vision software, Rold D50, D550, Yamaha TX 802, Akai S950, Sampler with 16 bit Upgrade, 360 systems MIDI Bass & Patcher. **Monitors:** "A" Westlake BBSM-10's with Meyer 833 Subwoofers, Westlake BBSM 6, Yamaha NS10M. "B" Westlake BBSM-10's. **Specified outboard:** AMS RMX 16, DMX 15-80S, GML E.Q., EMT 140S Stereo Tube Plate, Lexicon 480L, PCM 70, SPX 9011, API 550 & 550A, Pultec, Eventide H3000, H949, DBX 165, 162 & 902 Desser, Urei 1176 LN. **A/V equipment:** Sony BVU 850 3/4 inches SP Umatic and Zeta 3 Synchronizers. **Special Services:** In house maintenance. Assist with housing, rental cars, etc. Location along the banks of the New River in a private historic Mediterranean Village. Close to the airport, beaches and fine restaurants.



## OMNI SOUND RECORDING STUDIO

1806 Division Street, Nashville, TN 37203, USA. +1 615 321 5526; Fax: +1 615 321 5528.



## ONE WORLD RECORDING CORPORATION

72 East Dedham Street, Boston, MA 02118, USA. +1 (617) 426 8078;

**Fax:** +1 (617) 426 3709. **Owner:** Steve Van Natta. **Studio/Bookings Manager:** Alexander Milne. **No. of studios & dimensions:** B room MIDI pre-production 15ft. x 15ft. control. 15ft. x 15ft. live room 6 ft. x 9ft. ISO. Main control room 30ft. x 20ft., live room 60ft. x 30ft., ISO 15ft. x 20ft. **Mixing consoles:** Neve 8038 with 32 1081 EQ and preamps. **Recorders:** Studer 827 24 track. **Digital audio workstations:** Mac FX with 2 gigabytes running Studio Vision & Soundtools. **MIDI set-up:** Studio Vision, IBM: Voyetra Gold Mark III. **Monitors:** JBL 4435 Yamaha NS10m, ARBXI modified, Tannoy 6.5.

**Specified outboard:** Tape Machines: Studer A827 (2inches) 24-track, Studer A807 (1/4inches), Otar 5050B (1/4inches), Panasonic SV-3700 DAT, Panasonic SV-3500 DAT, Nakamichi MR1 Cassette Deck, 5 Nakamichi MR2 Cassette Decks, Tascam 122 Cassette Deck. **Monitors:** Steven Durr/JBL 4435 (mains), Audio Pro AR 18 Bxi (near field), Yamaha NS10m Studio (near field), Tannoy PBM 6.8 (near field), Urei 809 (studio), 10 AKG 141 Monitor Headphones, 2 AKG 240 Monitor Headphones. **Monitor Amps:** Belles OCM 500 (mains), Belles OCM 200 (near field), 2 QSC 1400 (cue system), Ashley Mos-Fet 200 (studio). **Computers:** MAC II FX (running Sound Tools and Studio Vision), IBM PC (running Voyetra MK 4 Gold), 360 Systems MIDI Patcher, JL Cooper PPS-100, Opcode Studio 3. **Acoustic Instruments:** Steinway 6.5' Grand Piano (1901), Fender Rhodes ('73), Yamaha Recording Series 9 piece drum kit, Tama Swingstar 7 piece drum kit, Vintage guitars & basses from Fender, Gibson, and Guild. **Synthesizers:** 2 Yamaha DX7's, Yamaha TX816, Yamaha DX7 II FD, Emulator II+HD (with full library), Emu SP-12 (with sampling), Alesis HR-16. **Kurzweil Midiboard,** Roland S550, Korg Mono/Poly, Moag - Mini Moag, Oberheim OB-8, Roland JX8P, Roland TR 909, Yamaha CS 5. **Mics:** 2 AKG 414 B-ULS, 2 AKG 451 CK1 (matched), 1 AKG 451 EB, 1 AKG 224, 2Beyer Dynamic M69, 2 Electrovoice RE-20, 2 Electrovoice PL-20, 1 Electrovoice 55, 1 Neumann U87, 1 Neumann U47, 2 Neumann TLM 170, 2 PZM, 2 Sennheiser 441, 8 Sennheiser 421, 2 Shure SM 58, 6 Shure SM 57, 1 Shure SM 7, 1 Sony C37, 1 Sony C33, 2 Vintage Sony ECM 56F (matched).

**Special Services:** One World is a full service music production facility with a client list that includes commercial applications as well as album orientated projects. We produce everything from traditional jazz to urban contemporary. Call for Studio Guide and booking information.



## PLATINUM ISLAND STUDIOS

676 Broadway, New York, NY 10012, USA. +1 212 473 9497; Fax: +1 212 505 8277. **Owner:** RLK Enterprises. **Studio/Bookings Manager:** Suzanne Mates. **No. of studios & dimensions:** East Studio: control room- 22ft. D x 20ft. W, Studio- 32ft. D x 20ft. W, Booth- 6ft. D x 8ft. W. West Studio: Control room-18ft. D x 21ft. W, Studio- 18ft. D x 14ft. W, Booth-5ft. D x 7ft. W. **MIDI Studio:** Control room- 16ft. D x 20ft. W. **Mixing consoles:** SSL 4064 E/G; Neve 8128 56 in/Flying Faders; Harrison 4032A. **Recorders:** Studer A-800, A-827 24 Track, Mitsubishi X-850 32 Track digital, Studer & Ampex 1/2 inches 2 Tracks. **MIDI set-up:** Fully equipped 24 track MIDI studio; MacIntosh, Atari & IBM; Iso booth. **Monitors:** Urei 813 B, Yamaha NS10M, Genelec, Tannoy, ProAc. **Specified outboard:** Very

comprehensive. **A/V equipment:** 3/4 inches video lock-up. **Special services:** Be it mixing, tracking or MIDI; analog or digital, Platinum Island is your one stop to do it all. Our numerous gold & multiplatinum certifications attest to the excellent environs, vibe & staff that make it happen. Free cold noodles with sesame sauce if you mention this ad. Go Platinum with us.



## THE PRODUCTION BLOCK STUDIOS

906 East Fifth Street, Austin, Texas 78702 USA. +1 (512) 472 8975; Fax: +1 (512) 476 5635. **Owner:** Joel C. Block **Studio/Bookings Manager:** Delaine Frasier. **No. of studios & dimensions:** 2 studios and one free listening room. **Mixing consoles:** Otari 54 and Yamaha MR-1642. **Recorders:** Sony/MCI JH 24-track and Tascam MS 16-track. **Monitors:** Sony 29inches, Samsung VM 3105, Sony KV20TS30. **Specified outboard:** Adams Smith Zeta 3, Alesis PA-100, Crown D-150, Crown D-75, DBX 160x compressors/limiter, DB 165A, Eventide HD3000 Harmonizer, Alesis 3630 Compressor, Yamaha SPX-900, Yamaha SPX-9011 effects processors Lexicon LXP-15 reverb, sound performance "The vitalizer" equalizer. **A/V equipment:** Adam Smith Zeta 3.

**Special Services:** Advertising voice-overs, industrial and slideshows narrations, radio shows music libraries, SFX libraries, Phone patch jingle packages/post scoring. Time compression, DAT mastering, remotes, automatic dialogue replacement, R-T-R- and cassette duplication, night music packages.



## RECORDING ARTS RECORDING ARTS

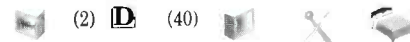


Box 121702 Nashville, TN 37212, USA. +1 615 321 5479; Fax: +1 615 321 0756. **Owner:** Carl Tatz. **Studio/Bookings Manager:** Lou Johnson. **Mixing consoles:** SoundCraft 3200. **Recorders:** Sony 3348, Mitsubishi X-850 Apogee Filters. **MIDI set-up:** Name it. **Monitors:** Yamaha NS-1000s, NS10 Studios, Name It. **Specified outboard:** Lexicon 480L, (2) Lexicon PCM70, Lexicon Prime Time, Eventide H3000SE V, Klark Teknik DN780, Roland SRV-2000, Roland DEP-5, Roland Dimension D, Yamaha REV7, Yamaha SPX90 II, Teletronix LA-2A, (3) UREI 1176LN, (2) LA-4, (3) dbx 160X, Drawmer DL241, Valley People 440, (2) Focusrite ISA 110 mic pre/EQ, Adams-Smith Zeta-3, Alesis D4 drum sampler, J.L. Cooper PPS sync, Neumann U87 modified, (2) Akg 414EB, EV RE20, (4) Sennheiser 421, (2) Sennheiser 441, (3) Shure SM57, (2) Bryston 6B amp, (3) Bryston 4B amp, Recording Arts comp/ease vocal compiler, (8) Judenus headphone boxes. Sony CD player, (2) LofTech TS-1 RMX test set, Alphasat PC-100 Phase Checker.

**Association member:** NARAS, CMA, NEA.

## REELSOUND RECORDING CO.

2304 Sheri Oak Ln. Austin, TX 78748, USA. +1 512 472 3325; Fax: +1 512 282 0713.



## REFLECTION SOUND STUDIOS

1018 Central Ave. - Charlotte, N.C. 28204, USA. +1 704 377 4596; Fax: +1 704 375 9723. **Owner:** Wayne Jernigan. **Studio/Bookings Manager:** Kelly Bright.

**No. of studios & dimensions:** Studio A: 44 x 32 with 18 ft. ceiling, control room 19 x 24. Studio C: 8 x 24 with 12 ft. ceiling, control room 18 x 14. Studio B: 10 x 12, control room 20 x 12 (MIDI suite). **Mixing consoles:** Sony MXP 3036 36-ch. with hard-disk automation, Sony MXP 3036 32-ch, Allen & Heath Saber Plus 36-ch JL Cooper MAGI automation. **Recorders:** (2) Sony PCM-3324A 24-track digital, Sony APR 24-track analog, Sony/MCI 24-track analog, Sony PCM 3402 2-track. **Digital audio workstations:** Digidesign Sound Tools with 1.8 gigabyte hard drive. (Studio B). **MIDI set-up:** Mac IIcx and SE running Digital Performer interfaced with (2) Motu MIDI Time Pieces. Roland D-550, Korg M1Rex, Akai S1000 with 20 meg RAM, E-mu Proteus 1, Proteus 2, Procussion, Yamaha TX7 and TX81Z, Oberheim Matrix 1000, Alesis HR-16 and HR-16B, KX-88 and Octapad controllers. **Monitors:** Studios A and C-TAD double 15 inches systems, powered by Hafler and AB systems amp with White EQ. Tannoy Series 8 with subwoofer (Studio B). **Specified outboard:** T.C. 2290 (2), Eventide H300 ultra-harmonizer (3) Lexicon PCM 70, Lexicon 224XL with LARC controller, EMT 140 stereo reverb. (2) dBx 900 frames. Too much more to list. **A/V equipment:** Sony V09800 3/4 inches VTR, Sony monitors, Motu Video Time Peice, Adams-Smith Zeta Three Synchronizer. **Special Services:** On staff computer, 24 and 48 track digital or analog remote recording.



## SHEFFIELD AUDIO/VIDEO PRODUCTIONS

13816 Sunnybrook Road, Phoenix, MD 21131, USA. +1 410 628 7260; Fax: +1 410 628 1977. **Owner:** John Ariosa. **Studio/Bookings Manager:** Richard Van Horn. **No. of studios & dimensions:** (1) 50x40 with 18ft. ceilings. **Mixing consoles:** SSL E/G. **Recorders:** Sony 3324 Digital Otari MTR 90-Analog. **Digital audio workstation:** Pro Tools - Mac Quadra. **Monitors:** Urei 813B, Yamaha NS-10. **A/V equipment:** Lynx Timeline, 1 x Beta Machines.

**Special Services:** 48ft. Remote Truck w/ SSL + Neve Consoles - 30ft. Video Remote Truck. **Association member:** AES



## SORCERER SOUND

19 Mercer Street, New York, NY 10013, USA. +1 212 226 0480 (Tel. No.)



## SOUND EMPORIUM

3100 Belmont Boulevard, Nashville, TN 37212, USA. +1 615 383 1982; Fax: +1 615 383 1919.

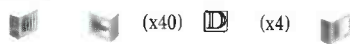


## SOUNDMIRROR INC.

**soundmirror**

76 Green Street, Boston, Massachusetts 02130, USA. +1 617 522 1412; Fax: +1 617 524 8377. **Owner:** Soundmirror, Inc. **Studio/Bookings Manager:** John Newton (Boston); Henk Jansen (Holland). **No. of studios & dimensions:** 3 post-production studios; 1 24m\* recording room. **Mixing consoles:** (3) Studer analog mixing console - 42 total inputs; (1) Lexicon Opus digital console with automation; (1) Benchmark 5 x 2 mixer. **Recorders:** (2) Sony 3324 with Apogee filters; (1)

Mitsubishi X-86 2-track 20-bit digital recorder; (4) Sony 1630; (3) Sony DMR 4000; (3) Sony DMR 2000; (1) Studer A80 1/4inch and 1/2inch analog with Dolby; (2) Sony PCM 7030 timecode DAT; (2) Sony PCM 2500 DAT; (2) Sony D3 portable DAT; (2) Sony DTC 700 DAT; (3) Nakamichi cassette Deck 2. **Digital workstations:** (1) Lexicon Opus 8-track workstation with automation; (1) Sonic Solutions 24-track 20-bit digital workstation; (2) Sony DAE-3000 equipped for 2-track stereo editing, direct DAT editing and 24 track digital editing. **Monitors:** B&W 801M; B&W 802M; B&W803; B&W 805; B&W CM-1/2; Quad ESL 63. **Specified outboard:** 50 assorted condenser microphones, including Neumann TLM-50, B&K 4006 and 4011, Sanken, and complete set of Schoeps KM 100 series; SigTech AEC-1000 acoustic correction filter; Lexicon 480L; Lexicon Nuverb; Lexicon 300; Lexicon LFI-10; Sony DAL-1000 limiter/compressor; DCS-900B 20-bit multi-format AD converter; Apogee AD500; Apogee DA10001; Soundmirror/Ultra Analog 20-bit AD converter; Sony DFX-2400 sample rate converter; Dolby and DBX. **A/V equipment:** Sony BVU 800 video recorder; Adam-Smith Zeta 3; Mitsubishi 35 inches monitor; VHS and Beta machines; Opus and Sonic locked to picture. **Special services:** Multitrack location recording capabilities around the world. Offices in Holland and Boston. Digital post-production capabilities include 2 - to 24-track editing, 24-track fully automated mixing and CD mastering. A two room audio/video production suite offers a voice-over recording room with an adjoining control room/editing suite. A fully isolated machine room common to all studios allows complete flexibility. In-house engineers and producers. **Association member:** AES.



## SOUND ON SOUND RECORDING

322 West 45th Street, New York, New York 10036. +1 212 757 5300; Fax: +1 212 757 5816. **Owner:** David Amlen. **Studio/Bookings Manager:** Ann Selznick; **No. of studio & dimensions:** Studio A - 31 x 27 ft, Control Room A: 20ft. x 18ft. Drum Iso: 15 x 12 ft., Iso 10x 6 ft, Iso 2: 8 x 4ft., Studio B: 24 x 16ft., Control room B: 21 x 17 ft., Iso 1: 15 ft. x 8ft., Iso 2: 6 x 5ft.

**Mixing consoles:** Neve VR60 Legend with Flying Faders SSL 4064G+ with Ultimotion. **Recorders:** Studer D820 48-track recorder, Studer A827 24-track recorders, Otari and Studer 2 and 4 track recorders, Panasonic DAT recorders. **Digital audio workstations:** Sonic Solutions. **MIDI set-up:** Yamaha DX7, Chroma Polaris, Prophet 600, Akai S900, Emu Systems SP12, Atari 1040ST w/C-Lab Creator, Korg M1R music workstation. **Monitors:** Urei 813A, Genelec 1031A, Westlake BBSM4, Tannoy PBM 6.5, Yamaha NS10M, E-V Sentry 100A, JBL 4401, Auratone 5C, Bryston and Yamaha Amplifiers. **Specified outboard:** AMS, Aphex, dbx, Drawmer, EMT, Eventide, Lexicon, Pultec, t.c. electronic, Teletronix, TUBE-tech, Urei, Valley People, Yamaha. **A/V equipment:** JVC CR8250U 3/4 inch video recorder, Sony 27 inch and 20 inch monitors, Timeline Lynx synchronizers with CCU/SSU machine control. **Special services:** Analog-Digital transfers, STUDER compact disc recorder, staff engineers and in-house production, convenient mid-town Manhattan location, private lounges with kitchen, cable, video and catering. **Association member:** SPARS.



## SOUND TECHNIQUES INC.

1260 Boylston Street, Boston, MA 02215, USA. +1 (617) 536 1166; Fax: +1 (617) 536 4446.

**Studio/Bookings Manager:** Susie Pottery, Gina Romani.

**No. of studios & dimensions:** CRA 510sqft. Studio A 775 sqft. ISO1 168 sqft. ISO2 95 sqft. ISO3 42sqft. CRB 510 sqft. Studio B: 400 sqft. ISO1 48 sqft. ISO2 30sqft. CRC 220sqft. ISO 88sqft. Scenaria Suite 500sqft. ISO 120sqft. **Mixing consoles:** SSL 4056 G3.2, SSL Scenaria, Neve Flying Faders, Allen & Heath Saber. **Recorders:** Sony 3324 (2), Sony APR 24, Ampex ATR 102(1/2"), Sony 7030 DAT with TC, Sony 5003 with TC, Otari MTR10 (3), Panasonic SV3700 (5). **Digital audio workstations:** SSL Scenaria, SSL Screen Sound (2), all networked via, SSL Sound NET, DigiDesign Sound Tools. **MIDI set-up:** MAC IIs in all studios, pro, performer, S1000, K2000, K250, Proteus (2), 01w(2), R8M (2), M1, D550, MKS80, MKS70, Young Chang 7ft Grand. **Monitors:** Westlake BBSM-12 (3 Pair), meyer hd-1 (3 pair), Westlake BBSM-4, Yamaha NS10, Tannoy PBM 6.5. **A/V equipment:** Ampex VPRS, Sony BVH 3100, Sony BVW75, Sony BVU800. **Specified outboard:** Reverb Effects: Lexicon 480L, 224, PCM70(2), Quantec QRS XL, TC M5000, TC 2290(3), Eventide H3000(3), Dynacord DRP20(2), KT DN780(2), Roland SDE 3000(5), Yamaha REV5(2), SPX9011(2). **Compressors:** Urie LA2A(2), Tubetech CLIA, UA175(2), DBX165(3), DBX160X, DBX900. **Equalizers:** Pultech EQP1S(2), Summit EQF100, DBX900's, Dolby 740, SPL Vitalizer, BBE 804, Orban(2). **Gates:** Drawmer DS201(4), Ashley SC33, DBX 900's. **Synchronizers:** 6 Timeline Lynx with SSU+KCU, SSL Screensounds, JSK1128 Timecode Machine. **Microphones:** U47(Klaus Heine), U47Fet, U67(Klaus Heine)(2), U87A(5), KM84(2), AKG C-24, 414(6), D112, D12E 460(6), Beyer MC740N(2), 160N(2), Sennheiser 421 (6), 441(4), B&K 4003, PML DC96, EV RE20(3), Shure SM57 (10), SM81(2).

**Special Services:** In house engineers, original composite work, satellite, talent casting, duplication, located in centre of Boston, near clubs hotels and restaurants.



## STUDIO 56

7000 Santa Monica Blvd., Hollywood, CA 90038, USA. +1 213 464 7747; Fax: +1 213 467 8579.



## STUDIO CENTER

6157 NW 167th Street, Suite F-4, Miami, FL 33015, USA. +1 305 828 7231; Fax: +1 305 826 8615.



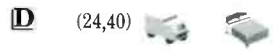
## SUNBURST RECORDING

10313 W. Jefferson Blvd., Culver City, CA 90232, USA. +1 310 204 2222 (Tel. No.).



## TRACK RECORD, INC.

5102 Vineland Avenue, North Hollywood, CA 91601, USA. +1 818 761 0511; Fax: +1 818 761 0539.



## TRUSTY TUNESHOP RECORDING STUDIOS

8771 Rose Creek Road, Nebo, Ky. 42441 USA. +1 502 249 3194(Tel.+Fax). **Owner:** Elsie Trusty Childers. **No. of studios and dimensions:** 2 Studios: 32 x 36 11ft. ceiling; 12ft. x 18ft., control room- 20 x 22ft. **Mixing Console:** Tascam M3700 (24 tracks), Studiomaster 16

into 8. **Recorders:** Tascam DA-88 (3). **Monitors:** JBL 4412A (2). **Specified outboard:** PMC-70 Digital Effects Processor, Roland R-8 MK II, Sv-3700, RTU-11, Magnavox - Custom made (2), Yamaha NS-10(2), Yamaha PS-35 synthesizer, PAIA -Strings & Things Synthesizer, Jesse Green Grand Piano, Otari (8 track), Baldwin Acousonic Piano.



## ULTRASONIC STUDIOS

7201 Washington Ave; New Orleans, LA 70125 USA. +1 (504) 486-4873; Fax: +1 (504) 488 1057. **Owner:** Jay Gallagher. **Studio/Bookings Manager:** Steve Reynolds. **No. of studios & dimensions:** Two studios: "A" 45 x 50 ft., "B" 15 x 15 ft. **Mixing consoles:** MCI/Sony JH 652. Soundcraft Delta 200. **Recorders:** Studer A827 with SR. MCI JH24. **Digital audio workstations:** Pro-Tools 8 tracks. **MIDI set-up:** SoundTools II, D-4, Roland S-50. MAC II CI/ Opcode Studio Vision, Kurzweil K2000R; Wavestation AD. **Monitors:** JBL 4331A; Tannoy SGM 10 with M.L. x overs. **Specified outboard:** Lexicon 300; Summit EQP 200A; Drawmer DL241 & 1960. **AV equipment:** Sony 3/4 inch recorder. **Special Services:** Remote recording; ADR; Sound Design. **Association member:** NARIS.



## WALLY CLEAVER'S RECORDING

2200 Airport Avenue, Fredricksburg, CA 22401-7220, USA. +1 (703) 373 6511 - (Tel. + Fax). **Owner:** Peter Bonta. **Studio/Bookings Manager:** Buffalo Bob. **No. of studios & dimensions:** Room 1: Studio 20 ft. x 40 ft., control room 18 ft. x 22 ft. Room 2: Studio 8 ft. x 8 ft., Room 3: Studio 8 ft. x 9 ft. **Mixing consoles:** Custom ESP 44 Input with JL Cooper Magi II Automation. **Recorders:** MCI JH-114 24 track with AL III, Tascam 85-16B 16-Track Linch, Otari 5050 2-track, scully 280B 2-track, Revox A77 2-track, Panasonic SV-3500, and SV-3700 DAT Recorders, 2 Tascam C-3RX Cassette Recorders. **MIDI set-up:** Alesis MMT-8 Sequencer, Alesis Data Disk, Akai ME-35T Audio/MIDI Trigger, J.L. Cooper PPS-1 SMPTE/MIDI Generator, Atari 1040 STE Computer with MIDI sequencing software, 2000+ voice DX-7 Library, 300+ Voice Akai S-900 Sample Library. **Monitors:** Urei 809 Time aligned monitors, Tannoy PBM 6.5, Near-Field Monitors. **Specified outboard:** Urei 1176 Limiters, Urei LA-4 Limiters, DBX 160 Limiters, Aphex aural exciter, Neumann U-87, U-47 FET, KM-84; Sennheiser MD-441, MD-409, MD-421; RCH 44A, 77DX, BK5; Yamaha Rev-7, Sony R-7, Alesis Quadraverbs, Alesis MIDI verb III, Lexicon PCM-41, SDR-1000 Digital Reverb. **Special Services:** In House engineers and producers. **Association member:** AES, AF of M.



## WENDELL RECORDING STUDIO

Lockes Hill Road, Wendell, MA 01379, USA. +1 (508) 544 8288 - Tel+Fax. **Owner:** Jeffrey Bauman. **Studio/Bookings Manager:** Judith Bauman. **No. of studios & dimensions:** 1 studio - playing room 25 ft. x 28 ft. x 19, control room 22 ft. x 16 ft. **Mixing consoles:** Trident 24 Recording console, with 32 channel mega-mix automation. **Recorders:** Otari MTR 90 II 24 Tracj; 3M M79 1/2 inch 2 track; Otari 56/50 1/4inch,

Panasonic SV 3700 DAT, Sony PCM 501 Digital 2 track processor, Esoteric V9000 cassette, Aiwa AD-S 40 Cassette. **MIDI set-up:** Opcode 2 + 2. **Monitors:** Gauss 7258; Yamaha NS-10M; Aurotone T6; Aurotone Sound Cubes; Electro-Voice Sentry 100A; ADS L700; Altec 604. **Specified outboard:** Lexicon PCM70, 6042, Teltronix LA2A, (2) Pultec MEQ-5, Drawmer 201 Noise Gates, Valley People 610, Quadraverb plus, Yamaha SPX900, DBX166, Ashley SC50, 2 Ashley SG-33 Noise faders, DBX 150L101, Ashley SE66 Parametric EQ; Aphex Aural Exciter, Delta Lab Super Prime Time Digital Delay, Urei 1176 compressor; Valley People Dynamite, Klark Teknik, DN360 Equalizer, Orban Co-Operator, Master Room XL-305. **Special Services:** Residential facility.



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7265 Santa Monica Blvd, Los Angeles, CA 90046, USA. +1 213 851 9800; Fax: +1 213 851 9384. **Studio/Bookings Manager:** Steve Burdick. **No. of studios & dimensions:** 9 - overdub to 35 Pieces. **Mixing consoles:** Neve VCO & 72, with Flying Faders, Yamaha DMC-1000. **Digital audio workstations:** DigiDesign Pro Tools, Digital FIX (Wave Frame). **Monitors:** Westlake Audio HR-1, SM-1B3SM-6, Otaries. **AV equipment:** Barco Video Producer, 1 inch C, 3/4 inch various. **Special services:** Attention to client requirements, technical and personal.



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**Mixing consoles:** SSL 4064G, Neve VR48. **Recorders:** Mitsubishi X880 Digital, Otari MTR 9011 Analogue. **MIDI set-up:** MacIntosh & Atari computers with performer, Cubase & Notator software. Complete selection of keyboards. **Monitors:** Westlake TSM 3 and BBSM 12.

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16 Milling Avenue, Sea Lots, PO Box 783, Port of Spain, Trinidad, West Indies; +809 623 7789; Fax: +809 637 7086. **Owner:** Coral Recording Services Ltd. **Studio/Bookings Manager:** Mike Schuler. Engineers: Eric Michaud.

**Dimensions:** Studio: 48'x30' w/20' ceiling, control room: 24'x12', Mixing Consoles:

Auditronics 26x24 w/8 Focusrite ISA-110 module rack. Audio Recorders: Otari MTR-90 24-track w/Dolby SR24-channel connected, Otari MTR-20 1/2" w/Dolby SR2-channel connected, MCI 1/4" Cassette Recorders/Duplicators: (2) Tascam 122 Echo, Reverb & Delay Systems: Lexicon 200, Lexicon Prime Time II, Yamaha Rev7, (2) Yamaha SPX90, Eventide Harmonizer H969. Other Outboard Equipment: (2) Aphex Aural Exciter 103, Orban Sibillance Controller 516, (2) Urei 1176n limiting amplifier, (2) Urei LA-5 audio leveller, Orban parametric equalizer 622B, Studer A727 compact disc player. Microphones: (2) AKG The Tube, (2) Neumann U87, (2) Shure SM7, (2) AKG 414.

Monitor Amplifiers: BGW 75, BGW 250E, BGW 75A, (2) JBL/UREI Room EQ. Monitors

Speakers: (2) Altec Super Reds 604E, (2) Yamaha NS-10M, (2) Aurotone 5C, (2) Visonik 9000, (2) Mastering Lab crossovers. Musical Instruments: Oberheim Matrix-12 synth, E-max sampler/synth, Yamaha DX711 FD, Prophet-2002 sampler, Akai Linn MPC 60 drum machine/sequencer, Linn drum machine, Roland electronic drum kit, Kawai baby grand acoustic piano, extensive library of E-max, Akai Linn & DX7 diskettes & cartridges. Other: Sound ideas CD effects library, complete set professional percussion instruments, AKG headphones, Countryman Direct Boxes. Rates: Special introductory rate of U.S \$40 / hr. (or even less for quantity block bookings), which includes engineer with 15 years of experience and all equipment / instruments. Top-quality accommodation in relaxing and sunny locations available at surprisingly reasonable rates.

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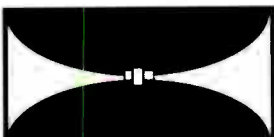
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**T**he big battle between DCC and Mini Disc is still to come. Both sides will now admit, in their own way, that neither format has taken off as hoped for or expected.

Polygram admit that the capacity of DCC duplicating plants around the world far outstrips demand. This is better than the situation that existed ten years ago, when demand for CDs far outstripped the capacity of CD pressing plants—but it does nothing to encourage the record companies to push the format. The result is that if you see any DCC cassettes in a record shop, they will most likely be tucked away in a corner.

The record companies thought that the first DCC machines to go on sale would be portable playback-only units. But, of course, Philips launched with table-top recorders, designed for home taping CDs. The first portable, sourced from Panasonic, is now going on sale (under the Panasonic, Philips and JVC brand names), but at several hundred pounds, it is not what the record companies expected. The first table-top recorders (made by Philips, Marantz factory in Japan) sounded good, but were expensive and have a very sluggish fast-wind motor, which makes track search and access painfully slow.

So the original promise of DCC, a relatively simple and low cost upgrade from the analogue cassette, has not yet been fulfilled.

Significantly, Philips have now taken the brutal decision to relocate its audio group from Eindhoven to Singapore. Wim Wielans, who headed Philips' Audio Group during the DCC launch phase, is being replaced (from October 1st) by Victor Loh, previously head of all Philips' operations in Singapore. The audio management staff in Eindhoven will be reduced from 66 to 20, with some employees transferred to Singapore, but 35 jobs disappearing.

Philips thinking, as explained to me by Henk Bodt, world head of consumer electronics, is that audio production is now centring in the Far East (with Philips' Hasselt factory to concentrate on CD-I) so it makes sense to have the management there on the spot.

Philips are bringing in a new project coordinator for DCC, Piet Bogels, who was previously project coordinator for the Eureka 95 Group which developed the ill-fated MAC HDTV TV system. Fortunately, Gijs (Gerry) Wirtz, who pulled together the development of DCC, remains the



**Barry Fox**

## Media marketing—going backwards in order to go forwards with DCC

pipeline between the DCC engineering team and the outside world. Without Wirtz there would have been no DCC. But somewhere along the line, Wirtz's vision of DCC got screwed by the Philips management.

Bodt admit that he is 'disappointed' by the lack of support for DCC from the music industry, but puts on a brave face, saying he is 'not dissatisfied' with DCC progress. Philips now realise they will take time to build a park of players in homes to stimulate music sales. I like Bodt's pragmatic explanation for the music industry's lack of support and failure to go out on a limb and take chances on DCC. 'There must be a reason why the record companies are so rich.'

Bodt is more blunt in a private letter which he sent to the record companies. He describes the appointment of Piet Bogels as needed

'to get a more coherent and coordinated effort within the DCC project.' Bogels, he says 'has a track record on systems introduction and cooperation with the music industry as he was very much involved in the introduction of the CD system onto the market, participated in the DAT standard setting and has recently been heading the Eureka 95 project leading to the introduction of new broadcasting standards in Europe.'

Only time will tell what Bogels does for DCC. But it has been said that Philips never launched DAT, wisely judging the standard wrongly for format. The MAC system failed miserably, except in Scandinavia, and HD-MAC has failed with it both as a domestic transmission system and studio production medium. CD turned into a roaring success, but was something of a slow starter.

Although Philips have done surprisingly little (in fact, absolutely

nothing) to publicise the happy event, the story of the introduction of CD is told in an extra chapter added to the book *Breakthrough!—An International Study of Innovation* by Arthur D. Little, Inc. In the original book, the ADL researchers studied the introduction of several groundbreaking products, including the VHS VCR, Walkman and microwave ovens. The extra chapter describes the crucial roles played by Jan Timmer, then heading Polygram, Akio Morita and his friend Herbert von Karajan, and Philips' men Francois Diereckx and Gaston Bastiaens, accurately described by ADL as 'a workaholic who forced Philips normally sluggish manufacturing capacity up to a pace of production and new product development that had been—until then—unthinkable in any nation other than Japan'.

After CD, Bastiaens moved on to launch CD-I then left Philips and joined Apple in Cupertino, California where he heads the Personal Interactive Electronics division.

Significantly, when Gastiaens left Philips, the company blinked on CD-I, lost momentum and gave rival multimedia systems, like 3DO, the chance to pitch for the emerging new market. Bastiaens is now mercilessly driving Apple towards the launch of new multimedia gizmos, like the *Newton* personal communicator which works like an electronic notepad. The Apple staff, some of whom behave like overgrown school computer enthusiasts trapped in a college time warp, have never experienced anything quite like the workaholic Belgian.

The bottom line is that, although the development of DCC was an impressive feat, the launch misfired on several cylinders. And there is no team comparable to that which broke through on CD. Worse still, Sony are in opposition with MiniDisc, not cooperating as on CD.

Philips' only real hope for DCC is to follow through on the design team's original game plan. This is to capitalise on the 'backwards compatibility' of DCC, and get recorders, car and portable units on the market at low enough price for potential customers (and car manufacturers) to say, 'what the hell, I need a new cassette deck and as a DCC deck is not much more expensive than an analogue deck, I might as well pay the extra and get one that plays digital tapes as well as all my old analogue ones'. ■



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Our ground-up design for sound includes a multi-processor computer configuration, a real-time multi-tasking operating system, scrolling graphics (so you can see all 24 tracks of waveforms moving all the time), and a very fast hard disk interface that allows you to get all 24 tracks from a single hard disk or 8 tracks from optical. That's what MFX2 is all about, and that's why using it is a very different experience from all the rest.

Most important of all, we designed our own editing console. That's because when you're spending 2,500 hours behind a workstation next year, it's your staying power that's important. Forget about staring at a cursor at the end of a mouse all day. MFX2's console lets you edit with eyes closed if it makes you more comfortable. Compared to a mouse, you'll find it relaxing, very fast and essential.

Our users were the first to have "sampling" and waveform editing, and have enjoyed an upgrade path that took them through SMPTE sequencing, and four models of disk recorder, through to the world's fastest audio editor. This year they'll be adding 24 tracks of simultaneous recording, EQ and digital video playback.

MFX2 is the one you need to look at when you've checked out the rest. You'll be surprised...but you shouldn't be!

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1994  
TBA

1993

1993

24 tracks from one disk  
24 Simultaneous Record  
Equalisation  
Digital Video Playback

1992

MFX2

16 tracks from one disk  
Scrolling waveforms  
Frequency Domain time  
compression  
Gated Recording

1991

MFX

Hard Disk editing  
8/16 track playback  
Audio freeze frame  
16 Zoom scales

1990

Series III Rev 8

Dynamic Voice  
Allocation  
8 track disk recorder

1988

Series III Rev 7

Fast disk transfer card  
Caching of software  
display  
32-bit processor added

1987

Series III Rev 6

Cue List timecode  
sequencer  
CAPS music sequencer  
Integrated mono disk  
recorder

1985

CMI Series III

First 16 bit sampler  
16 Voices  
Shared Memory  
Architecture

1982/3

CMI Series IIX

HiFi sampling  
MIDI implemented  
Page R sequencer

1980

CMI Series II

First Real Time  
Graphics based  
Music Sequencer

1978

CMI Series I

First Sampling  
Digital Workstation  
Waveform Editing

1976

QASAR

8 channel Fourier  
synthesis  
Light pen interactive  
graphics  
Dual CPU architecture

At last, a console that combines  
what you WANT with what you NEED.



Crest Century GT

**C**rest Consoles' Century GT combines the operating features users want most in a live board with the rugged reliability for which Crest Audio is famous.

#### HOW DO WE KNOW WHAT YOU WANT AND NEED?

Because we asked. Before we designed the Century Series, we spent over a year talking to our customers, including sound rental companies and contract installers around the world. Every facet of the Century GT's design reflects this user input.

#### YOU WANT INTELLIGENT DESIGN

Crest Century GT's intelligent design means faster, easier set up and operation. Gain setting is simple with dynamic Signal Present and multiple-sample point Peak indicators on all inputs. With powerful 4-band sweep EQ (peak/shelf switchable on HF/LF), four programmable scene mutes and two matrix sends as standard, it's an accurate, professional approach to sound engineering.

Flexible too, with four or eight bus configurations plus optional matrix and stereo modules. Balanced inputs and primary outputs (including all 8 Aux sends) and ultra-low noise signal paths add up to truly advanced audio performance.

#### YOU NEED PERFORMANCE AND DEPENDABILITY

We build Crest Century consoles to the same high quality standards as our world-standard amplifiers and renowned Crest Gamble consoles. The build quality goes beyond the console itself—its power supply is practically indestructible.

#### UNCOMMON VALUE

With all we've put into it, you'd expect Century GT to cost much more than other consoles in its class. Well, you're in for a pleasant surprise when you contact your Crest Consoles distributor. For your local distributor's name, address and phone, please call your nearest Crest office as listed below.

**CREST**  
CONSOLES  
THE POWER OF INTELLIGENCE

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**TEC**  
TECHNICAL INTELLIGENCE CREATIVITY  
1993 NOMINEE