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

International Studio Directory
G Plus consoles additionally provide:
- 3.5" disk drives
- Audio phase scope
- Wireless talkback system
- Automated solo
- Video switcher
- G Series or E Series equalisers
- SSL's own linear crystal, oxygen-free cable
- Redesigned group and main mix amps
- Pair of PPM meters
- Push/push switching to mute aux masters
- Listen mic post-compressor output to patchbay
- Cue stereo normalising
- LED meter illumination
- Buffered main output distribution
- Second mini speaker output
- Group cross-normalising
- Black Trim strips
- On consoles of 72 channels or over:
- A fully-connectorised remote patchbay becomes a non-chargeable option

G Plus consoles allow the use of low cost, high capacity disks for mix data storage.

Audio phase scope provides permanent display of amplitude and phase relationship of left and right stereo signals.

Wireless talkback system uses a PCM encoded infra-red handset.

Solid State Logic
International Headquarters: Begbroke, Oxford, England OX5 1RU - Tel: (0865) 842300
Paris (1) 34 60 46 66 • Darmstadt (6151) 938640 • Milan (2) 262 24956 • Tokyo (3) 54 71 11 44
New York (212) 315 1111 • Los Angeles (213) 463 4444

Improved specification at no extra cost.
Falling equipment prices may not be the good news many would have us believe. What happens when gear is too cheap to sell?

News from the world of pro-audio—Harman acquire AKG, Sonosax take over StellaDAT manufacturer Digital Audio Technologies, Chicago gets new postpro complex and Theatre Projects provide the sound system for Carousel.

Product news includes wireless mics from BeyerDynamic, a transmitter from Micron, a wireless system from Nady and four dynamic mics from Sennheiser.

Dave Foister evaluates the latest addition to the ubiquitous SPX signal processor range and considers its importance to Yamaha.

Nigel Orango and Chris Gilbert discuss the practicalities and legalities of using radio mic systems on stage and in the studio.

Still defiantly analogue, Rupert Neve's latest console for Amek flaunts its descent from previous Neve designs. Zenon Schoepe talks to the designer about his new project.

The Zoom Corporation's latest signal processing units attract the critical ear of Zenon Schoepe.

Taking the best of analogue and digital technology, Otari have produced a cost-effective console for music recording and production. Patrick Stapley mixes the American way.

The Paris COPRA studio complex houses Europe's largest concentration of SSL ScreenSounds. Zenon Schoepe learns the power of the co-operative.
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 him! 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 then 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......
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 a 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
Since 1991, thousands of audio professionals have come to depend upon the power and flexibility of Digidesign's Pro Tools® for audio post, music, and broadcast production. Indeed, you'll find hits made with Pro Tools on just about any top movie or music chart, just about any week of the year. In many circles, Pro Tools is even considered the de facto standard of multichannel professional audio workstations.

Rather than let this success go to our heads, we let it go to our brains. And ears. And hands.

You see, we've been thinking. And listening. And working hard. All to build something even better. Now, it's ready, and it's called Pro Tools 2.0.

Two Point Oh Wow. Pro Tools 2.0 is a new, software-based advanced user interface. Without any modifications or additional hardware, 2.0 runs with all past and present Pro Tools hardware. If you're already familiar with Pro Tools, the first advancement you'll notice is that 2.0 combines full-featured recording, mixing, signal processing, automation, along with advanced waveform and event editing — all in one, easy-to-use, integrated program.

There is simply no other interface as fast, as powerful, as flexible, and as complete.

More Than Speed and Efficiency. The benefits of Pro Tools 2.0 go far beyond the obvious. For instance, we improved Pro Tools' already acclaimed audio quality. Our new digital EQs are as effective and musical as they are clean. We've added a host of intuitive automation, auto location and transport features. Pro Tools now has a no-wait waveform overview mode. There's complete time-stamping. Enhanced grouping. Better scrubbing. More session management options. Bigger, brighter, faster, and more accurate VU metering. Improved MIDI sequencing and control. Extensive undo commands. In fact, Pro Tools 2.0 has dozens of new features, and scores of enhancements, for audio post, music, and broadcast production applications.

There's Much More To Come. We've become the industry leader by responding to the needs of the people who use digital audio. And by listening carefully to people like you, we have a clear vision of what a professional digital studio should offer.

First of all, it should offer power, flexibility, loads of features, and excellent sound quality. It should be highly cost-effective, without compromising performance or quality. It should be modular, to allow each user to have the power he or she needs, without having to pay for unnecessary features. It should also be

You Might Call That Impressive.
backed up by the best customer support in the entire industry. It's no coincidence that all of this describes Pro Tools 2.0, perfectly.

A Vision To Share. We believe that a truly professional digital audio workstation should have a truly open architecture. By "open," we mean that you should be allowed to add software-based power when you need it. (DINR; our amazing Digidesign Intelligent Noise Reduction system, is the first of many forthcoming Digidesign software "plug-ins").

By open, we also mean that your workstation should have powerful and affordable upgrade paths. (We think Pro Tools 2.0 makes this case quite elegantly.)

And by open, we actually believe that your professional digital studio should allow you to integrate hardware and software from a variety of manufacturers, and not just us. Which is why, in 1993, we are releasing the remarkable Digidesign TDM Digital Audio Bus—a 256-channel, 24-bit system which will allow you to "drop in" DSP and other cards from Lexicon, Apogee, and other leading manufacturers. No muss, no fuss. You can even automate and route your existing analog and digital gear within this new, all digital environment. Of course, all past and present Pro Tools systems will be easily and affordably upgradable to be totally compatible with the Digidesign TDM Digital Audio Bus.

Now that's what we mean by open.

Make Pro Tools 2.0 Your Reality. Thanks for taking a few minutes to read what we had to say. Hopefully, we've helped you understand better the depth of our commitment to the people who use Pro Tools today, and will be using it tomorrow.

So while we call it Pro Tools 2.0, you might call it exactly what you need. And if so, perhaps your next call should be to us.

**PRO TOOLS**

**AVAILABLE SOON!**

**THE NEW PRO TOOLS POSTVIEW® OPTION INTEGRATES FRAME-ACCURATE, FULL-SCREEN, FULL MOTION RANDOM-ACCESS DIGITAL VIDEO® WITH YOUR PRO TOOLS SYSTEM. THE POSTVIEW PACKAGE ALSO FEATURES MACHINE CONTROL® FOR PERFORMING CHASE LOCK OF VIDEO DECKS TO PRO TOOLS AUDIO. CALL ONE OF THE DigiDESIGN REPRESENTATIVES LISTED BELOW FOR MORE INFORMATION.**

*REQUIRES SOME ADDITIONAL THIRD-PARTY HARDWARE.*
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 intern award

Pans-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 figure 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.

● Skilled work launches project

Skilled, 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 feels 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.

● AESC 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, JED, Lone Wolf, Rane Corporation, THAT Corporation, The Golden 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. ACG’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 ACG, dbx, Orban, RSS, Quested 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.

Lakeside scene

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

The new facility will comprise a 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.

Cutters’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.’

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 MXF2 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 MXF2 via Shotlist, a audio 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

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 ‘Flashlight’, incorporating Funktion One’s new Axehead technology.

The Flashlight 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 which 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.

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.

Show Preview

AES Technical Paper Sessions

The 95th AES Convention in the Jacob J. 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 Gornadow; 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
  Aja Productions have set a complex for Theatre Projects that has 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 MD16 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

StellaDAT—in its old, familiar guise

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 opens at London's Shaftesbury Theatre in 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 Grouthuis, awarded TP the whole audio hire contract.

Theatre Projects is supplying a Cadic 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, BSS 302a, BDL Control Ones, and Canon V100s for surround sound.

'The contract', comments Theatre Projects sound hire manager Rachel Henahaw, '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.
Each of the images in this ad has a unique story to tell. Happily, they're all stories of success. Identify those images and you could win a Jeroboam of fine champagne, courtesy of Studio Sound and Haseldine Wood Associates.

They're some of the ideas that have helped create marketing successes and strengthen customer loyalty for our clients. As an advertising, marketing and design agency Haseldine Wood knows how the power of ideas can spur great business even in a recession.

A memorable brand image keeps your products or services up front in people's minds. Powerful, strategic creativity focuses your message and underlines your corporate heritage. With the right mix of advertising, direct mail or brochures, you can top every prospective customer's list.

To win that Jeroboam, simply complete and post the coupon - the winner will be drawn from correct entries received by 31 October 1993.

And to make your marketing budget work harder, call Haseldine Wood Associates now on 081 675 9227 for an informal chat.

HASELDINE WOOD ASSOCIATES
ADVERTISING, MARKETING & DESIGN
THE POWER OF IDEAS
Philip House, 8 Ravenswood Road, London SW12 9PJ
Tel: 081 675 9227 Fax: 081 673 0006

STUDIO SOUND
Spotlight Publications Limited, 8th Floor, Ludgate House, 245 Blackfriars Road, London SE1 9UR
Tel: 071 620 3636 Fax: 071 401 8036

WIN A JEROBOAM OF CHAMPAGNE
To enter, write the number of each advertising image in the box alongside the appropriate company or product and post the completed coupon to Studio Sound, Spotlight Publications Ltd., 8th Floor, Ludgate House, 245 Blackfriars Road, London SE1 9UR, United Kingdom. The winner will be drawn from correct entries received by last post on 31 October 1993.

NAME
POSITION
COMPANY
ADDRESS
POSTCODE

I would like more information on the strategic and creative services of Haseldine Wood Associates
I would like a Studio Sound Media Pack

STIRLING AUDIO SYSTEMS LTD., Kimberley Road, London NW6 7SF • Tel: 011 624 6000 • Fax: 011 372 6370

SELECT YOUR MOGAMI CABLE
24-pair multi-core
16-pair multi-core
9-pair multi-core
8-pair multi-core
7-core mic cable
Star quad mic cable

YOU DON'T HAVE TO TIE A KNOT IN IT... to remember the name of the world’s best audio cable. Still, it's good to know that Mogami's unique construction not only makes it so flexible, but also makes it easier and quicker to wire a complete installation.

Mogami sounds better too! So, with a wide range, from multicore to patchcords - all designed to be better - Mogami is the cable for every application.

mogami 071 624 6000
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 multiple 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-X50 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 polymide 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 lm 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 damp any significant potential resonances in the frame.

Recording Architecture, 21-33 Greenwich Market, London SE10 9HZ. Tel: 081 858 6883. Fax: 081 305 0801.

Micron Transmitter

Audio Engineering, manufacturer of the Micron range of radio microphone equipment, announces the launch of the TX831, 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 TX831 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
  Trisol Inc are offering the first of a series of upgrade modules for its Digital Companion series A-D and D-A converters. The newest plug-in module is a 5th-order sigma delta 18-bit A-D converter. Northeastern Digital Recording Inc.
  Tel: +1 508 481 9222.

• 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-8 microphone with digital output. The P1 features a 1-bt A-D converter with a fourth-order noise shaper and 64x oversampling digital filter and dual D-A converters 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 BrainFX, 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 production professionals Denon Pro use true diversity receivers operating on two different VHF high band frequencies, and a choice of two transmitters—lor, hand-held microphone or musical instrument bodypack. DDA. Tel: 081 570 7161.

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

Four-way Nady

Nady Systems have introduced the NW-3 UHF wireless system. The system features four user-switchable channels on the receiver and transmitters. Nady also claim the NW-3 wireless system. 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 NW-3 uses Nady's patented companding circuitry to deliver a dynamic range of 100db 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 bias 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—lor, hand-held microphone or musical instrument bodypack.

Carver Professional, PO Box 1237, 2011 46th 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 SIF 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 bu102 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 converter between AES-EBU, S-PDIF, SDIF-1 and SDIF-2 formats. The SFC1 converts between arbitrary and even time varying sampling frequencies. The SFC1 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.
Try a Sony DASH recorder, and you might find that nothing else will do. It’s hardly surprising.

You’ll be experiencing all the creative freedom and sound quality of the world’s most popular digital multitrack format.

And that’s before you count the studio time and budget benefits. Sony DASH recorders offer faster operation than any comparable machine – digital or analogue. They’re easy to use. And of course, because they’re DASH, you use less tape.

And in action?

The Sony 48-track offers the ultimate in digital recording. There’s on-board sampling, full timecode chase synchronisation – and you can even bounce all 48 tracks at once.

Our 24-track needn’t cost any more than some analogue multitrack systems. Yet with fourteen different hardware options, you can tailor it precisely to your needs.

And at the highest level, you can actually incorporate all the features of its 48-track big brother.

What’s more, both units are fully compatible with each other, and easy to integrate into existing analogue and digital environments.

All sounds pretty good? Just wait until you hear them.
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 SPX990 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 easier 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 converter (or in the old days, a pitch-to-voltage converter) 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 converters and a 44.1kHz sampling rate. Reverbs are crystal clear and breathtakingly natural, and even old Yamaha chestsnuts such as Sympathic (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 least 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 unmissable 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 366872. USA: Yamaha Corporation of America, 6600 Orangethorpe Avenue, Buena Park, CA 90620. Tel: +1 714 522 9011. Fax: +1 714 739 2880.

Yamaha SPX990—the ultimate ‘toybox’?

14 Studio Sound, September 1993
"I remember this Logic 2 was up and running the day it arrived... and I don't believe it's been idle since.

"Of course, the assignable processing makes any layout you may prefer very easy to set up. The real difference is Dynamic Automation of the digital signal path - it's fast and flexible and means I can be more creative with changes in the mix.

"The integration with the AudioFile's Event Based Automation allows you to make changes to the edits, with the console automation following suit.

"I think the speed of it... the flexibility, is a standard I've come to expect now. I can sail through time consuming tasks and get on with the real business - getting a true feel for the mix.

"The on-board EDL conform allows greater control over source audio - saving on On-Line time - the system relays the tracks from first generation material.

"The sound? I love it. An acute lack of distortion.

"Essentially, Logic 2 is reliable and it's fast... and anything that makes me look the same, I want a piece of..."
The sound and the fury

Following the furere 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 ADX model to DG's own specification. The absence of any 21-bit linear converter 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
NOBODY KNOWS SONY BETTER THAN HHB

NOT ONLY ARE WE BRITAIN'S BIGGEST SONY PROFESSIONAL AUDIO DEALER, WE'RE ALSO THE LONGEST STANDING. CONSEQUENTLY, OUR CUSTOMERS ENJOY UNRIVALLED LEVELS OF SALES AND TECHNICAL SUPPORT FROM A TEAM OF DEDICATED PROFESSIONALS THAT KNOW SONY PRODUCTS INSIDE OUT. IF IT'S SONY CHANCES ARE WE HAVE IT IN STOCK, FROM MICS THROUGH SIGNAL PROCESSORS TO DAT RECORDERS AND BEYOND. IN FACT, WE SUPPLY AND SUPPORT THE ENTIRE SONY RANGE. SO IF YOU'RE AS SERIOUS ABOUT SONY AS WE ARE, YOU KNOW WHO TO CALL.

HHB Communications Ltd • 73-75 Scrubs Lane, London NW10 6QU • Phone 081 960 2144 • Fax 081 960 1160 • Telex 923393
Concept One
Digitally Controlled Production Consoles

Although new to Otari, Concept 1 is the culmination of over twenty years of console design and manufacturing expertise. Given the unusually attractive price, what else is different?

- True symmetrical inline design with up to 48 dual I/O modules featuring 96 automated mix channels. Each channel path uses its own dedicated, identical 4-band equalizer with a 100 mm large fader.
- Console-wide snapshot automation allows storing and recalling of switch functions, manually or with reference to SMPTE/MIDI timecode. DISKMIX™ dynamic fader & mute automation enables fader grouping with VCA or moving faders. Additional console screen dynamics will follow.
- User programmable softkeys per I/O module and the additional virtual master status control create a new level of operational flexibility.
- Each channel's switching functions may be accessed from the easy to understand master section in form of an active color-coded block diagram (photo insert).
- CompuCal™ allows precise digital calibration of output and meter levels.

The particulars are endless, but the bottom line is simple: Otari has done more than just reinventing midrange audio consoles.
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 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
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 go home, you plug in 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 whine simply because they have not got their head around the metering or got around to delving into the device to tinker 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 sure that these products are as accessible as possible to people 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 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 twist the Parameter 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, wash 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 Selecting the recalled 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 'Guit 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 but it defaults at its lowest gain setting to a definitive solid chord sound. Two sets of EQ—one 2-band and one 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 reverbs. 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-processors 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.

Rocktron Corporation, 2870 Technology Drive, Rochester Hills, MI 48309, USA.
Tel: +1 313 853 3055.
UK: Adam Hall, 3 The Cornwarens, Temple Farm Industrial Estate, Sutton Road, Southend-on-Sea, Essex SS9 3RU. Tel: 0702 610922.
The GS3V combines exceptional audio quality with the power of digital control to deliver an outstanding recording console.

Equipped with the world's most accessible fader automation which includes full MIDI capability, optional SMPTE synchroniser, graphic software and MMC function keys.

Designed with leading-edge technology and manufactured with the most exacting care to deliver the highest standards of consistent, reliable performance GS3V is unequalled in value for money.

If you would like more information, call or write to the address below.
We have designed and manufactured more than half a million transformers during the last 50 years and have several thousand original designs.

We can supply single prototypes or quantities at very reasonable prices, with quick despatch, quoting without delay against detailed specifications.

Sowter Transformers are in constant demand the world over, for such uses as Microphone – matching and splitting, Line – distribution (up to 10 secondaries), bridging, input and output, to Recording, Broadcast or P.A. Quality. Also Loudspeaker transformers and output, mains and chokes for Valve Amplifiers, to name but a few.

We will send details of our range on request and quote for any requirement.

E. A. SOWTER LTD
PO BOX 36, IPSWICH IP1 2EL
Tel: 0473 252794 Fax: 0473 236188

---

**Does digital audio give you the jitters?**

Get the measure of AES/EBU and SPDIF with Prism Sound instrumentation

**DSA-1**

Hand-held Digital Audio (AES/EBU) Interface Analyzer

- Measures jitter and other electrical parameters
- Displays Channel Status
- Monitor loudspeaker and headphone output
- Automatic test programs

**DScope**

PC-hosted Audio Analyzer for AES/EBU signals

- FFT analysis
- 24 bit signal generation
- Channel Status generation, editing, analysis
- High resolution plotting
- Stores results to disk

**Realize your dreams with the Prism Sound AD-1 A/D converter**

- -115dB dynamic range
- Super Noise Shaping (SNS) or dither
- Dynamic Range Enhancement (DRE) for 16 bit recorders
- 16 or 20 bit output

Using the Dream AD-1 you can relax and enjoy the performance. With an extra 24dB of dynamic range yielding a total S/N ratio of -115dB a generous level of headroom can be set without risk of low-level noise or distortion.
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 the 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 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 remotely 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 a 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 their reception range to virtually nothing.

A well-designed ADU unit will incorporate a front end band-pass filter to ensure the signals in bands are passed on to the RF amplifier which in turn feeds the antenna splitting device which ▶
The usual solution is to use rechargeable batteries, which have a much longer life and are also a shelf life. With our Trantec systems, 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 cost, though it is wise, especially 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. Not withstanding the unlikely coup of a live broadcast of a new 'squidy' 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 hand-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 Sonneither within the ETU, 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, you have 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 affecting RF users—the Wireless Telegraphy Act—puts the onus on the broadcaster 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 BSS750, have issued an edict to their production managers instructing them to only use legal radio mics. Another bombshell is that 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 conflicting 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 affect us more in the future too. ASP FM are working closely with the European Telecommunications Standards Institution (ETS), 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 is concerned with Electromagnetic 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 in 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.
AT ANY PRICE, THIS ALL-DIGITAL SYSTEM IS IMPRESSIVE

TASCAM DA-88 8 Track Digital Recorder
£3403*

TASCAM RC-848 Remote Control
£850*

YAMAHA DMC1000 Digital Mixing Console
£22995*

AT THIS PRICE, IT'S REMARKABLE

For around £30,000 excluding VAT, HHB can now supply a 16 channel digital recording system of quite exceptional quality. Yamaha's revolutionary DMC1000 is fast becoming the industry standard all digital console - not surprising when one considers its uncompromising specification. And in our opinion, a full complement of professional features makes Tascam's DA88 the 8 track digital recorder of choice.

If you're considering the installation of either or both of these revolutionary products, the dealer of choice is HHB. We're Europe's biggest supplier of digital audio equipment, the UK's exclusive supplier of the DMC1000 console and a leading authorised Tascam dealer.

So for further details and a demonstration of the Yamaha DMC1000 digital console and Tascam DA88 digital recorder, call HHB today.

HHB Communications Limited · 73-75 Scrubs Lane, London NW10 6QU · Phone 081 960 2144 · Fax 081 960 1160 · Telex 923393

* Manufacturer's suggested selling price excluding VAT
The HOME SERVICE PRESENTS...

The TOTAL PACKAGE

Soundcraft Sapphyre LC
NOW WITH INTEGRAL OPTIFILE AUTOMATION
- 32 TRACK CONSOLE WITH INGENIOUS ROUTING SYSTEM
- IDEAL FOR RECORDING, VIDEO POST OR BROADCAST PRODUCTION
- SMPTE PERFORMANCE OPTIFILE AUTOMATION
- MUTE WRITING FROM CONSOLE CONTROLS
- EASY SUB-GROUPING OF MIX FADERS
- FULL COLOUR GRAPHICS DISPLAY OF FADER AND MUTE STATUS
- IMPECCABLE AUDIO SPECIFICATIONS
- UNIQUE 4 BAND EQUALIZER
- VERSATILE NOISE GATE IN EVERY MODULE
- THE SOUNDCRAFT REPUTATION OF SONIC EXCELLENCE

The Equalizer with no Equal
HEAR THE CRITICALLY ACCLAIMED SPL VITALIZER
- UNIQUE FILTER DESIGN GIVES UNCOMPROMISING QUALITY OF SOUND
- UNRIVALED CLARITY AND DETAIL
- ENHANCES THE FULL SPECTRUM
"THE BEST SUCH DEVICE I HAVE HAD THE PLEASURE OF USING" - PAUL WHITE, SOS / SOUND ON SOUND / AUDIO MEDIA

The Hiss Busters
CRYSTAL'S DAZZLING RANGE OF DE-NOISERS
- SINGLE-ENDED NOISE REDUCTION SYSTEM
- WIPES OUT HISS AND BACKGROUND NOISE
- ULTRA FAST CIRCUITRY
- UP TO 28 dB NOISE SUPPRESSION

I am dedicated to providing my clients with a first-class service with full back-up, whether they want individual products, tailor made packages or full studio outfits. What's more as a former platinum and gold album recording engineer, I have years of experience and know what I'm talking about.

Louis Austin, The Home Service

THE HOME SERVICE ● 178 THE HIGH STREET, TEDDINGTON, MIDDX, TW11 8HU ● TELEPHONE: 081-943 4949 ● FAX: 081-943 5155
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 surpike 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 mice has greatly increased range availability, 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, its 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. 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 (685MHz 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 increases 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 lavalier 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!

---

**TABLE 1: COMPARISON OF VHF AND UHF**

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

---

It's the only 2-Track DAT recorder

There are any number of stereo DAT recorders on the market, but if you need the true professional capability of individual 2-track recording, there is only one choice — the Otari DTR-90.

It really is the most professional DAT recorder. Apart from individual channel record, you also get 4-head flexibility, a time-code facility, and a removable front panel for remote operation that makes it about the easiest machine to use. And we'll back it up with the best after-sales support in the business.

Where else can you get such a straight deal? Call Stirling now for your professional demo and persona quotation.
Dual Domain Audio Testing

It's About Time

AUDIO PRECISION ... We're in the studios, stations and networks and on the factory floor. You've seen Audio Precision at the trade shows and in the magazines and technical reviews ... so now you're about to select your audio test and measurement equipment.

It's about time to look at the System One and Portable One from Audio Precision.

SYSTEM ONE is the industry standard. Over three thousand benches, factories, studios and stations around the world rely on System One for the final word in analog measurement:
- Complete analog and digital domain testing
- State-of-the-art performance and speed
- Now available with FASTTRIG, for subsecond audio channel testing
- Graphic results on PC screen, copies to printers and plotters

PORTABLE ONE PLUS has established itself as the compact, affordable leader in audio test sets:
- 12 different measurement functions
- Sweeps, graphs and printer port
- New GPIB control interface option
- Robust polycarbonate case
- Full stereo capability

We'd like to take some time to talk with you. We'll be happy to discuss your application and arrange for an onsite demonstration.

Audio Precision ... The recognized standard in Audio Testing.

P.O. Box 2209
Beaverton, OR 97075-3070
503/627-0832, 800/251-7350
FAX: 503/641-8906

Audio Precision

INTERNATIONAL DISTRIBUTORS: Australia: IRT Electronics Pty. Ltd., Tel: (61) 2 439 3744 Austria: ELSINCO GmbH, Tel: (43) 222 810 04 00 Belgium: Tient Europese Music NV, Tel: (32) 2 445 5010 Bulgaria: ELSINCO, h.a. Sofia, Tel: (359) 2 381 580 Canada: GERALD DISTRIBUTION, Tel: (614) 669 2779 China, Hong Kong: A.C.E. (HK) Co. Ltd. Tel: (852) 424 0267 Czech Republic: ELSINCO Praha a.s., Tel: (42) 444 24 27 Denmark: IRT Electronics a.s., Tel: (45) 86 57 15 11 Finland: Genelec OY, Tel: (358) 77 133-1 France: STS Mesureur, Tel: (33) 5 43 82 66 41 Germany: RTW GmbH, Tel:(49) 221 70 91 30 Hungary: ELSINCO KFT, Tel: (36) 1 12 6569 India: TURKOM Services PVT. Ltd., Tel: (91) 2 396 666 India: ELSINCO National Co. Ltd., Tel: (91) 3 565 1457 Japan: TOYO Corporation, Tel: (81) 3 591-5900 Korea: HP International Co., Ltd., Tel: (82) 2 546-1457 Malaysia: Test Measurement & Engineering Sdn. Bhd., Tel: (60) 3 734 1017 Netherlands: TM Audio B.V. Lda, Tel: (31) 161 916 671/940332 Singapore: TMC Systems Pte. Ltd., Tel: (65) 396 2608 Slovakia: ELSINCO Bratislava a.s., Tel: (42) 7 784 165 South Africa: SOUND/FUSION, Tel: (27) 11 477 1315 Spain: Telefónica Electrónica, Tel: (34) 1 501 710 Sweden: Tel & Ton Elektronik AB, Tel: (46) 31 60 35 25 Switzerland: Dr. W. A. Günther AG, Tel: (41) 1 910 41 41 Taiwan: ACESONIC INT Co., Ltd., Tel: (886) 2 719 2386 United Kingdom: SSE Marketing Ltd., Tel: (44) 71 387-1262

2000 - 2001 AUDIO PRECISION INC. - ALL RIGHTS RESERVED.
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 the 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 SuperMae 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 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 Neve.

‘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 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 find 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.’

You’re using your miracle TLAs (Transformer Like Amplifiers) again.
'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 TLA. 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.

'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 TLA 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.'
For the first time, DENON is offering professional users the choice of drawer or cartridge loading in the latest two CD players from the company.

While the CD cartridge has become very popular, and not just with broadcasters, or for jingles, some users still prefer drawer loading. Now DENON is able to offer the choice, in machines designed and built for professionals.

Features include:
- Playback of recorded CD's (even without TOC)
- End of track preview
- Instant start - cues to signal
- Digital output
- Parallel remote control
- RS422 interface
- Fader start option
- Single track or continuous play modes
- Automatic re-cue after single track play
- Narrow body

For more information and to arrange a demonstration contact Hayden Pro-Audio
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 curves even more like I thought they ought to be and making sure that things 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.'

The Medici's WARMTH control 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 SURENESS 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

---

**Fig.1: 9098 transformer output stage. Frequency response**

- Frequency response curve showing changes across frequency bands.

**Fig.2: 9098 transformer input stage. Line output stages. Maximum output at low frequencies**

- Output stage curve showing maximum output at low frequencies.
ALL DAT TAPES ARE NOT THE SAME

In recommending DAT as the format for exchanging digital audio, the European Broadcast Union also warned its members that the tape itself should be chosen with great care. Block errors, archiving stability – even head wear are affected directly by the quality and design of the tape and the shell in which it’s housed.

In pursuit of the highest standards of excellence, Europe’s leading supplier of DAT technology – HHB Communications – has developed a new range of DAT tape providing a consistently higher level of performance than conventional Digital Audio Tapes in a wide variety of professional audio applications.

We believe HHB DAT tape to be the safest choice for professional users.

Post the coupon below and we’ll tell you why.

ADVANCED MEDIA PRODUCTS

For further information and full specifications of HHB Digital Audio Tape, please complete and post this coupon:

Name: ___________________________ Organisation: ___________________________

Address: ___________________________ Phone: ___________________________

HHB Communications Ltd · 73-75 Scrubs Lane, London NW10 6QU, UK · Phone 081 960 2144 · Fax 081 960 1160 · Telex 923393
In North America: Independent Audio · 295 Forest Avenue, Suite 121, Portland, Maine 04101-3000 · Phone: 207 773 2424 · Fax: 207 773 2422
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 have 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 HP and LP frequency controls give reproducible and controllable curves? I would agree with that but to be honest you can actually get 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 backwards to not depart too much from my tradition.

You’ve included a selectable notch on the mids. That’s a nice bit of spin-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 LP 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 64kHz on an odd channel of a Neve at AIR.’

How do you feel about putting the VCAs of Virtual Dynamics into a 20kHz 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 modulate 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 8098 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.’

Amek Systems & Controls Ltd., New Islington Mill, Regent Trading Estate, Oldfield Road, Salford M5 4SX, Tel: 061 834 6747.
Fax: 061 834 6583.
US: Tel: +1 818 508 9788 Fax: +1 818 508 8619.

---

**Beware of limitations ...**

...discover intelligent equalisation by VARICURVE™

The **FCS-926 Dual VARICURVE Equaliser Analyser**

The **FPC-900 VARICURVE Remote Controller**

The **FCS-920 VARICURVE Slave Module**
THE Hx 2000
HAND HELD
TRANSMITTER.
IT SOUNDS
AS GOOD
AS IT LOOKS.

Professional sound recordists have told us that they found the sound quality of our Tx 2000 transmitter almost indistinguishable from a line mic. Praise enough you might think. But we wanted to go further.

So when we produced the Hx 2000 hand held transmitter, the newest addition to our highly successful RMS 2000 range, we first made it as slim as we could, squeezing the very latest multi-layer PCBs into a tube measuring only 220mm by 20mm. Then, on top, we added one of the world’s finest microphone capsules, specially produced for us by Schoeps of Germany. The result is an ultra-lightweight hand held transmitter that delivers transparent sound.

And, since the Hx 2000 is also compatible with the vast range of Schoeps Colette interchangeable microphone capsules, real versatility too.

Now you’ve heard how good we think it is, we’d like you to hear for yourself. For more information or to arrange a demonstration contact us at the address below.

Audio Limited, 26-28 Wendell Road,
London W12 9RT.
Tel: 081-743 1518 (2 lines), 081-743 4352.
Fax: 081-746 0086.
“Our combination of classic analogue synthesizers as well as ‘state of the art’ Midi and software equipment has broken some of the conventions of the more traditional studio.

“This, coupled with acoustic instruments and performance, creates a good blend. Dolby SR on the multitracks is the ideal format to capture the vast range of sounds our clients create and use.”

*Paul Brewster – BJG*

*Dolby SR can be heard on the following BJG projects.... The Orb, Sabrina Johnson, Galliano, Real Thing, FFF, Dakeyne, Mike Oldfield, Robert Fripp, Yellow Magic Orchestra.*

More and more studios are realising what Dolby SR can do for them. Call Andy Day on 0793-842100 and find out for yourself.
Zoomb'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 Show 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 mono 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 exulted 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 reverb which translates into the paring-off 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 5-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 business right through to what can only be described as an advanced stereo form. But it is reverb that this...
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. It 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 half-baked 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 caliber. 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 more 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 multifunction 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 transferal 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 patch is 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 multifluid effects 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.

Zoom Corporation of America,
385 Oyster Point Blvd, Suite 7, So.
San Francisco, CA 94080, USA.
Tel: +1 415 873 5885. Fax: +1 415 873 5887.
UK: MCMXCLX, 9 Hatton Street, London
NW8 8PR. Tel: 081 963 0653. Fax: 081 963 0624.

FOR THE INS AND OUTS
OF A PROFESSIONAL DAT RECORDER

Look on the back panel of the Otari DTR-7

That's where you'll see that the Otari DTR-7 has been purpose-built for professional use, with XLR-type connectors for its AES/EBU digital I/Os. Plus a host of other professional-standard features:

- SDP/IF digital interface
- Selectable 48/44.1/32 kHz sampling frequencies (auto select for digital recording)
- Input signal monitoring through its built-in A/D and D/A converters
- Complete with rack mounting ears
- Start ID, Auto ID Edit and Auto Renumber functions

Otari doesn't make Hi-Fi DAT machines – so you don't have to use one! Choose the professional DAT recorder from the company that's committed to the professional audio business.

Stirling Audio Systems, Kimberley Road, London NW6 7SF • Tel: 071 624 6000 • Fax: 071 372 6370

071 624 6000
The new Vienna II gives your performance that little bit more

The new Vienna II shares the same smooth looks as its predecessor and has many of the same attributes - with up to 46 input frame size, 8 groups, aux sends and effects returns together with optional 11 x 8 matrix.

However, lurking inside that cool exterior are a number of new and unique features which have been included by popular demand:

- Improved EQ for tighter control over LF in both bell and shelving mode
- Fully featured stereo module giving higher input density
- Individual pre-post switching on all auxiliary sends
- New input stage giving wider range and allowing mic and line level signals to be connected via the XLR input
- Insert points on auxiliary outputs
- VCA Grand Master module for extended control of 3 VCA groups

Whether you are on the road or have a permanent venue to fill, the Vienna II offers unrivalled performance together with Soundcraft's impeccable pedigree at a price which may surprise you.
The dual converters provide four mono and two stereo pairs, 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 gimmickery retrieval in the multitrack 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 assign 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 layout. This arrangement serves the dual 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 ENS/MUTE 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, Channel 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-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—preset memories can be transferred to floppy as backup, or to set another Concept 1. Globally setting a status preset, such as Overdub, to the central control is a simple three-button operation: PRESET/RECALL/COPY TO MODULE.

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, which is a useful facility if, for example, a configuration has been copied to the wrong module which will then require reconfiguration. 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 either within the module itself, or 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 Default (toggles on/off all AFL/PFL selections) are selectable.

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 allow 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.

Sources 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 monitors, and the ten paired aux buses, which can all be summed.

Control room monitoring is divided into nearfield and main sections. Both sets of buttons 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.

**Automation**

The console is fitted with two types of automation as standard—Otari's Diabux system governing all faders and their mates, 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 cross-fades can be set up to 'ease-in' fader settings, and a Mask facility is included to block-out specified data—which 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.

**Future options**

Four main options will be available for Concept 1 in the near future. The first is a moving fader option for Diabux operating on both channel and mix faders. Audio will remain routed through the VCA and all other Diabux 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 sweep high-low-pass filters section. The Stereo Output module derives information from the multitrack buses and is equipped with the same equaliser as the Stereo Input module. Its inputs are to the mix bus and/or an additional stereo Main output, providing 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 ever 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. ■

**US:** Otari Corporation, 37th Vintage Park Drive, Foster City, CA 94404. Tel: +1 415 341 5900. Fax: +1 415 341 7200.

**Europe:** Otari Group GmbH, Rudolf Diesl Strasse 12, D-40670 Meiderich, Germany. Tel: +49 23159 50861.
Whatever your situation, the MKH family ensure accuracy and intelligibility in all aspects of recording.

Sennheiser MKH 80 studio condenser microphone

Superb studio performance and the ultimate in flexibility: the MKH 80 variable pattern studio condenser microphone extends the outstanding quality of the Sennheiser MKH range. The MKH 80 features exceptionally low noise, a wide range of audio control and a high dynamic range plus switchable pre-attenuation, HF lift and LF cut to compensate for proximity effects, and LED indicator for exact orientation. The most versatile microphone designed for any recording situation.

ALL THE MICROPHONES YOU'LL EVER NEED.
"After using 996 for over 12 months, I remain very impressed with its consistency and performance. 996's low noise floor makes it ideal for most applications, even without noise reduction, and its high level capability copes with almost anything we throw at it without any saturation."
- Callum Malcolm, engineer and producer. Castle Sound Studios.

"The performance is excellent. You can push it very high indeed, yet it still retains the clarity needed for CD's, combining the best of analogue warmth with a good crisp quality - real competition for digital."
- Craig Leon, producer.

"I've been using 3M 996 tape at 30ips without noise reduction, and it sounds terrific. It's analogue like analogue ought to be - with digital, all you can do is get the level right but 996 gives you far more control over getting the sound right. It's the only tape I use now."
- Chris Kimsey, producer.

"Clarity, punch, excitement. 3M 996 Audio Mastering Tape elicits a dynamic response from producers and engineers. It provides the analogue performance they've always wanted - the ability to record as hot as +4dB, with a maximum output of +14dB. A very low noise floor, achieved by a signal-to-noise ratio of 79.5dB and class-leading print-through of 56.5dB. 3M 996 captures every subtlety, delivering every note just as it went down. The highest level of response."
- Hugh Padgham, producer.

3M AUTHORISED AUDIO DEALERS:

- Transco Mastering Services
  7 Soho Square
  London W1V 3HD
  Tel: 071 287 3563

- P. F. Magnetics
  14 Simpson Court
  11 South Avenue
  Clydebank, Business Park
  Clydebank
  Dunbarton G81 2NA
  Tel: (041) 952 9676

- Orchid Video
  The Latch House
  7 Somervile Road
  St Andrews
  Fife KY10 9AD
  Tel: 0272 247687
France has a long and illustrious tradition in cinema film—and 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 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 ProTools 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.

'The building 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 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...'
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 benefit 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 fundamental 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.'

COPRA, 12 rue Heinrich, 92100 Boulogne, France. Tel: +33 1 4608 2040. Fax: +33 1 4621 7095.
Few curves are as exciting as ours.

Sometimes the curves which attract the most attention aren’t the sharpest, or the most breathtaking. In fact, sometimes they’re the smoothest. Case-in-point: the distinctive, exceptionally smooth, tailored response of the all-new Beta 87 vocal condenser microphone from Shure.

The Beta 87’s response curve has been engineered for natural sound at all usable frequencies. Its all-new supercardioid condenser element, low handling noise, tremendous gain-before-feedback, and wide dynamic range make it the perfect hand-held choice for the most demanding vocal applications. And it’s available in both wired and wireless versions.

Audition one today!
Loud and Clear

“We got the M3s because they simply blew me away. We were comparing many different systems and when the M3s got here I just said ‘That’s it, no more!’ because they were so much better than anything else we had heard. They are very clean and crisp and can handle level, so we can do dance and rap, but we also master rock, pop, reggae and heavy metal. The M3s are great with everything we listen to, and the imaging is simply the best of any studio monitor.”

Chris Gerenger, Mastering Engineer
Hit Factory New York

dynaudio acoustics®

“The Studio”
1 Book Mews, Flitcroft Street
London WC2H 1DJ, UK
Tel. (+44) 71 379 7600 Fax (+44) 71 497 8737
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 sidebar). 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 Jahan (Studer Digitec) explained that 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 system of carts without loss 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 Deca, 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 effects 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 i). The tool which made 'going digital' worthwhile was the random access recorder with nondestructive editing. As a result, the total time required for...
most programmes dropped by 30%–50%, although in some 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 64–64kbit/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 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 resynchs, 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.

**Router:** 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.
To Make Money in Radio Advertising, You've Got to Push the Right Buttons.

Since 1990, radio stations in every music market have been more creative, more efficient and more profitable with the DSE 7000. In order to increase profits in the competitive radio environment of the '90s, general managers have been asking more from their production directors, who in turn have had to do things faster and cheaper. Clearly, the trusty 8-track recorder wasn't going to lead radio stations through this new era. Since it was impossible to become more efficient at tape splicing, astute production types contemplated digital technology. They found out about a company with over 40 years experience manufacturing professional audio products, who was already shipping a digital sound editor for radio production. Not coincidentally, this system had many of the same controls and functions they were used to.

They tried a demo of the DSE 7000 and realized they could produce spots in one-third the time. Which meant they had time for a certain luxury called creativity. The DSE's UNDO button gave them room to experiment. And its audio quality raised their standards to an entirely new level.

Today, hundreds of radio stations are making more money producing radio commercials, because they're pushing buttons on the DSE. Now it's time to push some buttons on your telephone and call AKG.

DSE 7000 • The New Speed of Sound

AKG Acoustics Ltd., Vienna Court, Lammas Road, Godalming GU7 1JG Surrey Tel No. 0483 425702 Fax No. 0483 428967
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 10–12 Mbytes/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 Elliot (BBC Radio) looked at networking personal computers for both audio and business data, using Novell Ethernet networks in particular. Elliot 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 practice a Novell Ethernet network can only deliver 40–50% of the 10 Mbit/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 TMODEL**

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 bandwidth of 16 Mbit/s and 100 Mbit/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 and a collision occurs, this is detected and the packet is retransmitted. Collision detection is used by Ethernet which has a maximum bandwidth of 10 Mbit/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.

---

**Studio Monitor Speakers Made in Germany**

The tweeters of our studio monitor speakers do not require a special colour to mark them as professionals, they are as grey as the tweeters from other makers. For 35 years we have designed and manufactured professional studio monitor speakers and we do know the need of an objective tool for the professional sound engineer.

KLEIN + HUMMEL (K+H) are world leaders in active speakers with electronic crossover and built in 3 channel power amplifiers. Not even the cheapest design of monitor speakers, only high quality ones, do accept line levels between 6 - 12 dBm. The result is a lower bass frequency response together with a tighter transient sound free of colouration.

KLEIN + HUMMEL have a wide speaker range from mini model MM 201 to the large studio monitor 0-121 to suit any application.

For more details please write or Fax.

---

52 Studio Sound, September 1993
Fly High Tech

Virtual Array™ Technology

World Touring Standard

KF850 Array
by Concert Sound
Chris DeBurgh
Earl's Court

In the UK: Harman Audio • Tel: (0) 753-576-911 • Fax: (0) 753-535-306
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 GB/byte 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 streaming 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, 'it 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 ABS Ltd, PO Box 645, Slough SL1 8BJ, UK. Tel: 0622 657225.
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.

STELLA PLUMBRIDGE with YASMIN HASHMI established SYPHA in 1988 to operate as a consultancy to manufacturers and users of disk-based audio-video editing and related systems.
Allow us to introduce a console that combines dramatic good looks with the finest in audio specification and leading edge DSP technology to set a new standard in audio performance.

It’s equipped with highly developed dual inputs on every module with fader and mute automation, EQ and dynamics processing.

The extraordinary sonic specification includes the unique FdB Parametric Equaliser™ which overcomes the problems of non-linearity in music and the ear and provides precise control of all frequencies in the audio spectrum.

In addition, all monitors have a 2 band equaliser and can share the FdB Parametric Equaliser™ with the channels.

Flexible, yes. Pure in sound - of course.

All inputs, outputs and busses are balanced to minimise hum and RFI interference and all circuits have extended bandwidth electronics to ensure ultra-low phase distortion, clarity at high frequencies and a punchy, precise low end.

Signal coherence and audio integrity is ensured.

Reliability is designed in, problems designed out and fidelity second to none.

Allow us to introduce the new Soundtracs Jade Production Console.
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 lost in records in techniques some professional studio owner requires 'rite, to be found your eye. MIDI', to be 'true' or 'pseudo'. The control room A Neve VR-72 console is fitted with GML fader automation and Graphite 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 1038A 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 Parish, Andora Studios, Hollywood, California, USA.

Dear sir, Barry Fox is certainly very persistent in his writings on the possibility of extracting 'true 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 'pseudo stereo' 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 'pseudo stereo', and have a fair amount of experience in this field.

Barry Fox says in his article ('Business', Studio Sound, May 1980) 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 he engineer Mike Dutton, who was responsible for the Elgar Edition Vol 1.
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 may 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 a noisome 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

"Microphones by Neumann..." What better endorsement could there be for a studio. And what better news for your studio than a budget price Neumann. The TLM193 is a large diaphragm cardioid condenser microphone designed for discerning studio and live applications.

With breathtaking sound, outstanding specifications and superior build quality, it's a microphone you would expect from Neumann, at a price you wouldn't.

A Neumann mic means business. The TLM193 is the business. And it's now within your means.

NEUMANN

Data Precision Ltd
Byfleet Business Centre
46-50 Chertsey Road
Byfleet, Surrey KT14 7AP
Tel: 0932 353679
Fax: 0932 342441

Kommunikationstechnik-AG
Industriestrasse 6
CH4562 Biberist
Switzerland
Telefon + 41 65 31 1111
Telefax + 41 65 32 3427

8 input channels, mono or stereo
4 auxiliaries, with returns
2 band equalizer in each channel
Pre fader listening and channel on switches
M/S switch in each channel
Penny & Giles long scale faders
2 stereo instruments
DC or AC powered
Weight 9.8 kg
Fits in a 19" rack
When equipment spares become scarce, the hi-tech cannibals come out to play

Martin Polon

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 $Z 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 audio 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 the Apple/IBM PowerPC, the Intel 80386 and the DEC VAX these manufacturers 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 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 is likely 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 tie 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!
Quality Audio for Professionals

- Quality Audio for Professionals
- Quality Audio for Professionals
- Quality Audio for Professionals
- Quality Audio for Professionals
- Quality Audio for Professionals
- Quality Audio for Professionals
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 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 1983) 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 a ageing process based on 60°C and 90% humidity. These conditions are derived from research undertaken by W.H. Abbott and D.E. Speletis 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 20-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.

These so-called 'Battle' 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 mix.

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 to 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 ➤

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
(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 a few 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 SM 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 text, with test results in Table 1.

Apogee

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 Apogee 467 tape 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 muted. 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
The music show of shows.
International marketplace.
For every aspect of music,
Pop, Rock, Jazz, Classical and Contemporary.

Palais des Festivals
Cannes - France
30th Jan-3rd Feb 1994

For more information contact: Peter Rhodes,
Reed Midem Organisation Ltd
Metropolis House,
22 Percy Street, London W1P 9FF.
Tel: 071 528 0086. Fax: 071 895 0949.

Reed Midem Organisation
A member of Reed Exhibition Companies

For every international music industry professional
who's into supplying professional hardware
to suppliers and studios around the world.

And those allied professionals
who make the music industry their own concern.

It's strictly business
Midem is in the business of creating business,
in Cannes. With live television performances,
concerts and showcases. Buzzing with talent,
opportunities and the hottest deals around.

Take a stand
and create a profile for your organisation.
It's your headquarters away from home.

Advertise
Be seen and heard in the Midem Preview,
Midem Daily and the Midem Guide, and
get your message across loud and clear.

And hurry
You may even qualify for a DTI subsidy, providing
your stand is booked by September 30th.
The HHB result showed some signs of damage. There were serious errors or muting. Additional test results prior to ageing. Two tapes had no C2 errors, but not audible, and one tape had several clusters of C2 errors, also not audible.

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 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.

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 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 ▶

---

**LEVEL & PHASE CORRELATION AT A GLANCE**

To improve audio metering - focus your attention on both key parameters of audio signals: PEAK LEVEL and PHASE CORRELATION.

**RTW Peakmeter & Correlator**

RTW RADIO-TECHNISCHE WERKSTATTEN GMBH • D-5000 Köln 71 • W.-Germany • P.O. Box 710654

Telephone (221) 7 09 13-33 • Telefax (221) 7 09 13-32

---

**LEVEL & PHASE CORRELATION AT A GLANCE**

To improve audio metering - focus your attention on both key parameters of audio signals: PEAK LEVEL and PHASE CORRELATION.

**RTW Peakmeter & Correlator**

RTW RADIO-TECHNISCHE WERKSTATTEN GMBH • D-5000 Köln 71 • W.-Germany • P.O. Box 710654

Telephone (221) 7 09 13-33 • Telefax (221) 7 09 13-32

---

**LEVEL & PHASE CORRELATION AT A GLANCE**

To improve audio metering - focus your attention on both key parameters of audio signals: PEAK LEVEL and PHASE CORRELATION.

**RTW Peakmeter & Correlator**

RTW RADIO-TECHNISCHE WERKSTATTEN GMBH • D-5000 Köln 71 • W.-Germany • P.O. Box 710654

Telephone (221) 7 09 13-33 • Telefax (221) 7 09 13-32

---

**LEVEL & PHASE CORRELATION AT A GLANCE**

To improve audio metering - focus your attention on both key parameters of audio signals: PEAK LEVEL and PHASE CORRELATION.

**RTW Peakmeter & Correlator**

RTW RADIO-TECHNISCHE WERKSTATTEN GMBH • D-5000 Köln 71 • W.-Germany • P.O. Box 710654

Telephone (221) 7 09 13-33 • Telefax (221) 7 09 13-32

---

**LEVEL & PHASE CORRELATION AT A GLANCE**

To improve audio metering - focus your attention on both key parameters of audio signals: PEAK LEVEL and PHASE CORRELATION.

**RTW Peakmeter & Correlator**

RTW RADIO-TECHNISCHE WERKSTATTEN GMBH • D-5000 Köln 71 • W.-Germany • P.O. Box 710654

Telephone (221) 7 09 13-33 • Telefax (221) 7 09 13-32

---

**LEVEL & PHASE CORRELATION AT A GLANCE**

To improve audio metering - focus your attention on both key parameters of audio signals: PEAK LEVEL and PHASE CORRELATION.

**RTW Peakmeter & Correlator**

RTW RADIO-TECHNISCHE WERKSTATTEN GMBH • D-5000 Köln 71 • W.-Germany • P.O. Box 710654

Telephone (221) 7 09 13-33 • Telefax (221) 7 09 13-32

---

**LEVEL & PHASE CORRELATION AT A GLANCE**

To improve audio metering - focus your attention on both key parameters of audio signals: PEAK LEVEL and PHASE CORRELATION.

**RTW Peakmeter & Correlator**

RTW RADIO-TECHNISCHE WERKSTATTEN GMBH • D-5000 Köln 71 • W.-Germany • P.O. Box 710654

Telephone (221) 7 09 13-33 • Telefax (221) 7 09 13-32

---

**LEVEL & PHASE CORRELATION AT A GLANCE**

To improve audio metering - focus your attention on both key parameters of audio signals: PEAK LEVEL and PHASE CORRELATION.

**RTW Peakmeter & Correlator**

RTW RADIO-TECHNISCHE WERKSTATTEN GMBH • D-5000 Köln 71 • W.-Germany • P.O. Box 710654

Telephone (221) 7 09 13-33 • Telefax (221) 7 09 13-32

---

**LEVEL & PHASE CORRELATION AT A GLANCE**

To improve audio metering - focus your attention on both key parameters of audio signals: PEAK LEVEL and PHASE CORRELATION.

**RTW Peakmeter & Correlator**

RTW RADIO-TECHNISCHE WERKSTATTEN GMBH • D-5000 Köln 71 • W.-Germany • P.O. Box 710654

Telephone (221) 7 09 13-33 • Telefax (221) 7 09 13-32

---

**LEVEL & PHASE CORRELATION AT A GLANCE**

To improve audio metering - focus your attention on both key parameters of audio signals: PEAK LEVEL and PHASE CORRELATION.

**RTW Peakmeter & Correlator**

RTW RADIO-TECHNISCHE WERKSTATTEN GMBH • D-5000 Köln 71 • W.-Germany • P.O. Box 710654

Telephone (221) 7 09 13-33 • Telefax (221) 7 09 13-32

---

**LEVEL & PHASE CORRELATION AT A GLANCE**

To improve audio metering - focus your attention on both key parameters of audio signals: PEAK LEVEL and PHASE CORRELATION.

**RTW Peakmeter & Correlator**

RTW RADIO-TECHNISCHE WERKSTATTEN GMBH • D-5000 Köln 71 • W.-Germany • P.O. Box 710654

Telephone (221) 7 09 13-33 • Telefax (221) 7 09 13-32

---

**LEVEL & PHASE CORRELATION AT A GLANCE**

To improve audio metering - focus your attention on both key parameters of audio signals: PEAK LEVEL and PHASE CORRELATION.

**RTW Peakmeter & Correlator**

RTW RADIO-TECHNISCHE WERKSTATTEN GMBH • D-5000 Köln 71 • W.-Germany • P.O. Box 710654

Telephone (221) 7 09 13-33 • Telefax (221) 7 09 13-32

---

**LEVEL & PHASE CORRELATION AT A GLANCE**

To improve audio metering - focus your attention on both key parameters of audio signals: PEAK LEVEL and PHASE CORRELATION.

**RTW Peakmeter & Correlator**

RTW RADIO-TECHNISCHE WERKSTATTEN GMBH • D-5000 Köln 71 • W.-Germany • P.O. Box 710654

Telephone (221) 7 09 13-33 • Telefax (221) 7 09 13-32

---

**LEVEL & PHASE CORRELATION AT A GLANCE**

To improve audio metering - focus your attention on both key parameters of audio signals: PEAK LEVEL and PHASE CORRELATION.

**RTW Peakmeter & Correlator**

RTW RADIO-TECHNISCHE WERKSTATTEN GMBH • D-5000 Köln 71 • W.-Germany • P.O. Box 710654

Telephone (221) 7 09 13-33 • Telefax (221) 7 09 13-32

---
Capture a Sigma...

...and the DASS 100 goes **FREE!**

Revolutionary DSP capabilities including Segment-Based EQ, gain and pan settings.

A rewritable optical disk provides 'background mode' backup and portable media.

DASS 100 multifunction digital audio interface and sampling frequency converter keeps signals digital.

This is one release you just can’t afford to miss.

Buy the Soundstation Sigma – an awesomely powerful package of digital audio editing and processing features – and you’ll also become the proud owner of a DASS 100 multifunction interface that will free you of your digital audio transfer and routing problems.

The Sigma is tailor-made for either 8 or 16 channel audio production with up to 16 hours of hard disk storage and built-in optical drive. It’s the perfect blend of total control and optimum flexibility, with instant response, single page touch-screen and dedicated “no-guesswork” controls.

Add the support of a DASS 100 – unique in providing functions for digital transfers, mastering, and synchronisation – and you’ll have the keys to unlock greater quality, productivity and creative flexibility.

DIGITAL AUDIO RESEARCH

DIGITAL AUDIO RESEARCH LIMITED
3 Silverglade Business Park, Leatherhead Road, Chessington, Surrey KT9 2QD, England.
Tel +44 (0)372 742848. Fax +44 (0)372 743532.

Please call me to discuss this offer.

Please send me a quotation on this special promotion.

I am interested in seeing a demonstration of the Sigma and DASS 100.

Please send me a quotation on this special promotion.

Name

Company

Address

Country

Postcode

Telephone

Business Activity
<table>
<thead>
<tr>
<th>Tape</th>
<th>Manufacturer</th>
<th>Test Cycle</th>
<th>C1 Error Count</th>
<th>C2 Error Clusters</th>
<th>C2 Error Count</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>Ampex</td>
<td>WO1</td>
<td>1,999</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Ampex</td>
<td>WO2</td>
<td>168,499</td>
<td>many</td>
<td>388,303</td>
<td></td>
</tr>
<tr>
<td>25A</td>
<td>Retest of 25</td>
<td>WO2</td>
<td>5,383</td>
<td>many</td>
<td>202,462</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Ampex</td>
<td>WR</td>
<td>2,859</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Fuji</td>
<td>WO1</td>
<td>6,986</td>
<td>3</td>
<td>21,270</td>
<td></td>
</tr>
<tr>
<td>27A</td>
<td>Retest of 27</td>
<td>WO1</td>
<td>n/a</td>
<td>3</td>
<td>25,515</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Fuji</td>
<td>WO2</td>
<td>129,395</td>
<td>many</td>
<td>191,605</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Fuji</td>
<td>WR</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>HHB</td>
<td>WO1</td>
<td>726</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>HHB</td>
<td>WO2</td>
<td>402</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>HHB</td>
<td>WR</td>
<td>371</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Sony</td>
<td>WO1</td>
<td>3,131</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Sony</td>
<td>WO2</td>
<td>1,180</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Sony</td>
<td>WR</td>
<td>195</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>TDK</td>
<td>WO1</td>
<td>796</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>TDK</td>
<td>WO2</td>
<td>1,705</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>TDK</td>
<td>WR</td>
<td>1,106</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>3M</td>
<td>WO1</td>
<td>107</td>
<td>1</td>
<td>3,008</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>3M</td>
<td>WO2</td>
<td>1,876</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>3M</td>
<td>WR</td>
<td>5,221</td>
<td>8</td>
<td>79,773</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>TDK</td>
<td>WO1</td>
<td>11,639</td>
<td>1</td>
<td>33,605</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>TDK</td>
<td>WO2</td>
<td>3,068</td>
<td>1</td>
<td>324</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>TDK</td>
<td>WR</td>
<td>1,047,180</td>
<td>many</td>
<td>449,570</td>
<td></td>
</tr>
<tr>
<td>48A</td>
<td>TDK</td>
<td>WR</td>
<td>n/a</td>
<td>many</td>
<td>151,750</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>Maxell</td>
<td>WO1</td>
<td>1,617,491</td>
<td>many</td>
<td>2,228,897</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Maxell</td>
<td>WO2</td>
<td>1,128,655</td>
<td>many</td>
<td>1,994,506</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>Maxell</td>
<td>WR</td>
<td>n/a</td>
<td>many</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>Apogee Ver. 3</td>
<td>WO1</td>
<td>123,650</td>
<td>many</td>
<td>325,604</td>
<td></td>
</tr>
<tr>
<td>53A</td>
<td>Retest of 53</td>
<td>WO1</td>
<td>n/a</td>
<td>3</td>
<td>47,701</td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>Apogee Ver. 3</td>
<td>WO2</td>
<td>2,896</td>
<td>many</td>
<td>125,095</td>
<td></td>
</tr>
<tr>
<td>54A</td>
<td>Retest of 54</td>
<td>WO2</td>
<td>7,098</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>Apogee Ver. 3</td>
<td>WR</td>
<td>6,688</td>
<td>1</td>
<td>45,886</td>
<td></td>
</tr>
<tr>
<td>55A</td>
<td>Retest of 55</td>
<td>WR</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

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, Fujifilm Maxell presents 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 40 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 keep 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 Apgeeq for furnishing information and comment, and to Tascam America who answered questions we could not get answered locally.

References:

Magnetic Tape Recording: Forever?
3M. Publication number 84-911-2085-4/4119 I. R1 Test Method for the Environmental Stability of Metal Media
RAO InfoSystems Company, Plymouth, Massachusetts, USA.
INTERNATIONAL STUDIO DIRECTORY

LEGEND TO SYMBOLS:

DIGITAL CONSOLE:  
DIGITAL EDITING:  
DIGITAL - TRACKS:  
ANALOGUE - TRACKS:  
AUDIO FOR VIDEO:  
FULL-TIME MAINTENANCE:  
MOBILE RECORDING:  
RESIDENTIAL STUDIO:  

AUSTRALIA

NEWMARKET MUSIC STUDIOS  
67-91 Arden Street, North Melbourne, Victoria 3051, Australia. +61 3 932 2877; Fax: 336 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 & Tavie 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 15 sq.m. Mixing consoles: Rainbird Symphony, Tascam M-3200, Yamaha & Roland.  

BELGIUM

IMPULS RECORDING STUDIOS  
Wittevrouwe Straat 26B-3020 Herent, Belgium. +32 (0) 16 290000; Fax: +32(0) 16 290123.

KITSCH RECORDING STUDIOS  
15 Rue Wery, 1050 Brussels, Belgium. +32 2 640 6888; Fax: +32 2 646 3205.  
Recorders: 2 Mitsubishi x 850/Studio A80/24/Apple. ATR100. MIDI set-up: EMU 3 - Memory M60G - DX7.  

PYRAMIDE RECORDING STUDIO  
31, Heerweg, B-1650 Beersel, Belgium. +32 02 377 5582; Fax: +32 02 377 9077.

PHASE ONE RECORDING STUDIOS LTD.  
3015 Kennedy Road, Unit 10 Scarborough, Ontario, Canada. 416 291 7898.  

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

PINEWOOD SOUND  
1119 Homer Street, Vancouver B.C. V6B 2Y1, Canada. +1 604 669 8900; Fax: +1 604 669 0040.
STUDIO MORIN HEIGHTS

201 Perry, Morin Heights, Quebec, J0R 1H0, Canada. +1 514 256 3418; Fax: +1 514 256 5409.

Owner: L’Equipe Spectra. Studio/Bookings Manager: Judy Smith/Peter Holmes. No. of studios & dimensions: Studio 44t - 30 ft., Control Room 10 ft. x 10 ft.

Mixing consoles: SSL 4056 G-Series. + Total Recall, Events Controller plus extra stereo switchable VCA's assignable in stereo bus. 1 Neve 12-4 with 1073EQ. Recorders: 1 Studer A800/1, 1 Otari MTR90/1, 1 Studer A80/1/2 inch. 2 Studer B67, 1/4 inch. 2 Studer A10/1 cassette. 2 Panasonic SD/500/370 DAT. 1 Revex R225 CD player. 1 Timeline Lynx Synchronizer.

Monitors: 1 pr ACOUSTIC Research A330S, 2 pr Auratone 505/S main monitors, 1 pr Quested 412/1L, 1 pr Yamaha NS10M, 1 Macintosh Mac200 (near field), 1 Quested DX300/7E (main monitors), 2 Quested A90/50E (main monitors), 3 Studer A69 (headphones), 2 BSS FB5500 (Modified) Crossover (main monitors). Instruments: 1 Hammond B3, 1 Leslie 122, 1 Yamaha 9/Grand Concert Piano.

Specified outboard: 8 Focusrite ISA110, 12 Assorted Equalisers, 1 AMS RX162, 3 EMT 140 Plates, 1 Eventide H3000NV, 1 Lexicon 224XL, 1 Lexicon 480L, 7 Assorted Digital Reverb/FX, 7 Assorted DDL, 1 Gates M352/8 Tube Limiter, 2 Neve 225E, 3 RCA BABA tube limiter, 2 Urei LA3A, 2 Ure Monarch, 8 Assorted compressors/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, board 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 7235.

VANCOUVER STUDIOS

3955 Gravelly St., Burnaby, B.C. Canada. +1 (604) 291 0758; Fax: +1 (604) 291 6009.

Studio/Bookings Manager: Tilde Camenier. No. of studios & dimensions: Studio 1 - 31 ft. x 27 ft. - studio - 23 ft. x 20 ft. control room. Studio 2: 24 ft. x 17 ft. studio - 16 ft. x 15 ft. mix. 10 ft. x 10 ft. control room. Studio 3: 32 ft. x 11 ft. 10 ft. x 10 ft. main control room. Studio 4: 20 ft. x 16 ft. 10 ft. x 16 ft. in house control room. Studio 5: (attached to studio 2) 20 ft. x 30 ft.


Specified outboard: Lexicon 480L Eventide H3000 Digital/210 TC Electronics 2290/Lexicon PCM-70/Lexicon PCM-42 Yamaha SFX 90-AMS RMX-16/KORG DTR-3000, Yamaha Expander - Gate/10X-196X Compressors/ Valley Dynamite Expander/Gate/TC Electronics 2240 Preamp & EQ (Tube Tech Pre-IB EQ)/John Hardy M-1 Mic Pre-Amps/4. AV equipment: SSL Screen sound digital workstations, JBL projector/100" Screen, Timeline Lynx synchronizer with RCU controller, Sony BVU-900 514m 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


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

KLING KLANG STUDIO

Kiekegaardsgade 3, 9000 Aalborg, Denmark. +45 98 164622 (Tel. No.)

MEDIA SOUND STUDIOS

Storlsgade 14 B, 2300 Copenhagen S., Denmark. +45 31 54 100; Fax: +45 31 543 539.

PUK RECORDING STUDIO

Kaarbyvej 65, 8983 Gjørløk, Denmark. +45 864 74600; Fax: +45 864 74611.

SWEET SILENCE STUDIOS APS

85 Strandlægevej, 2300 Copenhagen, Denmark. +45 3159 1200; Fax: +45 3284 0310.

FRANCE

DAVOUT

73 Boulevard Davout, 75020 Paris, France. +33 71 538 493; Fax: +31 74 72 48 83.

BAUER STUDIOS

Markgröningen Str. 46, D-71384 Ludwigsburg, Germany. +49 (0) 7141 22680; Fax: +49 (0) 7141 226899.

DAVITON RECORDING STUDIOS

An der Mosebecke 1, 22758 Detmold, Germany. +49 0231 34548; Fax: +49 0231 21010.

DIERKS STUDIOS

Hauptstr. 33, D-50239 Pulheim, Stömmeln, Germany. +49 2238 92300; Fax: +49 2238 930201.

KILLING SOUND RESEARCH

Lindensstraße 97a, 49233 Düsseldorf, Germany. +49 211 691 2385; Fax: +49 211 691 2476.

PILOT TONSTUDIO GMBH


SALA TONSTUDIO

Seewiesenstr. 14, D-73584 Eisingen, Germany. +49 07161 8510; Fax: +49 07161 841222.

69
THEIN RECORDING MOBILE

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


(24/48) D

THEIN STUDIOS

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

(24) D

TOUCHDOWN STUDIOS

Kirchbergstrasse 25, D-8051 Kranzberg, Germany. +49 (0)8166 5071; Fax: +49 (0)8166 5072. Owner: Terry Drivas. Studio/Bookings Manager: Barry Bonjovi. No. of studios & dimensions: Studio 1: control room, 30m². Recording room 85m². Studio 2: control room, 35m². MIDI room, 20m². Digital editing suite (SSL) 30m². 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-66 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 640. MIDI setup: Wide range incl: EMU HIV EX (8ms) with CD-ROM & MOD, Kurzweil 250, Kurzweil MIDI Board, Akai S-1000 (12 mb) with CD-ROM & MOD, Oberheim DX-1 with CD-ROM, Oberheim Xpler, JL Cooper MIDI Patchbay plus a wide range of vintage & modern outboard expanders. Monitors: Control Room 1: Quested Q210 with 21" Subwoofer and Dolby surround. Control Room 2: Quested Q212 with Dolby surround/quested Q108. Assorted Nearfields including Yamaha NS10. JBL Control 5: Audix mm5, Westlake. Specified output: Over 60 pieces including: 2 x Lexicon 4801, 2 x AMS DMX 45 x 2 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. AV equipment: 4 x Sony U-matic Recorders/Players, 1 x Sony HDVS-10 UNIFI video recorder, 55" Sony HDTV etc. projectors system, numerous colour monitors. Special Services: Catering, Januzzi, heated swimming pool. Also access to one of the largest sound libraries currently available. HDTV facilities. Association member: AES.

WERTON STUDIOS UND VERLAG WERNER RYGOL KG.

Munchner Str. 11a, 85714 Unterhaching, Munich, Germany. +49 (0)89 9520077; +49 (0)89 9597976. Owner: Werner Rylgo. Studio/Bookings Manager: Andrea Moosbauer. No. of studios & dimensions: A 30'70m², B 32'45m², C24m². 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 setup: Akai S 1100 Atari mitotor cubase etc. Monitors: Quested Q 312 Q 2126/Yamaha Tannoy. Specified output: Lexicon/EMT/AMS etc. AV equipment: U-matic/Studer Syn System.

(32/40) D

STONESOUND STUDIO

Nucleoeweg 24, 47076 Rees, Reesenthal, The Netherlands. +31 01659 45806 (Tel.: Fax no).

(24) D

STUDIO 44

Herenastr 44 - 2681 BH Monster, The Netherlands. +31 01749 13239; Fax: +31 01749 45026.

(24) D

STUDIO 150

Lauriergracht 150, 1018 BV Amsterdam. +31 0 20 625 85 85; +31 0 20 620 49 82. Studio/Bookings Manager: Peter Rochee. No. of studios and dimensions: 1, recording area 80 m² control room 40m². 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 9700 DAT, Fostex D20 DAT with timecode. Digital audio workstations: DAR Sigma with DSP, 16 channels playback and 16 trackheads recording capacity. MIDI setup: Atari Mega ST with Cubase and 44MB Syquest, SMP24 synthesizer, various synths. Instruments: Yamaha CSB Grand Piano, Vox AC50. Monitors: Genelec 1034A, Nearfield: Genelec 1031A, Tannoy NS10, Tannoy Eclipse. Specified output: Lexicon 2241L, Lexicon 440L, Lexicon PCM70, Yamaha SX890, TC Electronics TCS290, Lexicon Prime Time II, Roland SDE3000, A/DA STDI, AMS 2-20, AMS DMX 18-50. Urei 1178, Aphex Compeller, DBX 155, DBX 990 series compressor, gate and de-essers. Audio & Design Comper F760, Peavey US gate, Valley People Dynamic, Focurite RED I prepamp, Focusrite RED 2 Eq, Focusrite ISA 115 HD. Tube MPA tube pre-amp, Tube MPA tube Eq, Aphex Aural Exciter, BBE 882 maximizer, Behinger De-essers, Klark Teknik DN 360 1.3 octave graphic EQ, Microphones tube: 4 Neumann U67, 1 Neumann U47, 1 Neumann MM23, stereo, 8 Neumann KM64, 2AKG C28, 1Telefunken CM3 Microphones other: Neumann; 2 x TLM 170, 2 x TLM 250, 2 x U87A, 1 x U89, 4 x XM140, Neumann KMS AKG, 1 x Beta 41, 2 x 480 Semenisher; 4 x 441, 2 x 421 Super, 6 x SM57, 1 x Beta58, 1 x 55SH, Electro Voice, 1 x P120. AV 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

HOLLAND

CAVERN RECORDING STUDIOS

Van Diemen Straat 206, 1013 CP Amsterdam, Holland; 31(0) 20 6263367; Fax: 31(0) 20 6263386. Owner: Paul Downes.


(32/40) D

(3x24)
**STUDIO ARNOLD MUHREN**


---

**ITALY**

*CAPRI DIGITAL STUDIOS*  

---

**FINEPRINT RECORDING STUDIOS**


---

**IO LA MERIDIANA STUDIOS/HAVANA PRODUCTIONS**

*LA MERIDIANA*  

---

**MULINETTI RECORDING STUDIO**

Mulinetti  
Via Bordigotto, 5 - 16036 Recco (GE), Italy. +39 (185) 756017; Fax: +39 (185) 7232525. Owner: Alberto Paroli. Studio/Bookings Manager: Alberto Paroli.

---

**HONG KONG**

**POLYGRAM DRAGON STUDIO**  
Room 1001, Garley Building, 233-239 Nathan Road, Kowloon, Hong Kong. +852 3760 3455; Fax: +852 3759 6903.

---

**INDONESIA**

**STUDIO 15 (SAGITARIUS RECORDING STUDIO)**  

---

**JAPAN**

**AVACO CREATIVE STUDIOS INC.**  
3-18-2 Chome, Nishiwaseda, Shinjuku-ku, Tokyo, Japan. +81 3 3203 4181; Fax: +81 3 3207 1388.
ECH0 HOUSE
B1, 6-15-23 Roppongi, Minato-ku, Tokyo 106, Japan. +81 (0) 3 3403 1569; Fax: +81 (0) 3 3403 2395.

HITOKUCHI-ZAKA STUDIOS INC.

MAGNET STUDIO
B1, 3-4-11 Motoazabu, Minato-ku, Tokyo 106, Japan. 813 3400 8406; Fax: 813 3423 4849.

SOUND DESIGN
D:
2-3-2 Sendagoya, Shibuya-ku, Tokyo 151. +81 (0) 3 3423 0481; Fax: +81 (0) 3 3423 0480. Owner: Sound Design, Inc. Studio/Bookings Manager: Kenji Suzuki. No. of studios & dimensions: (4) W. 8m x H.3m x D7m. Mixing consoles: Focasure Studio Console + GML MPA. Recorders: Sony PCM-3348 x 2, PCM -7030 x 2, Studer A800 MKII-24, Sony PCM-3402 x 2. Panasonic SV-2700 x 2, Studer A 80 1/2 inch. 14 inch. MIDI set-up: SBE-60. Monitors: Ray Audio

SOUND INN STUDIOS

VILLAGRECORDERS LTD.
The Production Village, 26 Wright Street, PO Box 6595, Wellington, New Zealand. 64 4 385 0781; Fax: 64 4 384 3774.

SOUND DESIGN
D:
33609, Wellington St, Singapore 2290, Roland, Yamaha. 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: ARES.

ADDAUDIO POST PRODUCTIONS SDM BH

TOWCHDOWN - PORTUGAL
For bookings contact Touchdown Munich: Kircherstrasse 25, D-80518 Kranberg, Germany. +49 (0) 81 66 5071; Fax: +49 (0) 81 66 5073. Owner: Terry Drivas. No. of studios & dimensions: Studio 1: Control RM 60m2, Recording Room 200m2 with IMD ceiling. Studio 2: Control RM 60m2, Recording Room 75m2. 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 suits 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: ARES.

LION STUDIOS
115B Commonwealth Drive 02-90, Singapore 0314. +61 65 473 4627; Fax: +61 65 474 1273. Owner: Lion Studios Pte Ltd. Studio/Bookings Manager: John

BUNK JUNK & GENIUS (BJG)
18b, 101 Farm Lane, Fulham, London, SW6 1QJ, UK. +44 (0) 71 381 6288; Fax: +44 (0) 71 385 6165. 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 Pro Digital 481 Room. Mixing Consoles: SSL 4000 series with E & G Computer and Total Recall. Recorders: Otari MTR 90 Mk 2 x 2 & MTS X/8/Akai DD 1000. Digital audio workstations: Sonic Solutions/ProTools/SoundTools. MIDI setup: Apple TDM/Atari with all current software respectively with over 45 keyboards/samplers etc. Monitors: Dynaudio M4 Main Monitors (x 4) x21 with Digital X-Over, Dynaudio M1 Near Field with ABES Sub Woofer, Yamaha NS 10M/Auratone/BLAR 18. Specified outboard: Neve, Focusrite, API, Alesis, Lexicon, Urei, Summit, Drawmer, Yamaha, Ursa, Major, Roland, Eventide, AMS, etc. AV equipment: U-Matic, Beta 3, with full projection and Doby 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) 688 643636; Fax: +44 (0) 688 644771.

THE CHURCH STUDIOS
145H Crouch Hill, London, N8 9QH, UK. +44 (0) 81 340 9779; Fax: +44 (0) 81 298 3346.

COMFORTS PLACE STUDIO
Tandridge Lane, Lingfield, Surrey, RH7 6LW. +44 (0) 342 893046; Fax: +44 (0) 342 893062. Owner: Andy Hill Studio/Bookings Manager: Sandy Reid. No. of studios & dimensions: 50 sq. 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 2000. Monitors: Westlake BBSM 12, Yamaha NS10, Auratones. Specified outboard: Lexicon 244L, AMS RX16, Quantec Q5S, 2 x SB 9x0, Rev 7 x 2 AMS-DMX 15-805, 2 x Urei 1176, 2 x DBX 160x, 2 x Keepek. 2 x Drawmer Gaters, 1 x BSS De-eesser, 2 x EAR 822Q Valve EQ, Yamaha Rev 1. Special services: Have completed extensive refurbishment, which includes enlarging the studio area to 300'. 29 ft. x 90 ft. high (including gallery), with natural daylight in all areas. Fully residential, including floorit tennis court swimming pool, satellite TV in all bedrooms. Association member: APIS.

EDEN STUDIOS
20-24 Beaumont Road, London, W4 5AP, UK. +44 (0) 81 985 5432; Fax: +44 (0) 81 747 1939.

FALCONER STUDIOS

THE FACTORY SOUND (WOLDINGHAM) LTD.
Toftcash, Church Road, Woldingham, Surrey, UK. +44 (0) 8583 652586; Fax: +44 (0) 8583 652457.

FALCON STUDIOS
79 Scrubs Lane, London NW10. +44 (0) 81 985 5432; Fax: +44 (0) 81 298 3346.

HELIICON MOUNTAIN STUDIOS

THE HIT FACTORY
31-37 Whitfield Street, London W1P 8RE. +44 (0) 71 638 3434; Fax: +44 (0) 71 600 8545.

HOUSE IN THE WOODS
The Yews, Whitehill, Bletchingley, Surrey RH7 4QU. +44 (0) 883 343062; Fax: +44 (0) 883 341108.

JOE'S GARAGE RECORDING STUDIO
95-99 North Street, Clapham, London, SW4 0HF. +44 (0) 71 498 0781; Fax: +44 (0) 71 498 1326.

R.G. JONES RECORDING
Bevel Road, Wimbledon, London, SW19 3SB, UK. +44 (0) 81 540 8888; Fax: +44 (0) 81 542 4548. Owner: Robin Jones. Studio/Bookings Manager: Gerry Kirkingham. No. of studios & dimensions: 1 Control Room 40q.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-450, 24 Track Analogue, Studer A800 MKII. Monitors: Eastlake Monitors: comprising of JBL and TA-0 drivers. Specified outboard: Lexicon 224 X, Lexicon PCM70, Yamaha SPX90 MKII (x2). Roland D5P 5 (x2) AMS DDL with Harmoniser cards (x 2) Alexis Midiverb II. Equalisers: Focussire ISA with mic amps Massenburg 8200 (pair) Ame APF 891 (pair) BBE Sonic Maximizer and Doby spectrums processors.

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

LOCO STUDIOS
Llanhennock, Cefallon, Gwent, NP6 LLU, UK. +44 (0) 633 49603; Fax: +44 (0) 633 49666.

MILO MUSIC
**USA**

**AL JOLSON ENTERPRISES, INC.**

MASTERCRAFT STUDIOS & 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, 1.4 m x 4.7 ft., control room 1, 1.5 x 17.4 ft., control room 2, 2.5 x 16.8 ft.

 Mixing consoles: control room 1, 9 channel; control room 2, Trident Series 72 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 headstock. Studer A810 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 E-67, 1/4 inch 2 track, Scully 1/2 inch 3 or 4 track, Ampex AG-440-C 1/4 inch 2 tracks. Sony 5000 R-DAT.

Digital Workstations: SONY SYMPHONY 100B with AES/EBU, Silicon Graphics Impact. Synclavier, Syntec mixer, Soundcraft, Yamaha, Marantz, MOTU.

**PALLADIUM STUDIOS**

7 Loanhead Road, Edinburgh, Scotland.

+44 (0)31 440 1084 (Tel. No.).

**PAVILION STUDIOS**

20 Middle Row, London, W10 5AT, UK.

+44 (0)71 860 0751; Fax: +44 (0)71 860 2474.

**RONNIE SCOTTS RECORDING FACILITY**

47 Frith Street, London, W1Y 6HT, UK.

+44 (0)71 439 6075; Fax: +44 (0)71 437 5081.

**ROOSTER**

117 Sinclair Road, West Kensington, London W14, UK.

+44 (0)71 692 2891; Fax: +44 (0)71 693 1273.

**SAWMILLS STUDIO**

Golway, Fowey, Cornwall PL23 1LP, UK.

+44 (0)726 833572; Fax: +44 (0)726 833515.


Special Services: Full recording studio with in house production.

**SHAMBLES STUDIO**

The Shambles Westhorpe Road, Marlow, Buckinghamshire, SL7 1LD, UK.

+44 628 828801; Fax: +44 628 843363.

Owner: Chris Rae. Studio/Bookings Manager: Adam Vartyne. No. of studios & dimensions: 1 studio, 18 ft x 12 ft.

Special Services: Music composition.

**STRONGROOM**

120, Curtain Road, London, EC2A 3PJ, UK.


Specified outboard: Studio 1: 480L Eventide H300SE, Massenberg, EQ, Neve compressor. Studio 2: 224 x L Eventide DSP4000. Massenberg EQ, Reverbs etc. A/V equipment:

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

Association Member: APRA and Accord.

**SURREY SOUND STUDIOS**

70 Kingston Road, Leatherhead, Surrey, KT22, TW14.

+44 (0)727 575844; +44 (0)727 563556.

**TURNING POINT RECORDING STUDIO**

The Hall Farm, St Nicholas - At - Wade, Birchington, Kent CT7 9PZ.

0843 439649; Fax: 0843 480036.


Specified outboard: Lexicon 480L, Yamaha SPX 901i (2) (extension), Lexicon LXP16(2), BEL BD 808 St. Monitor/Tester, Lexicon PC 42. DBX & DAWer 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.

**WESSTIDE STUDIOS**

The Olaf Centre, 10 Olaf Street, London, W11 4BE.

+44 (0)711 221 9494; +44 (0)71 727 0008.

**THE WOOL HALL STUDIOS**

Castle Corner, Beckingham, Lincolnshire, NG9 6TA, UK.

+44 (0)373 839793; Fax: +44 (0)373 830679.

USA
ARDESTUDIO


BATTERY STUDIOS

137-139 West 25th Street, New York 10001, USA. +1 212 627 8900, Fax: +1 212 627 5265.

BEARSVILLE STUDIOS


THE BENEFIT HOUSE

134 Fourth Avenue North Franklin, TN 37064, USA. +1 615 790 8089; 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


EMERALD SOUND STUDIO

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

BY DAVE WILLIAMS

EASTSIDE AUDIO AND VIDEO

216 East 45 Street, New York 10017, USA. +1 (212) 867 0729; Fax: +1 (212) 867 0426.

GREENE STREET RECORDING


HOWARD SCHWARTZ RECORDING INC.


IN YOUR EAR MUSIC & RECORDING SERVICES

I.Y.E., Inc., 1300 East Main Street, Richmond, VA 23220, USA; +1 804 359 3879; Fax: +1 804 358 2256.

Studio/Bookings Manager: Gay Chapman. No. of studios & dimensions: 2 Studios. 2 MIDI rooms. Post production rooms - 20 x 20 x 12 ft. with variable acoustics. Control room - 20 x 11 x 140. Studio B. Studio 10 x 13 x 100. Control room - 10 x 14 x 110. Mixing consoles: (A) Euphonix CSX 56 fader system. (B) DDA "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, Panasoniq 3700 DAT, Otari MTR-15/14 inch tape with centre track time code, JVC 34inch VCR, Ampex VP66 inch type C video recorder. (B) New England Digital B track Post- Pro with DSP option, Panasoniq 3700 DAT, Otari 1/4 inch Tape Machine with Center Cassette. Studio/Bookings Manager: Stephen Meister. MIDI set-up: Comprehensive MIDI/Macintosh 950 based setup equipped with
OMNI SOUND RECORDING STUDIO
1806 Division Street, Nashville, TN 37203, USA.  
Tel: 615 321 5536; Fax: 615 321 5538.

D

ONE WORLD RECORDING CORPORATION
72 East Leddham Street, Boston, MA 02118, USA.  
Tel: 617 426 0807; Fax: 617 426 3709.  
Owner: Steve Van Natta
Studio/Bookings Manager: Alexander Mine.  
No. of studios & dimensions: 2 room MIDI pre-production  
15x. 156. control. 156. live room 6 ft. x 9 ft.  
ISO. Main control room 30 ft. x 20 ft., live room 6 ft. x 30 ft., ISO  
15x. 20ft. Mixing consoles: Neve 8038 with 32 1018  
EQ and preamps. Recorders: Studer 274 2 track  
Digital audio workstations: Mac FX with 2 gigabytes running Studio Vision & SoundTools MIDI setup;  
Studio Vision, IBM-Voveta Gold Mark III Monitors: JBL  
Yamaha NS10m, ARX50 modified, Tannoy 65.  
Specified output: Tape Machines: Studer A837  
(24-track), Studer A807 (1/2 inch), Otari 5600B  
(1/4 inch), Panasonic SV-5700 DAT, Panasonic SV-5500  
DAT. Nakamichi MR1 Cassette Deck, 5 Nakamichi MR2  
Cassette Decks. Technics 1001PB, Technics  
KD-77 and Yamaha TX-92.  
Mixing consoles: Yamaha 566, Sony EMX 1000,  
API 550, Yamaha 1000PB.  
Recorders: Studer 274 2 track Digital audio workstations:  
Mac FX with 2 gigabytes running Studio Vision & SoundTools MIDI setup;  
Studio Vision, IBM-Voveta Gold Mark III  
Monitors: JBL 4435 Yamaha NS10m, ARX50 modified, Tannoy 65.

NEW RIVER STUDIOS, INC.
408 South Andrews Avenue, Fort Lauderdale, FL-  
33301, USA.  
Tel: 1 (305) 524 4000; Fax: 1 (305) 524 3999. Owner:  
New River Productions. Studio/Bookings Manager:  
Virginia Gaya. No. of studios & dimensions: 2 studio  
"A" 35 x 25 ft. Live Tracking area with tall ceilings in cen-
ter. "B" MIDI Studio: 15 x 15 ft. with IS0 booth (6 x 9 ft.).  
Mixing consoles: "A" Neve 1018 56 in 48 out with  
Recorders: "A" Mitsubishi XM500 with Apogee, 2 Studer  
A800 Mark III 24 track Analog. MIDI setup-Studio: B  
Macintosh plus computer with performer software, Vision  
software, Roland D50, D550, Yamaha TX 892, Akai 8550,  
Sampler with 16 bit Upgrade, 360 systems MIDI BASS &  
Patch. Monitors:"A" Westlake BBSM-10 with Meyer  
303 Softwoofers. Westlake BBSM-6, Yamaha NS10M. "B"  
Westlake BBSM-10S. Specified output: AMS RMX 16,  
DMX, 15-80S, GML E.Q., EMT 140S Stereo Tube  
Plate, Lexicon 480L, ECM 70, SPC 8901, API 550 &  
550C. Pultec, Eventide H3000, H949, DBX 165,  
162 & 902 Deaer, Urei 1176 LV. AV equipment: Sony BVD 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.

PLATFORM ISLAND STUDIOS
676 Broadway, New York, NY 10012, USA.  
Tel: 212 473 9497; Fax: 212 505 8277. Owner:  
RLK Enterprises. Studio/Bookings Manager: Suzanne  
Mates. No. of studios & dimensions:2 studio  
East Studio: control room- 21ft. D x 20ft. W. Studio-  
32ft. D x 20ft. W. Booth- 6ft. D x 8ft. W. West Studio-  
Control room-14ft. D x 21ft. W. Booth- 16ft. D x 14ft. W.  
Booth-5ft. D x 10ft. W. MIDI Studio: control room- 18ft. D x 20ft. W.  
Mixing consoles: SSL 4064 E, Neve 8128 in  
Flying Faders, Harrison 4032A. Recorders: Studer  
Studer & Ampex 1 1/2 inches 2 Tracks. MIDI setup:  
Fully equipped 24 track MIDI studio; Macintosh, Atari &  
IBM, ISO booth. Monitors: Urei 831 B, Yamaha NS10M,  
Genelec, Tannoy, ProAc.  
Specified output: Very comprehensive. AV 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 & platinum certifications attests 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.  
Tel: (512) 472 8975; Fax: (512) 476 5635. Owner: Joel C.  
Block. Studio/Bookings Manager: Delaine Frasier.  
No. of studios & dimensions: 2 studio and one free  
set-up. Our numerous gold & platinum 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.

MODERN AUDIO PRODUCTION INC.
1650 Market Street, 3FL Philadelphia, PA 19103,  
USA.  
Tel: 215 569 1600; Fax: 215 569 1685.  
(x8)  
(x24)

RECORDING ARTS
Box 121702 Nashville, TN 37215, USA.  
Tel: 615 321 5479; Fax: 615 321 0756. Owner: Carle Tatz.  
Studio/Bookings Manager: Lou Johnson. MIDI setup-  
Console: SoundCraft 3200. Recorders: Sony 3348,  
Mitsubishi X-650 Apogee Fingers. MIDI setup:  
Studio/Bookings Manager: Name it. Monitors: Yamaha NS-1000, NS10 Studios, Name it.  
Specified output: Lexicon LXP-15 reverber, sound perfor-
mation "The visceral" equalizer. AV equipment: Adam  
Smith Zeta 3.

Special Services: Advertising voice-overs, industrial and  
sales shows, narration, radio shows music libraries.  
SPX libraries, Phone patch jingle packages post sound.  
Time compression, DAT master, remote, automatic dialogue  
replacement, R-T-R and cassette duplication, night music packages.

REELSOUD RECORDING CO.
2304 Sheri Oak Ln. Austin, TX 78748, USA.  
Tel: 512 472 3325; Fax: 512 282 0713.

RECORDING STUDIO
1018 Central Ave. - Charlotte, N.C. 28204, USA.  
Tel: 704 377 4596; Fax: 704 377 9723. Owner: Wayne  
Jernigan. Studio/Bookings Manager: Kelly Bright.

77
SHEFFIELD AUDIO/VIDEO PRODUCTIONS

13816 Sunnybrook Road, Phoenix, MD 21131, USA. +1 410 628 7360; Fax: +1 410 628 1977. Owner: John Aries.

Audio/Video Productions: Richard Van Horn.

No. of studios & dimensions: 50 ft x 40 ft (15 m x 12 m). 4-Channel recording studio with 40 ft x 24 ft control room.

Audio/Video services: Video production, promotion, burning, distribution.

General equipment: Sony, Panasonic.

Special services: Video production, promotion, burning, distribution.

ASSOCIATION MEMBER: AES.

SHERWOOD SOUND INC.

3925 1/2 E. 39th Street, Los Angeles, CA 90056, USA. (323) 464-1503; Fax: (323) 464-1503. Owner: Vincent F. Sherwood.

Audio/Video Productions: Vincent F. Sherwood.

No. of studios & dimensions: 30 ft x 40 ft (9 m x 12 m). Studio A: 25 ft x 25 ft (7.5 m x 7.5 m). Studio B: 15 ft x 20 ft (4.5 m x 6 m).

Audio/Video services: Video production, promotion, burning, distribution.

General equipment: Sony, Panasonic, JVC.

Special services: Video production, promotion, burning, distribution.

ASSOCIATION MEMBER: AES.

SOUND RESEARCH INC.

3925 1/2 E. 39th Street, Los Angeles, CA 90056, USA. (323) 464-1503; Fax: (323) 464-1503. Owner: Vincent F. Sherwood.

Audio/Video Productions: Vincent F. Sherwood.

No. of studios & dimensions: 30 ft x 40 ft (9 m x 12 m). Studio A: 25 ft x 25 ft (7.5 m x 7.5 m). Studio B: 15 ft x 20 ft (4.5 m x 6 m).

Audio/Video services: Video production, promotion, burning, distribution.

General equipment: Sony, Panasonic, JVC.

Special services: Video production, promotion, burning, distribution.

ASSOCIATION MEMBER: AES.

SOUND AND VIDEO PRODUCTIONS

6801 Sunset Boulevard, Los Angeles, CA 90028, USA. +1 310 270 4848; Fax: +1 310 270 4848. Owner: Marcia Fish.

Audio/Video Productions: Marcia Fish.

No. of studios & dimensions: 100 ft x 100 ft (30 m x 30 m). Studio A: 100 ft x 100 ft (30 m x 30 m). Studio B: 50 ft x 50 ft (15 m x 15 m).

Audio/Video services: Video production, promotion, burning, distribution.

General equipment: Sony, Panasonic, JVC.

Special services: Video production, promotion, burning, distribution.

ASSOCIATION MEMBER: AES.

SOUND TECHNOLOGIES INC.

1200 Boylston Street, Boston, MA 02215, USA. +1 (617) 536 1166; Fax: +1 (617) 536 4446. Owner: Jerry Healy.

Audio/Video Productions: Jerry Healy.

No. of studios & dimensions: 600 ft x 500 ft (180 m x 150 m). Studio A: 600 ft x 500 ft (180 m x 150 m). Studio B: 300 ft x 300 ft (90 m x 90 m).

Audio/Video services: Video production, promotion, burning, distribution.

General equipment: Sony, Panasonic, JVC.

Special services: Video production, promotion, burning, distribution.

ASSOCIATION MEMBER: AES.

SOUND TECHNICS INC.

1200 Boylston Street, Boston, MA 02215, USA. +1 (617) 536 1166; Fax: +1 (617) 536 4446. Owner: Jerry Healy.

Audio/Video Productions: Jerry Healy.

No. of studios & dimensions: 600 ft x 500 ft (180 m x 150 m). Studio A: 600 ft x 500 ft (180 m x 150 m). Studio B: 300 ft x 300 ft (90 m x 90 m).

Audio/Video services: Video production, promotion, burning, distribution.

General equipment: Sony, Panasonic, JVC.

Special services: Video production, promotion, burning, distribution.

ASSOCIATION MEMBER: AES.
ULTRASONIC STUDIOS

WALLY CLEAVER’S RECORDING

WENDELL RECORDING STUDIO
Locks Hill Road, Wendell, CA 01378, USA. +1 (508) 544 8288 - Tel+Fax. Owner: Jeffrey Baum. Studio/Bookings Manager: Judith Baum. Number of studios & dimensions: 1 studio - playing room 25 ft. x 26 ft. x 19, control room 22 ft. x 16 ft. Mixing consoles: Tascam 24-Track Recording console, with 32 channel, mega-mix automation. Recorders: Otari MTR 90 II 24 Track, SM M7 1/2 inch 2 track; Otari 56/56 1/4 inch.

CARIBBEAN SOUND BASIN

CORA L SOUND STUDIOS

Specialisation & Credits: Relax in a Caribbean Island studio with a room purpose-built to professional specifications with top - quality equipment. We are "The Home of Calypso Rhythm & Steelbands Drums" in a modern 24-track studio with 24-channel Dolby SL & eight Focusrite ISA-110 equalizer modules. We recently had a 50 member local Steelband Orchestra doing tracks for Jean-Michel Jarre of France, which was used as the basis for a live show in Paris on Bastille Day with an attendance of about two million people. We have also done a multitude of best - selling calypso records in the Caribbean for the past eight years. We welcome all types of music and projects and do our utmost to make all clients feel welcome and comfortable for their entire stay on the island.
CLASSIFIEDS
Please call Peter Turberfield for Rates & Details 44 (0) 71 620 3636
The attention of advertisers is drawn to "The Business Advertisements (Disclosure) Order 1977", which requires that, all advertisements by persons who seek to sell goods in the course of business must make that fact clear.
All job advertisements are bound by the Sex Discrimination Act 1975.
Advertising copy must be clearly printed in black capitals or typewritten and addressed to: Peter Turberfield, Studio Sound, Spotlight Publications Limited, 8th Floor, Ludgate House, 245 Blackfriars Road, London SE1 9UR.

STUDER A710 CASSETTE DECK £550.00
STUDER C37 STEREO VALVE £800.00
STUDER A812 TWO TRACK 4SP £5,500.00
STUDER A80 SIXTEEN TRACK £5,000.00
REVOX C279 SIX 16TH BROADCAST £5390.00
REVOX A700 TWO TRACK 3SP £800
REVOX C274 FOUR CH PRO CD £1,000.00
REVOX MK III 16 TRACKS £1,500.00
REVOX A62 B62 SPARES £2,000.00
STUDER A80 B62 TRACKS £5,000.00
STUDER A810 TWO TRACK 4SP £4,000.00
STUDER B67 TWO TRACK 3SP £1,000.00
STUDER C37 STEREO VALVE £300.00
STUDER A710 CASSETTE DECK £250.00
REVOX B77 HS TWO TRACK £700.00
REVOX PRM9 B9 TWO TRACK £1,500.00
REVOX A700 TWO TRACK 3SP £900.00
STUDER B62 STEREO £650.00
REVOX C221 PRO CD PLAYER £207.00
REVOX C115 PRO CASSETTE £830.00
REVOX B77 MKI 1 NSHS £1,600.00
REVOX PRM6 MKII £22,240.00
REVOX C270 TWO TRACK £2,665.00
REVOX C274 FOUR CH £1,800.00
REVOX C7266 GH CH £750.00
REVOX MB18 16CH BROADCAST £590.00
REVOX C270 SIX INTO TWO £1,790.00
REVOX MKI NF MONITORS £222.00
REVOX A77 HF SPEED £250.00
STUDER/D731 PRO CD £2,295.00
STUDER D740 CD £3,550.00

TENTALING
STUDER REPAIRS - SPARES SERVICE
APPROVED CONVERSIONS
STUDER A62 B62 SPARES

STUDER A80 B62 TRACKS £5,000.00
STUDER A810 TWO TRACK 4SP £4,000.00
STUDER B67 TWO TRACK 3SP £1,000.00
STUDER C37 STEREO VALVE £300.00
STUDER A710 CASSETTE DECK £250.00
REVOX B77 HS TWO TRACK £700.00
REVOX PRM9 B9 TWO TRACK £1,500.00
REVOX A700 TWO TRACK 3SP £900.00
STUDER B62 STEREO £650.00
REVOX C221 PRO CD PLAYER £207.00
REVOX C115 PRO CASSETTE £830.00
REVOX B77 MKI 1 NSHS £1,600.00
REVOX PRM6 MKII £22,240.00
REVOX C270 TWO TRACK £2,665.00
REVOX C274 FOUR CH £1,800.00
REVOX C7266 GH CH £750.00
REVOX MB18 16CH BROADCAST £590.00
REVOX C270 SIX INTO TWO £1,790.00
REVOX MKI NF MONITORS £222.00
REVOX A77 HF SPEED £250.00
STUDER/D731 PRO CD £2,295.00
STUDER D740 CD £3,550.00

TALING
STUDER REPAIRS - SPARES SERVICE
APPROVED CONVERSIONS
STUDER A62 B62 SPARES

TALING
STUDER REPAIRS - SPARES SERVICE
APPROVED CONVERSIONS
STUDER A62 B62 SPARES

TALING
STUDER REPAIRS - SPARES SERVICE
APPROVED CONVERSIONS
STUDER A62 B62 SPARES

TALING
STUDER REPAIRS - SPARES SERVICE
APPROVED CONVERSIONS
STUDER A62 B62 SPARES

TALING
STUDER REPAIRS - SPARES SERVICE
APPROVED CONVERSIONS
STUDER A62 B62 SPARES


FOR SALE: SSL 4000E. £4,000. Studer A800 mixers. £2,000. SSL 4000E. £1,950. Tel: 081-322-3456.

REPOSSESSION SALE RECORDING STUDIO

1 mile South of Chelsea Bridge 125 year lease £40,000. Cent. Heat., Air Cond., Fully fitted sound proof part could be residential 975sq ft. Totally Refurbished

PHONE NOW: 081 673 3667

WANTED: Any information on the Ferrograph Professional Studio 8 Recorder. Spares required. Phone or fax: Malvern (0684) 561040.
The 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, Gjs (Gerry) Wirtz, who pulled together the development of DCC, remains the pipeline between the DCC engineering team and the outside world. Without Wirtz' there would have been no DCC. But somewhere along the line, Wirtz 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.

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 ground breaking 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 Dierexx 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 Bastiaens 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 systems, like the Neutons 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 record 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'.
Looking for a disk recorder with a FUTURE?

It isn't surprising that the oldest name in digital audio workstations has today's best solutions for audio-post.

But it probably will surprise you to learn that if you had bought the first Fairlight workstation 15 years ago, by now you could have upgraded affordably through seven product models and 30 software updates all the way to today's MFX2 workstation.

Fairlight does things differently from other manufacturers. That's because we design from the perspective of the user, not the most commonly available technology. For example, you won't find a 'personal computer' in MFX2 because professional digital audio has different needs from word processors and spreadsheets.

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!

CALL FAIRLIGHT EUROPE: +44 763 844090
At last, a console that combines what you WANT with what you NEED.

Crest 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/IF), 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—it’s 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

CREST AUDIO INC. 100 Eisenhower Dr., Paramus, New Jersey 07652 USA - TEL 201.909.8700 - FAX 201.909.8744
CREST AUDIO EUROPE 5a Willbury Grove, Harrow, East Sussex HA1 3UB, England - TEL 44+(0)273.325840 - FAX 44+(0)273.775462
CREST AUDIO ASIA 6001 Beach Road #17-03, Golden Mile Tower, Singapore 0719 - TEL 65+(0)295.2328 - FAX 65+(0)295.4707