EXCLUSIVES

Eventide Orville
Digidesign Pro Tools v5.0
Crane Song Flamingo
Digidesign Digi 001
Steinberg Nuendo
Avalon Vt747sp
Sony DRE-S777
RTW 1024 Plus

WALKING WITH DINOSAURS
Living large in prehistory

BEARSVILLE STUDIOS & ATHENS MASTERING
WIN DRAWMER DS210 AND KT DN-360
COMPUTERS AND AUDIO
SSAIRAs NOMINATIONS

The MICK GLOSSOP Interview
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Editorial
On the Millennium and angels

Soundings
Professional audio, post and broadcast news

World Events
Updating the audio professional's events calendar

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First call for nominations

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Understanding directivity
Version 2.0
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- Reel Feel remote
- High speed incremental backup
- Analog, AES/EBU, or MADI interfaces
- Fast lockup and machine control

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www.euphonix.com
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- Fest, fun, traditional style control surface with total automation and snapshot recall
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System is more than a mixing console. Four years in development, ADVANTA delivers on the promise of digital – with outstanding Sonic Quality, frame-accurate Dynamic Recall/Reset of every parameter, comprehensive Assignability to reconfigure the entire system to meet your precise requirements, Scalability, and full Connectivity with other components that complete the all-digital studio.

ADVANTA is targeted at a wide spectrum of applications – from music recording, through broadcast production, to film and TV post.

Novastar Studios, Los Angeles
A magician’s touch

HOW WILL YOU BE CELEBRATING the new millennium? Are you the type that will enjoy the turn of the century party mania or will you enjoy your swim against the tide of popular hysteria, maintaining that the turn to 2001 is in fact the date of symbolic importance?

Which ever way you look at it, we have developed an aptitude for using any opportunity to draw a line under our lives and to seize the promise of a new start. This is peculiar because change is continual and only the rate of change gives any indication that something may be up. There can be few surprises awaiting us on January 1, everything is already in place, and punctuating this occasion with a fresh beginning is purely artificial. It is a convenient way of creating a time reference to record a state of mind. We need occasions to log memories.

I feel less comfortable in predicting what 2001 will hold than 2000 simply because it is far enough away for a technology, or application of technology, to emerge, be acknowledged and to take hold causing everyone to rethink. So many potential candidates exist and so many potential routes to evolution are bubbling away on back-burners awaiting the magician’s touch of commercial greatness that only the reckless or the biased can feel truly at ease with—the black art of prediction.

What is, however, becoming apparent in this audio universe is that the good and sensible technology idea seems to hold less credence these days than the calculated commercial all-or-nothing endeavour. At the end of this millennium we are being driven by forces that owe less to matters of audio for audio’s sake than to those of mass acceptance. Individuality is being lost, despite the fact that users regularly request specific solutions to their specific needs. Currently, many of them still get it. Whether 2001 will see this balance maintained or redressed will be a question for the reckless or biased.

Angel dust

LOVE YOU, ANGEL. Love what you do; love what you are... London’s Angel Studios embodies much of the tradition of the music recording studio. Ready for its 20th anniversary, it is sited discreetly in a converted church—complete with large live rooms and an imposing pipe organ restored by the son of the man who built it—in central London, from where it plays on its tradition of excellence and expertise. Apart from younger and more ambitious studios with an anxious eye on The Next Big Thing, Angel commands an enviable trade in film, television, cast and library music recording, moving in the same circles as London’s orchestral recording giants—Abbaye Road, CTS and Air Lyndhurst. Recently, the studio has spent a small fortune on keeping up to date in the equipment stakes, but has remained quite true to its brief. In short, Angel represents the old order with no apology for its past and no fear for its future. It’s a philosophical thing.

The Angel model fits well with another I was introduced to recently. Someone learned, benevolent and enabled by the BBC observed that, in contrast to the Christian order (and others), the Hindu Book is used by its advocates as a source of inspiration rather than a dictate. It was a new idea to me—I’m more familiar with religious zealots arguing futile details of the Bible Story than trying to draw more philosophical lessons from it. But I’ve always been attracted to elegant philosophy—and anything that looks like a model...

When technological progress is slow, it is tempting to regard the lack of new equipment as an indictment on our industry. When there’s new equipment in every trade show aisle, it’s easy to forget that the artistic considerations of a project are the most important. As a reminder of just how important a balanced philosophy is, my visit to Angel was most timely. A comfortable proportion of these considerations seem only to belong to the realm of angels. But I now know where they live...

Thank you, Angel, see you soon.

Zenon Schoepe, executive editor

Tim Goodyer, editor
After considering a number of consoles, leading French mobile recording operation Le Voyageur has recently installed an MT digital multitrack console in its new, state-of-the-art truck, Le Voyageur 1. "We finally picked the MT because it was very similar in its way to the SL 9000 J Series, which all engineers around the world know very well already."

Yves Jaget, Le Voyageur Mobiles.

Le Voyageur. 56 Avenue de la Pyramide, Z.I. Paris Nord II, B.P. 50058, 95947 Roissy CDG Cedex Phone: +33 (0)1 48 63 22 02

Solid State Logic
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Tel: +44 (0)1865 842300
Fax: +44 (0)1865 842118
E-mail: sales@solid-state-logic.com
http://www.solid-state-logic.com
London's Videosonics is to upgrade all of its 14 AudioFiles to AudioFile SC systems. Ten will be 32-track systems, with the remaining four being 24-track. The 32-track systems will be installed in the facility's mixing theatre and the 24-track systems into the sound design rooms where they will work on feature films and TV dramas including Jimmy Grimbble, In a Land of Plenty and Millionaire's Billions for Channel 4 Elsewhere in the Big Smoke, the Grand Central Sound post operation is to upgrade its four AudioFiles to AudioFile SC. Out west, Bristol based Broadcast Film & Video has ordered two 32-track AudioFile SCs and will upgrade two existing M16 systems to AudioFile SCs. Broadcast Film & Video has also ordered AMS Neve's StarNet audio editor networki ng. The AudioFile SCs will be installed into dubbing theatres at two sites with the facility enabling networking across all four systems.

VideoSonics, UK.
Tel: +44 20 7482 2855.
Grand Central Sound, UK.
Tel: +44 207 306 5600.
AMS Neve, UK.
Tel: +44 1228 457011.

Brazil's TV Globo has ordered two SSL Avid Air digital broadcast consoles and a HH Router system for its revamp ed Studio 3. Uniquely equipped to monitor audience figures and modify programme content accordingly, San Paulo-based TV Globo will use the new system on a variety of broadcasts including the Jo Soares daily show recently won a national award.

SSL, UK.
Tel: +44 1865 842300.

Los Angeles-based postproduction facility, Intersound, took advantage of the AES Convention to order its first Euphonix CS3000 console and Fairlight MFX3 Plus workstation. Known for radio and TV commercials, BBP's new Studio B shares server access to all sessions and sound effects with all the facility's rooms. Hollywood's Sony Pictures, meanwhile, has ordered the largest SSL Avant console to date. The 128-channel, 3-position digital film console will go into the new Stage 4 all-digital dubbing theatre along with a DAOR-3000 disc recorder. The facility has also upgraded 24 Waveframe workstations located in editing suites to v6.5 software with which they will continue to handle assignments.

BBP, US.
Tel: 1 310 326 8320.
Euphonix, US.
Tel: +1 650 855 0400.
Fairlight, US.
Tel: +1 213 460 4884.
SSL, UK.
Tel: +44 1865 842300.

Waveframe, US.
Tel: +1 510 654 8300.

Portuguese state broadcaster RTI has taken its fifth Otari Status Elite analogue console. The new 48-frame desk will go into RTI'sport important rivalry and competition. Status and Concept One consoles are already in use with the broadcaster. It will be used on national morning news and breakfast programming.

Otari, Germany.
Tel: +49 21 59 508861.

Texas Sound recording studio Sound Ideas in Carrollton has installed an 84-input D&B Cinemix multichannel console in pursuit of its Christian music clients. The console has 32 dual-path mono line input modules and 5 dual stereo return modules to drive its DA-88 and FCY1600 MD mixing systems.

Sound Ideas, US.
Tel: +1 972 306 7844.
D&R, The Netherlands.
Tel: +31 294 418014.

The 2-year-old Mix East Recording Studio has purchased a Necrotek Elite II console fitted with the Martinsound Audiomate moving-fader automation system. The Elite is has 32 in-line channels and includes motorised faders on both the input/patch panel, which can be configured to suit the needs of the mixer. Designed in-house, monitoring options include Urei, KRK, Genelec and JBL. Systems and recording comprise Otari analogue and Tascam digital machines. The studio offers an 8-track Pro Tools system as well as vintage Neve, SSL, Fairchild, Atlantic, Geoffen, Island, Capitol, IRS and Alternative Tentacles labels.

Trac East Recording Studio.
Tel: +1 732 254 9400.
Martinsound, US.
Tel: +1 800 582 3555.

The BBC's Elstree Centre has installed a multichannel Calrec C2 analogue production console for use on production of the Eastenders soap opera, North of the Scottish border, Grampian Television has ordered a C2 to replace the Neve 51-series desk in one of its mobile units. The new console will be commissioned in June 2000 and be blooded on a new series of the Scottish Woman's topic debate programme.

Calrec Audio, UK.
Tel: +44 1422 842159.

AllSystems-Basel World Studios has recently purchased a selection of Audio-Technica equipment including AT4050 condenser mic, AT4060 valve mics and AT-HM055 headphones. The purchase follows an intensive evaluation period during which the valve 4060 scored particularly well on vocals and drums.

Audio-Technica, UK.
Tel: +44 113 277 1441.

Darwin's largest Rental company, Top End Sound, has taken a number of ARX-LP1 and LP-2 speaker processors for their ARX 212 and 118-based ARX Concert Systems. The new processors replace 12-year-old systems pur chased on the Australian circuit. The Dutch -Heuvelman Sound & Vision offer reinforcement and large venue video equipment specialist has bought ten Arka Teknik DN360 dual-channel 10-band third-octave graphic equalisers to add to its existing stock. With 12 offices in Germany Belgium and Holland -Heuvelman is one of Europe's largest, sale and installation companies for video and sound systems.

US-based Logic Systems Sound and Lighting has purchased the first Meda H-4000 series console to be delivered to the United States. The Heritage 4000 adds to Logic Systems' array of Meda consoles comprising a Meda XL20 on an XL250, plus a DDA CS152M.

ARX, Australia.
Tel: +61 3 9555 7859.

KlarkTeknik, The Netherlands.
Tel: +31 346 573200.

Klark Teknik Group, UK.
Tel: +44 1562 741515.

IBC Report

The Netherlands: Trading the traditional rain for sunshine, this year's IBC saw some 38,000 visitors treacling the aisles of hot exhibition halls at the RAI centre. As in previous years, audio equipment exhibitors had the option of subscribing to the audio hall (Hall 8) or sleeping with the enemy. And as in previous years, both options were taken and vigorously defended by their pro tagonists. Less a matter for debate was the standard of business which appears to have been consistently good. Supporting the organisers' reports of 32,124 visitors from 121 countries with 700 exhibitors occupying nine halls of the Amsterdam RAI.

At the close of the show, 381 companies had already booked almost 28,000 square metres for IBC2000. On average each company has booked 7% more space than they used at IB09, said IBC Exhibition Chairman Bob van der Leece.

Hot topics this year were Business Opportunities in DTW, and Internet TV. Sessions on Metadata, and MPEG-4 and MPEG-7 proved popular and the IBC Keynote address by Tony Ball CEO and MD of BskyB attracted a crowd of 650. The fifth IBC Wide Screen Programme Festival also continued to grow in popularity. Reflecting the success of digital TV in the UK this year, Channel 4 picked up several prizes including the Golden Rembrandt for best programme.

IBC2000 the 21st IBC, will take place at the Amsterdam RAI from Friday 9th to Tuesday 12th September 2000.
Testing DVD-A

US: Sonic Solutions, Parasonic, Sonopress (IMG Storage Media), Sony Music, Universal Music and the Warner Music Group (WMG) have collaborated to create DVD-Audio test discs demonstrating high-resolution sound, graphics, and interactivity. Shown at the Nautilus complex Studio, UK, installed a variety of projects including documentaries, sports and some famous composers, and will help us refine the production version of our system.

"Preparing DVD-Audio titles is more challenging than traditional CD mastering," added Al McPherson, VP of Technology at the Warner Music Group. "Our first demonstration DVD-Audio disc contains hundreds of different elements—10 tracks with 6 channels at different sample rates, graphics, menus, slide shows and video. Preparing DVD-A titles requires complex tools that can handle these elements, and working with Sonic will enable us to publish titles that exploit the exciting new features supported by DVD-Audio.

Sony Music has begun production on a slate of DVD-Audio releases from a number of top artists which will be available concurrent with the new format's launch," commented Leslie Cohen, Vice President, New Business Development, Sony Music Entertainment. Sonic Solutions is the first company to develop the authoring tools for DVD-Audio, and following our joint success in producing these first test titles, we look forward to working closely with Sonic to take full advantage of DVD-Audio's capabilities as we help shape the future of this format.

Surround guide

US: Martinsound is offering a free guide revealing some of the mysteries of surround sound production in The Secrets of Doing Surround Sound on Your Existing Console. The guide offers tips on how to work around what may be perceived to be the shortcomings of the average stereo console to successfully produce surround sound projects. It discusses the features that should be included in a good surround-sound monitor control system, and provides some basic advice on getting set up for a surround mixing session. It also looks at the most commonly used surround-sound formats, and even looks back at the history and development of multichannel sound.

With the mixing console probably the most expensive item of equipment in the control room, this guide offers suggestions on how to use an existing stereo console to produce surround sound mixes without modifications or custom electronics, simply by augmenting the console's monitor section with a monitor controller. Martinsound, Tel: +1 800 582 3555, Fax: +1 626 284 3092, Email: info@martinsound.com

China: Beijing's Tian'anmen Square recently saw a vast concert commemorating the 100-day countdown to the return of Macao to the Chinese. The concert was performed in front of an invited audience of around 2,000 VIPs with thousands in the Square, and Central China Television broadcasting a 55-minute programme to some 200 listeners on the following evening.

The Beijing Symphony Orchestra joined the orchestra of the Central Opera House and the Beijing Film Orchestra on stage for the event, with a 400-strong adult choir, 150-strong children's choir in support. The performance also involved some of China's foremost musicians and singers including tenors Zheng Yong, Dai Yuliang and Ding Yi and pop superstars Xie Xiao Dong and Chen Ming.

With 19 grand pianos and 18 singers in tow, the total number of people on stage came to some 787 presenting a considerable challenge for Oxford Audio Training's John Gallen and Nigel Luby who had been called in to handle the broadcast and to record the event using the CCTV mobile. The exercise involved 108 mics, a Cadac J-type console for the FOH live sound and the mobile's 32-input Soundcraft desk for the recording. To augment this, a 348 Yamaha console was used for a brass and woodwind submix while the choir and 16 of the pianos were sub-mixed to stereo pairs on the Cadac, and sent back to the OB truck. In spite of teething troubles including running the whole setup from a mains extension lead run across the Square, Head of Sound Production at CCTV Zhu Wei Chong was delighted with the results and expects to involve the Oxford Audio Training team in future events.
November
2–3

24th Sound
Broadcasting
Equipment Show
NEC, Birmingham
Contact: Point Promotions.
Tel: +44 1398 323 700.
Email: info@pointproms.co.uk
Net: www.ves.com

February
19–22

108th AES
Palladium Congress,
Paris, France.
Contact: Herrmann A O Wils.
Tel: +32 2 345 7917.
Email: 108@exhibition.aes.org
Net: www.aes.org

March
5–7

Entech 2000
The Dome, Sydney Showground
& Exhibition Centre, Homebush, Sydney, Australia.
Contact: Caroline Fitzmaurice,
Connections Publishing.
Tel: +61 2 9876 3530.
Fax: +61 2 9876 5715.
Email: caroline@conpub.com.au
Net: www.conpub.com.au

15–19

ProLight & Sound 2000
Frankfurt, Germany.
Tel: +49 69 750 11.
Fax: +49 69 751 00.
Email: info@webbabeaus-mbh-
octanorm.de.
Net: www.webbabeaus-mbh-
 octanorm.de

26–29

SIB International
Rimini Trade Fair Centre,
Rimini, Italy.
Contact: Ente Autonomo
Fiera di Rimini.
Tel: +39 541 711 711.
Email: fierarimini@inter.net

April
12–14

Optical Disc Production
2000
Tokyo Big Sight, Tokyo
International Exhibition Centre, Japan.
Contact: Mesuso.
Tel: +81 3 3359 0894.
Fax: +81 3 3359 9328.
Email: kumamoto@message-jp.com
Net: www.message-jp.com/odp

June
3–6

Nightwave
Rimini Trade Fair Centre,
Rimini, Italy.
Contact: Ente Autonomo
Fiera di Rimini.
Tel: +39 541 711 711.
Net: www.fieraninmi.it

January 2000
24–27

Broadcast, Film and
Audio, BFA 2000
Bombay Exhibition Centre,
TC ICON

Icon /ˈaɪkɒn/ n 1 [An object acting as mediator between man and the ideal] 2 [A symbol having cultural significance and the capacity to excite or objectify a response]
REMEMBER my first encounter with a pitch-shifting effects processor. It was in the late seventies and I was still a humble assistant dubbing mixer working mainly in TV current affairs. We hired in a unit to disguise an interviewee's voice in an attempt to preserve anonymity. As usual we had to wait for the film to arrive from the cutting room and so there was plenty of time to experiment with the new toy. I was knocked out by what could be achieved using up and down shift with delay and feedback. Thanks to a director who cared about sound and was more creative than most, the Eventide H910 Harmonizer, for such it was, more than earned its hire fee. We used it not only for voice disguise but also to mangle real-world effects, in particular a venetian blind to work with semi-abstract graphics. Later, I often used harmonisers to pitch shift material shot at 24fps. For me, the chief virtue of the original Harmonizers was the ease and speed with which seriously wacky (for the time) effects could be created.

Eventide is currently celebrating 25 years in the business and Orville is the latest and, perhaps, greatest in a long and illustrious product line. Over the years manufacturers of effects processors have followed three main paths to try to keep ahead of the opposition. The first and most obvious has been adding more and more features and presets. The second, and arguably the more important for most applications, is improvement of the fundamental quality of the audio and basic effects. Third is the advent of 'multiprocessors' with two or more processing engines used in series or parallel. Eventide has more than kept up on all three fronts.

Orville ships with over 800 presets and it has features undreamt of 25 years ago. The audio quality is first rate with 24-bit converters and 96kHz working if required. Since 96kHz operation requires approximately twice the processing power of 48kHz, some programs are only available for the lower sampling rates. There are two main processing blocks imaginatively entitled 'A' and 'B' each with four channels and four channels of both digital and analogue I-O for a total of eight independent inputs and outputs.

Overloading a unit with features can be a trap unless the user-interface is kept simple and intuitive. Given one motto common to the majority of busy engineers, 'When all else fails, read the manual', for a real-world, no-nonsense test I always begin the review process by connecting audio, powering up and seeing what I can achieve. Having seen Orville's specifications I suspected I would not get very far. This is often the acid test of an effects unit. If an engineer likes what he or she hears during a quick audition then there is some chance they will make the time to explore the device properly and maybe even read the manual. If not, the attitude tends to be one of using what you know.

It was a pleasant surprise to discover instant gratification was perfectly possible once I had worked out you use the left and right cursor keys to scroll preset banks. There are up to 100 internal banks each of which can contain a maximum of 128 programs. Each program title is accompanied by two digits indicating the number of physical inputs and outputs. If there is a 'lightning flash' adjacent, the program can be run in high-speed mode—96kHz. Operating Orville using the factory presets is quite intuitive and modifying them is equally simple. An even more pleasant surprise is the organic quality of many of the sounds. With many effects units the presets are just too clinical and require a lot of effort to make them sit in a mix without calling undue attention to themselves. Not so with Orville. Certainly some of the synthesised sound effects like Steam Train and Flintlock are frivolous, but the kind of effects you actually buy a unit like this for are deadly serious. A further revelation is the reverbs. The last Eventide reverb I heard (years ago) was rather underwhelming. Orville is a completely different proposition.

The latest effects processor from American pioneer Eventide offers quality and complexity to the busy engineer. Rob James tries his busy hand
sition. It manages to provide a reasonable simulacrum of various classics, plates, springs, digital, and so on, but it is when it is not pretending to be something else that it really shines - clean, rich and soaring reverbs with super-clean tails. Outside of one or two of the latest dedicated units this is one of the most classy reverbs I have encountered and I would seriously consider giving it rack space for the reverb programs alone. There is also a not insignificant amount of rehab programs so there are four outputs which is handy for surround work and saves a lot of messiness with delays. It is perfectly feasible to use both DSP's running the same program in order to obtain highly satisfying reverb across anything up to eight discrete outputs from a mono source. The same applies to many other effects. The richness and complexity that can be obtained with this approach needs to be heard to be believed.

As you might expect from a company that owns the trademark 'Harmonizer', there is a plethora of shutter effects here. Particularly impressive are the Ultra-Harmonizer's rich sound and the presence of the launches of Orville that one of these uses only half of one DSP. By comparison it would use almost the whole DSP on an H4000.

Apart from the staples of shifting and reverb, dynamics, equalisers, filters, distors, delays, paniers, phasers, chorus, ring modulators and so forth, there are a few corners and folders for other things. The manuals is a compilation of the case. The review sample. The computer can communicate with Orville via RS-232 or MIDI. MIDI is a visual editor much like the editors available for various synthesizers. I have no doubt we shall see special MIDI programs - the M49, for instance - thriving as if they will become a standard. The last two keys access the Levels menus for metering and levels and SET UP gets you into configuration and data dump utilities and the like. With the mains switch is off the unit is hard bypassed.

The rear panel carries four XLRs for AES/EBU 1-O, another four deal with analogue outs. A further four rather neat dual sockets (XLR and jack) take analogue inputs. Two phonos handle SDP/D I-O which are alternatives to the AES/EBU connections for digital I-O 1/2. Control I-O is catered for by two +/- Uses half pedal jacks, a further relay jack that enables Orville to control external equipment via a pair of relays and the usual MIDI In and Out. An unusual feature is the low voltage Remote Power in connector. Power connected here is sent down pins 6 & 7 of the MIDI in port to enable easy powering of a MIDI pedal board. A 9-pin D sub RS232 serial port is provided to allow connection to a PC for loading programs or data. The MIDI clock supports sampling rates of 44.1kHz, 48kHz, 88.2kHz and 96kHz. External clock is taken in digital in 1/2 and will accept from 30kHz to 50kHz and from 54kHz to 99kHz. Word-clock input on BNC is an optional extra. Provision has also been made for connecting user-supplied clocks or crystal oscillators directly to the mother-board to cope with alternative sampling rates. Hardware sample-rate conversion is available as an option. If fitted this also provides hardware dither of the otherwise 24-bit output.

**Contact**

**Eventide, US**
Tel: +1 201 641 1200.
Fax: +1 201 641 1640
UK: HHB Communications
Tel: +44 20 8922 5000
Net: www.hhb.co.uk

**STORAGE AND INTERFACING**

For a device of this complexity the silver and black front panel is surprisingly bare. Four LED bar graphs may be switched to display the analogue or digital inputs or outputs and also the ins and outs of the two DSP blocks. Five LEDs indicate the four internal sampling rates or external. The BYPASS key, essential on this type of device, is below the meters between the two DSP engines. A brief press on PROGRAM accesses the load, save and delete functions. Holding PROGRAM for one second gains access to the routing storage area and holding for a further second gets you into the Setup storage area. PARAMETER accesses the variable parameters for the loaded Program. The chunky black knob is well up to the usual (high) Eventide standard for turn parameter values. The numeric keypad is predictably used to enter numeric data, but also provides a quick way of getting to specific programs — if you know the number. Below the pad is a slot that takes PCMCIA type 1 static RAM cards of up to 4MB capacity that may be used to augment the internal memory simply to keep favourite programs to hand. Orville cannot use 'flash' cards. The last two keys access the Levels menus for metering and levels and SET UP gets you into configuration and dump utilities and the like. With the mains switch is off the unit is hard bypassed.

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**Contact**

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Fax: +1 201 641 1640
UK: HHB Communications
Tel: +44 20 8922 5000
Net: www.hhb.co.uk
Sony DRE-S777

Combining reverb and sampling technologies enables us to apply real-world reverberation treatments within the studio. Rob James samples the goods

THE IDEA of superimposing the characteristics of a 'real' acoustic environment onto a dry signal is hardly a new one. It is not even confined to audio circles any more as certain manufacturers, notably Sony and Yamaha, now include it on home cinema equipment. Even these offereried facilities have hitherto been more sophisticated and potentially useful processing such as presets based on impulse measurements of the Cary Grant and Kim Novak dubbing theatres and the scoring stage at Sony Columbia Studios in LA. There are also software packages employing impulse response modelling and convolution processing techniques such as SEK'D's Samplitude and Sonic Foundry's Sound Forge Acoustic Modeller plug-in.

The same techniques can be used to create previously unheard sounds by using unreal sounds for the impulse response samples. While the results obtained can be highly impressive there remains a snag—they are not yet truly real time due to the huge amount of computation required. So far as I am aware the Sony DRE-S777 is the first rackmount unit to attempt professional-quality sampling reverb in real time.

The underlying technology is the one of the fruits of some research undertaken by Sony Corporate R&D and the resultant silicon has already found its way into some of the consumer division products. The far more sophisticated S777 is the first professional application to use it. In appearance the unit is unlike any other I can think of. The front panel is a huge slab of what appears to be plastic but could well be MDF finished in a dark red mottled wood effect reminiscent of motor car dashboard design. I wouldn't mind seeing this in the Merc, but at first sight it is an odd, arguably distinctive, finish to find on an effects unit.

Set to the rear panel is a push-button mains switch and satin chrome jog wheel. Above the CD-ROM drive is a PC card slot currently used with an adaptor to take a Memory Stick. This is a small solid-state storage device seen on various consumer and IT equipment. The large, green back-lit LCD screen has adjustable brightness and contrast, but is not the most legible example of the species. Four small, internally lit soft function keys sit below the screen. The only other button opens and closes the CD-ROM drawer. One thing to note about this box is its sheer size and weight. At over half a metre deep and 15kg fully loaded this needs a hefty and deep rack to support it. Sony supply optional slide mounting rails and brackets and I would strongly recommend their use. The unit arrives with feet attached for free-standing use.

At the rear, a standard DRE-S777 comes with AES-EBU digital in and out and one reverb engine under the bonnet which has a mono input and stereo output. Adding an optional DSP card adds another reverb engine and expands the options to: Stereo in and out or mono in with 4-channel output, mono in, stereo out at 96kHz sampling rate or split in 4-channel output—two mono inputs with independent stereo outputs. Optional A-D and D-A converters are also available. One input card provides the maximum two channels while one or two output cards may be fitted for up to four channels or 2-channel 96kHz stereo working. The converters are high-quality items with a quoted signal-to-noise ratio of 110dB which I have no problem believing. For versatility the unit also has a mode that allows it to act as a stereo A-D and stereo D-A. All audio connections are XLR. Possible configurations are Mono in Stereo Out, Mono In 4-channel out, Split Mono in 2 x Stereo Out, Stereo in Stereo out or Stereo in Stereo out at 96kHz. Two BNCs cover wordclock in and out, two DINs, MIDl In and Out (although these are not implemented in V1 software) and a 9-pin sub-D, RS-232. The rear panel is dominated by an enormous finned heat sink that will lacerate unwary fingers or clothing.

Powering up the unit brings up a screen that advises 'Loading from CD-ROM This may take a few minutes'. If no CD-ROM or Memory Stick is present you are eventually prompted to insert them. The unit boots up in around three minutes with the same status as when the particular CD-ROM-Memory Stick combination was last used. I feel the use of the Memory Stick as a copy protection method is a little cumbersome, although I can see the virtue in keeping setup selections specific to the particular CD-ROM. Each memory stick has 99 locations for storing parameter settings. Seven used as defaults and the rest available for user storage. Nine cache memories keep programmes ready for immediate use.

The screen presents a graphic appropriate to the reverb source sample currently in use—for a Medium Hall you get a grand piano in the middle of a stage. Two meters on the left indicate input level of the active channel(s) with the active cache number adjacent. At the bottom of the graphic are Reverb mode, Direct-Reverb and sample type indicators. To the right is a graphic display of the microphone and speaker arrangement used to produce the sample. Below, two rows of text supplement the graphic information with sampling rate, programme name, a text version of the speaker and mic details and labels for the functions of soft keys 1-6. Programme loading from cache memory is virtually instantaneous while loading all the caches from CD-ROM takes around a minute. For each type of reverb there will be a number of programmes. These differ according to the I-O configuration, and the number of speakers, mics and positions. Thus there may be six programmes for Medium Hall A mono in, stereo out, but only one for Medium Hall A mono in, 4-channel out. I couldn't find a way of loading caches with different I-O modes, say 4-channel out mode in one cache and stereo out in another. Once a programme is loaded the only reverb controls are Reverb time and pre-delay, variable from 0-5s. The minimum Reverb time is 0.3s, maximum 6s. This is also dependent on the specific sample, as you might expect. Several of the samples supplied are limited to figures below the maximum. In practice this should not be a limitation since the DRE-S300...
As one of the UK’s leading audio post production centres, working on high-end television productions like “Trial & Retribution”, “Grafters”, “Bob Martin”, “Madame Bovary” and blockbuster films “Star Wars”, “Titanic” and “Deep Blue Sea”, Magmasters Sound Studios started their transformation to go ‘digital’ just twelve months ago.

With the initial installation of two DPC-II digital consoles last year in Studios 1 & 2, a third DPC-II digital console has recently been installed in Studio 5 for Bob Jackson, specifically for TV documentary and Light Entertainment productions. Scott Jackson, Operations Manager for Magmasters, explains their commitment. “We looked at all the available options but the overriding decision was due to Soundtracs compatibility, ease of use and speed of operation.”
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The remainder of the user tweaks are to be found under the Mixers menu. There are three pages which deal with the mixer, EQ and input trims. Scrolling up down the menu lines with the jog dial also scrolls between pages which is on the top or bottom line. Each channel has its own wet/dry mix and equaliser in 4-channel mode otherwise the controls are ganged appropriately.

The EQ is 4-band, top and bottom shelving with two peaking mid bands each with a variable Q (0:1-4:0) with 12:1 or boost or cut. The last main menu option is Setup where housekeeping is performed and various global settings established.

In operation the S777 does not disappoint. The supplied selection of programs based on seven sets of samples served to dispel the appetite. There is an uncanny sense of ‘being there’ about the Church and Medium Hall. Plate A reminds me strongly of the old EMIs of my youth. What a shame it can’t reproduce the wonderful going sound we used to get by kicking the case. I look forward to the rash of samples which will follow.

Surround capabilities are interesting — four channels of closely related reverb from a mono source. With the programs supplied this will give LR front and rear with virtual centre. If you need a hard centre you’ll have to work out your own solution. Future programs will deal directly with LECS format. For film work you could use two units with a mono point source to achieve 5-channel or even 7-channel reverb by loading appropriate mic and speaker placement versions of the particular program on each unit. For more purist classical acoustic applications, the DRE is designed to receive reverb from a traditional concert setup where the orchestra is at the front of the hall. Using four machines a full surround reverb is possible with three inputs (LCR) and five outputs (see diagram). When sounds are panned across the LCR dimension realistic surround reverb is produced. At a pinch this could be done with one unit by recording multiple pairs. This raises the possibility of taking an existing stereo recording and treating it with sampled reverb from the original recording venue to produce a surround mix. Record companies dust off their back catalogues now.

The difference between the S777 and a conventional DSR reverb is analogous to the relationship between a synthesiser and a sampling keyboard. It is for this reason some owners of major venues which would be ideal candidates for sampling may well be nervous and see S777 as the new number of the beast. The argument runs like this. Why book Carnegie hall for a recording if you can record anywhere dry and superimpose the acoustic later? I believe they have little to worry about. Just as sampling keyboards have not replaced orchestras, sampling reverb is unlikely to prove much of a threat. Rather, they add another tool to the armoury. In classical musical editing for instance it will surely be preferable to use a sampled reverb of the original venue when doctoring recordings than to use a synthetic DSP modelling algorithm.

There is also the issue of classic kit. Not everyone has the space or cash to maintain a collection of plates, pedals or whatever. Many conventional effects boxes make an admirable attempt to reproduce these, but don’t quite hack it. Sampling and convolution processing make for a very credible alternative. One obvious question raised by this approach is, can users make their own samples? The answer from Sony is encouraging although the loudspeakers used for reproduction of the test signals and the mics used for recording the samples will have a profound effect on the results as will the noise floor. The capability already exists in the hardware for the S777 to be used to generate the necessary signals, record and process samples using suitable reproduction equipment and mics. The unit is also said to be physically capable of recording multica samples and averaging them in order to minimise signal-to-noise ratios. The recordings would be stored on Memory Stick (or given the slot exists, presumably PC cards). The main obstacle to implementation of these capabilities in a release version of the software is a commercial one. It has yet to be decided how to handle the thorny questions relating to rights and distribution of samples.

Sony is to be congratulated on making available, virtually on tap, a technology which was previously cumbersome and didn’t quite live up to the promise. The keys to success are meticulous sample recording to minimise the influence of any technology and especially speaker characteristics and careful post processing. When this is achieved the results are stunning. If the DRE-S777 is a portent of things to come; sampling reverb may well become as commonplace as sampling keyboards.

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Crane Song Flamingo

A microphone preamp in the hand is worth two in the hide. Dave Foister prepares to go birding.

The phenomenal growth in the microphone preamp market has seen the emergence of three basic types. There are those that set themselves up as the ultimate pristine analogophile circuit; those that rely on some fairly dull facility to create a unique character, and those that offer both, adding some kind of enhancement optionally to an essentially clean signal path. Crane Song’s Flamingo falls into this last category, with not one but two subtle treatments available as additions to a high-quality preamp.

Crane Song’s quality credentials, under designer David Hill, are well established. It is one of the high-aspiring companies that is dedicated to the use of discrete Class A circuitry whenever possible, and the Flamingo shares this attribute. It also shares the stylistic character of its stabilizers, with a fairly plain, neatly legended silver panel set off by big blue knobs, a huge marching turquoise-power on indicator, and simple old-fashioned black toggle switches. Crane Song has sensibly avoided the whiz-bang-ism of many US products by mounting them sideways. But the dominant thing on the front of the Flamingo is a horizontal pair of bright red meters reading the output level, complete with Gip units, and this, perhaps, shows how simple the preamps are—two in TU-high with half the space taken up with the metering.

And on the surface this is true. The two controls are for coarse gain and output level, the first being switched in 6dB increments and the second a continuous pot. The output control is a little confused in its labelling: it is actually marked attenuation, but runs from 0 at the bottom to 10 at the top, which means that strictly it does the exact opposite of what it says. In the light of the extra functions of the Flamingo a little more calibration might have been useful, as we shall see.

The first of the two additional effects is simply marked sound, switched between Normal and Fat. This selects two quite separate signal paths, the first designed for accuracy and neutrality and the other designed to add valve-like distortion in very small amounts so as to thicken the sound in a predictable way. There is a warning that the switch may click and thump, as the circuitry to suppress this would have compromised the integrity of the Normal path. The Fat sound is clearly intended as a subtle enhancer for vocals and the like, and as such is an interesting and worthwhile effect. If not driven hard or with suitable material it can be hard to detect, but out of them is to increase the input gain, pushing more through the internal circuitry, and decrease the output level to compensate. The trouble is that the meters show the output after an uncalibrated attenuation control, so there is no way of judging how near the internal ceiling you are until something cracks—although there’s enough headroom that overcoming it takes some doing.

Curiously, both the effects are switched into both channels simultaneously—you can’t have one Fat and oneIron, or one clean and one with an effect. This is such a compromise on the potential flexibility of the Flamingo that I very much hope there’s a good reason for it. On the other hand, each channel has its own phase reverse and phantom power switches, but no filters of any kind nor any pads as it can handle +18dBm as it stands.

For normal high-quality microphone amplification the on and now switches should be off, the Attenuation full up (unity gain) and the gain controlled purely by the coarse switch with perhaps a little trimming. Under these circumstances the Flamingo delivers a commendably quiet, clean and uncoloured sound, avoiding all the complications that the effects switches work so hard to put in. It thus nearly achieves its aim of providing the best of both worlds: straightforward quality amplification, plus the option of subtle and distinctive enhancement that would be hard to produce in another way.
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The popular DAW has been enriched with post-biased features. Zenon Schoeppe reports on developments.

DIGIDESIGN targeted postproduction with its release at AES New York of Pro Tools v5.0 which introduces new software editing features, expanded OMFI file interchange, and support for new hardware options that offer strengthened integration with Avid video. V5.0 runs on the Pro Tools|24 family for Mac OS and Windows NT with prices starting at $995.

It is available as a free upgrade to those who bought Pro Tools|24, Pro Tools|24 MIX, or Pro Tools|24 MIXplus systems after 19th April 1999 and as a $159 software upgrade to those who bought a TDM-based systems before then. It will also run on Power Macintosh G4.

Significantly, new continuous scrolling with playhead options have been added that keep the current play position visible during playback, and a Separate Edit and Timeline feature that allows two distinct selection areas: one to maintain cursor position against picture, and the other to select the edit source. The Grabber Tool now works in time-based, object-based or auto-separate modes to nudge, copy or move non-contiguous regions as a group, or to automatically create new regions by pulling out selected areas. Regions can now be snapped to picture by user-definable sync points. Trimmer Tool options have also been expanded, adding time-compression or time-expansion while trimming, and audio scrubbing during trimming. F-key shortcuts can now switch among editing tools and modes while single-stroke hot keys can perform commonly used editing commands.

V5.0 adds two hardware options for bringing Avid video into TDM-based Pro Tools systems. Avoption and Avoption XL offer complete integration, conversion-free media compatibility, and audio/video sync. AV option is a two-card solution based on the Avid media hardware subsystem and can capture, import and play broadcast quality video from within Pro Tools sessions for resolutions up to AV 77.

Avoption XL is a two-card system with a breakout box that captures and plays back JPEG media in video compression ratios ranging from 1:1 to uncompressed. Based on the Meridian Avid hardware platform it permits Pro Tools users to import, capture and playback video files originally created on a Meridian-based Avid workstation, such as the Avid Media Composer XL series or Avid Symphony.

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Putting two ribbons into a single microphone, Royer offers a modern stereo package. Dave Foister talks deadly accuracy

FOLLOWING MY RECENT LOOK at the few currently available ribbon microphones, a reader wrote to point out that the American Royer model I was enthusing about was not a new design but the latest in a line involving a company called Speiden. Quite by chance I recently encountered a Bang & Olufsen ribbon microphone believed to be from the fifties, and the physical similarities to the Royer were immediately obvious. Steve Lane from Royer’s UK distributor Funky Junk confirmed that the Royers owe something to the B&O heritage, and indeed Funky Junk owns a 1970s stereo B&O ribbon that is even closer in appearance.

This all happened just as I took delivery of the Royer stereo model mentioned in the original overview, and whetted my appetite even further.

The Royer Speiden SF-12 is at first sight nothing more than a pair of the mono models bolted together, or at least two head pans sitting on one body. The business end of the mono microphone is a vertical cylinder with slots both sides, through which is just visible the long narrow ribbon. The SF-12 has two of these, although they are not exactly the same as the mono version, they incorporate a new lighter ribbon for improved transient response and even further HF excursion.

The two ribbons are mounted one above the other and fixed permanently at 90° to form a classic Blumlein pair. If it seems odd that there should be no angle adjustment, where other microphones offer some degree of swirling, it is important to remember the almost perfect figure-of-eight pattern exhibited by a ribbon. Two ribbons produce their best stereo image—theoretically and practically—at 90°. Indeed wider angles should be avoided at all costs as they introduce out-of-phase components at the edges of the target sound stage, as the back and front lobes of one microphone pick up the same sound as the front lobe of the other. At the same time, narrower angles achieve nothing more than a compromise of the stereo picture and a waste of the microphones’ capabilities. The best way to control the stereo pickup of a Blumlein pair is to move it; often the best results are obtained when the 90° angle of the microphones points exactly at the edges of the orchestra or whatever is being recorded. Again, any wanted sounds coming outside the 90° arc will start to introduce out-of-phase elements. For these reasons it is perfectly natural that Royer should have fixed the two microphones at the chosen angle.

The other option is to set the microphone up with one of the capsules facing forwards and the other sideways to give an MS pair. Many people seem to have the impression that MS requires a cardioid as the front microphone, but any polar pattern can be used (even omnidirectional), each giving different results. With a figure-of-eight like this, equal amounts of Mid and Side translates exactly to the 90° eights we began with, with the added advantage of stereo width manipulation that MS gives.

The Royer is beautifully built and finished in gun-metal grey and in fact the casing for the capsules is made of ingot iron and forms an integral part of the magnetic circuit. A badge with the Royer logo indicates the front and the model number appears on the top, but it is otherwise completely unadorned. At the base is 5-pin XLR for output, and a splitter lead is provided, helpfully labelled front and side and avoids the left-right confusion that would occur if the microphone were suspended upside down. It comes in an attractive wooden case.

The quoted performance figures are another reminder of what a good ribbon can achieve, with a frequency response whose flatness is rarely matched by any other type. The specs show a top turnover frequency of 15kHz, but the new ribbons take that up to 20. The result is a sound that has all the warmth a ribbon is good at—the warm velvety sound keeps coming to mind—but not the HF limitations that might apply. The top end is bright and clear, making this one of the smoothest and most accurate microphones you’re likely to find. The nature of the ribbon also means that this is maintained right the way round the polar pattern, which hugely enhanced the SF-12’s stereo imaging capabilities.

The traditional Achilles heel of ribbon species is the low sensitivity, although the Royer’s is almost in moving coil territory at 2.3mv per Pascal, set against this is the low source impedance that minimises interference pickup along the way. Essentially the Royer generates no noise, but requires a good clean preamp to give it the gain it needs without adding its own.

This is a very satisfying and rewarding microphone that can lend itself to a huge variety of applications, from drum overheads to whole-ensemble recording, in every case offering almost unbelievable stereo imaging and uniformity along with delightfully open and accurate sound. If anything can put the ribbon back on the map, the Royer is it.

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RTW 1024 Plus

With controversy continuing to confuse metering matters, RTW offers us the capable 1024+ Rob James takes its measure

To observe Heisenberg's Uncertainty Principle, an audio meter should have no effect on the measured signal. Easy to say, but much harder to achieve, as audio engineers tell each other on a regular basis. In fact, the unremarkable matter of metering is often the subject of remarkable debate.

Presently, meter displays based around compact electro-luminescent or TFT screens with DSP processing are becoming increasingly popular. The information presented is limited only by the capabilities of the screen technology and the ingenuity of the designer. The RTW PortaMonitor 1064+ is a good example of the type. A 4-channel unit, the main screen combines four bar graphs and a correlation (phase) meter with a stereo vectorcope or goniometer. The 1064+ also displays AES-EBU status, real-time analysis and surround information. Audio connections are made via a 25-pin sub-D, while another 15-pin connection enables remote function switching. Power supply is external but the low-voltage lead uses a heavy cast base and although connections are made for remote function control, a definite plus. Two AES-EBU inputs and four balanced analogue inputs add to the 1024's versatility.

The unit stands on a heavy cast base and optional panels are available to build the meter into a console or rack. The TFT colour screen is visible from a considerable distance and, more to the point, well off the horizontal axis. At angles of up to 45° it remains perfectly legible. In the vertical plane the picture is less rosy, but this compromise is inherent to the screen technology.

Menu navigation is straightforward with only two layers. The top level is a circular list of setup options navigated via up-down soft keys. Next opens the selected page and then toggles available options on the list; esc returns you to the top level. It is easier to use than to describe.

Seven basic styles of bar grants cover all the popular types. Digital, referenced to dBFS, Nordic, Din and vu types together with both the ubiquitous British Il, the less common Ih and a ZOOM 20 mode. User-options allow a choice of screen colours, headroom, span, and, in fact, every other parameter I have ever felt the need to alter and then some. Meters are generally designed to display peak levels, essential to avoid over or under modulation however this gives little clue to the perceived loudness of a signal. RTW has attempted to address this with an additional moving indicator on each bar graph. This gives a weighted display of the integrated energy content of the signal and appears to be better measure of perceived average loudness. The horizontal Correlator bar graph indicates phase coherence of a stereo input. In-phase mono on L&R shows as full-scale deflection to the right or -1, antiphase PSD to the left or -1. For good mono compatibility the reading should remain positive.

Although there is the option of fixing the gain, the goniometer, the display is generally more useful if the auto-ranging option is chosen. For those unfamiliar with the goniometer or audio vectorscope the principle is fairly simple and perhaps best illustrated by a symmetrical sine wave. Zero is in the centre of the screen. Applying the signal in phase on both L&R channels will result in a vertical line of equal length above and below zero. The same signal applied to left or right only results in a similar line but at a 45° angle left or right. If one channel is phase reversed a circle will result. More complex signals generate frisky wire wool. Good stereo gives a shape taller than it is wide.

The Real Time Analyser is a neat compromise between simplicity and utility. Thirty bands are shown with average or peak with three options for the integration time-constant. The display can span 15dB, 30dB or 45dB. Eight memories allow snapshots to be stored and recalled.

Basic surround functions are included. With discrete inputs the unit gives a display similar to the goniroscope. This gives a good indication of the position of the source in the sound field. It is also possible to display a Right Total, Left Total (R, L) signal either from an alternative input or mathematically derived internally. But there is no inbuilt matrix decoder so it is not possible to compare the discrete inputs with the decoded version of matrixed L,R on the surround vector display without using an external decoder and switching.

As a bonus the 1024+ also provides analysis of AES-EBU bit streams. This includes word width analysis and a count on the number of overs with a user-selectable threshold.

The 1024+ Porta Monitor manages to cram a lot of useful functions into a small space. It is not as feature-rich as some of the alternatives, but this has the happy result of making it intuitive in use and easy to interpret. I understand RTW has a new unit capable of dealing with 5.1 and 7.1 surround signals which I await with interest. Meanwhile this unit is accurate, versatile and easy on the eye.

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NEW TECHNOLOGIES

HHB 80-minute CD-R
Adding to its extensive Advanced Media Products range, HHB has introduced the CD80 Silver (CD recordable) and CD890 (CD rewritable), the first professional 80-minute CD blanks. Launched at the NY AES, both discs are Orange Book compliant, achieving extra running time through reduced track pitch. In line with earlier HHB CD media, the phthalocyanine-based CD80 Silver and CD890 have an expected life span in excess of 100 years and their intended applications include classical recording, archival and library duties.

EMO cable tester
The EMO E450 tests cables using 8-pin and 4-pin Speakon connectors, as well as 3-pin XLR and 1/4-inch mono and stereo jacks.

Leitch compression
Leitch has announced plans for a higher resolution audio compression system for its modular products which will enable compression at 16/20-24bit resolution and 16/20-34bit AES transport. The enhanced system will allow existing dual-signal stereo AES infrastructures to increase channel capacity to between five and eight stereo signals without adding routing levels, distribution amps or other equipment. With the Leitch audio compression users will be able to handle multilingual broadcasting, 5.1 surround and other multichannel applications. It also allows one VTR to record video with enough audio channels for surround sound. The technology has come about through newer and more powerful DSPs and improvements in the apt-X compression algorithm.

Leitch, Europe, Tel: +44 1483 591000.

StartREC 400
The Microboards StartRec 400 combines a digital audio editing system with multi-track duplication ability. Editing functions include...

StartRec 400
November 1999 Studio Sound
This superbly crafted new breed of advanced tube microphone preamplifier reaches far beyond mere technical excellence to deliver sound that is uniquely involving, compelling, and real. Our incredible new 2 channel Model 1100 gives you up to 20dB more headroom than conventional preamps, allowing you to record hotter tracks with the highest possible digital resolution. This unprecedented amount of headroom, combined with an EIN of -135dB, allows you to take more gain without the pain of overload distortion or noise.

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- Drift Stabilized™ A/D Circuitry eliminates the need for high pass filtering in the digital domain
- Third Stage Reflected Plate Amplifier Tube Circuit Discrete Class A Impedance Balanced Output Stage

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For more information visit our web site or contact us for an in depth brochure.
Neumann Series 100

Less glamorous than its more bulky brethren, the Neumann 'stick' has also been mimicked. Dave Foister pushes up the faders

Some time back, Neumann acknowledged the affection in which the modest and unassuming little KM84 was held by introducing the KM184. This is a non-modular cardioid microphone sharing the basic shape, size and capsule design of the original KM84, but with 100 Series transformerless electronics. The pairing of capsule and electronics had effectively been available as part of the modular KM100 range, but the 184 with its simpler integrated construction offers the much-missed microphone at a more affordable price. Now more of the original range is available in the same updated form; the 184 is joined by the KM183 omni and the KM185 hypercardioid.

All are immediately recognisable as being based on the original KM84 range, although the actual construction is very different and even the dimensions are not quite the same. The KM180s were modular like the KM100s, with interchangeable heads on a common body, and, although the 180s share common electronics and differ only in the capsule assemblies, the heads are not readily interchangeable—they will unscrew, but it is not intended that this should be done as a matter of routine. Distinctively, the three models are easy to identify, not only is there an engraving of the polar pattern on each near the Neumann badge, but the leads in the head give away, with two for the cardioid, one for the hypercardioid, and the usual blank unbroken sides for the omni.

Closer inspection reveals more differences from the 80 series, such as the absence of a pad switch. This little recessed slide that often needed something poisonous stuck into it to move it, was the only facility the original possessed, making the 180s even more simple, these really could be hung from the roof of a concert hall and left there. In fact this is not a short cut, as the 100 electronics can handle substantially higher SPLs than the 80 series, so the new range's upper limit is higher than the old one was with the pad in.

All come packaged in card-board boxes, and, although the supplied accessories are unusually comprehensive a sturdy housing might be appreciated. There are cut-out slots for all the bits and pieces in the interior cardboard, but it is still destined for the bin after any attempt to use it to store the microphone in. When cheap imitations can be supplied in smart wooden boxes it seems a bit mean of Neumann to scrimp on the packaging like this, unless market research has shown that most microphones just get chucked into the cupboard loose anyway.

The standard complement of components comprises not one but two stand-mounts and a foam windscreen. One of the mounts is very similar to the basic plastic one provided with the original KM84, while the other is a little larger and features a knurled locking screw to clamp it at the chosen angle. There are enough thread adaptor variations to fit them on to anything, and in case you need more options there is a typically huge range of accessories available, including cable suspension kits, double holders, shock mounts, wind screens—Neumann has always boasted one of the largest accessory catalogues in the business.

The appeal of the KM84 was its capability as a complete all-rounder. It had no distinguishing character that made it more suitable for some things than others, rather it produced a neutral convincing portrayal of almost anything, with an honesty that more than made up for a slight lack of extreme LF. Foister in my review of the 184 that the bottom end had been improved and extended, and the same is true for its companions. Particularly noteworthy in this respect is the omni 185, with a flatter of LF frequency response on paper that could only come from an omni—it shows no deviation right to the bottom of the scale. This shows powerfully in the studio, and makes it particularly appealing to those who how to use omnis. By comparison the other two suffer slightly, but still exhibit a commendably full range. The tight pattern of the 185 is offset by a reduction in bottom compared with the 184, but it is still remarkably uncoloured for such a design. Any of these microphones is at least as versatile as the original, with the small yet significant performance improvement that today's market demands.

For paper the polar patterns of all three are incredibly consistent with frequency, the only significant deviation being at the extreme HF of the omni, which becomes almost hypercardioid at 16kHz. In practice this is not really a problem, and the off-axis pickup of all three is one of the things that sets them apart from the cheaper competition.

Because, let's be honest, there are almost as many KM180s wandering out there as there are U87 lookalikes, but few come close to true emoluation—the combination of smooth quality and versatility is hard to match. The Series 180 microphones remind us once again who's boss, and why it is Neumann that seems to inspire all the copies. It's good to see them back.

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NEW TECHNOLOGIES

API 560 graphic reissue
API has reissued its 560 10-band graphic EQ originally available in the 1960s. The sound quality has been retained but the unit fits into flexible, outboard, modular frames rather than directly into consoles as the original version did. The heart of the 12dB of boost-cut per band box is the 2530 opamp, and frequency centres start at 31Hz and span ten octaves up to 16kHz. Other new reissues of the API 500 Series include the 525 compressor-limiter, the 512C mic pre and the 550B equaliser. Each small processor fits into the 500H (2-slot rack with PSU), 500H (4-slot lunchbox with PSU), or 500V (10-slot rack with outboard power).

ATI-APL, US. Tel: +1 410 381 8779.

Jünger compact
Jünger's 4-channel A-D and D-A converter box has 24-bit converters and fitted with an SDI-interface for embedded audio processing it converts between analogue, digital AES-EBU and digital audio embedded in a serial digital video stream. Inputs and outputs can be linked using an internal routing matrix. Sample-rate converters for adjustment of input sample rate and dither modules for adaptation of audio resolution are included. The modular processing system C8000 combines a selection of input and output interface cards with 2- or 4-channel audio processing DSP cards in a 3U rack frame. The functionality of the processing cards depends on the loaded DSP software from the Jünger Audio hardware processors. C8000 saves space and costs in remote-controlled multichannel processing applications. New audio embedder/de-embedder cards have been launched.

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

Digital location mixer
The Cameo LRC location recording console is described as the first portable, digital location mixer. The desk includes a...
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Steinberg Nuendo

Steinberg now has its higher end post-orientated DAW ready. Zenon Schoepe appraises the native status.

SHOWN FOR THE FIRST TIME some two years ago, Steinberg's flagship Nuendo 'Media Production System' has been a long time coming but will ship by the end of the year for $1,395 (US). What excited many at that first announcement was the revelation that it would run on SGI, something that was largely unheard of in audio at the time and something that communicated a sense of seriousness. Two years is a long time in audio and an eternity in computing and with the many computing changes that have occurred Nuendo now runs on Windows NT with a BeOS version planned.

Aimed at film, video and the interactive media sectors, Nuendo is a modular system that uses entirely native processing and is supported by a collection of hardware accessories. It will run to 138 tracks of digital audio, includes surround mixing, a video track, MIDI tracks plus the usual editing capability. VST and DirectX plug-ins are supported which means that more than 200 are currently available. ASIO implementation supports sound cards from stereo I-O up to 481-0s and 24-bit, 96kHz resolution.

Steinberg makes much of the use of the computer host processor rather than additional DSP and argues that the use of DSP fixes flexibility at its creation. There are a number of manufacturers who would not agree with this tack but Steinberg is convinced that the strength is in the software. An advantage of the native approach is that the system is scalable through the sophistication of the host computer and projects can be started on a basic computer and transferred along a production chain that ends with mixing, mastering and completion on a state of the art processor.

Nuendo is object orientated and features drag and drop prominently, something that is well demonstrated in its handling of crossfades. These can be manipulated by dragging the audio clips or the crossfades region around, and the process does not create an additional file. The system's attitude to Undo is interesting. Effects can be applied in real time, but audio clips can also be processed off-line and these have an edit history associated with them that can be edited and altered.

Alternatively audio can be permanently changed with a sample editor and this also boasts high levels of Undo. Audio tracks are linked directly to mixer tracks which have 4-band EQ, 4 insert points for plug-ins, and 8 auxes per channel together with 8 global plug-in effects. Predictably the mixer is fully dynamically automated and can be controlled via external hardware remotes. The multichannel capability of the mixer is impressive within the context of its own environment and it is important to remind that the system has access to numerous surround-able plug-ins.

Nuendo chooses to employ 'speaker sets' which can be configured as presets for the various multichannel formats which can be switched between if necessary. Most interesting is the availability of multichannel mastering tools that understand the speaker sets approach and manage image shift and balance issues accordingly. The LFE channel is available as an individual routing destination, can be filtered and can be accessed from an aux on every mixer channel. Panning modes take the form of plug-in modules, which offer a choice for different applications, and leave the stage open for any future developments.

The system can sync to any time-code source that can be translated into MTC, but is most elegant when run with Steinberg's TimeLockPro synchroniser which facilitates direct chase and lock to VITC and LTC and provides an ultra low jitter word-clock source. It can also handle AVI and MPEG video formats with preview thumbnail tracks and run frame synced to Nuendo audio. A current video file can be placed in a window and switched on and off line and Nuendo supports dedicated video hardware like Miro DC50.

Networking is taken care of in host computer fashion allowing fast ethernet connection between multiple machines with remote access of a specified computer's sound storage across the network. Project archiving causes the accessed files to be copied and stored within a project on the local computer.

Steinberg has really set out to stand with Nuendo and does a convincing job of arguing the case for native signal processing's true coming of age with this product and that things will only get better and faster.

It claims that a Nuendo running on an Intel Pentium III can play back 32 tracks comfortably from a single modern drive with effects and equalisers. Track replay capacity can be increased with parallel additional drives or a SCSI RAID disk array. A real leap in real-time audio processing power can be grasped with a dual Pentium system.

Reservations about Nuendo will almost certainly centre around just how convinced potential users are by the defence of the native processing issue as anyone who sits in front of the system for any length of time cannot deny Nuendo's abilities. It's a interesting and viable product.

Maybe this is the future, Steinberg clearly thinks that it is. Decide for yourself. ■

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BitHeadz and Pre Tools

BitHeadz has implemented support for Digidesign's DirectConnect technology for Pro Tools. DirectConnect allows the main stereo mix and all 16 MIDI channel mixes from the Unity DS-1 sampler and the Retro AS-1 synthesizer to be routed directly into Pro Tools. With these fitted the user will be able to route 32 streams of audio to the TDM bus. BitHeadz also has plans to add DirectConnect to its other software instruments, Voodool MIDI Drums, and Black & Whites Virtual Piano.

BitHeadz, US.Tel: +1 831 465 9898.

MultiMax upgrade

New software enhancements for the MartinSound MultiMax multichannel monitor controller are accessible through a new SPL... November 1999 Studio Sound
Choosing the right audio Codec.

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

The range of network protocols included means that it can be taken to virtually any part of the world. In the studio the audio I/O can be analogue or digital (AES/EBU & S/PDIF interfaces are both provided). The aux data channel enables embedded control data to be sent alongside the audio, and the unit can be controlled remotely from a PC or the external Remote Panel if desired. Most importantly automatic sensing of the codec at the other end of the call means that it sets itself up to communicate with the most commonly used systems in use today, i.e. Telos Zephyr, CDQPRIMA, Glensound and others without complicated manual programming. Operationally the buttons are large and straightforward to use, while the illuminated LCD display gives a clear indication of what is going on at all times. No noisy internal cooling fan to worry about in quiet studio conditions. The Remote Panel can control a MusicTaxi from over 500m away via the RS422 interface. The online menu indicates online time, send-level, receive-level, adjusted headroom, Rx and Tx audio configuration, SYNC flag of MusicTaxi at the other end.

Tapeless recording and transmission on the spot is the answer to the enhanced requirements of correspondents. The CTAXI is the solution and is set to become the standard for mobile recording and transmission, because it satisfies the users demand: stereo recording, editing, file-transmission to computers, realtime-transmission to all well known codecs. The CTAXI is, of course, child’s play to operate. You can use it as telephone, walkman, audio recorder, mobile editing station, transmission device. The size is as small as today’s cutting edge technology allows: 58 x 239 x 150 mm, the weight is 1150 g including 2 x Li-ION batteries. The charger is inbuilt and allows uninterrupted operation. PCMCIA flash cards or hard drives can be used for stereo recording. BWF format is supported.

We are not American or British. We don’t belong to a big industry corporation. So we have to work that little bit harder. We started 8 years ago with advanced MPEG integration into Audio Codecs and have dedicated ourselves to making them as user-friendly as possible. Our product know-how covers ISDN and satellite transmission, recording, editing and storage. Add our experience, research capabilities and production expertise and you have the legendary German Quality that keeps us one step ahead. For more information, call our UK distributor Charlie Day at THE UK OFFICE, Tel. +44 (0) 1442 870103, or contact our headquarters in Germany.

The Dialog4 logo is displayed at the bottom of the page.
Avalon Vt747sp

Like good and evil, 'clean' and 'valve' sounds both have something to offer. Dave Foister finds a temptation at his fingertips.

AVALON'S RANGE of distinctive signal processors continues to grow with the VT747sp, a compressor with EQ intended for overall stereo treatment. The range is distinctive both in styling and in design approach, and the VT747 shares both these characteristics with the 737 Direct Signal Path.

The compressor design comes from a thick aluminium front panel featuring a recessed panel, a bolted-on meter housing, and big metal knurled knobs. The layout is clear and well-labeled despite the flexibility on offer, which was just as well since the manual was not sent on by the previous loanee. One cosmetic niggle: the switches are hack-like transparent push-buttons, and the lights are so far back inside that they can make adjacent switches look as though they're on if you're not directly in front of them.

Avalon's distinctive electronic characteristics is the fondness for class-A operation and discrete solid-state circuitry. The 747 shares the 737's hybrid approach, building the compressor around a valve stage and opto-couplers while remaining solid-state elsewhere. This time the use of the valves is optional, selected by a switch marked TSP for Tube Signal Path, giving a useful facility to choose the character that best suits the job.

Avalon generally puts one or two unusual features in as well, and the compressor here is no exception. In some respects it's simple enough, with continuously variable Attack and Release times, click-stop pots for Threshold, and twin controls, and variable gain make up. The single huge vu meter in the middle shows the amount of gain reduction, and is augmented by a blue LED buried among the controls. The time parameters are completely uncalibrated, marked only from Slow to Fast, and so forgiving that you could be signal-dependent, although Avalon does not say so. Everything else is calibrated in the expected way, although the threshold is unusual in having most of its rotational range above zero and a relatively small arc below. This fits its mixing-mastering role as subtle treatment of the upper reaches of the dynamics is more likely to be required than serious crunching of the lower level stuff. All of this is simplicity itself to set up, and the ranges of the controls are such that gentle unobtrusive smoothing is as easy as aggressive dynamic contouring.

The extra element within the compressor section is a couple of swept EQ bands sitting in the side chain. These are labelled sub-chain common, and are basic filters with 15dB of boost and cut and overlapping frequency ranges. They can be switched in and out as a pair, and also allow for the signal through them to be monitored, although this can give rise to some initial confusion. The key is that they are controlling the contour of the threshold, increasing their gain settings raises the threshold within the band so that the compressor does less. Because of this, when the side chain is monitored, what looks like a pair of semi-parametricals seems to be working back to front, as turning the gain down to -15 turns the band up as heard via

November 1999 Studio Sound
Level-Range menu page in the setup directory. They include an SPI Display Range mode adjustable in 5dB increments and an expansion range by 30dB. A Wide Inputs Interlock mode permits all five 8-channel inputs to be selected in any combination, or in an interlocking mode.

Martinson, US: Tel: +1 800 582 3555.

British channel
Joemeek has launched the VO5Q 'British' channel which combines a mic pre with, compressor and equaliser sections. The mic pre is a 5-stage design with phantom power, 20dB pad, phase reverse, overload indicator and front-panel mounted passive instrument input. A full mono optical Joemeek compressor has compression control for threshold, fully variable slope and attack and release controls that run with gain reduction metering. Equaliser is derived from the Meequalizer EQ unit with LF and HF shelf and a sweepable mid. Compres-

or and EQ sections can be bypassed.

Joemeek, UK: Tel: +44 1626 333948.

MotU 24i
Mark of the Unicorn has announced the 24i, a 24-input analogue audio interface for computers that will be sold as an expander for 2408 and 1224 hard-disk recording systems and as a complete core system for Mac OS and Windows 95/98. The 24i offers computer-based hard-disk recording in a cost-effective 1U I/O unit with 2i-4i converters. Designed specifically for multitrack audio production entirely within a host computer, the single rack space 24i provides 24 balanced TRS inputs for simultaneous recording of 24 channels at 44.1 or 48kHz audio. For stereo monitoring, the unit's main outputs are supplied in 24-bit balanced TRS jack: 24-bit optical SPDIF and 24-bit RCA SPDIF. The 24i includes ASIO. Wave and Sound Manager drivers for compatibility with popular audio software and the core system ships with AudioDesk, MotU's sample-accurate audio workstation software for MacOS. MOTU has demonstrated new features for Digital Performer including adjustable PPQN resolution, beat-based effects automation support for Apple Computer's new G4 processor and Velocity Engine, and a new MDM Drum Editor window.

Installation voice processor
Symetrix has introduced a voice processor specifically tailored for installed sound applications. The single channel 527E Voice Processor combines a mic preamp with a compressor-limiter, an expander, high-pass and low-pass filters, and 3-band parametric EQ. The device accepts mic or line inputs with phantom power, push-button 15dB pad, a compressor-limiter and downward expander and the parametric bands deliver ±15dB of boost across overlapping the monitor path and makes the compressor work much harder in that range. I'm not sure why Avalon would have decided to do that way, as most of us are used to simply boosting the frequency band in the side chain to make it compress more, but once you've got the hang of it it's okay, and the fact that the knob is seen at first sight to work backwards doesn't detract from the feature's presence.

There's more to come, also in the EQ area, but quite different from what the 757 offers. To the right of the meter is a 6-band graphic, with three bell-shaped mid bands, three shelving LF bands and one no but two shelving bands, one mid-range at 5kHz and one up with the bars at 32kHz. Boost and cut is in single figures for all but the outer two bands, which can go ±16dB, although all are shown on the panel as ±3. Sublity is the aim here, and it is indeed a very sweet and smooth EQ, just right for a little final tweak of a mix.

As with other Avalon EQs, the apparently ultrasonic band is actually very useful for a little bit of shine or softness. Like the 737, the 747 has a switch for placing the graphic pre the compres sor stage, adding further detailed tailoring possibilities. The final area of the panel contains a pair of red LED meters (so bright and fast that they look like flickering flames when they're running), an EQ in-out switch and a final output level control.

The sonic qualities of the 747 are impressive indeed, achieving the unlikely feat of two paths that both sound natural and accurate and yet are different. The valve path adds a certain thickness and size to the sound while the other is the more open and transparent, yet both are quiet, flat and clean. The subtle difference, along with the flexibility and fine control of the ganged sweep processing, makes it a very desirable mastering compressor indeed.

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Studio Sound November 1999

35
Maycom Easycorder

Following up his earlier review, Neil Hillman presents a field test of Maycom's digital location recorder.

I'm going to be rather cagey about telling you how the Maycom Easycorder has been a companion for the last two months and how I fared in the heat of competition. Under the guise of extended appraisal, the machine and I have become close friends and now I must return to its foster home before I do, however, I am going to introduce it to Matthew—my neighbour's 18-year-old sound student son who is just starting out on the long and winding XLR road. Matthew has his first location-recording assignment to produce a one minute edited montage that had to include a minimum of eight different identifiable spot effects or dialogue.

In my time I chose to record buying 20 Rothmans King Size from the corner shop, he chose to stage a mugging—I leave you to draw your own conclusions on the youth of today. I chose to use the Maycom Easycorder, I made him use my original local radio 9/11 machine: the one that rhymes with 'brewer'. To recap, the Easycorder (Studio Sound, September 1999) is a portable battery-powered digital audio recorder made in the Netherlands by Maycom, distributed in the UK by the Canon Audio group. It offers in its basic guise the cheapest entry into the solid-state recording market with onboard editing using internal memory and removable cards.

The machine carries the digital connections with an AES/EBU input, twin phono sockets for S/PDIF input and outputs, a 25-pin EGG port for transferring audio between the Easyesm and a notebook-desktop PC and a shutterless open slot to accept an external PC hard disk or flashcard or the optional ISDN modem. With the recording of our two montages dealt with easily enough by both the analogue and digital machines, the time taken editing out respective field-taped highlights just how far technology has progressed, and making me look—untarily, but satisfyingly—slip.

The down-side of the Easycorder editor is the lack of a scrub-wheel. While it takes only a short time to get into the Easyesm's method of selecting in and out points by pressing a mark button—and then cutting or pasting—a flywheel arrangement gives more feedback when scrolling up and down an audio waveform

However, such features clearly come at an extra cost—so perhaps I'm expecting too much from an entry-level priced machine that almost offers as much as its costlier rivals, and pluckily stands up to the bigger boys. The Easyesm is a machine that is almost the ideal for a radio journalist—it comes in at the right price, it is robust and overall it is dependable but. In my heart I know that the little luxuries of the Nagra, Mandozzi or Sonifex would become a source of envy within a short period of time.
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Alesis M1 Active

Studio Sound's 'bench test' loudspeaker reviews continue with the M1. Keith Holland reports

The Alesis M1 is a 2-way active loudspeaker consisting of a 165mm diameter carbon-fibre cone woofer, a 25mm soft-dome tweeter and built-in power amplifiers and crossover electronics. Both drivers are magnetically shielded. The power amplifiers are specified as 75W for the woofer and 25W for the tweeter and the crossover as an 8th-order filter set crossing over at 1500Hz, along with additional time-alignment circuitry and a high-pass protection filter. The cabinet is a ported design with dimensions of 380mm high by 215mm wide by 250mm deep, and each loudspeaker weighs 8.9kg. The back-panel contains a line input socket and input level control, along with an IEC-type mains socket and switch. The input socket can accept 1/4-inch jack or XLR-type plugs that may be balanced or unbalanced. Sensibly, there is a pair of posts either side of the input socket and control to protect the latter from damage should the loudspeaker be placed on its back.

Fig.1 shows the on-axis frequency response and harmonic distortion performance for the M1. The response is seen to lie within ±2.5dB limits from 48Hz to 19kHz, which is a commendable result. The low-frequency roll-off is 6th-order, due to the use of a bass reflex port and a high-pass protection filter, with the -10dB point at about 40Hz. Harmonic distortion is low with the 2nd harmonic peaking to -34dB (2%) at 75Hz, but reducing to below -46dB (0.5%) above 100Hz. 3rd harmonic distortion remains below -46dB above 60Hz. The off-axis frequency responses are shown in Fig.5 for the horizontal, and Fig.6 for the vertical plane. The directivity is seen to be well controlled in both planes with a cross-over interference notch only evident in the 'downward' direction. High-frequency lobing is only evident at very high frequencies and at angles well away from the axis. The relatively low cross-over frequency in this design ensures that the mid-frequency narrowing, usually associated with very rigid diaphragms, is kept reasonably low at 5dB for 60° off-axis (horizontal). The time-domain performance of the M1 is shown in the step response, Fig.3; acoustic source position, Fig.2; power cepstrum, Fig.4; and waterfall plot, Fig.7, respectively. The step response indicates that there is a time-alignment problem between the drivers, with the peak in the mid-frequency response delayed by about 1ms compared to the initial, high-frequency attack. This is further borne out by the movement of the acoustic source position to some 0.3m behind the loudspeaker at 1.8kHz. The waterfall plot shows very little 'ringing' at this frequency indicating that the delay is not due to resonant behaviour. Both the waterfall plot and the acoustic source position show the effect of the 6th-order low-frequency roll-off, with the low frequencies appearing to emanate from a position some 3m behind the loudspeaker. The power cepstrum shows very little activity due to the smooth and even on-axis frequency response, but there are low level echoes at about 100ps and 200μs.

Overall, the Alesis M1 Active is an impressive performer. The on-axis frequency response is commendably flat and the off-axis response and distortion performance are both good. The otherwise excellent performance is let down slightly by a peculiar mid-range phase response, which results in a group delay of about 1ms at about 2kHz. The limited number of experiments that have been carried out on the audibility of group delay indicate that this figure is close to the threshold of audibility. Questions concerning the audibility of phase at low frequencies have yet to be answered, however, but a project has just begun at ISVR, University of Southampton, to investigate the audibility, or otherwise, of high-pass protection filters in loudspeakers; the results may aid the interpretation of the measurements presented in this series of reviews.
Fig.1: On-axis response and distortion

Fig.2: Acoustic source

Fig.3: Step response

Fig.4: Power cepstrum

Studio Sound November 1999

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### 2000 SSAIRA Nominations

Table: **SSAIRAs**—the *Studio Sound* Audio Industry Recognition Awards are set. This follows the outstanding success of the last two year's awards in which the readers of *Studio Sound* voted for products in assorted categories.

In response to popular demand we expanded the number of category types last year to take in desktop duplicators, location-portable equipment, and plugins.

However, we first need to gather the nominations from which the winners will be selected. And quickly. This is where you come in...

In short, anyone can nominate a product for a suitable award category, but only fully qualified readers of *Studio Sound*, not manufacturers or related personnel, will be permitted to vote.

To nominate a product simply fill in the form and post it or fax it to us or send your nominations via email by listing the category number followed by the product.

**To be eligible, a product should have been released since the Munich AES Convention (held in May 1999) and obviously needs to conform to the description of a particular category.**

The resulting nominations selection will be published in future issues of *Studio Sound* for postal voting and for interactive voting from the *Studio Sound* web-site.

With regard to the categories, it should be noted that, in the case of outboard equipment, this is described by function rather than product description—hence a 'voice channel' may legitimately be entered as a compressor if you feel it excels in this area. Not all the categories work this way, however, but all are explained in the table. There is also a special category in which you are invited to nominate equipment, people, initiatives or anything else that falls outside the other categories yet warrants acknowledgement.

Nominate only in the categories you feel comfortable with. Do it now!

---

**1. Large scale console:**
- Analogue or digital, recording, broadcast, post or film.

**2. Medium to small scale console:**
- The affordable end of the console business continues to see plenty of innovation.

**3. Outboard dynamics:**
- A by-function category covering any outboard featuring dynamic processing.

**4. Outboard preamp:**
- A by-function choice from outboard including microphone preamps.

**5. Outboard equaliser:**
- Graphic, shelf or parametric.

**6. Outboard Reverb:**
- The final by function category addresses reverb processing.

**7. Combined outboard device:**
- Some units thrive on the combination of their processes.

**8. Monitors:**
- Never more important or prolific than for surround sound.

**9. Microphones:**
- More choices than ever before.

**10. Convertors:**
- More choices than ever before.

**11. Audio editor:**
- Hardware or computer-based?

**12. Audio recorder:**
- Your choice can draw from CD-R, MD, DAT, HD or HR.

**13. Desktop duplication:**
- Convenient and economical, your preference please!

**14. Location-portable equipment:**
- Gear for guys on the move.

**15. Plug-ins:**
- The list continues to grow but which is your favourite?

**16. Special category:**
- Your opportunity to recognise anything or anyone that has benefited pro-audio, Think carefully and laterally.

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**NOMINATIONS can be made by photocopying or cutting out the page opposite, filling it in and returning it to SSAIRAs Nominations, Studio Sound, 8 Montague Close, London Bridge, London SE1 9UR, UK. Fax: +44 171 407 7102. Alternatively, you can email the category numbers and your nominations to SSAIRAs@unmf.com**
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Studio Sound November 1999
Mick Glossop
Close to the Edit

Trading perfection for performance and accuracy for atmosphere has seen Mick Glossop making some of the best records of three decades.

Richard Buskin meets the thinking musician's producer

AFTER YOU'VE BEEN involved in a process to achieve a particular performance for five or six hours, it's a great experience to finally capture that. Nevertheless, I also have to say that the word 'capture' is used a lot to give credit to producers. I mean, producers are instrumental, I think, in terms of helping people to get there, but when you press Record you're basically sitting there listening. You're not doing much else.

That may be open to question, yet what is in doubt is that Mick Glossop is a producer and engineer for whom the essence of live performance has been a key feature of much of his work with artists ranging from Frank Zappa, Van Morrison, Tangerine Dream and Flesh for Lulu to Queen, Mott the Hoople, Mike Oldfield, Sinead O'Connor, The Skids, The Waterboys, The Wonder Stuff and The Men They Couldn't Hang.

'There's a link between human performance and imperfection,' he says, 'and you have to be rather careful about the imperfections that you decide you're going to rub out with your little eraser.'

The 'little eraser' that Glossop is referring to is the editing process, and this is something he is extremely conscientious about.

'Spontaneity is something that refers to performance,' he says, 'and I think you can retain that as long as you're open enough and you keep the tape rolling and you give the artist the opportunity to do several takes. After you've achieved that you can then set about looking at what you've got, analysing it while at the same time being respectful with regard to what you've recorded.'

A case in point is Van Morrison, with whom Mick Glossop has collaborated on no less than 13 albums since kicking things off with the Wavelength project in 1977.

'I remember something that happened with his saxophone part on 'Celtic Swing,' ' says Glossop with regard to one of the singles on Van the Man's 1982 album, Inarticulate Speech of the Heart. 'He was playing a low note and it wouldn't speak properly. The key wouldn't seal, so we just got this kind of rushing air sound, but he carried on playing and he was really furious about it afterwards. "The bloody thing only got serviced the other day and it's still not working properly!"' However, it was left on the record and a lot of people have since remarked about that, because it's a very interesting sound; the sound of the air blowing through the key of the sax. At the time Van was upset about it, but other people thought it should be left in because it was atmospheric, which is not something that he would normally do.

He's very much a Take 1 person and he's certainly not obsessed with technique in the technical sense. He's very into the feel and he's had a big influence on me in that respect, and he usually okays quite a few things which other people would iron out, such as a guitar that might be slightly out of tune. If the performance has got the feel and the spontaneity and the creativity that it needs then he'll accept that. He'll always sacrifice technical considerations for atmosphere and expression and feel, and from that point of view it's very good working with him.

There have been several performances and overdubs where he's initially said, "No, that's fine, that's great," and I've thought, "He's going to reto that in a couple of weeks. I'm sure he's going to replace that overdub." However, two weeks later we've put the tape up and I've listened to it and thought, "Well, that's actually okay, isn't it? It's not a problem." I'd been sucked into being too focussed and too microscopic about it, and therefore in terms of my other work it's a very good thing for me to work on his sessions every now and again, because it just sets things in perspective. He's constantly got his mind on the performance, and that's very healthy.

From 1970 through to the end of that decade Mick Glossop was the beneficiary of a first-class apprenticeship courtesy of the time he spent on staff at Wessex Studios in North London, Nova Studios in Marble Arch, Studio Son Quebec in Montreal, The Manor in Oxfordshire and The Town House in West London. At Wessex he assisted on numerous live orchestral sessions as well as those with artists such as King Crimson, The Moody Blues, Georgie >
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Glossop at Town House 2 in 1978

Fanie, Alan Price and Stevie Wonder, while as engineer at Nova he learned a lot from working with Mike Weigell.

“What he taught me was a way of communicating with the producer and the artists, and learning that was as important as getting the sound,” Glossop recalls. “He also showed me that, as an engineer, it was possible to subtly influence what went on in a session.”

After spending four months recording and mixing the music of French-Canadian rock outfit Offenbach for a 1974 documentary movie, Glossop was then offered the job of chief recording engineer at Virgin Records’ residential facility The Manor. This not only brought him into contact with a wide variety of major international artists, but also enhanced his technical knowledge—by way of his direct involvement in the studio’s redesign, and it was during his 4-year stint there that Glossop gained invaluable experience working alongside Mutt Lange.

‘Engineered four or five projects with Mutt when he came over from South Africa in the late seventies, and he is the person who probably influenced me more than anyone else,” Glossop says. “He was 100 per cent focused on what he was doing and his powers of concentration were fantastic. He’d be on top of things for 18 hours a day when everyone else was losing it, and so what he showed me was a level of dedication which I realised was necessary in order to achieve real success as a producer. Also, his encyclopedic knowledge of production techniques was incredible, and that emphasised how important it is to do your research prior to working with a particular artist and then to cover every base. There wasn’t one note or beat that went on in any of his records that wasn’t closely examined. Everything was there because it was supposed to be there.’

Which brings us back to the subject of deciding what imperfections to ‘rub out with your little eraser’. After all, isn’t the syllable-by-syllable approach also a threat to the kind of spontaneous emotions that is associated with many of the artists whom Mick Glossop has produced and/or engineered?

‘I’m a fairly spontaneous person,” comes his justification, ‘and generally I find that the best decisions I make are the ones I make quickly. So, I try to balance the two aspects.’

Glossop also tries to keep the tape rolling in order to avoid missing out on any moments of artistic inspiration.

The first time that I missed something with Van Morrison was at the Record Plant in Sausalito,” Glossop recalls. ‘It was the second album that I did with him (Into the Music), as usual everything was live—live vocals, the band was playing live—and they all came into the control room to listen to playbacks for a couple of tracks. People were just hanging around chatting, and Van walked out into the studio and was tinkling around on the piano, and then he picked up his guitar and started turning it. I was still talking to everybody else, and a couple of minutes later I looked out and he was strumming some kind of idea or other. He was nowhere near his recording area, but then the drummer wandered out there and he started playing along, followed by the piano player who started fingerpicking a few notes in relation to what Van was doing. Well, this gradually evolved into a performance, and at that point I realised something was going on and we’d better put some tape on. Don’t forget, we’d just been playing back a track and the master was still on there, and so we quickly spoolied the tape off, put on a new reel and stuck the machine in Record but by that time they were already into the chorus of the song. Of course, because of the way that things work psychologically and musically, this ended up being the take, of which I had recorded the first two minutes. I think they ended up having to do another take.

‘As a result, ever since then I always have two tape machines, and if we’re working with Dolby—which is normally the case—I take wire leads from the back of the Dolby rack to both machines. That means there’s always a tape machine ready to record. At the same time, quite often Van’s songs will extend much longer than most people’s—I mean, the longest live performance I recorded with him was about 32 or 33 minutes. You don’t know how long it’s going to be, so you have to have another machine that you can put in Record to catch the overlap instead of losing 15 seconds of the song.

‘Van does do a lot of stream-of-consciousness-type songs, where instead of lyrics he’ll have a page of words or phrases that he dips into and a lot of other stuff is off the top of his head. There’s no structure and the >
One look at the back panel and it's easy to see why the HHB CDR850 leaves other CD recorders where they belong: in the bedroom! XLR and RCA analogue inputs and outputs, an AES/EBU digital input, optical and coaxial SPDIF digital I/Os and parallel remote control, the CDR850's comprehensive connectivity perfectly complements its class leading sound quality and ease of use.

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Before you buy a CD recorder, it pays to check around the back. See both sides of the HHB CDR850 at your nearest dealer.
Posting effects for the creaks, grunts and groans of creatures that no-one has ever heard is a tall order. **Kevin Hilton** hears the patter of rather large feet.

The **Natural History** documentary is a well established and much-loved part of television schedules. Whether it be sweet meercats all looking in the same direction at nothing in particular or cheetahs chasing down a Thompson's gazelles and then ripping it apart for the cameras, it has produced hours of screen time and forged the careers of many naturalists and film makers. With ever more screen hours to fill, particularly with dedicated channels like Discovery, the danger must be repetition. So, where to go for something fresh?

Producers Tim Haines and Jasper James decided to go back 220 million years and make a natural history documentary about creatures that, hitherto, had only hit the screens in dubious Hammer films or, most famously and lucratively, **Jurassic Park** and **Godzilla**. **Walking with Dinosaurs**, made for BBC Science but with a huge potential for world-wide sales, is a series of six 30-minute programmes that aims to blend scientific fact with scare-ya-silly, rip-your-throat-out entertainment value.

Sound is a big element in any natural history programme: the thrumming of the African undergrowth as a lion stalks its prey; cries of birds in the rain forest; sea-lions roaring during the mating season. All these can be recorded on location, sourced from CD effects libraries or, in the case of Foley sounds (animals moving, digging, fighting), simulated by a human technician back at the studio.

It is, to state the blindingly obvious, a tougher task when dealing with creatures that died out 65 million years ago. Everybody probably thinks they know what a Tyrannosaurus-rex sounds like, thanks to Michael Crichton and Steven Spielberg, but it is more likely that what shook audiences during **Jurassic Park** was what struck sound designer Gary Rydstrom as dramatic and scary. And the Academy of Motion Picture Arts and Sciences thought so too.

For **Walking with Dinosaurs**, the brief was for something that sounded convincing, based on the best guesses of palaeontologists. It was speculation — as was the colour of animals recreated by computer animation and animatronics — but the sound designers were advised by the scientists and worked according to factors like the size and shape of the dinosaurs’ heads, the length of their necks and the fact that these creatures did not possess lips or cheeks.

Sound design — creating, recording, editing and track-laying the effects — for the series was handled by Andy Sherriff and Simon Gotel of independent record and music production company Adelphoi. Founded by songwriters and producers Charles Hodgkinson and Kirk Zavieh in 1994, Adelphoi represents and produces other composers, while running a number of labels, notably for the dance market. Its television, channel branding, corporate communications and new media division, headed by Sophie Taylor, deals with music production and sound design. This has worked on projects for Channel 4 (Television), BSKyB, The Discovery Channel (promos and theme music for programmes) and the pan-Scandinavia Viasat network.

Like the company’s founders, Sherriff and Gotel came from musical background, playing in various bands, but found themselves moving towards a more technological style. ‘We got into dance music,’ explains Sherriff, ‘and that is more technically-based. As we got into it, we found it was more like sound design than straight music.’ Gotel agrees, describing the process as ‘sound filtering’.

The pair’s shift towards the technical continued with work on short-form promos and MIDD-techno for touring bands whose experience with such equipment was not huge and who needed back-up. While Sherriff and Gotel have built up their experience working on promos and commercials, they admit that **Walking with Dinosaurs** is the first pure sound design project of a significant size.

Despite having worked on a nature documentary for Discovery, Sherriff and Gotel knew that they were entering a new realm with this production. ‘All the sounds for this were organic, not metallic,’ observes Gotel. ‘That really stretched our imaginations.’ Sherriff adds, ‘This sort of sound design would be easier if it were a science fiction production — you can get away with the more obvious effects. Although the landscape depicted is very different, it’s not really an alien environment; so we worked to make the sounds convincing, believable. ‘This is not **Jurassic Park**’.

Further constraints were put on Adelphoi by the very nature of the ecosystem that existed during the various phases of the prehistoric age. ‘These are all natural sounds but what exists today is very different to what existed then,’ explains Sophie Taylor. ‘Andy and Simon had the problem that they couldn’t go out and record a present day forest and just hope that it would sound

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like a prehistoric forest."

Walking with Dinosaurs starts 230 million years ago, during the Late Triassic period, when the dinosaurs familiar to the majority of people did not exist. Dr Jo Wright, a palaeontologist who was a scientific adviser on the series, wrote in the BBC Online's background to the programmes: 'When dinosaurs first appeared about 230 million years ago, the world was very different to as we now know it. There were very few representatives of any animal group alive today—no mammals, birds or lizards (although there were some lizard-like reptiles). The difference was also apparent in the plant kingdom. There were no flowering plants, which includes most of the common trees and shrubs today. The trees would not look very familiar to us, although some were relatives of modern day ferns and podocarps. Plant life would have seemed very drab, just green and brown in colour. There was no grass, instead, low ground cover would have been ferns and mosses.'

This meant that Sherriff and Gotel had to be very careful about where they recorded background atmospheres. Locations included Devon, Scotland and Dubai, where general sounds of vegetation (leaves rustling, branches snapping) were recorded. Care had to be taken to ensure that no obvious human or modern noises (people talking, cars, aeroplanes) were picked up but, perhaps less obviously, there could be no bird song or cries.

Flying creatures existed during the earliest times, but there were no birds in the periods featured during Episodes 1 to 4 of Walking with Dinosaurs: The prehistoric ancestors of today's birds appear in the last two editions but there was still not scope for bird song. 'We weren't allowed birds in those first four programmes,' comments Sherriff, 'and the insects we were allowed—like the giant dragonflies—were unique to the time and sounded very different to today's insect life. When birds did start to evolve, they did not have song boxes and were much bigger than modern birds.'

Such fine points were discussed with the various scientific advisers to the series, including a palaeontologist based in Japan who is recognised as an expert on dinosaur sounds. 'Initially we visited palaeontologists in Cambridge, who were advising on the series in general, and went to the Natural History Museum in London,' says Sherriff. 'They were also helping the animators and model makers in deciding the skin colour of the creatures, which, in some cases, could be as speculative as the sounds. But we were trying to make logical guesses.'

While some modern creatures could be used as a basis, Adelphoi were conscious of the fact that animals bearing a resemblance to modern mammals did not necessarily sound like their counterparts today. The team says the cynodont, a dog-like creature that appears in the opening programme, took some time to get right because it was in fact reptilian. In much the same way, familiar dinosaurs—including T-rex and the 30 metre long, whip-tailed diplodocus—could not be the prehistoric equivalent of the pantomime villain. 'We had to rethink things to a degree,' explains Sherriff, 'because something like the T-rex would not have been the successful hunter it is believed to have been if it had made a lot of noise. So we had quiet predators."

Sherriff and Gotel had extensive meeting with producers Tim Haines and Jasper James to discuss the details of each episode. Walking with Dinosaurs follows the natural history >
programme convention of focusing on a whole season or year in the lives of a number of creatures. To this end, a series of noises had to be created to illustrate different activities. This was one of the main differences between what we were doing and what a movie sound designer would do,' says Sherriff. 'We had to come up with a range of sounds for each animal: caring for their young, crying in pain, defensive, attacking.

Work began on the sound design a year ago, with the last six months of the process being particularly intensive. In addition to the location Foley recordings—laid down onto either DAT or MiniDisc—the Adelphi team had access to the sound library of the BBC's renowned Natural History department in Bristol. 'We sorted through stacks of reel-to-reel tapes there,' smiles Sherriff. 'Although we did use some of these natural sounds, they were not dynamically that great. If we time-stretched them or pitched them down, they would become less dynamic and we wanted to get away from the old slowing down a lion's roar approach.'

Much of the design was sample based, generated on the Akai S3000 and the recently released S6000 samplers; the last device coming, Sherriff says, 'hot out of the factory.' He adds this meant there were a few operational problems but that these have now been cured. The S3000 was best for time-stretching, it gave us more control,' he says. 'But we couldn’t have done this project without the S6000 because of the amount of memory it has. We could take WAV files and dump them directly into it from the SoundScape.'

The SoundScape hard-disk editor-recorder was used to prepare and build up the layers necessary, not only for each sequence but, in some cases, for each specific effect. The long bodied, small-headed diplodocus, for example, was a three-stage process, as the sound was envisaged to build through the body up to its mouth. Gotel says that some of the effects required a lot of layering and morphing to produce a final, single sound. Sherriff adds, 'Nearly every sound had something natural in it, although some of the roars featured an industrial element, like a car skidding, put through a 1960s Colour Sound distortion pedal.'

Some of these natural sounds occasionally included humans doing 'impressions' of some of the dinosaurs. People also filled in during some of the Foley sessions, particularly to simulate the sound of the larger creatures moving. 'On some of the location trips >
We Thought of Everything

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ABOUT TO ENJOY a limited chrome anniversary edition (pictured), KT’s DN360 is an industry standard stereo graphic equaliser combining two third-octave channels over 30 ISO centre frequencies from 25Hz to 20kHz. Equalisation scale switching gives the choice of either high slider resolution (±6dB) or normal (±12dB). The 360’s proprietary circuit designs use ‘MELT’ filters, incorporate electronically balanced inputs and LED overload indicators. A bypass function allows ready comparison between direct and equalised signals while low-cut 18dB/octave filters prevent subsonic components from overloading speakers or amplifiers.

THE KLARKTECHNIK DN-360 QUESTIONS

Q1 What anniversary is Klark Teknik celebrating this year?

Q2 What is the cut-boost on the DN360’s sliders?

Q3 What is the model number of KT’s loudspeaker processor?

CLOSING DATE: 7TH FEBRUARY 2000

ALTHOUGH THERE ARE two sets of questions to match the two prizes, you may enter either one or both sections of the competition as you see fit. All you have to do is to correctly answer the questions below and prepare to see red.

TO ENTER, you can either email your answers to ruby.competition@unmf.com, fax them (to +44 171 407 7102) or send them on a postcard to Ruby Competition, Studio Sound, Miller Freeman Entertainment, 8 Montague Close, London SE1 9UR, UK. As long as you are a registered Studio Sound reader, you may enter any number of installments of the competition as long as you do so separately (multiple entries will be collected and used as confetti during Studio Sound’s Millennium party season), and include your Unique Reader Identification Number.

...include your Unique Reader Identification Number.

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

November 1999 Studio Sound
STUDIO SOUND'S 40th BIRTHDAY celebration continues with two further star prizes: a classic Drawmer DS201 dual gate and a Klark Teknik DN-360 stereo graphic EQ. In common with the other prizes in this series, these are custom editions of current models finished in ruby red livery. In every remaining issue of the magazine until the end of the year, you will have the opportunity to win two items from the Studio Sound Ruby series listed below. Drawmer's DS210 is possibly the most familiar sight in a recording studio — having transformed the gate from what had been a simple on-off device into a musical tool. The 201 was the first gate to offer frequency-conscious operation, and this and its key filters, comprehensive envelope control and fast attack time readily gained it 'industry standard' status throughout the world. Little of its design has changed over the years, and designer Ivor Drawmer claims it sells as well now as it did in the early 1980s.

THE DRAWMER DS201 QUESTIONS

Q1 When was the DS210 introduced?

Q2 What is the nature of the DS201's filters?

Q3 What was Drawmer's first digital dynamics processor?

Ongoing thanks are due to all those who have so readily contributed equipment, time and advice in the preparation of this competition.
These voltages should be checked on a regular basis and aligned according to the service manual.

MKI A800s suffered from intermittent wow and flutter. Normal causes for such wow and flutter are nearly always either capstan motor problems or misalignments of the tape tension settings. However, many engineers reported that replacing the capstan motor and realigning the tape tension had little effect. After investigation, Studer found that the cause of this problem was mechanical wear on the potentiometer contained within the tape tension sensor. If a steady tape tension is maintained for a length of time, a flat spot appears on the carbon track of the potentiometer, and incorrect voltages are sent back through the operating system causing the tape tension sensor to read unstable tape tension values. To establish whether or not a machine is suffering from this problem, play a 1kHz tone from the machine and place your fingers gently on the base of the tape tension sensor. As you hear the wow and flutter you should simultaneously feel a very small vibration coming from the tape tension sensor indicating that there is a high chance the machine is suffering from this problem.

Studer's solution is to replace the old style potentiometer (index 58.99.0110) with a contactless Hall effect potentiometer—a conversion kit is still available from Studer for Mk I/I owners (Index 21.180.149.00).

Be aware that there are different alignments required for A800 Mk I and A800 Mk II III. (See Service Manual under the headings 455 and 457 indicating the spooling motor controller. 1.180.455.xx, resp. 1.180.457.xx.)

Fig. 3 shows the potentiometer in circuit as a part of the tape tension sensor PCB 1.180.145.11, (diagram ST 101/480). To increase the reaction time of the spooling motor, the Mk I spooling motor, power unit 1.180.500.xx has been replaced by the Mk II version 1.180.501.xx. Due to the faster motor reactions resulting transients caused an earlier failure of the power transistors (especially the one of the negative supply).

In 1991, Studer came up with a modification kit 1.180.093.00 for the 1.180.501.82 power stage, which contains first all stronger power transistor and an additional power bypass circuit to overcome this problem. For earlier versions (1.180.501.00 / 81) it is recommend that the whole power stage be exchanged. The upgraded power units should have the index 83. If a machine has the index 1.180.501.83 already, then it has been modified previously.

Fig. 2: Test points and trimmer potentiometers on switching stabiliser

<head for MkII/III. Record and reproduce heads in the A800 MkI are different from those on later models. The compound that makes up the head is much softer. For the MkII onwards, a new type of head was developed and the index number changed from 1.316.xxx.xx to 1.317.xxx.xx.

Be aware that heads that lose high frequencies may be relapped. However, once the core material is worn out, the head needs to be replaced. Heads with core material 1.316.xxx.xx may be easily replaced by 1.317.xxx.xx. For improved bass frequency response at 30ips, Studer offers a modification instruction. Details of all these can be obtained from Studer agents.

There are many electrical calibrations for the A800, all of which can be found in the service manual. However one important calibration that is often overlooked is the voltage stabiliser 1.180.465.xx or 1.180.466.xx. This PCB contains most of the voltage regulators for the machine, a deviation of 100mV on the 12V supply rail can cause a noticeable change in the tape tension, which may result in deterioration of the tape travel.
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In the year since Studio Sound looked last the recordable CD market, there has been a sea-change in the progress of do-it-yourself publishing and copying. Tim Frost puts it down to new drives, media and printers.

Duplication CD-Rs is still not everyone’s favourite occupation, with cassette still winning many votes for the easiest short-run medium. But CD-R is becoming continually more accessible, as all the costs surrounding recordable CD have tumbled and the technology gets more rugged. Drive prices that started at £300 (UK) at the end of 1998 have now been halved. Blank media prices are down to a single Euro a piece, and the computing power needed to do the job properly continues to halve in price and double in power on a yearly basis.

What hasn’t changed, however, is the need to have professional hardware and software to write the first master copy of a disc from the original tapes or files—the front end of the master-tocd process.

Where these low-cost drives from LG, Mitsumi, Ricoh and even HP, Philips and Yamaha, work better than ever, they are designed primarily for the computer user who may be using it for IT applications and then also to copy tracks from existing CDs. The point here is a simple one—that consumer products are designed for consumer users. So while the programs such as JustAudio, CD-Creator or HyCD offer a simple route to copy from CDs and LPs, they do not offer the flexibility and accuracy in terms of setting levels or track start points that a Sonic Solutions level of software can offer.

Also it should be self-evident that while some of these consumer packages also offer built-in hiss and scratch reduction—these are hardly up to the demands of commercial mastering.

There was a concern that as prices continue to drop and the desktop computing power increases to the point that it can bring bullet-proof CD-R creation to masses, that anyone—including the artists—will be able to create their own CDs ready for publishing. But the divide between real professional use systems and consumer packages remains as wide as ever. The studio packages offer more control and flexibility, and the consumer systems go for ease of use, with single-settings and uncalibrated sliders.

This applies with a vengeance to the difference between the stand-alone audio CD writers. Units such as the HHB CDR850+, Marantz CDR630/CDR640, Tascam CD-RW5000 or the Fostex CD200 are still absolute requirements for professional use, offering pro-I-O and high-quality sample-rate conversion. The domestic recorders (mostly based around the Philips unit) are good examples of what can be done to bring new technology to the consumer. But their feature sets, such as simple noise reduction, auto-silence detect to separate LP tracks and, of course their requirement to use audio-only CDs, make them less appropriate for professional use.

Things are also changing with the discs themselves. Although still commonly referred to as gold discs, CD-Rs using gold for their internal reflective surface are disappearing. With gold at many times the price of silver, it is hardly surprising that disc manufacturers have worked hard to find a way of improving the performance of silver alloys to coat the discs. There has been no single major breakthrough, but manufacturers have fine-tuned silver alloys and the chemistry of the dyes so that the discs have the right reflectivity and do not suffer degradation from the corrosive effects of the dye.

The research has also led to discs being able to work with a wider range of write speeds. In the early days, discs...
had to be fine-tuned to work specifically at 1x or 2x or 4x write speeds—a bit like having a tape that could record at only 7.5ips or 15ips. Now this has changed. Firstly, the dye and disc design offers a much wider window for write speeds—they can cope with wider range of exposure times to the drive’s laser. Also the discs carry with them pre-written information on the best write strategy for that particular piece of media. Modern writers can read that data and change the way they work to guarantee the best write interface between disc and drive.

This general up-rating of the media has meant that the myths surrounding the superiority of either ‘blue’, ‘green’ or ‘gold’ discs have all but disappeared, as in general most media works on most writers and at most write speeds.

Disc quality is still an issue, especially with a wide range of media process with a 2-fold gap between the cheapest unbranded and the most expensive ‘pro audio’ branded discs. The issue of quality is not as easily defined as a question of whether it works or not. Even the cheapest discs will usually write. The difference is likely to be in their error rates, longevity and the disc’s ability to play on less-than-perfect CD drives. If the blank disc is marginal because of wider tolerance windows used in low cost manufacturing, then as the disc deteriorates over time— as they will all do— then they are already that bit closer to becoming unreadable. And the same applies to their use on older or cheap players that may not be able to cope with marginal discs. The higher error rates will mean that the error correction on the player has to work harder, inevitably leading to degraded sonic performance. This leads to the fairly obvious conclusions which is either to use the higher quality discs all the time, or use cheap discs for immediate-use, mid-quality copies, and high-quality discs for quality demos, archive and mastering.

These developments in drive electronics and PC technology have taken the unreliability out of CD-R writing. Two years ago, getting perfect copies—just transferring finished masters from a CD or hard disk— could not be achieved with any guarantee of success. Data bottlenecks within the PC-based internal architecture—the infamous buffer underruns— conspired to make CD copying a very hit-or-miss affair.

The massive increase in power and memory of the PC has turned a process that stretched to computer to its limits, to one that it handles transparently. The ability to handle streaming data is now fully implemented in the latest generations of PC CPUs. With 128MB of memory and 10GB hard disks now standard, there are no memory limitations for the copying process and the availability of low-cost SCSI links ensures that anyone serious about burning discs can get the data to the drive reliably.

This all bodes well for duplication systems, as the technology has also dropped so dramatically in price. While it costs more for the case, the power supply, the robotics and the labour to put it all together, the price drop in the components themselves has had a big effect on the pricing of systems. This is especially true of the larger multi-drive systems where the cost of individual CD-R burners are the most significant part of the package.

Developments in printing have also become more apparent over the year. More units are coming with a printer, so that the system produces finished copied and printed discs. As the technology to write discs has become standard, it is now time to look at the quality of presentation of the disc.

So where to next? As well as being seen more like standard studio equipment, tower and automated duplicators are now adding CD-RW capability. CD-RW is becoming more popular as temporary storage media—the discs are getting cheaper—around 8 Euro each—and most CD writers are also adding CD-RW capability. Apart from the higher cost, the two problems with using CD-RW as a replacement for CD-R are the fact that CD-RW generally writes at half the speed of CD-R and that few CD-Audio players can actually read the discs.

DVD is the new area of interest for duplication. With DVD-Audio ‘just around the corner’, demos and trials will need to be cut in-house using DVD-R. Unlike CD, where the transfer from tape to disc should automatically produce a perfectly performing disc, the complex navigation and additional features of DVD-Audio and DVD-Video mean that the only bullet-proof way of making sure the disc is going to work is by making one and playing it. The DVD-R format has just been upgraded to 4.7GB capacity and while this is still limited for multilayer DVD-Video discs, it will be ideal for most early DVD-Audio releases which are likely to be on single layer 4.7GB DVD-S discs. Luckily for the audio industry that the cost of DVD-R writers (sole proprietor, Pioneer) has just dropped from Euro 15k to under Euro 5k. And it is only a matter of time before the price takes another major hike downwards and they start getting slated in stand-alone duplicators so that studios can meet that rush for DVD-Audio demos.
Premastering audio for DVD Video releases involves a number of disciplines. DVD Video premastering engineer Andy Day talks Simon Croft through the process

There is no doubt that DVD Video is taking off in a big way. Even the first generation players are affordable and—despite the capital investment required to make them—so are the discs. Perhaps more importantly, there is a good selection of titles available and the catalogue is growing quickly. With film companies putting out their back catalogue as well as new releases, a new breed of premastering facility has sprung up to cope with the demand.

One of the first in Europe is based at Anvil Post Production, a UK facility with a 48-year track record of working on films including the Star Wars trilogy, Superman and Aliens, as well as up-market television programmes. Open since April of this year, Anvil's DVD premastering room is run by Andy Day, who specified all the equipment. Day previously spent about eight years at Dolby Laboratories and before that was at SSL, so his technical grounding in Dolby Digital and multichannel mixing is substantial. He worked as a professional mix engineer before joining SSL and spent a year freelancing on television dubbing sessions, working on a large film library restoration project and acting as a consultant on surround-capable rooms, before joining Anvil.

Day says he 'had this list of equipment bubbling away for months' before striking a deal with Anvil, so the final specification came together very quickly. So did commissioning; the equipment was supplied by GearBox and installed by Anvil's in-house team in just three weeks. Anvil bought the equipment from GearBox because the company already supplied all its hire requirements and was prepared to loan alternatives for any items not available for delivery within deadline. Timing was actually very important: while the room was under construction, Day was already preparing the first job from a truck in the car park.

The heart of the setup is a Digidesign Pro Tools system and a Yamaha 02R desk. External monitor switching is handled by a Magtrax MusicBox system from Aspen Media, while routing duties are taken care of by a DAIS from Audio Service. In contrast to the wall of THX speakers found in Anvil's main dubbing theatres, monitoring is provided by close-field PMC units. The room also has CEDAR De-Grackle and De-Hiss units for restoration, plus multitrack recorders including a Tascam DA-88, which come into play at the start and end of a project. The other vital requirement is the Dolby Digital encoder-decoder. Day either supplies the mastering house with pre-encoded material, or will supply a list of compression and dialogue normalisation levels for the AC-3 encoder—depending on the client's requirement. Precisely how the raw material comes into Anvil depends on a number of factors, including the age of the film and whether it has been remastered in the recent past. In an ideal world, there will be a 5.1 M&E available.

'The source elements in a simple case will be the 5.1 film Dolby Digital print master,' Day confirms. 'Because of the way films are mixed, they will all be in reeds Reel 1, Reel 2, Reel 3, and so on. Those isolated sections will all work when they are in sync with the picture.'

Day says that the actual format of this material could be 35mm mag, Tascam DA-88, Akai MO, or any of the current generation of digital dubbers. 'But it's always six audio channels—it's a case of confirming that to the picture because there will be a different number of frames on the DVD picture source.' Even if the source material is pristine, Day has to compensate for the transition from a theatrical release to a home theatre, hence his use of close-field monitoring to produce an idealised domestic environment.

On an older title, there may only be a mono soundtrack as source material. Day notes: 'In an ideal world, you would want to create a multichannel soundtrack. Obviously, that's not something you can do very easily.' There are two related complications here. One is that the mono soundtrack will be the dialogue and the M&E premixed. The >

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recreate the M&E. In those instances, you have a complete new piece of audio which you are combining with the mono track so you have less chance of phasing.'

In the end, there has to be a balance between the available budget and the expectations of the consumer. 'Most people who are listening just using the stereo outputs of their DVD player, really are not going to be that worried whether it's mono or 5.1,' says Day. The users with the full-blownd Dolby Digital 5.1 decoders, will obviously benefit if they are watching a feature in 5.1. Just having the sound come out of the centre would seem a little strange.'

Removing optical noise from older material is an obvious application for the CEDAR modules. Day also uses the DInR plug-in for Pro Tools. But film companies are also adding value to DVD Video releases by adding 'The Making of...:' films and trailers.

'In the case of the trailer, you may find that it only exists as an LT-R, yet the main feature is in 5.1,' Day explains. 'So the client may want you to match the audio quality. You may find that the trailer comes off a second-generation Beta and the audio quality is not good, compared to the main feature. From a restoration point of view, there is a real requirement to quality match those two, just so the disc is more rounded,' he continues. 'Some of the discs out at the moment, you can tell someone has taken all the bits and thought, "we'll whack this lot on there". There's not much attention paid to the overall consistency.'

A subject which concerns the pre-mastering process is which audio formats to put on the disc. This is a slightly confusing area. 'You don't have to have a 5.1 soundtrack,' says Day. 'You do have to put a Dolby Digital soundtrack on there, but that can be a stereo Dolby Digital soundtrack—a 2.0. The thing about the Dolby Digital system is that within every player, there's a downmix chip,' he explains. 'If you give it a 5.1 soundtrack but you are only using the stereo outputs of your player, the downmix chip will take those 5.1 channels and downmix them into stereo format. You don't have to worry about creating a separate stereo mix.'

Day emphasises that this 'folding down' can be auditioned and controlled
Studio Sound November 1999

during premastering, it’s not just an automatic reduction.

The other thing is that it’s ProLogic [Dolby Surround] compatible, to the point that if you then take your stereo output and feed it into your ProLogic decoder, which you might have built into your TV set, it sounds very similar to something that would have been made from an L-Rt track.

Because this article is about DVD Video, discussion about the DVD ROM and DVD Audio formats really belong somewhere else. But it is interesting to note that Day regards super-resolution DVD audio-only formats as unlikely to produce audible benefits in the domestic listening environment. Also, he does not believe that the compression used in Dolby Digital leads to a significant degradation of the source.

‘If you were to be able to listen to a Tascam DA-88 against a Dolby Digital encoded signal, then you might hear differences but to be honest I don’t think you will,’ says Day. ‘The coding’s very good. Hundreds of people have listened to this over the years, either in its film form or DVD.’

In fact, music video is where Day and Anvil director Alan Snelling—who has enviable film music recording credits—see massive potential for DVD Video. I think that’s something that has not been exploited at all,’ says Snelling. ‘I think on the music scene, not many people have heard it properly yet. And it’s not just for rock and pop, even the classical concerts—the Three Tenors or something—if you put that into 5.1, it would be fantastic. It would be an event.’

‘There are music titles out there, but they tend to be pull-offs from existing VHS releases,’ says Day. ‘I think the big fear for record companies is “Oh my God, we’ve got to go and remix it in 5.1”. That would be an ideal situation but I think there is a realistic mid-way that gives you something beyond a stereo soundtrack but at a reasonable cost.’

Above:The machine room.
Right: Andy Day in the post studio.

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THE HISTORY OF COMPUTERS in audio is intertwined with the development of digital audio. The best way to keep an analysis both logical and chronological, is to use a timeline to analyse where we were, where we are and where we are going in computer audio.

During the first half of the 20th century, the development of computers in audio—or, if you prefer, audio-in or on computers—demonstrates how many technological developments in this century began during World War II. While many digital computer audio experts cite development work in the late sixties and early seventies as the logical beginning of both developmental tracts, there was fledging research by the Bell Telephone Labs into the forties on possible techniques to compress and otherwise change the analogue telephone signal to allow more conversations to be placed into finite copper line resources. The most impressive application of changes in the analogue transmission of audio vis-a-vis telecommunications circuits in World War II, was the levitation of valve electronic racks for frequency inversion of telephone signals used between Winston Churchill and Franklin Roosevelt intended to thwart the Nazi Abwehr. Designed by Bell Telephone Labs and manufactured by Mother Bell’s Western Electric subsidiary and installed in London in the basement of the Selfridge’s Department store, the system connected what appeared to be a lavatory site within the subterranean Cabinet War Rooms in Whitehall with the White House in Washington, DC.

This was the tip of the iceberg in secret military research continued after World War II into the basics of digital transmission—even if that methodology sometimes carried a different name. Certainly, the highly secret and still operative US-UK ABC Treaty in the late forties mandated a broad range of cooperation and research into intercepting and transmitting various forms of audio communications—including the fledging US NSA (National Security Agency) and the British GCHQ (Government Code and Cipher School). The British establishment (whose name was a solenoid designed to hide the real work at the factory), had been instrumental in developing and using the first practical form of digital computer, Alan Turing’s Bombe to break the Nazis Enigma code—guaranteeing the Allied victory in World War II.

Another landmark to be considered on the path to digital and computer audio is Bell Labs’ invention of the transistor in 1947. The transistor quickly replaced the valve with a device that could act as a switch and at much higher speeds and reliability. Once industry learned how to combine first hundreds, then thousands, then tens and hundreds of thousands of transistors within a single chip, the further development of the digital computer was a sure thing. Curiously, the circuits contained in Churchill’s frequency inverter that was essentially the size of a large London pub, would soon be housed in a transistor chip that would fit quite...
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Between 1950 and 1960, the pioneering work done on high fidelity recording of audio on magnetic tape by Jack Mullin and the Ampex Corporation based on work done by AEG Telefunken, was to leave the realm of time delaying the like of the Bing Crosby Radio Show on the ABC radio network (so that Bing would have more time to play golf), and provide a medium to record data for the US military. Mullin, using modified Ampex audio recorders, equipped the naval missile research facility at Point Mugu, and at the Air Forces Rosamond Dry Lake-Edwards Air Force Base (both in Southern California), for data capture and telemetry at the beginning of the fifties.

Military research and development into digitising audio for radio transmission and reception continues, in the search for reliable and non-interceptable communications means.

The first significant paper on digital audio was published in the July 1961 *Journal of the Audio Engineering Society* by Schroeder & Logan on ‘Colourless Artificial Reverberation’. In fact, successful commercial research in digital audio (as opposed to military) during this period was focused on replacing mechanical delay (metal plates), recorder delay (magnetic tape loops) and acoustic delay (long chambers with speakers and microphones) with flawless solid-state reverberation. Computers, through continuing to advance and shrink in size, were still physically much too large to even be considered for studio use, hampered by slow system buses, processor fields crippled by a minimal number of bits processed per cycle and slow cyclic rates that could not accommodate audio sampling in any size package that would be smaller than the recording studio building itself. Most important, the inherently small memory then available for computing functions, typically using storage cathode ray tubes or magnetically coated drums, was too slow and woefully inadequate for the task of storing recorded audio signals—with only the high-speed behemoth data-tape drives providing any capacity at all. In addition to memory concerns, price and size eliminated any possibility of computer audio usage.

The emergence of video tape recorders using moving heads as well as the movement of the tape to reach the speeds necessary to capture a video signal, provided a suitable platform for research into possibly capturing digital audio signals in a similar way. Companies such as SM, Ampex, Decca, Denon, Mitsubishi, Philips, Sony and others were looking for a reliable and viable way to store digital audio.

During the early seventies, computer manipulation of digital audio began to take a different course from the pure development of digital audio. Digital audio development would continue through this decade, evolving into the standards agreements and physical technology of the CD at the beginning of the eighties. Digital recording of audio on tape became a reality through the seventies with the advent of professional recorders by SM, Decca-London, Denon, Mitsubishi, Sony, Studer and others—some for proprietary use and some for commercial sale.

In an important parallel development, with much relevance to future computer audio developments, Dr Thomas Stockham created a digital-audio recording and editing system (Soundstream) using readily available computer storage tools. This was upgraded by the end of the seventies to the, then new, large, cumbersome, expensive computer hard disk drives and Stockham's digital editing systems were used successfully by many if not all of the major labels.

Those who were curious about controlling, equalising and otherwise manipulating audio via the computer began to recognise how components such as the, then fledgling, microprocessors could take advantage of evolving digital developments in musical instrument connection and control and of companion

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developments in using computers for musical synthesis, synchronisation, sequencing and shaping.

In the late seventies, the combination of digital audio, higher sampling rates and quantisation technologies made possible a number of firsts: musical synthesisers followed quickly by actual computer keyboard control, storage and manipulation machines. Albeit these machines operated at a very minimal rate of storage (by today’s standards) due to high per-byte storage costs at that time. These machines were actually the first digital-audio workstations, through a stretch of the definitions used today is necessary to include them in that category. They each developed with proprietary sampling rates, quantisation, microprocessors, bit rates for chip input and output, clock rates, system bus speeds, memory devices, capacity, and so on. Although there were flegling interfaces for digital audio exchange, these machines essentially could only exchange work with similar machines from the same manager. One of the several successful incarnations of these early digital-computer audio devices was developed in 1975 as the Synclavier at Dartmouth College, New Hampshire, by Sydney Alonso, who specialised in developing the hardware designs, and Jon Appleton, the musical advisor to the project and Cameron Jones, who acted as the software consultant. The Synclavier emerged as a complete, self-contained digital music and effects synthesiser using an internal matrix of integrated circuits and microprocessors. A year later the New England Digital Corporation was formed, to develop, sell, and service the Synclavier. The device was quickly upgraded with a well-engineered push-button key system, with later models having an added video display unit and a full computer type QWERTY keyboard and even provision for a hard disk drive.

More or less simultaneously, in Australia, a company called Fairlight (named after the hydrofoil ferry that traversed the waterfront of Sydney harbour) was formed by Peter Vogel, an electronics designer, and Kim Ryrie, a synthesiser enthusiast. Vogel and Ryrie created there first product by merging designs of their own creation with a dual processor system using Motorola products that they licensed. Reworking what it had, Fairlight produced the QASAR M8. The QASAR was an 8-voice synthesiser, with a keyboard and a 2ft by 2ft by 4ft control and computer processing unit. To quote Fairlight’s own description of the device, ‘it was huge, it was heavy, it was complex, it was costly, and it was unsuitable for mass production and servicing’. Moreover, it did not sound particularly good.

However, later in the seventies, by upgrading the technology and software design, and using libraries of real sounds stored on 8-inch 500 kilobytes floppy disks containing 22 sounds each, the device emerged as a landmark machine for recording musicians to add a level of musical and sound-effect whimsy to their recordings. The upgraded CMI had a musical keypad, a video screen with an interactive light pen, an additional QWERTY keyboard, and a much smaller physical stature with a 1ft by 2ft by 3ft CPU. The machine opened technology doors never before available to studio engineers and-or artists. Limited only by its 200 or so kilobytes of RAM, a variable sampling rate maxing out at about 24kHz to a maximum frequency response slightly above 10kHz, its 8-bit dual processors (the Motorola 6800) and its 8-voice polyphony, the CMI was hailed for its capacity to emulate real instruments and was called an orchestra-in-a-box.

In 1979, Peter Vogel, demonstrating his system to Peter Gabriel during a recording session in England, excited Gabriel who then purchased a complete system at its, then, price of about $24,000 (US). Artists Thomas Dolby, Herbie Hancock, Joni Mitchell, Alan Parsons, Todd Rundgren, and Stevie Wonder soon followed. It might be fair to say that electronic composer Jan Hammer, who also bought the system, was influenced by the technologies in the Fairlight box in creating much of the stereo soundtracks for the landmark network TV shows from Michael Mann—Miami Vice and Crime Story.

Lexicon, another company instrumental in pushing the envelope of digital-computer audio technology, was founded by MIT Professor Dr Francis Lee who had developed a digital delay unit for medical heart monitoring. With engineer Chuck Bagnaschi, he started up the company as American Data Sciences in 1969. The name was changed to Lexicon in 1971, when it appeared that there would be a market for digital technology in language instruction. Based on suggestions from Barry Blesser, at the time a teaching assistant to Lee at MIT, an audio signal was sent through the system. The result was a 100ms digital audio delay line, impressive enough to attract the interest of Steven Tenner at Gotham Audio. Lexicon prospered and continued to research the applications of digital audio for the studio user and ultimately released its OPUS digital-audio workstation in 1988. Over ten years, OPUS users continue to be fully supported and remain profitable in their studio production businesses.

At the end of the seventies computer audio technology was evolving, but the crucial developments to using digital audio on computer would be the evolution of real standards for interconnection with the computer of various electronic music components necessary for the use of a studio-in-a-box, and the advancement in chip and moving magnetic surface memory capacity to allow virtually manipulative (RAM) storage and permanent storage (hard disk drive) of digital audio.

The first half of the eighties was the period of the most innovative developments in digital tools, which we still use today as the basis of computerised audio. First among these was...
The landmark agreement for a standard of communications between an entire family of musical products and computers. Known as MIDI, or Musical Instrument Digital Interface, the protocol grew out of a paper on the Universal Synthesiser Interface (USI) presented to the AES in October of 1981 by Sequential Circuits (whose innovative staff later migrated to electronic music giants Korg and Yamaha).

By October of 1983, meetings between virtually all of the manufacturers of digital music electronics had produced the landmark MIDI 1.0 Detailed Specification. Since that time, other functions have been added such as MIDI Time Code in 1987. But MIDI has become so universal that no one wants to completely rewrite the specs due to the threat of making obsolete literally hundreds of thousands of items using the interface.

The interface itself, a serial data protocol sending one bit of pulsed information at a time (31.250 times per second) onto a 5V line, has remained a valid interface for computers (as well as for electronic musical instruments and devices) since its inception, because the chosen MIDI time increment of 31.250 is mathematically correct as a factor (1/8) of 1MHz or as multiples of multi-Megahertz clocking rates used by personal computers. However, MIDI is asynchronous itself or if you prefer not clock-rate dependent on external sources and does not have to wait for external commands to fire or execute.

The dawn of the personal computer from the laboratories of a team of IBM engineers working in Florida in 1981 and the simultaneous birth of the digital operating system (DOS) that IBM ordered from Microsoft, meant that...
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from that time on a standardised and recognisable permanent architecture and technological apparatus for small computers was now at hand. Begun initially with the Intel 8086 family of processors, without hard disks (which were still too expensive to use), using 5-inch floppy disks which really were floppy, and as little as 64 kilobytes of random access memory—these early PCs were memorable for what they would become to the world of digital audio on computer than for what they were at the time. During the same time frame, computers from Atari, Commodore, Texas Instruments and others were evolving, some with significant audio and multimedia capabilities superior to the PC at the time—only to fall victim in one way or another to the growth and power of the PC in later years (with some hanging on into the late 1990s).

The release of the Macintosh computer by the Apple Computer company in 1984 catapulted Apple from being maker of the computer most used in schools to the originator of the heralded platform eventually most coveted for digital audio, video, multimedia and desktop publishing usage in the eighties and into the nineties. Where PCs were limited in their audio usage by the lack of first—sound cards—and then of quality sound cards with acceptable A-D and D-A converters, Macs had sound capabilities built into their mother boards. Where early PCs had an inferior quality hard drive installed with little or no option of adding another hard drive, Macs could connect up to seven devices to and pioneered the usage of their, then, advanced SCSI (Small Computer System Interface) buses for the easy (most of time) interconnection of hard drives and other peripherals. With SCSI, the external devices were added to a series daisy chain of components—the user merely having to connect with large multipin SCSI connectors one to another.

One of the companies that prospered by centring on the Macintosh Computer platform for computer-digital audio recording and editing is Digidesign. The company established itself as one of the world's premiere digital platform-software combinations for professional postproduction and multimedia. Pro Tools, the company's digital audio production software would eventually be recognised as having more users in

---

**Ash Howes**

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<studios and post facilities than any other system, and today the company claims more users than that of all other workstations combined.>

Founded in the mid-eighties by Peter Gotcher and Evan Brooks, the company began as a project to raise money for their band by programming drum chips. A series of successes led to the offering of the Sound Tools software in 1989 to the recording musician and recording studio trade. In effect, they had created the first tapeless recording studio! The company which eventually merged with Avid in 1995 was proclaim sales of more than 150,000 systems.

Other notable players include AMS Neve, DAIR, Augin, Soundscape, Studio Audio and Video's SADiE, and Akai.

No development has been more important to the growth of successful non-linear editing and recording systems on personal computing platforms than the evolved AV-data disk and associated transfer circuitry. Successfully capturing AV data on a hardisk drive requires altogether different performance characteristics than those used for daily computer usage. To successfully capture AV data, long strings of data going on and going off the drive in question must do so without any failure, corruption or other interruption!

All hard drives in general have risen in capacity so that early 1990 Macintosh computers like the LC series, which were bundled with 40Mb or 80Mb hard drives, can be contrasted with late 1990 iMacs sporting 13Gb hard drives—a difference of 325 times in capacity. But in addition to growing larger and faster, all modern high-capacity hardisk drives have had to become smarter and especially so high capacity AV drives.

Every hard drive in use on every computer must have the ability to perform a thermal calibration process. When a hard drive is switched on, the drive head and the drive operating temperatures elevate, minute changes in the intimate relationship between the location of the data heads and record and the data platter surfaces itself occur. Through the calibration process, the drive can always find data in the specific location where it is expected, ensuring optimal performance and data integrity. But, non-AV drives frequently employ a calibration cycle on a regular schedule dictated by the drive's controller, regardless of what the computer and the drive happen to be doing. This is not generally a problem with a computer data application, since the entry string will be cached. But for AV recording, a hard drive entering a thermal calibration cycle could miss essential audio recording data. So an AV drive will perform thermal calibration only when it is not actively recording audio information. Similarly, AV drives are set up to cache or internally buffer data requests for longer consecutive audio data strings rather than the short strings found in most computer data transactions.

Personal computers on the Windows system became much more competitive with the Macintosh for audio applications during this period. The operating system itself (Windows) became much more user and audio friendly. The advent of the Intel Pentium family of microprocessors saw many more audio hookups or features added. Sound boards became much more fidelity oriented with quality A/D and D/A adaptors used and many of the better sound boards supported SCSI peripheral interconnection as well. That begat PC studio audio recording software from developers such as Cakewalk and Steinberg to name a few—one whose products had the same range of features seen on audio recording software for the Macintosh!

All computers entered a period of true 16-bit functionality and even 32-bit processing became a reality. The coming of the next Millennium promises to see full 32-bit and even 64-bit processing as the norm. New desktop machines from Apple (the G4), promise computing power on the par of that offered by Cray super computers the size of family houses just a few years before. The challenge for computer audio digital audio will be for developers on both platforms (PC and Macintosh) to rewrite and expand their software to take advantage of the new power and functionality available in the next century.
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Tricks on the Golf Course

Originally a sporting gesture, then the establishment of status, now a fiercely fought competition, the Ryder Cup has brought golf a long way.

Kevin Hilton joins the club

WINSTON CHURCHILL described it as 'an ineffectual attempt to direct an uncontrollable sphere into an inaccessible hole with instruments ill-adapted for the purpose.' Robin Williams once said it was the only time a white man could dress like a black pimp and not look bad. 'The silly trousers have gone, leaving the focus purely on the game of golf, one of the most lucrative in modern sport—a bold statement given the amount of money flying around in other sports.

The game's standing is reinforced by the amount of television coverage it receives and the amount of money broadcasters are prepared to pay for the rights to cover the big tournaments. Prime among these—and one of the highlights of the PGA (Professional Golfers' Association) Tour—is the Ryder Cup.

Where the other contests pit individuals against individuals, the Ryder Cup introduces a strong dash of nationalism into the proceedings, as the 12 highest scoring American golfers of the season take on the 12 highest scoring Europeans. The match is made up of a series of singles, foursomes and fours Nationals, played over three days.

This year's tournament, the 33rd, has become notorious for the perceived gamesmanship and poor sportsmanship of the US team. There is, however, a history of such behaviour. The 1991 Cup has gone down in records as 'The War by the Shore', while the 1997 competition in Valderrama ended with the European team charging onto the last hole in a similar way to this year's climax.

Such scenes were probably far from the mind of Samuel Ryder, the British seed merchant who unofficially financed tournaments between America and Britain in the early twenties, before eventually donating the trophy that bears his name in 1927. The tournament has been played every two years since, the venue alternating across the Atlantic. Until 1971, the Cup was contested only between the USA and the UK, Ireland teamed up with the British from 1973, with a Pan-European team facing the Americans from 1979 onwards.

The Ryder Cup has turned golf into a national team sport in the same way as football or rugby. Competition has always been fierce, with each team talk themselves up even before a single spiked shoe touches the green. At the start of a Cup challenge during the 1940s, US captain Ben Hogan introduced his players simply by saying, 'Ladies and gentlemen, the best golfers in the world.' America has dominated the competition since its inception, but Europe won in both 1995 and 1997, the feeling was that this year, more than any other, honour was at stake.

This was reflected in the amount of television coverage. Golf has long been a mainstay of TV sport, despite many observers pointing out its unsuitability for such treatment. The 33rd Ryder Cup saw the tournament back in America, held at the Brookline Country Club in Massachusetts over the weekend of >

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< the 24th to 26th September. The host broadcaster was NBC, but UK rights holder BSkyB decided to do more than just take the world feed and add basic continuity for its own output.

The satellite broadcaster has drawn criticism for its aggressive bidding to secure the big sporting events. But these criticisms have been tempered by admiration for the station's willingness to try something different, as shown by its coverage of the Cricket World Cup earlier in the year. Even before the tournament began, Sky Sports launched a daily, hour-long 'countdown' starting on 20th September. Thursday's opening ceremony was carried live, building up for the real meat of the occasion on Friday, Saturday and Sunday.

Graphics made the big difference to the Cricket World Cup. The Ryder was taken further by employing the technology that everyone who works in or watches television is talking about—interactivity. On Sky Sports Extra, through SkyDigital (currently available, it is claimed, to 1.2 million subscribers), it was possible to access three different views of the match by selecting a preference on screen. This offered either NBC's US coverage, the score card or Sky's European coverage.

By selecting two of the options, it was possible to have picture-in-picture, with the game in progress as a small insert into the main score card. Given the strong national feeling on both sides, the ability to flick between NBC and BSkyB provided an insight into how the two continents viewed the proceedings.

Sky built its own nine-floor studio at Brookline, embellishing the basic host feed with 20 cameras of its own, a 75-strong crew and roaming reporters (including one-time Ryder Cup player Ronan Rafferty). Presenter David Livingston linked the live coverage and talked to the inevitable line-up of pundits. These included former golfers Tony Jacklin and Peter Oosterhuis, and, somewhat incongruously, Sky Sports' hyperactive football analyst Andy Gray.

The European version only was available on Sky Box Office and was free to all Sky subscribers, although this initially caused friction with UK digital terrestrial broadcaster ONdigital, which felt its customers were being denied access to the coverage. The situation was later settled in what the Sky Sports press office described as an 'amicable' fashion. Sky Sports 2 screened three hours of highlights a day, while all cable companies were offered the transmissions.

Interactive coverage was overseen by Piers Croton, executive producer at Sky Sports. A similar approach had been taken with the broadcaster's treatment of the UEFA Cup football championship. 'It's the only way to watch something like golf,' comments Croton, 'and it's a convenient tool. Interactivity provides an environment that pulls together the two different coverages and gives the viewer instant access to the score card, which is constantly updated.'

On switching to Sky Box Office, the viewer was greeted by a 'invitation logo'. Pressing this launched the application, presenting the main menu: red button for US coverage, green for the score board and yellow for European coverage. Another feature was the 'sports ticker', a news-flash style graphic that carried the latest news of the tournament along the bottom of the picture.

While Sky handled its own continuity and commentary, the European version of the coverage was produced for the broadcaster by a third-party production company. Some of the cameras used were shared with NBC, but not all, meaning that Sky could get the pictures it wanted. Although Sky is known for its use of surround sound on sports events, the soundtrack in this case was straight stereo, something probably due
to the huge logistical task of getting signals back from five transmission sites.

BSkyB contracted NTL to provide broadcast transmission facilities for the Ryder Cup. Previously best known as the UK's commercial TV and radio transmission and satellite uplink provider, NTL is now positioning itself as a provider of cable, multimedia and Internet services. This contract follows on from Sky using the NTL/Williams Vyvx transatlantic fibre connection service for coverage of the US PGA Tournament during August. It marked a departure from using satellite uplinks, which had been the usual way to distribute sports events of this kind.

The Brookline feeds were carried on the AG-1 transatlantic fibre connection, using SDH technology. Full stream MPEG2 compression was employed, running at 12.5Mbps/s to provide broadcast-quality pictures. Steve Holebrook, NTL's director of satellite and media services, commented, 'For such a high-profile event, it is imperative that all aspects of the tournament, including its broadcast, run smoothly. We knew how important this transmission was to BSkyB and the AG-1 service is perfect for such events. It is protected with diverse fibres giving optimum reliability and the picture quality of the 12.5Mbps premium service is outstanding.'

Interactivity was combined with the latest graphics, to produce an individual look. Using Pineapplehead software, the Sky course reader mapped all the greens and fairways at Brookline. These were then computer-generated, enabling graphics designers to trace the flight of a ball within an instant of it being struck. A Sky Sports spokesman said of the transmissions: 'We had more coverage and more feeds to more people than before. This was the biggest ever presentation of the Ryder Cup and we couldn't have dreamed up doing it, particularly the three-on-one interactivity, two years ago.'

Europe probably dreamed of repeating its win of two years ago, but it was, controversially, not to be. The US—boasting a combination of audacious talent (Tiger Woods) and steady reliability (Mark O'Meara)—clawed their way back from being several games down at the start of the tournament. When Jason Leonard sunk a heroic putt at the 17th hole, his teammates invaded the green to congratulate him, even though Europe still had a shot to go.

European team captain Mark James was incensed, saying that his team, particularly Colin Montgomerie, had been insulted and harassed from the start of the tournament. While denying this, the Americans agreed that matters were getting out of hand. This is probably the kind of interactivity that golf does not need.
Introducing a brand new concept to any market is usually difficult. Zenon Schoeppe travels to the origin of modern civilisation to trace the country's origin of mastering.

Established two years ago as the only non-CD plant-affiliated mastering studio in Greece, Athens Mastering has an agenda. It has slowly been the Greek record production industry to believe that mastering is the last stage of the production process and not the first stage of the replication process.

According to studio MD Themis Zafiropoulos he is dealing with a client base that is simply not used to regarding mastering as a legitimate independent entity or prepared to pay for it. 'Our customers have been used to paying half the price of what we ask to do the job,' he explains, 'and there's an argument that says we could never have a pricing structure high enough to justify the high standard of work that we provide.'

On the face of it, this situation bodes badly for long-term profitability but Zafiropoulos points out that these are early days and that they are not just attempting to break into an existing market so much as create the market from scratch. Besides there are higher issues at stake here and the battle is beginning to be won.

'We are in our second year and we are already well known, and artists and producers are now attempting to persuade the record companies to pay more for mastering,' he asserts. 'The situation was unavoidable in the first year because we're talking about the Greek market here. They didn't even know what mastering was and had the attitude of why should they be obliged to do it. For all those years they have managed without it using mastering that the CD plants had provided for them. These have included a mastering service within the package of getting the CD replicating job. However, that's not real mastering it's PQ encoding, perhaps some compression.'

'This has to extend,' say chief mastering engineer Chris Hatzistamou beyond basic levelling and EQing because there is a creative element in what we do. In Greece the effect has been as if they have just discovered America. What you have to remember that there is no history of mastering in this country, it wasn't done with vinyl and it hasn't been done with CD. What they did was transfer and there was no sympathetic approach towards different styles of recording. As a consequence it is difficult to find people in Greece with experience in this area or an appreciation of it because there is no culture of mastering.'

The collaboration of Hatzistamou and Zafiropoulos led to the establishment of Athens Mastering as a 2-room facility with a feel, look and level of equipment that is comfortably international in standard and posture. Acoustic design was by Christian Marcurt of...
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TASCAM a whole world of recording
task of educating his potential market, Hatzistamou is positive about prospects and has enormous faith in his country’s ability to get its unique musical output and contribution up to what he describes as ‘international standards’. ‘The talent is there, Athens Mastering is attempting to put it and the country’s industry more visibly on the map.

“We had to do what we’ve done here, we have pride in our work and we enjoy our work,” he states. ‘There is a phrase that says that it is better to feel bad about something that you are doing than to feel regret about something you are not doing. It has gone well and we believe we can also offer an exceptional service to clients from outside Greece. We’re on the very edge of Europe here but I believe that our high standards and our reasonable pricing makes it a viable alternative for those who care about the process of mastering. People like to go to LA to master their recordings in a relaxed and sunny environment and of course we can offer the same attractions and a good deal more.’

It’s true that producers will experiment with different recording studios for a project but will usually trust only one mastering engineer to complete the process. The building of that sort of trust can take a long time but I believe we will get there. At present clients here to work with me but our goal is for Athens Mastering to have a reputation as a name in mastering excellence on the international circuit,” he states.

“The independence of the Greek market to mastering means that when I do get a new client in I feel a need to play the magician for them. It’s almost as if they think once you’ve done your magic everything will be absolutely glorious. Of course, it’s not like that but the pressure is on to make sure they get a good result and a good first experience for their money and I find that very stressful at times,” adds Hatzistamou. ‘You shouldn’t have to prove anything as long as everyone is happy but I have to control the urge to prove that I can be a magician. In mastering it is really important to be able to sit in your chair, listen to the tape and be able to say that it is very good as it is or that it just needs a little bit of something, and take the money. With clients new to mastering I feel I need to do something dramatic to justify taking the money.’

However, I am aware that this is a cultural thing and that attitudes will improve and I am already seeing that with clients who used to sit in on the mastering from the beginning but now trust me enough to get on it and simply come in towards the end. That’s a big difference, that’s progress and it makes me feel better because we have succeeded in creating an acceptance of the concept of mastering from the very beginning.’

Despite the peculiarities of the Greek market and the seemingly Herculean
It was more than five years ago that rigorous independent testing of 7 leading DAT tape brands led the respected pro audio journal Studio Sound to summarise: 'If it were my valuable recordings at risk, I know which tape I'd choose: HHB.' Since that time, we've applied precisely the same exacting standards of development, manufacturing and testing to create a complete range of digital recording media that sets the highest possible standards for performance and archival security across all major formats. HHB Advanced Media Products. Don't trust your valuable recordings to anything less.

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Neil Karsh is the Vice President of Audio Services for New York Media Group. Recently, Karsh selected LSR monitoring systems for two of his Manhattan facilities, Lower East Side and East Side Audio.

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David Kershenbaum is a Grammy Award winner who has been on the cutting-edge of music production for decades. His discography is a remarkable ‘who’s who’ of popular recording.

“Speakers have always been important to me and I’ve had many systems that I have really loved. When Kevin Smith told me about LSRs, I tried them and was amazed at the accurate, flat response and how the mixes translated so well compared to other monitoring systems. Now we’re using them to track our new records and we’ll use them to mix, as well.”
UNRAVELLING THE HISTORY of Bearsville Studios is a tricky business. Had its founder and mentor Albert Grossman been alive today, it would be simple matter of placing a thousand anecdotes in chronological order. But his death in 1986 robbed the music business of one of its pioneers, not to mention characters. Instead, my history lesson is left to Albert’s widow, Sally, co-studio managers Patti Merklin and Chris Laidlaw and English-born producer John Holbrook. Between them they know what went on, even if it takes a little discussion to agree the ‘official’ sequence of events. Yet somehow the uncertainty is in keeping with Bearsville’s curious history as even the studio’s neighbours remain in doubt as to which buildings actually house the recording areas after the making of nearly 30 years of rock history.

‘I’m really glad you came,’ says Sally as the group resolves another chapter of the story. ‘We would never have had this conversation without you.’

The studio complex is in upstate New York; a collection of rustic buildings spread over several acres of woodland sufficiently close to and far from the madness of Manhattan to prompt Sally Grossman to comment, ‘I always think that this studio may not have survived if it had been in a big city. Being out here has allowed us to be unique.’

The story began back in 1969 or 1970, Sally’s not absolutely sure. It was Albert’s intention that two studios serve the acts comprising his revolutionary artist management operation, that included Bob Dylan, The Band, Janis Joplin and Carly Simon among many others—although Dylan had left the stable before the studio was running. The studio concept grew from the fact that many of Grossman’s artists were already living on the Bearsville site and their regular trips to New York’s major studios seemed laborious and unnecessary. Later there was to be the Bearsville Records label too. ‘It was some incredible thing that brought everybody together,’ Sally muses. ‘Everybody was living here. I remember the first board meeting and someone saying, “I’m sure within six months we’ll have it all sorted out...” It was never going to be that simple.’

Of the four studios now in operation, it was Studio B that first ran tape on Todd Rundgren’s Something Anything, The Band’s Cabaret, Van Morrison’s Street Choir and the Jagger-Richards production of Peter Tosh’s Medicine Man among others. The now exposed masonry was then damped with acoustic treatment and there was a customised Quad Eight console where the present Ultimate-equipped SSL 4064 G+ sits.

‘Studio B has an interesting history in consoles,’ John Holbrook confirms. ‘the Quad Eight was a custom-built console with input strips built by Larry Dalstrom. The console had 20 inputs...’

Studio Sound November 1999
and at some point later on in the seventies it was extensively modified by Ted Rothstein with parametric equalisers and plasma metering. It made a few famous records, but I found that I could get a far better transient response by bypassing the board altogether. It was an interesting beast, but it was trying to make a silk purse out of a sow's ear and so the studio went into service sometime around 1981 and it was first used by Holbrook who had joined the studio staff full time in 1976 having spent three years in and around it. The studio now houses the 40-input custom Neve 8088 make notorious for its part in recording Quadrophenia at The Who's Ramport Street studio, but Holbrook remembers its first days using a spare tape machine and a small Allen & Heath Syncon A console.

'The recording area of Studio B was the John Storyk contribution,' he continues. 'It was a rustic look with lots of wood. It originally had these satin-covered pillows on the walls, in lurid colours. Remember, this is the mid seventies. It was a very strange mixture. At some point it was decided to put an isolation booth in and in the early eighties the walls were revised. Again Storyk was involved. He put sliding panels in to give it some variability, but it's still fairly dead.'

Studio A followed B into service. Studio A had become a store room for equipment,' Recounts Holbrook. 'All Todd's video equipment was there until they built a new building to house it. So I said that it would be great to get all the other equipment out and finish the studio.

'Albert said he'd look at it later and you did it kinda surreptitiously... Sally suggests.

'No. Albert knew about it,' Holbrook replies. 'He had to agree to get his gear out, but it was a makeshift thing to start with.'

A converted 100-year-old barn provided the third studio, appropriately called The Barn and originally a joint venture between Albert Grossman, The Band's Robbie Robertson and Garth Hudson.

'The Turtle Creek Barn was a rehearsal room, but we could hook the Location Recorders remote truck up to it if needed to use it as a studio,' Holbrook explains. 'Somebody put a Peavey AMR console in there around 1993 and people started cutting tracks in there. It was really a way of getting monitoring—people would use their own mic preamps to go to tape and the Peavey was an economical way of monitoring. The control room was added in about 1995 with an API desk. Dave Matthews was in at the time.'

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Below, left to right: John Holbrook, Patti Merklin with Sally Grossman

More recently, Todd Rundgren's departure availed Bearsville of his Neotek Elite-equipped Utopia studio as Bearsville’s budget fourth room.

There is a story that Albert and John Taplan, who was the road manager for The Band at the time, ran into each other at the Woodstock festival,’ Sally offers.

'John said, 'Here’s my Princeton buddy, John Storyk. Albert’s building this studio...'. I remember walking out the lines of the building with the surveyor before it went up.

As a result, both studios A and B were originally designed by John Storyk, but George Augspurger modified Studio B’s control room in 1983. 'The room was reshaped to take new Urei 813A monitors because Storyk had originally done this quadraphonic monitoring system,' Holbrook remembers. 'It was a weird-shaped room because it was originally built as an asymmetrical wedge shape. When the SSL went in and Augspurger came in they blew out the back wall to get more space.

Holbrook himself designed the API Legacy-equipped control room in the Barn as well as being responsible for the blankets that, although originally intended to be a temporary measure, still serve as acoustic treatment on the walls of Studio A. In addition to this, the original project was another joint venture, this time between Grossman and Ampex.

'Although it wasn’t conceived to be a commercial studio, Ampex decided in 1969 or something that they wanted to go into the record business, Sally recalls. 'They made tape, why shouldn’t they make records? But then after a year or so they decided they didn’t want to be in the record business, and so Albert started a joint venture with Warner Brothers. My guess is that basically enabled Albert to put the building up.'

'Pretty much it was set up for the people who were associated with Albert who were working here,' adds Holbrook. 'It wasn’t what you’d call outside clients. Then, in the mid seventies, the major proportion of stuff was for the Bearsville Records label because that was in full swing—people like Paul Butterfield, Jesse Winchester, and Todd. But as the seventies wore on, Bearsville Records was tapering off and so more outside clients like the Isley Brothers.'

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Below, left to right: Co-studio managers, Chris Laidlaw and Patti Merklin with producer John Holbrook

<came in.> ‘There were many characters who came and went through the seventies and there was a concerted effort made to bring in outside business toward the end of the seventies—the Isleys, Peter Tosh, the Rolling Stones came in to rehearse. Bearsville Records was still going at that point with a bunch of artists. ‘I’d hear these stories at the house,’ Sally recalls of the studio’s early heydays. ‘There’d be these near collisions on Spear Road with the Isleys going down and Todd on his way up. That was the vibe in those days, when you didn’t get stopped on the road and you’d be out late.’

In spite of its brevity, the arrangement with Ampex saw a number of records—including Jesse Winchester’s debut—come out on the Ampex label. But it was the Bearsville label itself that put the studios on the map and Todd Rundgren’s mainstream success that gave the impression it was his own label. ‘Even today I can be in and someone will see the logo and assume that it’s Todd’s studio,’ Sally confirms. ‘because he was so strongly associated with the studio. But the Isleys made four records here, and those are records that are being sampled today.’

Todd didn’t do all his work at Bearsville,’ adds Holbrook. ‘First he had Secret Sound in New York and then he bought a house in Mink Hollow and put a studio in there. So most of his own stuff was done there, but he used Bearsville for Patti Smith and Meat Loaf—other productions that came in—major portions of But out of Hell, for instance, were done in Studio B.’

As a result of these and other less tangible events, Bearsville now commands a new roster of clients including the likes of rappers Nas, Will Smith and Slick Rick, and English eccentrics William Orbit and Tricky making it more commercially successful than ever before. Bridging the two eras artists such as Muddy Waters, Paul Butterfield, The Pretenders, REM, Natalie Merchant, Pat Metheny and Rush helped build the studio’s reputation—and its mystique. Latterly Bearsville has extended its appeal to the urban R&B now keeping most of Manhattan’s finest studios in business. The thread that holds everything together is the unique atmosphere the...
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The studio has acquired. Built originally on the reputation of Albert Grossman and his first artists, furthered by the records the studio has produced, and garnished with incidents such as the time the police pulled Eddie Offord over on suspicion of driving while under the influence only to have him walk the proverbial straight line on his hands, the studio's place in history is unlike any other. Throughout the mayhem, Bearsville's studios have consistently attracted a disparate collection of artists, each room offering something equally special and equally unique.

'I think certain rooms get certain reputations,' comments Merkin. 'People know Studio A as a drum room and they love the Barn because it's unconventional.' Certainly the pull of Studio A's drum sound was strong enough to get Rush out of their native Canada for the first time.

'I remember the first time REM came in 1987 or 1988 or whatever,' Sally continues. 'I immediately connected with Michael Stipe and their manager at the time, but they were in awe of Bearsville. And they did parts of three albums here. I'm not sure what it stands for, but people feel that they can concentrate here. They know it's a good studio, they know they won't get dozens of people coming in to their session...'

'Steve Lillywhite likes it because it's private,' Chris Laidlaw agrees, 'there aren't strange staff members walking around the corridor. It's a great retreat, there are no distractions, the equipment's great.'

'Cassandra Wilson hugged me because the control room hadn't interfered with the vibe she remembered from before,' Sally enthuses. 'She had been so worried that the studio would feel different from the last time she was here. John Bon Jovi comes up and really feels he's touching that other base — whatever it means to him, I don't know. People feel comfortable here, they make it their own.'

'If you want to get a bit cosmic about it, the vibrations that have been through those walls over the years carry quite a bit of weight in the music business,' concludes Holbrook.

Then there is the project studio—that semidomestic facility that was years off its conception when Albert Grossman >

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Since then there has been talk of making structural changes to Studio B. 'There's been some talk about blowing the back wall out and adding some iso booths,' Laidlaw elaborates. 'We could do with getting some natural light in there, but it's not very high on the priority list.'

'I wanted to brighten it up both visually and acoustically,' Holbrook adds. 'For an average small studio it has a very high ceiling and it's lacking in air and reflections. In The Barn we could add a few more channels to the API that would be easy enough. But if it ain't broke, don't fix it, as they say.'

There's also been discussion about adding Pro Tools systems to bring Bearsville into the digital age.

'We've had ongoing discussions about Pro Tools but...' begins Holbrook. 'At the moment people bring it in if they need it but it doesn't seem that we need it unless we get a regular client who wants it.'

'We keep track of what people bring in with them and respond accordingly,' Merkin concurs.

'With the past in the bag and the future comfortably under review, there's obviously still plenty of life in the Bear. And the studio's constantly changing list of clients, the mix of old blood and new hands who have explored Bearsville with me speaks well for the future. 'I'm so excited with the balance between the artists we used to attract and the new artists that are finding out about us,' Sally enthuses as we head lunch to visit one of Bearsville's other attractions. Albert Grossman's Bearsville Theatre. 'I don't think we've ever really pushed Studio B, she confides, and to tell you the truth I don't think we've fulfilled our potential with the SSL yet.'
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US: The year analogue died

Touting the floor of this year's New York AES Convention invited an eerie feeling of impending change writes Dan Daley

IT IS OFTEN only in retrospect that the significance of certain events can be seen. From Archimedes' 'Eureka' and the import of steam power, 200 years later, through Edison's fumbling with wax cylinders, the knock-on implications of many epiphanies in human achievement are not felt for some time after their first appearance or discovery. And I think it may be the case that the recently concluded AES Convention in New York at the end of September will be a turning point in the evolution of how music is made. It was, I believe, the show at which the end of analogue was collectively, tacitly, acknowledged.

There were no announcements to this effect, only subtle clues and hints. But those were myriad and to this eye, definitive. Take the rejection of the mod-mod-cripped Fletcher, owner of Mercury Audio in Boston and long the ultimate poster boy for analogue technology. Upon being told about a particularly interesting new piece of analogue gear, Fletcher wavered and said, 'I used to care, adding that since the advent of 24 bit digital audio, the advantages that analogue preferred were diminishing rapidly. He sounded almost as though he were in recovery, relieved that the denouement of analogue had been conquered.

Then there were the standard-heirs of analogue itself, the tape manufacturers. Neither Quantum nor EMTec BASF offered any new significant music recording products. Instead, BASF's main thrust was to emphasise its self-appointed leadership position in how to maintain music from older analogue tapes and to stress its charitable efforts in rescuing Louis Armstrong's legacy from sticky-shed syndrome. When it comes to analogue, the tape companies are beginning to power down the machinery, shut off the lights and close the door behind them.

They'll certainly have less hardware upon which to base sales of their software. Studer made a point of showing off the last production line model of its 24-track, deeks, and Otari has already ceased making the MTR-90—the Saturday Night Special of multitracks.

Then there were the demographic clues. I'm not aware that AES tracks any statistics regarding the age of its constituency, but it was apparent from the show floor that it is getting a lot younger. This may be a personal perception, but it's inevitable that the pool of technical talent renew itself, and this year's show may have been a critical turning point in the course of demography. Certainly, the flocks of eager, sometimes Stepford-like students from Full Sail looked a lot younger this year, and they were joined by a variety of colours from MI and other aggressively marketed academic entities. The fact that the audio schools are growing at such a fast clip tells us not only is new and differently abled blood necessary for the technology of music today, but the very fact that it is school-aged people who are increasingly mantling the trenched reflects the fact that analogue's time has come. According to a recent university study here, over half of college students don't know who John Lennon was. For a generation for whom the Beatles are no longer a vital force, who were born after the last man had left the moon, who cannot recall a time without email, of what use is analogue? For them, it's the equivalent of Edison's wax cylinder, and of equal importance to Edison's own conception of it quaint and faintly amusing.

There is even a place to inter analogue now. The Museum of Modern Art has opened its doors in New York, and had at the show an exhibit dating back to some of the early wire recorders. Speaking of equivalents, this is like analogue having gone out and purchased its own burial plot. (Something overlooking Manhattan, please.)

Each of the many new hard-disc recording systems debuted at the show was watermarked in the very ears that will admit that they took part in the tests and are happy with 4C's decision to select a system for DVD-Audio without testing it at 192/24 bit level evaluation which led to MusiCode being 'selected' and thus allowing work to 'bring the benefits of DVD-Audio to the listening public'. In other Aris literature MusiCode is described as 'inaudible'. So when Aris refers to 'inaudibility', is this in the context of 72-bit payloading, with DVD-Audio's 192kHz/24-bit operation?

Aris says its own tests 'confirm inaudibility' but the company admits it 'has not internally evaluated at 192kHz/24 and cannot say for sure whether 4C tested at 192/24. Aris also says it cannot say what

Europe: A CopyCode copy?

The evidence suggesting that DVD watermarking is following the ill-fated path of CopyCode mount a claim that the music industry's choice of MusiCode was looking like a rerun of the CopyCode farce.

Aris, the SDMI (Secure Digital Music Initiative) and 4C Entity (the DVD Forum's Copy Protection Technical Working Group, of IBM, Intel, Matsushita-Panasonic and Toshiba) seem blind to the fact that the issue is not about whether they are confident that a watermark should not spoil the sound of DVD-Audio, it is about what tests it will perform to measure those in the hi-fi and studio worlds who are not unreasonably afraid that altering the waveform of a music signal may create artefacts that are stripped bare by DVD-Audio's 192kHz/24-bit working.

The DVD-Video standard already embraces 96kHz/24-bit. The main selling point of DVD-Audio (and Super Audio CD) is that the sampling rate can be raised to 192kHz, with MLP (Meridian Lossless Packing) to extend uncompressed audio bandwidth to 100kHz. Technics is promoting its new range of hi-fi as 100kHz-ready. Out of eleven watermarking systems originally proposed, only four were fully tested by the SDMI-4C. Some of the others were withdrawn because their proponents were unhappy with the test procedures. The IFPI had previously tested them only with CD-quality material and never released the results. I have twice now asked the SDMI for more information on how the 4C tests were carried out. The first answer I got speaks for itself.

Said SDMI spokeswoman Joy Pedulla: 'The major label studios and independent mastering houses employ expert listeners who have developed the skill of being able to detect subtle differences in audio with regard to quality impairment. Those were the people used for evaluating the SDMI audio watermark. An expert listener or 'golden ear' typically develops his or her skill through years of repeated critical listening experiences. There is not a formal recognition process and we don't maintain a list of these people. I hope that this information is useful.'

Small wonder that the IFPI in London is believed to be talking to one of the UK music copyright bodies, PPL (Phonographic Performance Ltd), about fresh independent tests.

MusiCode comes in a variety of flavours, the most basic being a 1-bit flag that signals the need for an SDMI compliance upgrade, with a 3-bit system that adds copy-once or copy-none control signals, right up to a 72-bit (or even bigger) payload which carries the kind of copyright information the music industry wants (such as ISRC coded identification of the music). In its August announcement, Aris said the 4C Entity was selecting MusiCode for 'copy protection in DVD Audio' and 'applauded' 4C for 'its intensive and thorough

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Studio has ear or otherwise with No except 4C names (a number of participants knows houses), and companies and sourcing. In evaluation was ‘intensive and thorough’? Ares knows been around ory entists toiling away low analogue, in New York and Tokyo profiling to suit us. So say a prayer for analogue, its memory is burned indelibly into the everyday language of music recording. Just as in America we still we’re ‘dialling’ the phone even though dial phones haven’t been around for over 20 years, it is analogue that we honour every time we say ‘roll tape’, even if we’re pushing the buttons on a hard-disc recorder.

MusCode payload 4C tested. If Ares knows so little about 4C’s tests, how can Ares say with such certainty that 4C’s evaluation was ‘intensive and thorough’? I again asked the SDMI for information and was promised a fuller response. After two weeks I had still heard nothing. In the meantime an authoritative source close to 4C has given some useful background which reinforces assertions made at the AES in New York. 4C worked with the Big Five music companies and it was the music companies who selected the material to be embedded, the test locations (LA, NY, Nashville, with both the music companies’ own studios and outside mastering houses), and the actual participants. 4C knows the names of the studios and the number of participants in each location (a total of about 25 to 30). But 4C does not know the names of the participants. Only the music companies know these names and the tests were conducted under non-disclosure agreements. All the 4C listening tests were done at 90/24, except for one master that was 88/24. No test results from 192kHz were included in the analysis. The hunt continues for golden ears who will admit that they took part in the tests and are happy with 4C’s decision to select a system for DVD-Audio without testing it at 192/24.

‘I do not know a single person, golden ear or otherwise who has heard it, let alone has a good opinion’ says Bob Ludwig. No hi-fi reviewers were involved either. This is CopyCode all over again.

Everything and nothing

This year’s IBC found itself facing a variety of difficult choices—reflecting the future of broadcasting itself writes Kevin Hilton

IBC WAS HOT THIS YEAR. That is to say that it was uncomfortably and unseasonably warm, not that it was a scorching exhibition. There was much to see during IBC 99, perhaps too much, which resulted in the situation of content being swamped by other, evolving technologies. The IBC has been positioning itself as a multimedia event for the past few years and such new technologies were everywhere: video streaming, Internet broadcasting and interactivity. Despite this apparent plethora of goodies, there was a strange lack of movement. There was very little in the way of hard news and, underneath all the potential, there were few new products. Convergence—the buzz word that surfaced at least four years back—could be seen in solid form, but even now the evolving products appear premature. There was a severe lack of what could be termed traditional broadcasting product. The new hybrids were there, even though the means to make it all work—the transmission distribution infrastructure—has yet to be fully implemented, particularly the promise of wide-band networks.

This gave the impression that both the broadcasting business and the IBC itself are in a state of flux. The potential is there—how quickly broadcasters and network service providers adapt them is the key to how broadcasting will develop into the new millennium. Usually, only cynical commentators would come out and say such things. If those behind the products or the services do entertain such doubts, they would either keep them to themselves or only express them in private.

So it was unusual and refreshing for the CEO of a major company to address a press conference and admit that not only is the market bewildered right now, but that his organisation had not been doing well in recent times. Roger Henderson of Chyron told a selection of the press corps that like many in our industry, our results over the last 18 months have not been spectacular. He added that many of the fundamental elements of the business had to be rethought, largely because of one thing: ‘The transition to digital has presented many opportunities—but for opportunities read confusion and risk’. The computing and telecoms newcomers are used to the new way of approaching a problem, broadcasting has had to deal with a variety of changes within a short space of time, not all of which have come off or survived. Henderson summed up this uncertainty by observing, ‘The question is where to put the money’. There is the thought that in five years time (or less), a programme-content creator can publish material directly to a server, which is leaving many of us struggling to determine a business model.

This last comment proves that the language of broadcast is changing too. Content distribution-transmission, asset management and content creation mean everything and nothing at the same time, because they are too all-encompassing and buzz-worthy. Content creation is perhaps the worst, regardless of the fact that it is the title of a new stable companion to Studio Sound. Digital has reduced everything to mere data, so it is no longer a programme, it is content. Analogue never decharacterised material, although it was fundamentally just electrical impulses.

One of the promises of digital is extra content, or added value. IBC proved that high definition still fails to move the Europeans, but multimedia and interactivity is the thing. Hence the proliferation of video streaming and interactive demos. Companies like Liberate and Omniflash demonstrated control over the whole chain from production to delivery, adding on distance learning, e-commerce and email. But many of these appear merely optional extras, nothing Stuart Collingwood of Liberate hinted at when he told me, ‘Free surfing of the Internet on TV is not the killer app’.

Collingwood’s point is that there should be a range of integrated features from email to stream grabs to chat to direct HTML access. While perhaps not a killer app, surround sound, a genuine added value, continued to languish in the twilight world of IBC. Dolby promoted its links with German satellite channel ProSieben Media, which is broadcasting movies in 5.1, and dreamt of Dolby E. After heated exchanges with audio manufacturers last year, the IBC management committee attempted to give this area a higher profile. This included a mini-conference on surround sound organised by the Institute of Broadcast Sound. It appeared well attended, but one of the speakers observed with a wry smile that much of it was like preaching to the Converted.

Change is evident, which has implications for broadcasters and the organisations of the IBC. Just as its rival, the IFS in Montreux, is rethinking its position, so the IBC will have to decide whether it is a broadcasting show with multimedia input or a multimedia exhibition with a bit of broadcasting. The two may have converged but for the time being, they are still different disciplines and it is important to remember that.
Time for a recone

Living with a new generation of studio equipment means learning more than the obvious lessons. Ben Duncan conducts life extension classes for studio electronics

Recently, various manufacturers and suppliers of different sorts of Rolls-Royce league recording studio gear have had to deal with customers who have been taken aback when equipment has exhibited mass failures. A shocking development unless the fact that this has occurred only after over ten or more years of continuous use is taken into account. The fact is that while most moving parts wear quickly or at least in a way that the eye or ear can readily detect but most electronic parts aren’t explicitly ‘moving’ yet they do still wear. This applies to everything in the studio that’s electronic—from backline amps through digital wonder processors to PCs. It’s well known that some electronic parts wear because they can do so quickly such that it can be hard not to notice. These include valves—where rapid wear is widely associated with the better sounding instrument amps (like pre-1960 Fenders) and then to a lesser extent switches, relays and control pots.

For the rest of electronics there are three crucial differences. Firstly, the wear is usually slower. Then there is the fact that wear often is not detectable—you can’t open a chip and say ‘this has done 99,000 hours and will probably die soon’. Finally, wear varies widely. Houralone don’t determine ‘closeness to expiry’. Frequent turning on and off can be more stressful to some electronic parts as continuous running is to others. For others, a ten-fold difference in lifespan is down to the fact that someone bothered to clean the cooling fan filters monthly. Conversely then, the use of common parts under shared conditions with shared powering, namely inside mix consoles, means that when parts reach their endpoint, it all happens pretty much at once. Heat is always the principal accelerator. Anything that runs hot is going to decay sooner rather than later.

Thus operators with breakdown contingency funds should be wary, that whereas smooth running for many years of particular equipment could be a sign of good design and careful use, the equipment must eventually enter rapid decay mode, and with increasing likelihood and severity, with passing time. Good news is that most reputable high-end analogue audio equipment can be ‘reconed’, and that this could work out less costly than buying new equipment—which, one gradually discovers, is not automatically better. Reconditioned gear will likely sound better than it did, better than ‘new’. That’s because the change in sonics due to part decay is so gradual you wouldn’t notice the wear. Revamped gear lives long enough to gain a patina. And no one has to learn anything new—the last thing many creative people need today.

A new category of fast-wearing electronics that should be worrying the studio world, is anything made with surface-mount parts. A typical camcorder costing $1k-3k contains over 100 electrolytic capacitors. It is not unusual for most of these to expire within two years, and repair is then utterly uneconomical—even if the failed capacitors’ chemicals have not leached out and also eaten the PCB away. Some products made by pro-audio manufacturers are already at this disposable level. The message it sends is cynical. The next step is when last year’s equipment no longer exists. In consumerland, expiry chips would already seem to be programmed to operate after the guarantee period has elapsed. At that stage, and after today’s vintage gear has died from lack of spares, the recording industry will have handed over to large makers the power to decide what equipment will be available for use this year.

Reconditioning worn equipment needs careful thought. As further breakdown is anathema in recording, the surest way is to replace everything that will have worn significantly, but this must be balanced against leaving well alone. The following example of a servicing cycle for all kinds of electronics that runs continuously, while never mentioned in most maker’s manuals, will make sense to those who have practised the recovery of high-end analogue gear, above and beyond the mundane maintenance of the connectors, pots and switches. The first recone should be at about five to seven years. All electrolytic capacitors that run warm should be replaced. Also, strictly, all the bipolar transistors and any chips and certain other parts which run hot. There are signs for this. At about 14 years or double the 1st interval, the above is repeated. Also, other semiconductors which run at all hot should be changed. At about 21 years, or triple the first interval, this would be repeated. In addition, all the soldered joints would be remade to be sure. At about 28 years, the 7-year and 14-year intervals are repeated. By now, certain other parts are best changed. This procedure is much less applicable to digital gear. Not much of today’s digital electronics will be repairable after 14 years use or storage—even if you would want to. Not unless someone has stockpiled the specialist chips in a freezer, and has the tools to remake multilayer PCBs, and the soldering gear for yesterday’s chip carriers. Along with surface mounted miracles, digital technology is frankly had for ecology—or recreating the sound of the nineties in thirty years time.
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