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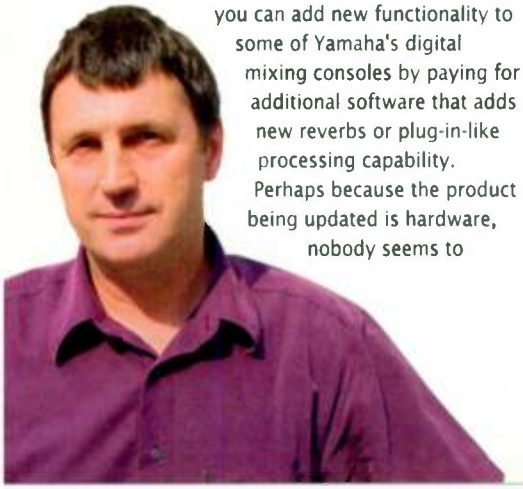
The Soft Sell

While many project-studio owners are now happy to do much of their recording work on computers, there still seems to be a degree of resentment at having to pay for software updates — you only have to check out some of the comments which followed the upgrade to Apple's *Logic 7* on the *SOS* Web forum to be convinced of that! And yet, when similar upgrades can be carried out on our studio *hardware* and they significantly expand what we can do with it, there seem to be far fewer complaints. Take computers themselves — there's a well-established culture of people swapping out motherboards and upgrading soundcards on the PC platform, and in recent years Mac owners have started to get in on the action too, with processor upgrades, flashier graphics cards and faster drives. Computer fairs, where all this stuff can be bought and traded, continue to be popular too. But perhaps it's not surprising. After all, what would you rather have — something that can be updated for a sensible cost, or something that gradually becomes obsolete at no extra charge?

And it's not just computers. You can add new sounds to some hardware synths by fitting optional expander cards, and this very ability to pay for new functionality is one reason why instruments like the old Roland JV1080 and 2080 are still so widely used today. Then there are the digital hardware products that have chargeable OS updates to add to their functionality. For example, simply by visiting the Line 6 web site and parting with a little cash, you can add some very nice new amp and effects models to your Pod XT guitar recording preamp, which more than justify the relatively small cost involved. Similarly, as Hugh Robjohns explained last month, you can add new functionality to some of Yamaha's digital mixing consoles by paying for additional software that adds new reverbs or plug-in-like processing capability. Perhaps because the product being updated is hardware, nobody seems to question the fact that you have to pay out to improve it. But with software, it's often a different story.



Why is this? There seems to be a significant sector of the computer-using community that expects free software updates as some kind of inherent human right, even though somebody clearly has to do a lot of work to create those new versions, and someone has to pay that person's wages. In fact, there are still those totally illogical people who think that all software should be free, no matter how much effort has been put into creating it — but that's an argument for another day! I'm sure those people wouldn't want to leave their front doors open with a 'Help Yourself To All My Stuff' sign outside, yet that seems to be exactly what they expect from software companies.

If you think it's frustrating having to update your plug-ins because a new OS has changed the rules, think how frustrating it must be for a software company to have to dedicate time and effort to jumping through all the new hoops when they could be using their R&D effort to develop new products. And of course some updates *are* still made available free of charge — but when it comes to a major update that adds new features as opposed to basic bug-fixes, I can't see why paying for it is in any way unreasonable. After all, in hardware terms, paying for a software upgrade is like being able to take your old synth back to the shop, pay out a small percentage of the original cost and then walk away with the latest model in exchange. And by registering as a paid-up user of a new software version, you're renewing your right to support, which is like getting a new warranty for your aging hardware, and certainly a lot more impressive than those extended hardware warranties that cost a significant proportion of the original price and still manage to expire two weeks before the item in question erupts in a puff of smoke! If only you could do all of that with hardware, I wouldn't have a cupboard full of old rack boxes and laughably out-of-date computers sitting around doing nothing!

Paul White *Editor In Chief*

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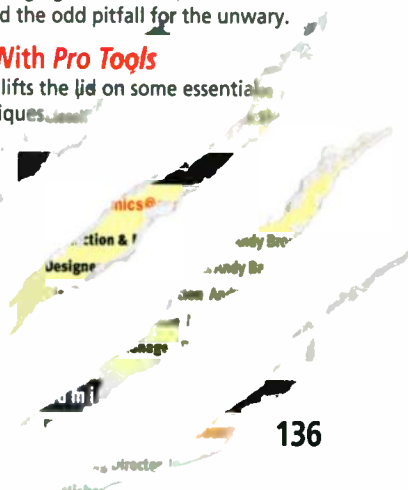

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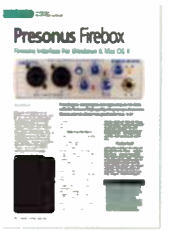

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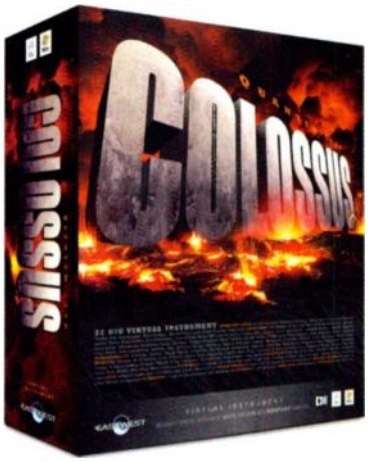

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Hump and grind

Two new effects plug-ins from Camel Audio

Camel Audio describe their new *Camel Space* plug-in as a 'rhythmic multi-effect' and we're at a loss to come up with a better description! It consists of range of simultaneous effects — reverb, delay, enhancer, flanger, auto-panner and multi-mode filter — that add up to more than the sum of their parts thanks to *Camel Space*'s 'trance gate', a 128-step sequencer which controls panning, filter cutoff and volume. Combine this with two additional independent LFOs, and the plug-in can quickly transform pads, synth lines and drum loops into dynamically evolving rhythmic textures. *Camel Space* also features an X-Y mod matrix, an intelligent randomise function and 128 presets.

Version 3 of the popular *Camel Phat* plug-in has a new look, new effects and new controls. Designed to add warmth, punch and presence to all kinds of material, but primarily drums, bass and guitar, *Camel Phat* 3 features four distortion effects, ranging from gentle warmth to full-on crunch, which can be used individually or blended together. The new version retains the unique Magic EQ section — a highly effective low-end enhancer — as well as the compressor, flanger and band-pass filter. *Camel Phat* 3 also features a multi-mode filter, two LFOs, an envelope follower, an X-Y mod matrix, an intelligent randomise function and 128 presets.

Camel Space and *Camel Phat* 3 are compatible with Windows ME, 2000 and XP and Mac OS X, operating as VST plug-ins under Windows and as VST or Audio Units plug-ins under Mac OS X. They cost £45 each or £79 for the pair direct from the Camel Audio web site, where you can also find audio examples of the plug-ins in use and download demo versions to try out for yourself.

W www.camelaudio.com

Busy B

New hardware controllers from Behringer

The Behringer B-Control range of controllers has two new members. The Nano BCN44 (pictured far right) is a compact MIDI controller with four rotary encoders, four buttons, 99 programmable presets and MIDI In and Out ports, which costs just £39. The Deejay BCD2000 (pictured right) functions both as a USB-equipped computer DJ controller and a conventional analogue DJ mixer, offering four-channel audio interfacing via 24-bit A-D/D-A converters. It features two scratch wheels, a crossfader and channel faders, a three-band kill EQ on each channel, two phono preamps and a mic preamp. There's also a full range of fixed and assignable controls, including Play/Pause, Cue and Loop buttons and four rotary encoders. It costs £125.

Behringer have also produced the C2, a small-diaphragm pencil condenser mic with pad and roll-off switches which is packaged in a matched pair with stereo bar, windscreens and case and priced at a frankly ridiculous £39. No less ridiculous is the Mini Series — eight half-rack processors costing £31 each. These include a mic preamp, a preset-based compressor, a 24-bit stereo multi-effects processor, a monitor controller, and a four-way headphone amp.

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Silicon valley

MXL introduce valve less valve mic

Marshall Electronics' latest offering under the MXL brand is the V6 'Silicon Valve' mic. The V6 is a cardioid-pattern solid-state mic with a specially designed FET amplifier which, according to Marshall, mimics the tonal characteristics of a valve mic. It has a large, one-inch diaphragm, a titanium silver body and a gold-plated grille. The mic's frequency range is quoted as 30Hz to 20kHz, with a maximum SPL figure of 130dB. And, as it isn't *actually* a valve mic, the V6 runs off standard 48V phantom power. It costs £199.

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Hit for six

Six more M Audio interfaces support *Pro Tools M-Powered*

In April, when M Audio and Digidesign surprised us all with the unveiling of *Pro Tools M-Powered*, a version of Digidesign's market-leading DAW software that works with a selection of M Audio's computer peripherals, they also hinted that the range of compatible devices would eventually be expanded. M Audio and Digidesign are clearly trying to keep us on our toes because, less than two months after the initial launch, hardware support has been extended to six further interfaces. M Audio's Firewire Solo, Firewire Audiophile and the Delta 44, 66, 1010 and 1010LT now join the Firewire 1814 and 410, Ozonic controller keyboard and interface and the Audiophile 2496 and 192 cards. This effectively means that *Pro Tools M-Powered*, which costs £239, will work with all of M Audio's Firewire interfaces, as well as all their Delta and Audiophile PCI interfaces. There's still no support for M Audio USB devices, though.

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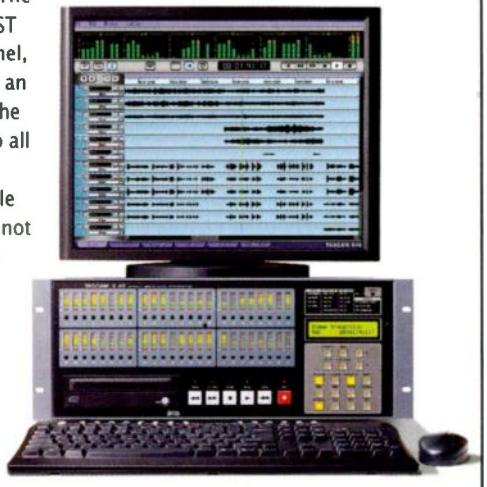
W www.maudio.co.uk

Tascam's 'X' factor

48-channel hard disk recorder launched

Tascam's new X48 Digital Audio Workstation is the latest attempt to marry the straightforward reliability of a stand-alone hard disk recorder with some of the more attractive aspects of computer-based recording systems, like plug-in hosting and editing via a graphic interface. The X48 offers 48-track recording at 24-bit/96kHz (the track count is halved at 192kHz) and is equipped with an 80GB hard drive, a DVD-RW drive and keyboard, mouse and VGA display ports. The X48 features 48-channel TDIF I/O, word clock In, Out and Thru, S/PDIF input and output, MIDI In and Out and multiple Firewire, USB and Ethernet ports as standard; two 24-channel slots allow users to add analogue, ADAT or AES-EBU expansion cards. The X48's automated 48-channel mixer features six aux sends and six stereo returns, 24 busses, 32-bit floating point resolution and four-band EQ and dynamics on every channel. The unit also allows up to four VST plug-in inserts on each channel, group or aux return. Built on an embedded Windows XP OS, the X48's GUI gives full access to all of its mixing and editing facilities. It's due to go on sale this summer; a UK price had not been fixed when we went to press, though the US list price is just under $5000.



T Tascam +44 (0)1923 438880.
F +44 (0)1923 236290.
E info@tascam.co.uk
W www.tascam.co.uk

Awal UK contacts correction

The news item in *SOS* May 2005 concerning Awal UK, a company who can help labels and musicians sell their music on-line in the iTunes Music Store, featured a now-defunct telephone number. The correct details for Awal UK are as follows:

T Awal UK +44 (0)114 279 6511 ext 3303.
E info@awal.co.uk
W www.awal.co.uk

Clash of the Titans

SE Electronics launch new mics

The latest addition to the SE Elctronics range is the Titan, a multi-pattern large-diaphragm condenser mic with, unusually, a titanium-sputtered capsule. The stated advantage of employing titanium over the more usual gold is its durablity — it's much more resistant to corrosion and damage from dust and moisture and, it's claimed, will offer consistent performance for longer. Mics with titanium capsules are few and far between in the recording world (titanium-diaphragm measurement mics are slightly more common) and the Titan, at just under £1000 including VAT, is a good deal more affordable than prominent titanium-toting studio mics like the Neumann M150 or the Sanken CU41. It also highlights SE's determination to change people's preconceptions about Chinese-made mics in terms of quality, innovation and, let's be honest, pricing. The Titan, which is covered by a two-year guarantee, is switchable between cardioid, omnidirectional, and figure-of-eight pickup patterns and is supplied in an aluminium flight case with an elastic shockmount.

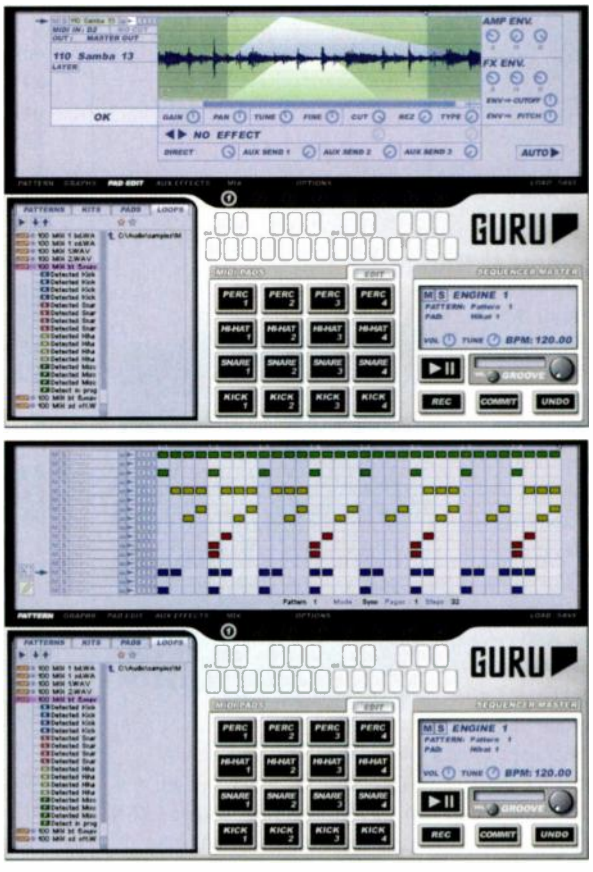
SE are also now offering stereo pairs of their SE3 small-diaphragm pencil condenser for £349. Each SE3 stereo pair is tested and matched in the factory and supplied with a flight case and a stereo mounting bar.

T Sonic Distribution +44 (0)1525 840400.
F +44 (0)1582 843901.
E sales@sonic-distribution.com
W www.sonic-distribution.com
W www.seelectronics.com

Groove *Guru*

FXpansion's virtual beatbox

The latest virtual instrument from FXpansion, producers of the *BFD* series of software drum modules, is *Guru*, an all-in-one groove-creating workstation for the studio and the stage that might be described as the closest thing to a virtual Akai MPC. *Guru*'s emphasis is on ease of use, with practically every parameter, from effects settings to sample start and end points, freely accessible via the GUI, or assignable to a MIDI controller. Each of *Guru*'s eight sound engines has a 16-track, 128-step sequencer and 16 virtual sample pads which are used to trigger samples and loops. Each pad has an insert effect slot and three aux sends, its own gain, pan, tune and resonant multi-mode filter controls, amplitude and effects envelopes and eight velocity layers. *Guru* will slice up, classify and map samples automatically and



can load WAV, AIFF and REX samples and loops, MIDI loops or complete kits, though it does come with a 2GB sample library of its own.

Guru is compatible with Windows 2000 and XP and Mac OS X. It can operate as a stand-alone instrument, as a Rewire device or as a VST, Direct X, Audio Units or RTAS plug-in. It's out now and costs £149.99.

T Sonic8 +44 (0)8701 657456.
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E sales@sonic8.com
W www.sonic8.com
W www.fxpansion.com

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Logic Pro, **Sonar** and **Tracktion** users are blessed with an abundance of fantastic virtual instruments, plug-ins, and tweakable parameters. But as these applications become more powerful, utilizing them to their fullest with a mouse and keyboard alone can be a royal pain in the rear. To truly get the most out of this software, we developed Mackie Control C4 — a professional 32-knob control surface with control protocol written by the software engineers at Cakewalk and Apple. With its 32 V-Pots and four virtual "scribble strip" displays, the Mackie Control C4 can simultaneously access and display up to 32 plug-in parameters without switching banks. And because the code was written by the software developers — not us — you're ensured of the tightest compatability and control on the market. Get the details at www.mackie.com.

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MACKIE.

Fixing a hole

An attractive solution to the problem of acoustic guitar feedback

People have been stuffing things in the soundholes of acoustic guitars to counteract feedback for almost as long as there has been electronic amplification. Usually made of solid rubber or plastic, the commercially available products do actually succeed quite well in their primary aim, but at the expense of some loss of tone and feel in the guitar. The new Lute Hole sound hole covers from The Lute Hole Company in the USA, however, offer an alternative with equally effective feedback reduction and less unwanted suppression of the instrument's voicing.

Made from a choice of solid hardwoods, Lute Hole covers feature an attractive, intricate laser-cut mesh that still allows plenty of sound to pass through and yet obscures the hole sufficiently to raise the feedback threshold. Three different anti-feedback grades are available, with the cut-out pattern becoming less open in each, and they've proven very effective in a recent amplified acoustic band situation. They slip in and out easily too without the need to slacken the strings, so you can put them in just for live performance, although we did find an unexpected benefit in the studio too. Normally you can't mic the soundhole of an acoustic guitar as the sound is far too bassy and resonant. With a Lute Hole cover in there, however, miking the sound hole becomes a useful additional option, giving more fullness than distant miking, but without the 'woofy' resonance, balanced out by some interesting high-frequency detail via reflection and diffusion from the cover. They also look rather nice!

All three designs are available in maple, mahogany or walnut and cost £31 each. Lute Hole covers incorporating a Rio Grande soundhole pickup are also available for £115. For a list of stockists, or to purchase by mail order, contact UK distributors Madison & Fifth. *Dave Lockwood*

T Madison & Fifth +44 (0)1858 446782.
E info@madisonandfifth.co.uk
W www.madisonandfifth.co.uk
W www.lutehole.com

Net gains

Introducing a new approach to collaboration via the Internet

Digital Musician Net is a very clever system that allows musicians to network their services in real time over the Internet. Essentially it uses a VST 2.0 plug-in that runs under most ASIO-compatible Mac and PC host applications to provide sample-accurate recording of MIDI or audio data via the Internet, in sync with the playback of your song. However, the strongest element of Digital Musician Net's product is its two-way video conferencing facility. The producer can see the performer, and the performer can see the producer, via two video windows in the plug-in that run at up to 25 frames per second. Combined with the real-time data transfer, the idea is to make you feel as if you are in the same studio on opposite sides of the control room window.

The data is time-stamped and buffered to compensate for any congestion or other connection problems, and using a broadband connection you can receive MP3 compressed files at rates of up to 256 Kilobits per second in real time, depending on the quality of your connection. Once the best take has been chosen you can later download it from the performer at higher audio quality if you wish. Applications like Steinberg's *Nuendo* and *Cubase SX 3* that are fully compliant with the ASIO 2.0 protocol also offer transport control over the remote application, so the producer is fully in control of the virtual session, but even with older applications like *Logic* v5.5 on the PC it's possible to achieve sample-accurate recording manually using the plug-in's built-in transport controls.

Digital Musician Net is aimed at musicians and other audio professionals who want to network their services around the world, and there's already been lots of interest from individual artists, producers, studios, and film composers. Also, because the data is sent directly between collaborators rather than being stored on a third-party server, it's more secure. Advertising your talents and arranging collaborations is organised through the community web site, and the modest subscription fee for the network starts at 15.90 Euros a month (the plug-in comes free). Digital Musician Net is poised to launch in August 2005, but extensive public beta tests are already under way, and the system already seems to work very well in practice.

W www.digitalmusician.net

BLUE Bluebird correction

If you found the pictures in the BLUE Bluebird review in *SOS* April 2005 a bit confusing, you weren't the only one! It appears that the unit we had for photography was incorrectly assembled such that the capsule housing was back to front with respect to the main bodywork. This meant that what was shown as the front of the capsule housing is in fact the back! To clarify, the flattened side of the capsule housing is the live side, and this would normally be located on the same side as the BLUE badge. Our apologies for any confusion caused.

BLUE have also asked us to point out that, in the light of Hugh's comments in the review, a 3/8-inch mic stand adaptor is now a standard part of the Bluebird package. Finally, BLUE have now moved to new premises, and their revised contact details are given below.

T BLUE +1 818 879 5200.
F +1 818 879 7258.
E support@bluemic.com.
W www.bluemic.com

01x

mLAN MUSIC PRODUCTION STUDIO

At the heart of the dream studio sits 01x. It not only works as a professional audio and MIDI interface for your computer but also as a total recall, motorised fader, stand-alone digital mixer. Compressors, gates, limiters and 4-band parametric eq feature on every one of the 28 digital mixing channels. mLAN

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Find out more at www.01xray.com or visit a Yamaha Dream Studio dealer to collect your free 01x DVD while stocks last.

YAMAHA

www.yamaha-music.co.uk

Cubase • sx NUENDO 2.0 SONAR dp ASIO Windows

Precision engineering

Celebrity-endorsed mics come to the UK

Thanks to KMR Audio, Josephson Engineering's hand-made microphones are now available in the UK. KMR have taken on distribution of the American pro-audio manufacturer's products, including the E22S small-diaphragm condenser mic (below).

Specifically designed for recording drums but equally useful elsewhere, the E22S was apparently created in response to a request from maverick engineer Steve Albini, who wanted a very high-quality, side-firing, small-diaphragm cardioid condenser that was small and slim enough to position practically anywhere, offered high SPL handling and, last but not least, was tough enough to withstand repeated whacks from a drum stick! That seems to be exactly what Mr Albini got, and the E22S has gone on to become a very well-regarded mic amongst those in the know Stateside. It costs around £960 including VAT. The Josephson range also includes the C42 (£305), a small-diaphragm cardioid condenser (above) designed as an all-purpose mic for the studio and the stage. A matched pair of C42s costs £705.

The E22S in use in Steve Albini's studio.

T KMR Audio +44 (0)20 8445 2446.
E sales@kmraudio.com
W www.kmraudio.com
W www.josephson.com

What's On?

If you would like your event to be mentioned here, email us at: diary@soundonsound.com

June 22nd Dreamtek Logic Training

Basic to intermediate level one-day training course in the use of Apple *Logic* 7.1 at Dreamtek's new training facility in Hackney. The course costs £116.

T Dreamtek +44 (0)20 8533 2222.
E training@dreamtek.tv
W www.dreamtek.tv

June 25th LSO Training

'Introduction to *Sibelius*' training day covering the basics of *Sibelius* run by LSO Discovery, the education and community outreach arm of the London Symphony Orchestra, at LSO St Luke's, London EC1. The course costs £99.

W www.lso.co.uk/musictech

July 2nd LSO Training

'Introduction to *Cubase*' training day covering the basics of *Cubase*. See above for details.

W www.lso.co.uk/musictech

July 16th LSO Training

'Introduction to *Reason*' training day covering the basics of *Reason*. See above for details.

W www.lso.co.uk/musictech

July 22nd-24th NAMM Summer Session

Summer NAMM show, Indianapolis IN. Expect plenty of new product launches and announcements.

W www.nammsummersession.com

July 23rd-28th CoMA Summer School

CoMA (Contemporary Music-making for Amateurs) Summer School at SIPA, University Centre, Doncaster. Tuition in composition, improvisation, performance and music technology for all abilities.

W www.coma.org
W www.don.ac.uk/ipa

Axon, axoff

Terratec update MIDI guitar system

With new software, new sounds and new technology, Terratec's Axon MIDI guitar system has taken a big step forward. Building on the Blue Chip Axon AX100 system annexed by Terratec a few years ago, the Axon AX100 MkII system features a new soundboard with over 500 GM- and XG-compatible sounds and 128-note polyphony. A PC software editor (a Mac version is to follow shortly) is included, giving users a convenient way to construct patches. Perhaps the most exciting aspect of the MkII system, however, is that while the system's pickup has not changed, note tracking has been enhanced. Multiple sounds can be assigned to different strings and even different parts of the same string, allowing a single guitar (when skillfully played) to sound like a full ensemble, as was impressively demonstrated at the Frankfurt Musikmesse and Sounds Expo. The Axon MkII will be available from June and will cost £435.

It has also been announced that Terratec's Phase 24 FW Firewire interface is now compatible with Yamaha's mLAN protocol, an open standard for the transfer of audio, MIDI and sync data.

T SCV London +44 (0)20 8418 0778.
E mail@scvlondon.co.uk
W www.scvlondon.co.uk
W www.terratec.net

Portsmouth offer degree in Computational Sound

The University of Portsmouth have developed a new music technology course. Their MSc in Creative and Computational Sound is designed to help students develop skills in sound design, synthesis and programming with a view to designing audio for computer games, multimedia and film, creating interactive sound systems and installations, and many other applications. The launch of the course coincides with significant investment in the University's recording studios and computing resources, as well as the creation of a new foley/multimedia studio. You can find more information at www.port.ac.uk/departments/academic/ct.

W www.port.ac.uk

Downtime production courses

From October 2005 to January 2006, Downtime, a new company, will be running a series of intensive eight-week courses in music production at London recording studios Stanley House. Limited to six students per course, attendees will receive in-depth tuition covering the entire production process, from concept to final mixdown. Contact Downtime for more information.

W www.down-time.co.uk

Back to the future

Machinedrum gets sampling capabilities

Elektron have produced a new version of their Machinedrum rhythm synthesizer and sequencer which has all the features of the original model but can also play and manipulate sampled audio. But before anyone gets too carried away, the new Machinedrum SPS1UW, to give it its full name (the 'UW' stands for User Wave), is not a radical departure from Elektron's resolutely retro approach — with a DSP sample memory of 2048K and a maximum sample resolution of 12-bit/44.1kHz, there's still a heavy whiff of nostalgia about it! In addition to the original Machinedrum SPS1's 39 sound-generating 'Machines', the UW model has 32 ROM Machines, storing data on internal (non-removable) flash memory. Samples are transferred to the ROM via MIDI sample dump — you see what we mean when we say retro — but Elektron have worked out a way to speed up this time-consuming process. A USB-MIDI interface called the Turbo-MIDI, designed specifically and solely for use with the UW, is in the works and will be available as a separate purchase, though its exact specifications have not yet been revealed. There are also two RAM Machines which allow real-time sampling on the fly via the audio inputs. We saw a demonstration of the SPS1UW hooked up to a turntable at Sounds Expo — the Machinedrum's synthesized beats and bass lines sounded as good as ever, but the addition of real-time sampling and playback make it an even more desirable tool for live performance or composition in the studio. As before, if step sequencing is your cup of tea, the Machinedrum is the *ne plus ultra* of drum machines.

The Machinedrum SPS1UW costs 1590 Euros direct from Elektron in Sweden (currently around £1070). We understand that existing Machinedrums can be upgraded, but since this involves installing new memory and not just a software update, the units need to be returned to Elektron. The upgrade will cost the same as the difference in price between the SPS1 and the SPS1UW — 400 Euros (around £270).

T Elektron +46 31 743 744 0.
F +46 31 743 744 9.
E info@elektron.se
W www.elektron.se
W www.machinedrum.com

Plug and play

The Lexicon hardware that thinks it's a plug-in

Lexicon's MX200 reverb/effects processor is a single rack-space, two-channel design with not only conventional front-panel controls, but also a USB connection and VST interface allowing use as a plug-in within Windows XP and Mac OS X-based software recording systems. As the MX200 takes care of all its own processing in this mode, it makes no demands on the host computer's processor, making it a very efficient way to run processor-intensive effects like reverb. And like most plug-ins, this mode also allows full automation and recall of all significant parameters.

MX200's simple, intuitive front-panel control line-up features three knobs for each of its two 24-bit processors, covering the three most critical parameters of each effect. Two simultaneous effects can be combined in four different ways: mono in parallel, mono summing to stereo, stereo in series, or stereo in parallel, allowing compound effects to be set up in the serial modes, or for the unit to appear almost as two entirely separate processors when accessed in parallel. Other front-panel controls include Input Level, Effects Mix, Balance, Audition (preview), Tap Tempo and Configuration. Inputs and outputs are via balanced/unbalanced TRS jacks, or S/PDIF in the digital domain, with MIDI In and Out/Thru, a dual-circuit footswitch jack, USB and an external 9V AC supply for mains power.

The MX200 ships with 99 factory presets, with an additional 99 user slots for storing your own creations. The effects line-up understandably places the primary emphasis on the reverbs for which Lexicon are so revered, with a choice of halls, chambers and plates, but there's plenty more besides, with slap and tape-type delays, Dbx dynamics algorithms, and other effects like chorus, flange, tremolo and rotary-cabinet simulations.

The MX200 is available now, at a UK price of £199.99.

T Harman Pro UK +44 (0)1707 668222.
E info@harmanprouk.com
W www.harmanprouk.com
W www.lexicon.com

SAE upgrade consoles

The SAE Institute have further extended their London college's facilities with the installation of new SSL AWS900 and Mackie Dxb mixing consoles. The AWS900, SSL's innovative hybrid analogue console and DAW controller, is attached to a Pro Tools HD rig, while the dual-touchscreen Mackie Dxb digital production console has replaced the college's Mackie D8b desk.

W www.saeuk.com

Logic training at London School of Sound

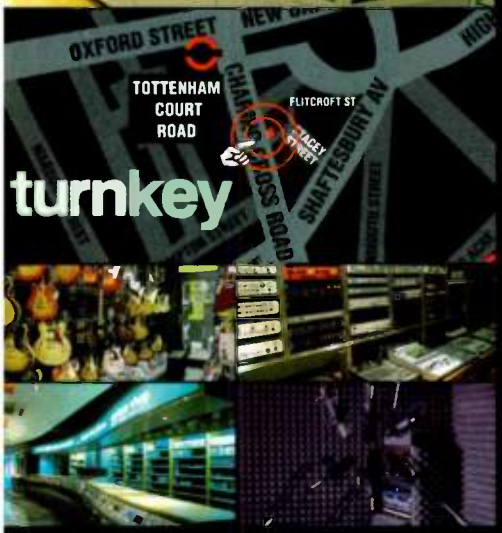
London School of Sound are now offering Apple-certified *Logic* 7 training courses. Classes for the three-day course are limited to four people and, on passing the final exam, attendees gain 'Apple Certified Pro' status and can, if they wish, be added to Apple's searchable on-line database. London School of Sound also offer customised one-to-one training in *Logic*'s more advanced features.

T London School of Sound
+44 (0)20 7354 7337.
W www.londonschoolofsound.co.uk

Mindprint UK distribution

SCV London have been appointed exclusive distributors for Mindprint products in the UK. The German company's small but perfectly formed product range features the DTC and Envoice MkII preamps and the Trio, the combined preamp, processor and monitor controller reviewed in *SOS* May 2005.

T SCV London +44 (0)20 8418 0778.
E mail@scvlondon.co.uk
W www.scvlondon.co.uk
W www.mindprint.com



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DBX 266XL
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EMU 0404
SOUNDCARD
RRP £70 £64

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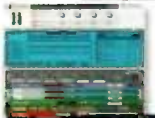
£545



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REVOLUTION X
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A sensational offer on this amazing centre speaker! Tannoy's Revolution X is ideal for 5.1 surround monitoring, home cinema, or use in pairs as normal monitors. It houses two composite 5 inch woofers and a 1 inch soft dome tweeter in a rear ported d'Appolito configuration. The cabinet has magnetic sheilding and heavy 17kg build quality. Output is 90dBspl per watt with max 90 watt RMS continuous rating (approx 150W program peaks) and 6 ohm nominal impedance. Very flat, linear 50Hz - 20kHz +/-3dB response and detachable black grille.

RRP £199 — £49.99 — TANN-REVOLX

S03SL
MIDI SYNTHESIZER — YAMAHA

Compact 5 octave keyboard synth with 64 note polyphony and 25MB wave ROM using Yamaha's rich 4 layer AWM2 tone generation to provide hundreds of great stereo sounds. There are 480 XG / GM presets, plus 128 Yamaha factory synth presets, 20 factory drumkits together with user preset space for 128 programs, 2 drumkits and 32 multis. The synth has 64 resonant LPF filters, huge Yamaha effects DSP including wah, overdrive as well as pitch / mod wheels, LCD and computer interface.

RRP £499 — £299.99 — YAMA-S03SL

SQUEEZ
COMPRESSOR — TAPCO

A 1U rack dual channel VCA compressor with built in noise gate expanders and a useful Air high frequency boost control that enhances the extreme treble that can otherwise become overly dulled by strong broadband compression. Squeez offers fully manual control with switchable auto mode for attack and release times, independent channel bypass, hard or soft knee modes and LED gain reduction metering. Tapco include balanced XLRs and jacks for input and output, stereo link facility and all at a bargain [illegible] ideal for any home or project [illegible]

RRP £120 — £49.99 — TAPC-SQUEEZ

TRITON RACK
SYNTH / SAMPLER — KORG

Stunning rack version of Korg's best selling Triton keyboard. The rack can take up to eight PCM expansion boards simultaneously, has 16MB of sample RAM as standard (expandable to 96MB), and retains loads of great features from the keyboard. 32MB sound ROM with thousands of sounds, built in EQ with 2 effects buses and 5 separate insert effects. 60 note polyphony, 4 analogue outputs plus S/PDIF out, onboard arpeggiator and pattern sequencer.

RRP £1249 — £699 — KORG-TRITRACK

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LAPTOPS!

We know the price/performance ratio of our portable systems is so good you could be forgiven for thinking we were having a clearance sale, but that's not what we're talking about here - imagine a laptop with a built-in RAID array...

For many people the portability and convenience of a laptop is just too good to resist but the power and performance limitations have made it quite a compromise. However, in response to calls for a more powerful laptop we've created the Carillon D900 monster which incredibly out performs a 2.5Ghz Dual Processor Mac on our benchmark tests, and even comes within spitting distance of our powerful desktop Cores.

The first thing you notice about the D900 is the massive 17 inch widescreen WSXGA TFT screen - fronted with X-Glass for a crystal clear viewing experience and capable of resolutions up to 1680x1050 when driven by the onboard Ati mobility X800 graphics engine. But it's under the hood where the really interesting stuff lies:

The D900 uses the latest Intel technology with the 915 Express chipset and full spec Pentium 4 775LGA processors. Up to 4GB of DDR2 dual channel RAM is available for use with Windows XP. Uniquely, the D900 can take two 2.5" laptop drives running at 7200rpm either separately or in a RAID configuration. You can even double up on the optical drives as there's room for another DVDR/RW if you wish. Add to that a sprinkling of USB2.0 and Firewire ports, wireless networking, modem and DVi port and even a built in camera. This is an awesome machine - powerful, rugged and portable - ***look no further for the ultimate in laptop audio performance.***

intel inside pentium 4

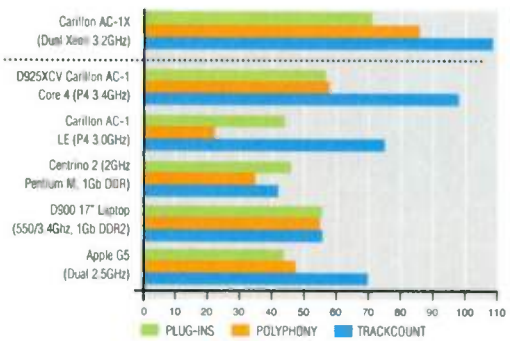
Reliability At Carillon, every last component we use in our machines from the cooling fans to the motherboards has been through a rigorous testing procedure to ensure its optimum suitability for audio use - we've never had to recall machines to replace parts which turned out to be unsuitable for music. We also select our parts for long-term reliability - as a result, and even considering the vast array of parts that go into making a modern PC, less than 3% of the machines we sell ever get returned to us for hardware faults.

Support When you buy a machine from Carillon, you're also buying into the best support in the business. If you do need to call, you'll be speaking to someone who is intimately involved in either our building and testing or research and development programs on a daily basis - we are after all a dedicated audio PC company, not a mass-market computer manufacturer.

Performance In the 'Who's the fastest of them all?' stakes of audio computing, talk is plenty, but objectively measured actual figures are few. To this end, we've designed the Carillon Audio Computing Benchmark tests to give an informed idea of how a range of different machines perform in as close to real world circumstances as we could simulate.

Tests The graphs to the right show the results of our tests. For a full explanation of the test conditions and hardware/software details, please visit www.carillonsupport.com/performance.html.

INDIVIDUAL TEST RESULTS



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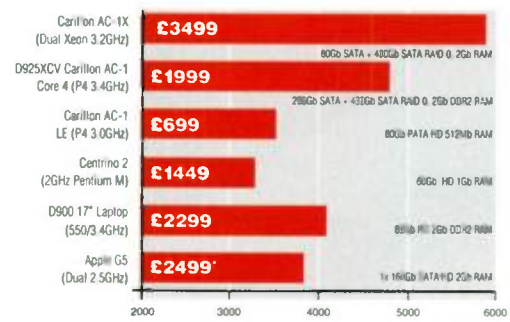

Longer bars are better
*Source: Apple Store UK 27/08/04 †Estimation - in development

Unsolicited *Sound On Sound* web forum quotes!

"The Carillon is a remarkable beast - very powerful and almost totally silent!"

"You're deciding between a G5 and a Carillon system. These are BOTH extremely high-end machines, the only difference that springs to mind is that Carillon have an excellent reputation for support."

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"My Carillon is an AC1-LE which I bought about two years ago. It's built like a tank and I love it to death"

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* 80 note polyphony based on average patch load. Oscillator/filter model selection can result in slightly less or even more.

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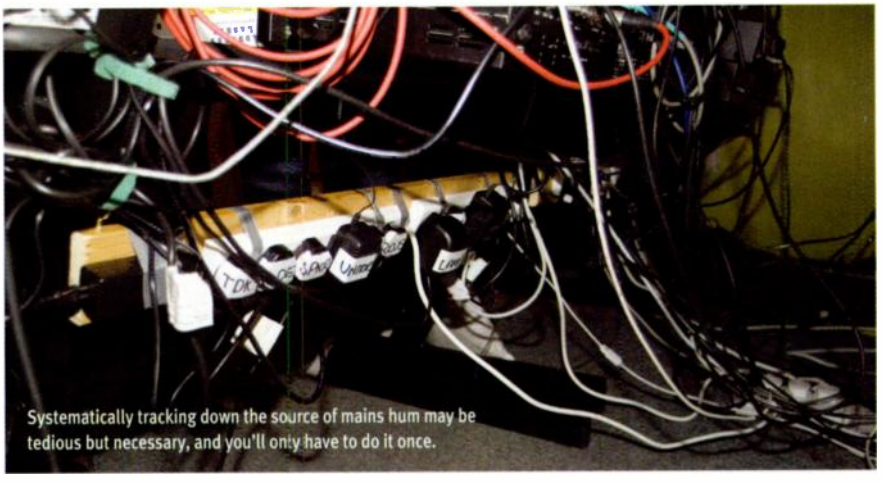
Q&A

Your technical questions and queries answered

Q How can I stop mains noise in my studio once and for all?

I was hoping you might be able to recommend products suitable for the European power grid that can be used to clean up the power signal and ground loops. I am experiencing both ground loops and a generally dodgy power signal. A lot of people recommend that I use some sort of UPS (Uninterruptable Power Supply), but I don't need the functionality they provide, and I would rather spend money on better power conditioning and filtering equipment. Your advice will be greatly appreciated!
Alexander van Rijn



Systematically tracking down the source of mains hum may be tedious but necessary, and you'll only have to do it once.

PC music specialist Martin Walker replies: In my opinion it's only worth 'cleaning up the power signal' if it's dirty, and a huge number of background noise problems are caused not by mucky mains, but by audio wiring that results in ground loops. This is the source of lots of unwanted nasties that sneak into your audio signals, and removing them often requires no dedicated products at all. Problems range from straightforward 'hums' (which normally include various levels of the mains harmonics, such as 50Hz, 100Hz, 150Hz, and so on in the UK, or 60Hz and higher multiples in the US), to a wide range of scratches, ticking, buzzing and other digital gremlins that are often associated with computer activities such as graphic redraws, mouse movements, and hard-drive activity.

If you're experiencing any of these ground-loop problems, you won't solve them by installing a power conditioner or an Uninterruptable Power Supply, so before you even think of spending money on either of these options you should examine your basic wiring. Temporarily unplug all the audio cables from your setup, and if you've got gear bolted into a rack, it may also be worth disconnecting the mains cables of this other gear to rule out problems with several metal cases touching each other and causing yet more ground loops.

As tempting as it might seem, short cuts such as leaving the cables plugged in and just switching off the connected gear at the mains won't work, since the mains cables and any resulting ground loops will still be in place. Unplugging one cable can therefore make the background noises better or worse, depending on how this affects the remaining ground loops. Only by removing every audio cable and working through your studio item by item can you totally eradicate ground-loop problems.

You should now hopefully hear silence from your loudspeakers or headphones, apart from a little hiss and possibly a tiny amount of hum or buzz if you turn the amplifier right up and place your ears nearby (be very careful when doing this, since an unexpected signal at this point could damage your ears or blow up your speakers). If there's still more hum than you expect, it might be due to a nearby 'line-lump' power supply, in which case, you should move this as far as possible from audio cables, and at the very least try rotating it to find the 'quietest' position. If you're still unhappy with the levels of hum and noise from your amp/speakers you may need to get them checked out by a technician — remember that hum levels of both solid-state and valve amps can increase over time, due to deteriorating capacitors or valves.

Assuming all is well at this stage, turn down the speaker levels, connect your mixer to the amp, turn up and listen again (if you route all your gear directly to a multi-channel audio interface, this *is* your 'mixer'). You'll probably hear greater hiss levels from the combined contribution of all the input channels until you pull the master fader right down, but there still shouldn't be any obvious hum or other interference. If there is, it's generally because you've just created an earth loop — the amp/speakers are already earthed via their mains cable, and the mixer is earthed in exactly the same way, so when you connect the two with an audio cable its screen connection completes the loop, causing unwanted earth currents to flow.

If your amp has balanced inputs and your mixer/interface has balanced outputs, the cure is to connect the two via balanced audio cables (twin core plus screen). If not, you may be able to achieve the same results by disconnecting the screen of an unbalanced cable at one end (in the case of soldered cables you can do this inside the plug, normally at the destination end). Similarly, if the amp has a balanced input, but your mixer/interface only provides an unbalanced output, you can make up a pseudo-balanced cable, as I described in 'Computer Audio Problems' in *SOS* November 2004 (www.soundonsound.com/sos/nov04/articles/computerproblems.htm). Here, one end of the balanced cable is wired to a balanced jack or XLR as normal, while the other end is wired to an unbalanced jack with the screen disconnected or, preferably, connected via a resistor. These cost only a few pence more to make than unbalanced cables, yet provide an ideal solution for connecting any unbalanced source to a balanced destination. I've got such cables wired between all my hardware synths and mixer, and background noise levels are considerably reduced as a result.

By disconnecting the earth wire inside a mains plug, you are removing an essential electrical safety measure — don't do it!

Don't be tempted to disconnect the earth connections of either amp or mixer inside their mains plugs — this is a recipe for electrocution if any of your gear becomes faulty, and simply isn't worth the risk. There ▶

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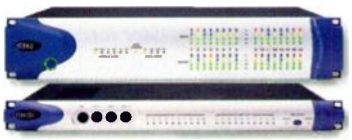

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- Patented touch-sensitive ARC technology allows instant *one touch* selection of any channel or group of channels from those currently in use on the DAW.
- ARC also allows instant muting, soloing (or custom function) of any channel, even if it not currently active on the console.
- Channels named in your own handwriting on the ARC appear in the electro-fluorescent display.
- Dual concentric touch-sensitive EQ pots show current gain and frequency information on LED fan displays.
- Central LCD touch-screen with dual concentric touch-sensitive pots offers detailed control of EQ, dynamics and 3rd party plug-ins for any channel with one touch selection from the ARC.
- Motorised touch sensitive aux send knobs and touch-sensitive pan knobs with LED surround pan displays.
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smartav

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is also a method of modifying the earth connection inside a mains distribution board that should break the earth loop for every associated socket and yet still pass safety regulations, but I'm not totally convinced that this approach is safe under all fault conditions — remember that mains voltages can be lethal!

Occasionally the only way to cure a ground-loop problem is to install a line-level DI (Direct Injection) box between the mixer and amp, to 'galvanically separate' the two circuits, commonly by using a transformer to transfer the signal — the audio gets through perfectly, but there's no direct connection at all between the input and output cables inside the DI box. This is sometimes the only way to cure some laptop-related ground-loop problems, but in my experience, most others can be dealt with by cable modifications.

Once your mixer, amp, and speaker chain have an acceptably low level of background noise, plug each remaining item of gear into your mixer in turn and power it up, listening at each stage for unwanted noises. As soon as you hear any, you know you've either got a faulty piece of gear or a ground-loop problem, and can sort it out in exactly the same way as before. If it's rack gear, you may need to temporarily unbolt it from the rack to check that the problem isn't due to its case touching other earthed metalwork and creating a further ground loop (if it is, use nylon rack bolts or 'Humfrees' to isolate it). Alternatively, low-level circuitry such as mic preamps can pick up mains interference from the mains transformer inside a nearby rack unit. This systematic approach is the only way to deal with ground-loop problems. It may be tedious, but you only have to do it once, and the benefits can be enormous!

When you've got all your gear connected, and still have no hums or other nasties, then and only then is the time to consider adding a 'power conditioner' or UPS. A power conditioner will filter the mains signal to remove any radio-frequency interference plus any incoming spikes and other intermittent noises riding piggyback on the mains signal from the outside world. However, most modern electronic gear, including computers, already includes such filtering in its own power supplies, and in general, it's far better to suppress switch-related mains transients from distant devices such as refrigerators and central heating systems at source, as this will be far more effective.

If, after solving your ground-loop problems, you don't hear any other nasties then you probably don't need a power conditioner at all, but they can be very useful bolted into a rack for live use, to cope with unexpected 'incoming' problems due to stage lighting or grotty wiring in unfamiliar venues. However, if your mains power is 'generally dodgy' it may pay you to have an electrician check your house wiring, and contact the local electricity board to have your incoming mains checked for quality. If, for instance, you live in a remote rural location or close to an industrial estate, you may suffer from occasional but unavoidable interference problems that will benefit from a studio-based power conditioner, although I've never personally found the need for one (perhaps I've been lucky).

A UPS will, in addition, cope with 'brownouts' (occasional severe drop in mains voltage, generally for a few seconds only),

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Q How do I get rid of ringing toms?

What's the best way to get rid of tom ring (a ringing noise after the tom is hit) picked up by the tom mics on a recording of a drum kit? I did my best to cure the problem at source, but now some is on the recording.
***SOS* Forum Post**

Technical Editor Hugh Robjohns replies: Obviously, it is essential to control excessive ringing from toms, snares, kick drums and whatever else is in your studio using damping before you start to record anything — it is extremely hard to fix what are inherently mechanical problems picked up on a recording using EQ, compression and other kinds of processing later on. It's also important to remember to check the sound of individual drums throughout the session to make sure nothing has changed.

Make sure that the toms and snare are sufficiently damped before you start recording.

As to the best approach in this situation, if the majority of your drum sound is based on the signals from the overhead mics, with the individual close mics simply adding impact and definition rather than the core sound, then you need to check the overheads by themselves to see how obvious and unacceptable the ringing is there. If the overall sound from the overheads is acceptable, then you can concentrate on treating the signal from the close mics so that the attack of the hit is preserved but the ringing decay is eliminated.

You can accomplish this using a gate or, at a stretch, the Strip Silence function found in nearly all DAW software, set with a higher threshold than normal. For preference however, I would use expanders on the close mics to chase down the ringing and subjectively tighten everything up. An expander is essentially a compressor in reverse — it decreases the level of low-level signals and increases the level of high-level signals, thus increasing the dynamic range of the signal. The SPL Transient Designer is a very good tool for this kind of job, too.

If the overheads are mainly delivering the sound of the cymbals, with the bulk of the drum sound coming from the close mics,

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Q&A

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then the situation is more tricky, as simply cutting off the toms' decay will sound obvious and unnatural. First, high-pass filter the overheads to remove as much of the drums (as opposed to the cymbals) as possible. Next, you are in for a lot of difficult work tidying up the individual drum sounds.

Assuming you have each drum on a separate track on your computer DAW or multitracker, you can manually edit each hit to replicate the action of an expander in reducing the level of the ringing, but with the manual precision that such treatment really needs.

Begin by editing the section between the start of each drum decay and the next drum hit, and reduce the level by 12dB or so (experiment with the degree of attenuation until you achieve the desired effect).

At the first edit point, straight after the drum hit, you'll need to set a crossfade time and shape that makes it sound like the drum is well damped, but has a natural-sounding decay curve. On the second edit point immediately prior to the next drum hit, you'll want a very short crossfade — possibly even a butt join if the spill isn't too bad.

With a little care and a lot of patience you should be able to fix it, and you certainly won't forget to check the sound of the kit before you start recording next time!

Q How should I connect up my MIDI gear?

I'm having some problems with MIDI routing. I'm in the process of setting up a Yamaha RM1X sequencer, Alesis Micron and Access Virus synths, a Yamaha TG300 sound module and a Yamaha SU10 sampler. Could you explain how to set all this up so that the RM1X is sequencing the whole lot? Ideally I would like to use the Micron as both the controller keyboard *and* as a sound source. Any advice would be greatly appreciated.
***SOS* Forum Post**

***SOS* Reviews Editor Mike Senior replies:** The RM1X has just the one MIDI output, so the first thing you'll want to do is invest in a MIDI Thru box so that you can feed this output to all the other devices. You'll need one with at least four Thru outputs. The Kenton FB5 would do the trick — it can route two separate inputs to two sets of four outputs, or a single input to all eight outputs — as would the recently discontinued Philip Rees V4. Connect the Thru box's outputs to the MIDI inputs of the other modules.

Once all the units are connected to the RM1X's Thru box, you need to connect the MIDI output of the Micron to the MIDI input of the RM1X, allowing the Micron to act as a controller keyboard. You'll need to switch MIDI Local Off in the Micron so that its keyboard doesn't trigger its own internal sound module directly — you only want its sounds to be triggered via the sequencer.

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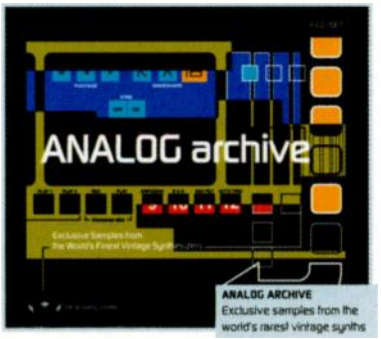

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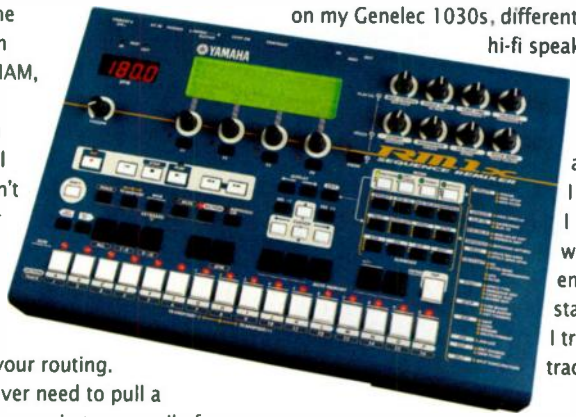
Finally, make sure the RM1X is set so that it echoes information at its MIDI input to the relevant channel of its MIDI output according to the RM1X's track selection — this setting will be somewhere in the RM1X's MIDI Setup page in Utility mode.

If you want to hear all the sounds at the same time, you'll need to get yourself a small mixer. If you don't need any channel processing (EQ and so on), then take a look at the compact 1U line mixers available from companies such as MAM, Rolls and Behringer.

Using a MIDI Thru box has an additional advantage. If you don't want to have all your gear switched on all the time, you can switch off what you don't need without having to rearrange your routing. Furthermore, if you ever need to pull a sound module out of your rig temporarily for any reason, it doesn't affect the rest of the setup.



Although it only has one MIDI output, with the addition of a MIDI Thru box the Yamaha RM1X can be used to sequence an entire MIDI studio.

Q Why don't my mixes sound good on a subwoofer system?

I've just finished mixing a couple of tracks and I'm checking out how they sound on different systems. So far I've managed to get them to sound OK (well, acceptable anyway) on my Genelec 1030s, different sets of hi-fi speakers, a boombox, TV speakers and so on. I thought I was on my way to engineering stardom until I tried the tracks on a friend's system which has a subwoofer. Even with the subwoofer turned down a bit, the amount of boomy low bass was incredible and pushed the other frequencies to the back. Do you have any tips on how to prevent this from happening. I guess EQing out the sub-bass frequencies is the trick, but how do you know what you're doing if all these other sets of speakers don't give you a clue as to what's going on?

***SOS* Forum Post**

Technical Editor Hugh Robjohns replies:

Do not despair! I strongly suspect the problem is with your friend's monitoring system rather than your mix, especially as it sounds OK everywhere else. Genelec 1030s are pretty good at telling you what is going on at the bottom end, even if you are doing daft things with subsonic rumbles, and if nothing stands out as silly on them, then it tends to point to a bad subwoofer setup.

So, assuming your track doesn't contain stupid amounts of sub-40Hz bass rumbles, you need to help your friend to sort out the standing-wave problems in his room, and to set up his subwoofer properly. ▶

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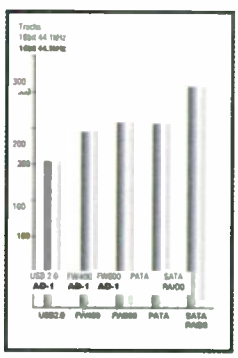

However, "real world" figures can be very different when you actually get down to it. In order to get a better idea of what our drives are capable of, we performed tests using audio track count, and also compared the results to that of a normal *internal* IDE drive (PATA) and SATA RAID-0 (2 serial ATA drives running as a single drive). As the graph *(right)* shows, the **AD-1** performs very favourably by comparison. The results are for a sustained rate of transfer playing back audio tracks in Cubase SX2

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Q&A

If you can, check your mix on a real-time audio analyser to see what is going on below 80Hz or so. Make sure there are no excessive peaks in the low frequency area — compare your mix against commercial tracks in a similar music style to get a feel for what is 'normal'. I suspect you'll find your track is fine and it is the combination of the room and the subwoofer setup that is the real problem.

Steinberg *Wavelab*'s real-time audio analyser can help to give a clearer picture of the frequency content of a mix.

A handy way to check for standing waves and the resulting uneven bass response in a given listening setup is to record a simple sine-wave signal from a synth or sound module playing each note in turn over the bottom two octaves. Make sure that all the notes have the same velocity, and ideally, make each note a 'ping' rather than a constant drone.

Play that back over each system in turn and you'll be able to assess their ability to reproduce low bass evenly, and the effect of the room's standing waves. I expect that in your friend's room you'll find some notes set off huge resonant peaks and others disappear completely.

Standing waves are a common problem, and one we come across all the time on our Studio SOS visits, in letters and emails to Q&A and on the *SOS* Forum. The solution is to set up some proper acoustic treatment in the room and to adjust the positioning of the subwoofer. As a starting point, I suggest you read 'Monitoring & Acoustic Treatment' (see www.soundonsound.com/sos/may03/articles/studioinstal4.asp) and 'Choosing & Installing a Subwoofer' (located at www.soundonsound.com/sos/jul02/articles/subwoofers.asp) by Mallory Nicholls. You also might want to read through some previous Studio SOS articles for some practical examples of room treatment, and searching the *SOS* web site for terms like 'acoustic treatment' and 'subwoofer' will turn up lots of useful information.

Q How do I set up acoustic treatment for recording vocals?

I'm looking to acoustically treat my home studio primarily for recording vocals. I've heard that putting acoustic foam tiles in the corner and singing towards the centre of a room is a good way of deadening a room for recording. But what sort of acoustic foam tiles would work best in this situation and how close could you get to the corner of the room without incurring unwanted low-frequency boost?

***SOS* Forum Post**

Technical Editor Hugh Robjohns replies: Most rooms have a reverberation time that is long enough to become audible when recording. Many are also rather overdamped at high frequencies but underdamped at mid-range and low frequencies, simply because of the kind of furniture, floor and wall coverings we tend to use in domestic rooms. Ours ears quickly adjust to or ignore these characteristics, but when listening to recordings made in such an environment they become obvious.

The simplest and most cost-effective way to overcome this is to come up with a way of stopping reflections in the room from entering the front of the microphone, leaving the mic's inherent directional characteristic to reject sound from the sides and rear, so a mic with a narrow and consistent cardioid pattern works best for this.

By placing absorbent material in an arc behind the vocalist or performer, usually around the corner of the room, any sound that would normally be reflected from those walls behind the singer back into the mic gets absorbed instead. Thus less reflected sound reaches the front of the mic and the recording sounds much drier than it otherwise would.

Acoustic foam tiles will work well — especially the thicker ones — but in practice we have found that a high-tog duvet actually works better, both acoustically and practically. A kingsize duvet works out a lot cheaper, it can be easily hung and later removed without damaging the walls, and it generally works over a wider bandwidth than most foam tiles will. The thicker and more absorbent the material, the lower the frequency it will work down to, and by spacing the duvet an inch or two away from the wall it will work to an even lower frequency.

This approach won't do much to sort out the problem of standing waves — you'll need proper bass traps for that — but if you are careful about where you put the mic and roll off some of the bottom end (which you usually don't need when recording vocals and most other acoustic instruments), it is possible to get some very good results indeed.

It is true that you tend to get a bass build-up effect close to the corners of untreated rooms, but in practice, by the time you have hung a duvet, installed a singer facing back out into the room, and placed a mic on a stand in a convenient location, the mic will not pick up any of that bass boost.

This technique, although very simple, generally sounds better than a lot of home-made (and even some commercial) vocal booths too! SOS

Placing acoustic foam, a thick duvet or, as seen here, some mattresses in a corner behind the performer helps to stop the reflected room sound from entering the microphone.

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Comparative Virtues

I have been spending a lot of time reading *SOS* reviews lately, and I must say, they are among the best I have ever read. My question is specifically for Tom Flint regarding his review of the Zoom MRS1608 in the January 2005 issue [www.soundonsound.com/sos/jan05/articles/zoommrs1608.htm]. In it he compares the MRS1608 to several machines in the 'Taking On The Competition' section. There is no mention of the Korg D1600. Since these are the two machines I am seriously considering, I am curious as to why the Korg was not included.
Derek Theisen

***SOS* contributor Tom Flint replies:** *I did briefly mention the D1600, but decided not to make any direct comparisons for a couple of reasons. The first was price. Although I see that the new D1600 MkII is now regularly discounted to well under £1000 by retailers, when the basic D1600 was reviewed it had an RRP of £1399, whereas the MRS is officially priced at £799 (or £899 with the USB board fitted). To reflect the price issue, I wrote in the review "of the products listed above, the ones in direct competition with the MRS1608 are of the sub-£1000 easy-to-use variety..."*

The Korg D1600 MkII and the Zoom MRS1608 both offer 16-track recording, but their other features are designed to appeal to very different kinds of musician.

My second reason for not making a comparison between the MRS1608 and the D1600 is that digital multitrackers seem to have started evolving into two distinct types, and in my opinion, the Korg D1600 is on another branch of the evolutionary tree from the MRS1608, although I realise that they still have a lot in common.

The D1600 belongs to the family of digital multitrackers which are primarily concerned with providing fairly traditional recording, mixing and editing facilities. The feature set includes effects, and, in some cases, sample-editing tools, but the emphasis is on the production of recorded sound rather than its creation. Some multitrackers in this category have fairly serious I/O facilities including features like word clock I/O, and multi-format expansion slots so that they can interface with other professional studio equipment. As far as mixer routing is concerned, they tend to have lots of auxiliary busses for use when patching to effects cards or for sending signals to outputs.

The other category of multitrack recorder offers fewer professional mixing facilities, in exchange for a greater variety of sound creation tools, which come in the shape of built-in rhythm machines, bass synthesizers and loop samplers. Instead of serving budding studio engineers who need a product that will be compatible with professional studio gear, they have evolved to serve as an all-in-one machine for the home recording musician who has limited recording facilities and possibly very little outboard gear. Naturally drums and bass are not easy things to record at home, and neither is a loud electric guitar amp, so a multitracker with internal rhythm features and amp simulators helps enormously.

I hope this makes my reasoning a little clearer.

Size Does Matter

In Martin Walker's PC Notes column in the May 2005 issue, he says, "With a 15-inch TFT screen at its native resolution of 1024 x 768 pixels, you may find yourself squinting to read text and other fine details from three feet away", and then goes on to say a 19-inch monitor at 1280 x 1024 is perfect... but the dots are the same size on this and the 15-inch! So all the 'text and other fine details' are exactly the same size. Surely shome mishtake?
***SOS* Forum Post**

PC music specialist Martin Walker replies: *I was using a 15-inch TFT display at 1024 x 768 up until a few months ago, and often found myself leaning forward and squinting to read text on it once I'd moved it three feet away to place it between my monitor speakers. However, after upgrading to a 19-inch 1280 x 1024 screen, I can now view the same information with ease.*

My comment wasn't an oversight — I simply increased text size on the larger screen proportionally, both by changing Windows font sizes using the Advanced section of the Display Appearance page, and choosing larger fonts within word processing and other applications. Another approach is to click on the Advanced button of Windows XP's Display Settings page:, you can change the global DPI (Dots Per Inch) setting from 'Normal size (96DPI)' to 'Large size (120DPI)' or another 'Custom setting', which will not only scale up the font size but that of other Windows objects as well.

Since the 19-inch screen is nearly 27 percent larger than the 15-inch one, you can view exactly the same amount of textual information 27 percent larger without losing any content. Similarly, since most sequencer software provides both vertical and horizontal zoom functions, the actual pixel size becomes far less important, since you can generally scale the screen contents to suit yourself. Only those soft synths that have a 'fixed' pixel design using bitmapping cannot be altered in size. For me, the 19-inch screen does provide the best combination of screen size and native resolution for the price.

More AW4416 Advice

I liked your 'AW4416 Masterclass' features [*see SOS May and June 2005*]. I just wanted to point out that saving disk space by erasing silent parts in the middle of a track is possible. You have to first divide the track into regions, copy the regions you want to a blank track or virtual track and then erase the original track.
Fletcher Smith

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Frontier Design Group's Tranzport might not be the most comprehensive control surface around, but it has one huge advantage — wireless operation means it's not tied to your computer.

Paul White

Ever since I first saw the prototype Tranzport, I knew that I needed one. When I visit music trade shows, I tend to evaluate products by how likely they are to have my credit card levitating out of my pocket, and in this case I had to climb up and drag it back from the ceiling! Given that I already have enough Logic Controls and Expanders to cross three time zones, you might reasonably ask why I should be interested in a control surface that offers only 16 function buttons (two of which are taken up checking the battery and turning on the LCD backlight!), basic transport controls and a data wheel lurking beneath a miserly two-line display. Those of you who have already read up on the Tranzport will know the answer, of course — it operates wirelessly over a sensibly adequate range so you can take it into the live room with you and operate your DAW remotely, which is invaluable on those sessions where you are both engineer and performer. It also has a footswitch jack on the side for situations where you can't spare any of your upper limbs for punching in.

A tiny radio receiver connects to a USB port on your Mac or PC, while the Tranzport itself operates from four AA batteries and puts itself to sleep after 15 minutes of not being used so as to ensure a long battery life. Touching any button wakes it again. Apparently the radio system uses advanced coding and frequency-hopping techniques to operate without falling prey to interference, even where other wireless devices are being used. The system is compatible with computers running Windows 2000/XP or Mac OS X (10.2.8 and above), and requires one USB port for the receiver.

The Tranzport is pretty easy to set up, requiring only the installation of some driver software, and better yet, it requires no configuration to work with *Pro Tools* (via the HUI protocol), *Sonar*, *Logic*, *Cubase* and *Digital Performer* as well as a few other supported, less well known applications. It has three basic control modes, selected from a software control panel: Native, HUI and *Cubase* (Mackie Control). To use it with *Logic* on a Mac G5, I just had to run the installer, then drop a file in the Library/Applications Support/MIDI Device and Plug-Ins folder. It is important to install the software before connecting the receiver, otherwise you'll probably have to start again. Once you finish the installation and restart, the Tranzport shows up in the Remote Control Setup Preference page alongside any other controller you may have installed. For *Logic* you simply select Native Mode, and there's absolutely no conflict in running the Tranzport alongside a Logic Control.

Using the Tranzport, you can select and arm tracks, use transport controls, set or locate to markers, move the timeline cursor using the wheel and so on. Scrubbing is also possible but you can't switch between Scrub and Jog modes using the Tranzport — you

SOUND ON SOUND

Frontier Design Tranzport £200

pros
- Wireless operation.
- Easy to install and use.
- Surprisingly inexpensive.

cons
- Range can be reduced by metal-framed buildings or dense walls.

summary
There are very few 'must have' studio accessories at the moment, but if your studio is based around a computer, this has to be one of them!

need to do that on your DAW. You can also adjust level and pan position, handle punching in and out, and engage your DAW's loop function. In and out points can be set from the Tranzport, and although the display is small, it provides bi-directional feedback (it updates to reflected changes using the mouse or other control hardware) of just about anything you might need to know while overdubbing, including the track name, cursor position, level fader setting and pan setting. The bottom line of the display also functions as a level meter. A backlight can be switched on or off when necessary, and key functions have status LEDs to show when they are active.

A Closer Look

You can see pretty much all you need to know about the controls from the photograph, but it is worth mentioning that the Shift key needs to be used for some operations, and when setting punch or loop in and out points, you have to use both the Punch/Loop and In/Out buttons in combination. The changes are reflected in the display, so you don't have to worry that you might not have got it right. One thing that fooled me at first when working in *Logic* is that when you select a new track using the Tranzport, its name shows up on the Tranzport display but the highlighted track on the *Logic* Arrange page doesn't move to match. The same is true with Logic Control of course, but it seems more natural with a controller that has multiple channel strips. You can use the Track button to step through the tracks one at a time, or use the Shift and Track buttons to jump through in banks of eight, and if you're one of the many people who find markers invaluable, you can add markers at the cursor position and then locate backwards or forwards through the markers, all from the Tranzport. Other key functions for which there are dedicated buttons are Record Ready, Track Mute, Solo and Undo (which can be used with Shift for Redo).

Practical uses for the Tranzport include doing your own engineering from the live room, but it's also handy if you have an electronic drum kit in the studio, as you can start recording from wherever you're sitting. A mic-stand adaptor will be available as an accessory, so mounting isn't a problem. You could also adjust your monitor mix settings from inside a vocal booth, or record that piano in the next room. It's also useful for controlling playback when you're standing outside the room to get a better idea of the general mix balance. Those with noisy computers will find the Tranzport useful in allowing them to record vocals or acoustic instruments a little further from the computer. Another great application is if you use your Mac or PC to play pre-recorded parts during a live concert, as it means you don't need the computer right next to you all the time.

The Big Picture

Installing the software took around five minutes, after which the three-page PDF manual told me all I needed to know about working with the Tranzport and my chosen DAW. A separate mini-manual is provided for all of the major DAWs so there's no translation between platforms involved. The unit worked as reliably and positively as any hardware controller and I soon came to rely on it — I even used it to operate my DAW from my office next door to the studio while writing this review! A green LED on the unit shows when it is communicating with the receiver; if you get out of range, the LED goes out. The typical range of the system is around 10 metres depending on the environment, so it may be rather more or less depending on the construction of the building you are working in. In my house I was getting a range of around 8 metres, even though two walls were separating the transmitter and receiver and the batteries were far from new.

For anyone using one of the supported DAWs who needs a simple hardware transport controller, the Tranzport is ideal, but its remote capabilities make it much more useful than a simple desktop controller. It does exactly as claimed without fuss, and the designers seem to have covered exactly the right key features required for general control and overdubbing, without falling into the trap of making the unit too complicated or too expensive. I'd recommend it to anyone — but not before I've bought one for myself! SOS

Information

£	£199.99 including VAT.
T	SCV London +44 (0)20 8418 0778.
F	+44 (0)20 8418 0624.
E	mail@scvlondon.co.uk
W	www.scvlondon.co.uk
W	www.frontierdesign.com

Hebden Sound HS3000 Modular Condenser Microphone

This British multi-capsule mic brings Calrec know-how to the home studio.

Hugh Robjohns

Hebden Sound are one of very, very few British microphone manufacturers. In fact, the only other one that springs immediately to mind is Soundfield, and the roots of both can be traced directly to Calrec Audio — the manufacturer of highly specified analogue and digital broadcast mixing consoles. Calrec had been making high-quality studio condenser mics since the 1960s, and produced the first Soundfield mics in the 1970s. They went through various acquisitions and buy-outs in the early 1990s, following which the Soundfield mic became a business on its own, based now in Wakefield, and the studio condenser microphones were taken on by former Calrec test engineer Keith Ming in 1994. He built the CM1000 and CM2000 series under licence from Calrec, and marketed them under the Hebden Sound brand.

Following Keith's death in 2000, David Anderson — the former head of microphones at Calrec and an experienced independent acoustic consultant — took over the helm. He had already amassed considerable microphone design experience at his own company, Bridge Microphones, and on taking over Hebden Sound realised that the existing CM1000 and CM2000 series of studio condenser microphones had received almost no development since their inception. The first new product under Anderson's guidance, the HS3000 series, is the result of a lot of new input and development, particularly in terms of the manufacturing, which is now undertaken in Sheffield under David's strict supervision.

For this review, I was supplied with a pair of HS3000 condenser mics, complete with pairs of removable cardioid and omni capsules, a pair of shockmounts, and a pair of stand adaptors — all cosseted in a compact but sturdy metal flightcase. Although not supplied for this review, Hebden Sound also manufacture compatible subcardioid and hypercardioid capsules for this microphone range.

The published specifications claim a frequency response of 20Hz-20kHz (but without tolerances being given), self-noise of a rather disappointing 17dBA, and maximum SPL of 135dB (but without a distortion figure). The output sensitivity is given as a healthy 25mV/Pa, and it should be noted that the impedance-converter electronics have a bandwidth extending up to 100kHz to minimise intermodulation artefacts.

The microphone body measures 160mm long and 23mm in diameter, of which the top 28mm is the removable capsule. The mic is surprisingly heavy at 290g and feels very solid and sturdy. Replacing the capsule is very quick and easy — the capsule screws onto the body, and the screw thread is sufficiently coarse to ensure that cross-threading is unlikely. The capsule contacts the preamp circuitry through a spring-loaded and gold-plated centre pin and the threaded barrel itself.

The mic was supplied with a standard clip and a simple shockmount, both made by Beyerdynamic and badged as such — and both with 3/8-inch thread adaptors. The shockmount comprises a plastic tube, each end of which carries a pair of interlocking rubber loops forming a cross shape. The microphone is inserted in the centre of these interlocked loops, something that is rather more easily said than done! On completion, though, the arrangement seems to work pretty well, and it is a shame that the mic can't be left in its shockmount in the case.

On The Session

Testing the HS20 cardioid capsule initially with spoken voice at close quarters, it became immediately apparent that a good pop shield was required — not surprising really, given the visual transparency of the front grille. If there was any kind of air movement from an air conditioning system, a foam windshield might be needed too, although none was supplied in the kit.

With that minor technicality dealt with, the mic performed very well, delivering a smooth, open, and airy sound to both male and female vocals, with just a hint of a broad presence peak. I also found it gave good results on acoustic guitar — even the challenging 12-string — and on a wide variety of other instruments, although it seemed more critical of relative angle than many mics. This can be attributed to its fairly narrow but tidy cardioid response.

The HS10 omni capsule also has a very respectable polar response and a fixed

SOUND ON SOUND

Hebden Sound HS3000

pros
- Smooth, open, and airy sound.
- Excellent build quality.

cons
- Self-noise higher than most.

summary
A solid performer with a Calrec pedigree, this mic has a classy sound which should help it stake out its territory in a competitive UK market.

Options & Pricing

- HS3000 preamp body, £199.75.
- HS10 omni, HS20 cardioid, HS30 hypercardioid, or HS40 subcardioid capsule, £229.13.
- HS3010, HS3020, HS3030, or HS3040 microphone kit, £428.88.

Includes HS3000 preamp body; HS10, HS20, HS30, or HS40 capsule; shockmount; and a metal flightcase.

- HS3010P, HS3020P, HS3030P, or HS3040P twin-microphone kit, £857.75.

Includes two HS3000 preamp bodies; a pair of HS10, HS20, HS30, or HS40 capsules; two shockmounts; and a metal flightcase.

- HSMC mic clip, £11.75.
- HSAVM shockmount, £41.13.
- HSFlight metal flightcase, £58.75.

Available in both single and twin versions.

All prices include VAT.

high-frequency lift to make it flat in a diffuse sound field. Close on-axis miking is not recommended if you want to keep your tweeters! Rigging the mics fitted with the cardioid capsules either as a coincident pair or as an ORTF pair produced great-sounding stereo, with stable and precise imaging. The bass was reasonably well extended when distant-miking, and the top end crystal clear and detailed. Some experimentation with mutual angles was required to optimise the imaging, because the polar responses are a little narrower than standard, although at the prescribed 90 degrees this helped to subdue central sources quite nicely.

Switching to spaced omnis, I was impressed with the full, spacious sound, which demonstrated the lovely bottom octave you only get from good omnis. Again, the high end was bright and crisp without being sharp or aggressive, and the HS3000 proved to be a very competent player. Its relatively poor noise performance became obvious when compared to my reference Sennheiser MKH20s, which were a good 6dB quieter, but although the Sennheisers sounded slightly cleaner and a hint more transparent, I didn't feel the need to swap mics on purely sonic grounds. That in itself is impressive, given that the German mic costs more than twice as much here in the UK!

The HS3000 mic is built very well indeed and should provide a reliable lifetime of service, and the ability to change the capsules makes it more flexible than many. However, at this price the new Hebden Sound mic faces some very stiff competition indeed — not only from the Chinese, but from all the other better-known manufacturers as well. Having said that, the HS3000 can look that competition squarely in the eyes from the point of view of its sound character, and the only weak point is its noise floor, which is a little higher than that of most equivalent designs. This won't be the slightest problem for any close-miking applications, or when working with loud sources — which probably covers 95 percent of most people's needs — but distant-miking of quiet sources certainly isn't its forte. It's nice to see an all-British microphone being promoted again, and the HS3000 series represents very good value for money, even given the very tough marketplace European manufacturers currently face. SOS

information

S See 'Options & Pricing' box.
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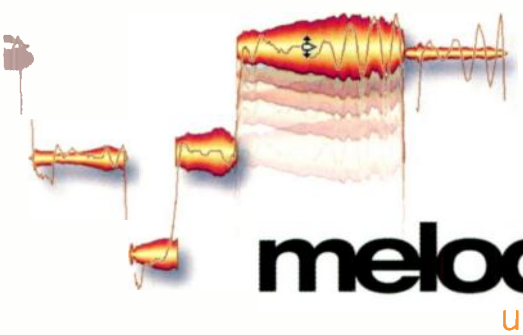
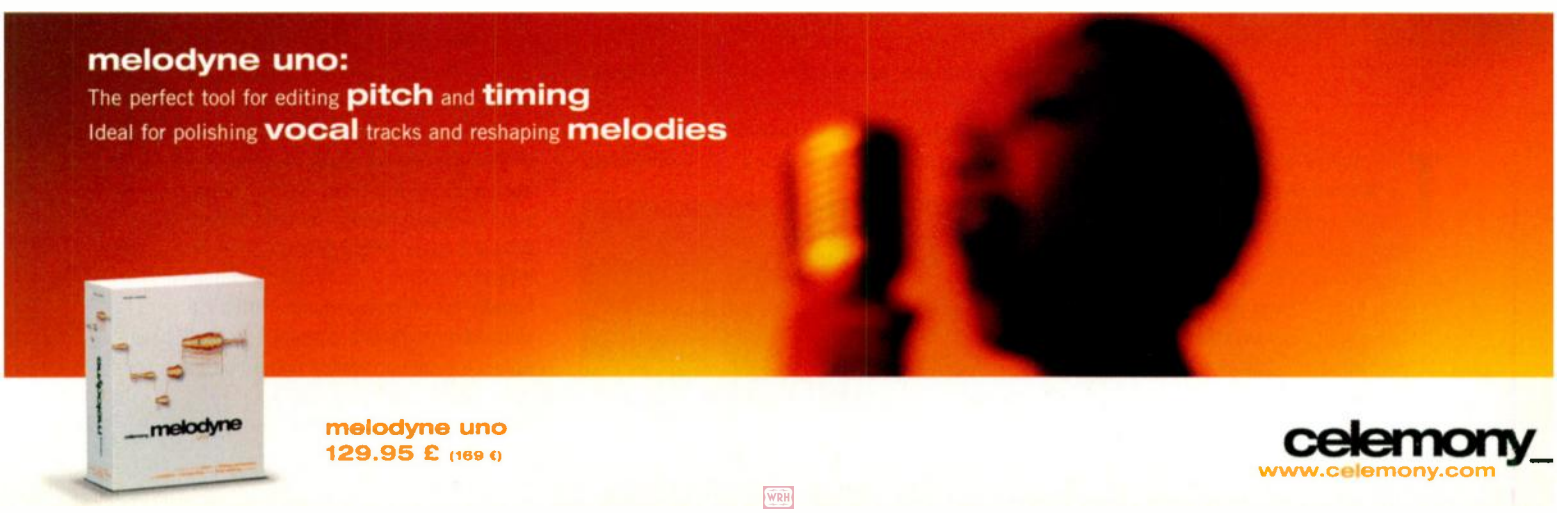


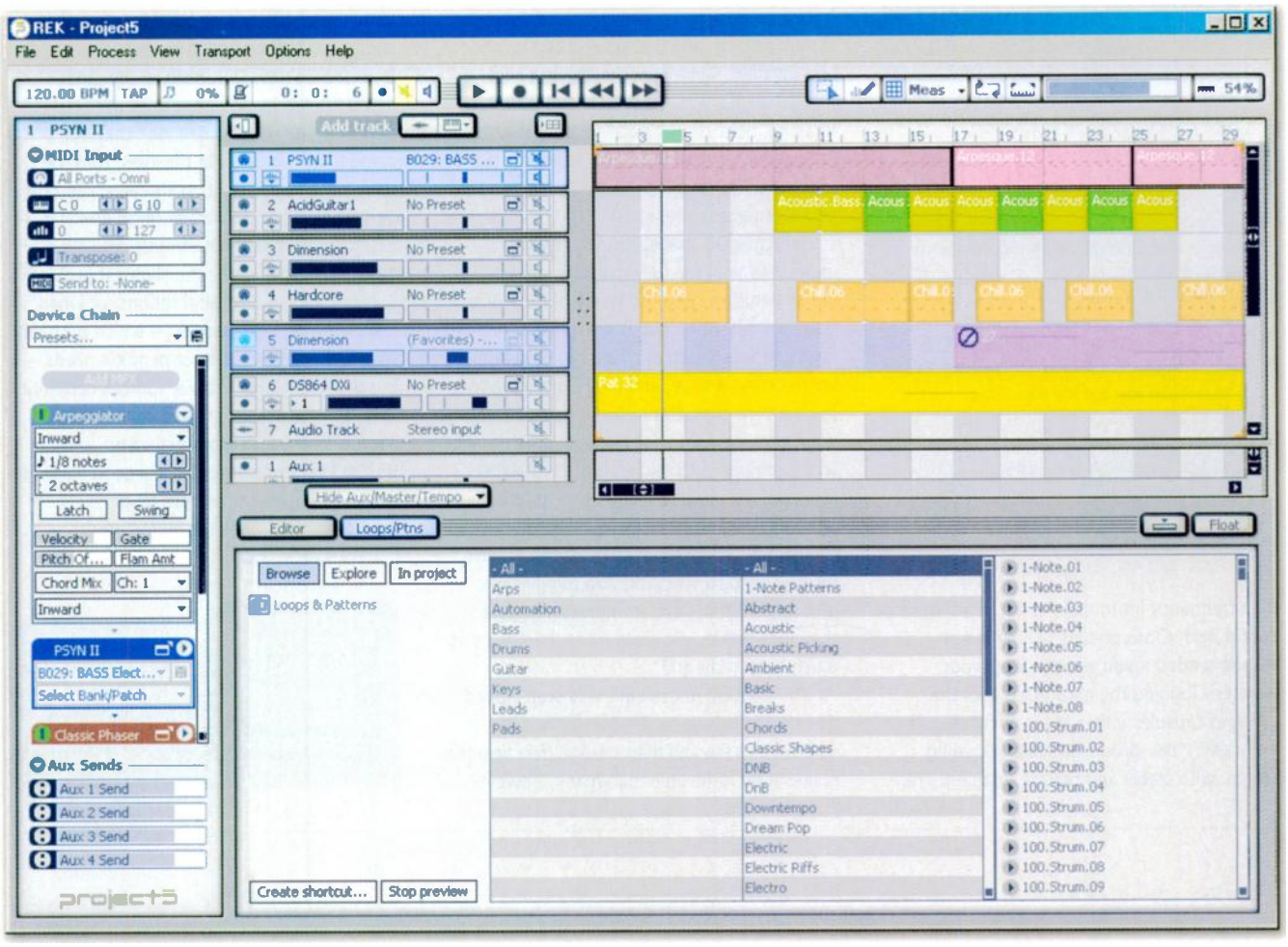
out now: **melodyne uno**

The small version of the unique audio software Melodyne works in a similar fashion to a sample editor — except that it offers characteristic Melodyne functions and is therefore the ideal tool for pitch correction, vocal production and the editing of melodies.

› mono pitch-shifting and time-stretching unsurpassed in audio quality
› ideal for remixing — facilitates the creative restructuring of melodies
› fixes timing and intonation errors
› 'Correct Pitch' and 'Quantize Time' macros
› easy and intuitive user interface
› ReWire integration with a host sequencer
› for Mac OS X and Windows XP

More information and a demo version with integrated tutorial at **www.arbitermt.co.uk**





Cakewalk Project 5 v2

Virtual Studio For Windows

Cakewalk have rethought their *Project 5* loop-sequencing application, adding features such as audio recording and a Groove Matrix for triggering patterns live — not to mention a virtual Roland sound module and a powerful new synth.

Alan Tubbs

The original version of Cakewalk's *Project 5* was released in the flood of audio looper and soft-synth sequencer programs that came out in the last few years. It shared many features with *Acid*, *Reason*, *Fruity Loops*, *Live* and the other such packages, and yet was different from any of them. In addition to playing imported *Acid*ised loops and plain old WAV files, *P5* included a drum pad you could load audio or loops into and play 'live', analogue and sample-based drum machines, as well as a sampler. All were good, if you didn't already have something similar (am I actually complaining about having too many synths?). There was also *PSYN*, a top-of-the-line analogue synth emulator. Finally, Cakewalk threw in a collection of audio loops and MIDI patterns.

In some ways, *P5* got lost in the 'me too' crush of releases and acquired the image of being a jack of all trades, rather than a master of one. It wrapped a basic line-up of soft synths and tempo-based playback in a DAW-looking package, got good reviews in *SOS* (www.soundonsound.com/sos/jun03/articles/cakewalkproject5.asp) and elsewhere, yet never caught on the way some of the other software did. Cakewalk have been busy since the first release, however, and have now released an update that's so radical it could almost be a different program. *Project 5* version 2 could have just been a laundry list of improvements with a 2.0 slapped onto the end. Instead, Cakewalk have upped the ante on what a pattern-based

Test Spec

- *Project 5* v2.0.
- PC with 1700GHz Athlon CPU and 1GB RAM, running Windows XP, with Presonus Firepod and M Audio Transit interfaces.

recording environment should be. *P5* v2 has a cleaner look and easier workspace, several new features including the ability to record audio, and some great new synths.

On The Outside

First, the new look. Since a picture is worth a thousand words, I'll save everyone time by referring to the main screenshot (left). The standard Windows drop-down menu bar lives at the top of the screen, along with the Main Control View, a bar containing the tempo, play/stop and other such master controls. The original Tracker is now called the Track View, although it looks much the same. Most of the overall work is done here. To the left are the Track panes, where each channel is set up. This is basic stuff like audio and MIDI channel settings, track arming, volume, pan, mute and solo. For the MIDI tracks, there is an MIDI override button which comes in handy — it solos the MIDI input to that channel only, so you aren't laying in a synth solo and having the drums playing along, too. If you are working fast, you can just push the button and keep the flow going instead of having to reset MIDI channel assignments. Both Audio and MIDI channels have a button that opens the automation tracks just below the actual recordings. MIDI channels also have a button to show the channel's instrument properties page so the synth itself pops up.

The right side of the Track View contains the Arrange pane. MIDI patterns or audio Clips can be mouse-clicked into a channel or dragged from the Explorer. It is also where live MIDI or audio takes appear as you record them. The advent of audio recording is another *P5* aid to keeping the creative juices flowing — no more having to open another program to drop in an acoustic line, as you do with some rival soft studio applications — and it works as you'd expect.

P5 now has an additional Buss Pane at the bottom of the Track View. This can be opened up to display not only the four Auxiliary outputs and the Master output, but a tempo track allowing you to draw in tempo changes over time. The Buss Pane may be less flexible than the floating panel in version 1, but is more conventional and, under most circumstances, just as functional.

The best improvement in the Track View is the Track Inspector, which is borrowed from Cakewalk's *Sonar* DAW and replaces the rather unfortunately named SYN.OPS — kudos to Cakewalk for renaming this and the former P-SEQ into more eloquent and functional terms. While the end user doesn't necessarily want music companies to farm out naming to lipstick makers or house-paint producers, standard and/or descriptive terminology helps. The Inspector opens with a show/hide button to the left of the Track View, making it easy to switch between working on a single channel's settings and laying in tracks horizontally while working on bigger sections of a song. Within the Inspector itself, both audio and MIDI tracks can be sent to the auxiliary outputs for treatment with internal effects or insert channel effects. If you inspect a buss, you can choose the effect here for the auxiliary send or pick a global effect for the Main.

MIDI tracks go above and beyond this basic setup, with a page for MIDI-specific setup information. You can pick key range and velocity, transpose and Device Chain (more about this latter). Besides the audio effects, there are MIDI effects that can be applied to the channel. And if you are a fan of arpeggiators, Cakewalk have you covered: every *P5* v2 MIDI channel gets its own arpeggiator. Although there are only about a dozen arp presets, changes to parameters such as speed, octave, swing and chord mix can completely alter the feel of an arpeggiation, and can be saved as new presets.

The synth page has another Track Properties button as well as preset and bank selectors. Most ▶

SOUND ON SOUND

Cakewalk *Project 5* v2 £199

pros

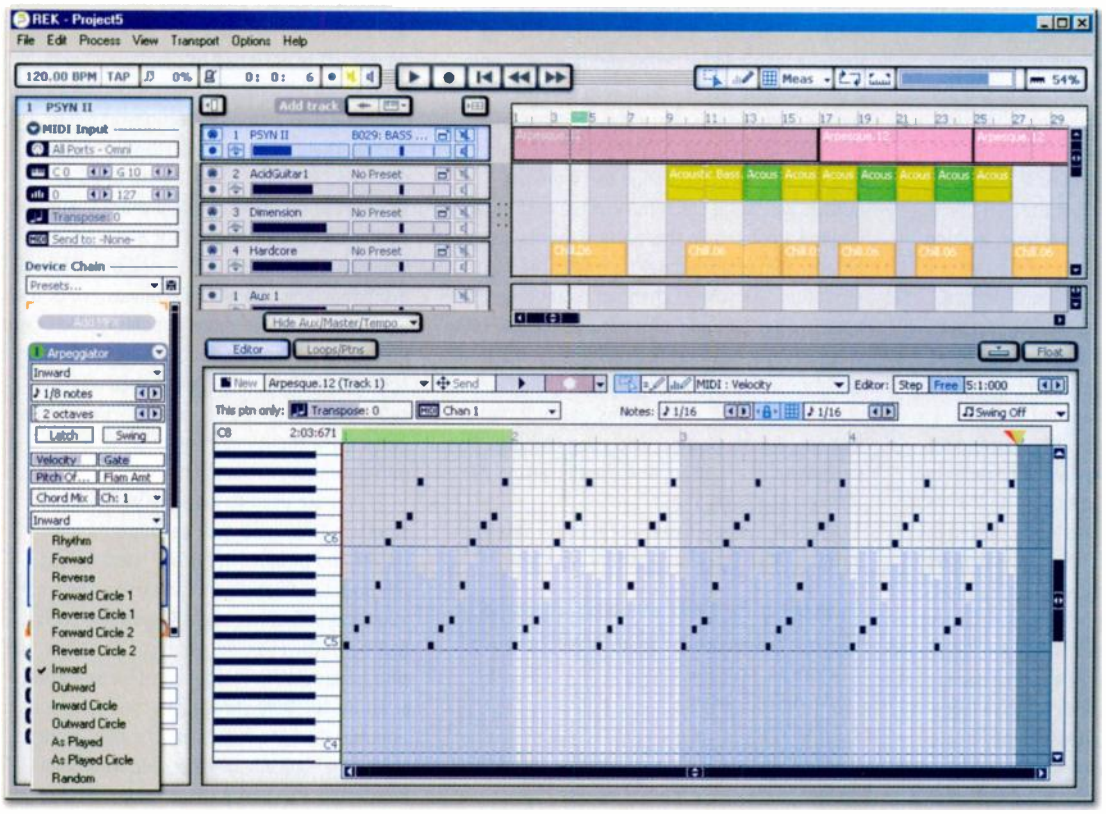
- *Dimension* and *Groove Synth* are great additions.
- Can record audio.
- Rewire support.
- Excellent ergonomics.
- Did I mention *Dimension*?

cons

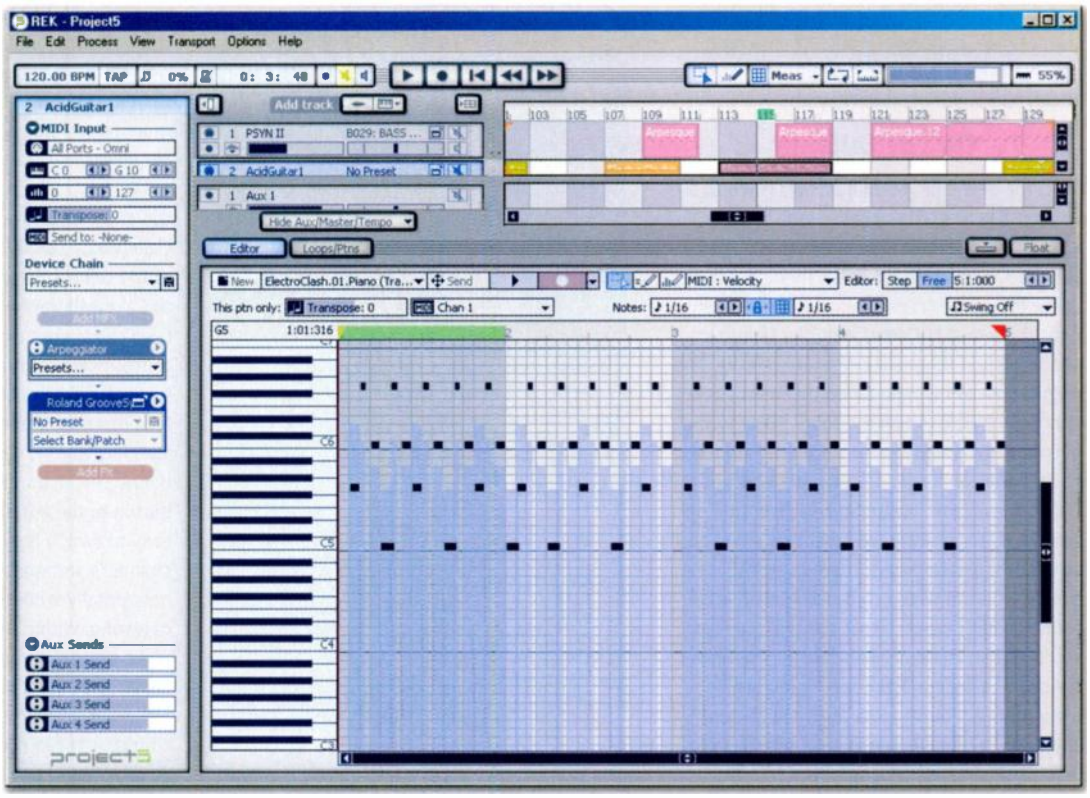
- *Dimension* and *Spectral Transformer* are CPU hogs.
- Some quirks arise from the pattern-based recording motif.
- Manual is missing some information on *Dimension*.

summary

Cakewalk's *Project 5* v2 adds new synths and functionality to an already good program. Audio recording and the new *Dimension* synth take this pattern-based virtual studio to another level, making it a match not just for the other looper programs out there, but for many stand-alone soft-synths.



The MIDI Track Inspector with the Arpeggiator page and presets open. The supplied presets only scratch the surface of what's possible.



The Editor Pane does double duty as a Browser. Since most of the *P5* synths don't have a built-in trigger, the virtual editor keyboard works instead.

of the included synths have built-in banks divided by classes of instruments, making it easy to find an organ or other sound close to the one you need. Not only can synth sounds be saved as presets, but also complete Device Chains consisting of a synth with its settings, along with any effects associated with the channel, and remote control assignments to either the synth or effect. So, if you've found that perfect Rhodes sound for R&B with just the right amount of chorus, save it as a Device Chain for instant call-up. This is a must-have for transferring sounds from song to song or for using *P5* v2 live.

The last basic element in the main screen is the Editor. It replaces version 1's P-SEQ editor, and includes a Loop/Pattern Browser window; you can audition patterns in the Browser before sending or dragging them to the Arrange pane. Once a pattern is in the Arrange pane, you can roll out as many iterations as you please. If you need to edit the pattern, switch from Browser to Editor. Although this seems counter-intuitive at first, the two features work well bundled together. I have two monitors, and float the Editor/Browser to the second screen, making it large enough to browse a lot of files at once. If you are working on a single screen, the Editor itself has a show/hide button, so you can accomplish much the same thing. I'll try out sounds and beats together, and end up dropping several audio loops and MIDI patterns into a song at once. After arranging the collection in the Track View and trying out variations such as different synths on the MIDI patterns, I'll edit some of the loops. A single button switches over from the Browser to the editing page. When you click on a loop or pattern in the Arrange pane, it pops up in the Editor. The edit screen itself is fairly conventional: MIDI notes appear on a piano roll, while *Acid*ised audio files (Groove Clips in Cakewalk-speak) appear chopped into beats. Non-*Acid*ised audio shows up in the editor, but *P5* can't do anything with it except place it in a track — it isn't an audio editor. You can, however, choose to add beat information by importing WAV files as Groove Clips.

One song I worked on contained a MIDI drum pattern that matched the rest of the song, except for an annoying vocal 'uh' at the very end. I opened the pattern in the Editor, found the offending note visually by playing the pattern (there is a play button in the Editor itself) and excised it with the eraser. Editing just like it should be. However, if you change a pattern/loop in the Editor window, the default behaviour is that every instance of that loop in the song is changed. There is a drop-down menu to change this from the default, but it did catch me out the first time I edited a pattern. In this pattern there was a hit at the end that led naturally into the next repetition. But when I changed to another pattern after a couple of iterations the late hit was jarring, not smooth. I took the hit out and was momentarily flummoxed when the hit disappeared in all the patterns, just not the last one. A little pop-up help soon had me saving the new pattern and then inserting it into the Arrange pane.

Overall, the workspace of *P5* v2 is fast and intuitive. The Track and Editor views are resizable, of course, and you can float the whole Editor. With the Editor closed and the Inspector open, it is easy to see large chunks of a song as well as the specific settings on the channel one is working on. With the Editor open, the song mostly disappears but the loop itself is large enough to edit easily. Effects and synths float over the top for easy tweaking. No real genius here, just efficiency. As Craig Anderton observed in the original review, *P5* is designed to build up a song from small patterns, whereas most DAWs are designed to play longer sections into. Of course, there is nothing to stop you from recording song-length 'patterns' in *P5* v2, which I did on some ambient drones. But the 12-bar blues are so called for a reason, and if you've ever worked with an old, one-line LCD drum machine you are painfully aware of the repetitive nature of most popular music — not just trance and other dance genres. *P5* v2, in common with other pattern-based sequencers, lets you see as well as hear the patterns, without resorting to writing mind-numbing drum charts.

If you are used to working with a more standard DAW, you may encounter a few quirks and pitfalls with *P5*'s pattern-based method. I tried adding a fade using the track automation feature, and all seemed to go as planned. However, on playback, the track had disappeared! When I opened the automation window, the fade showed a spike up to full volume, then the fade. The first part of the track had sonically been zeroed. Not what I expected, but easily correctable. Another

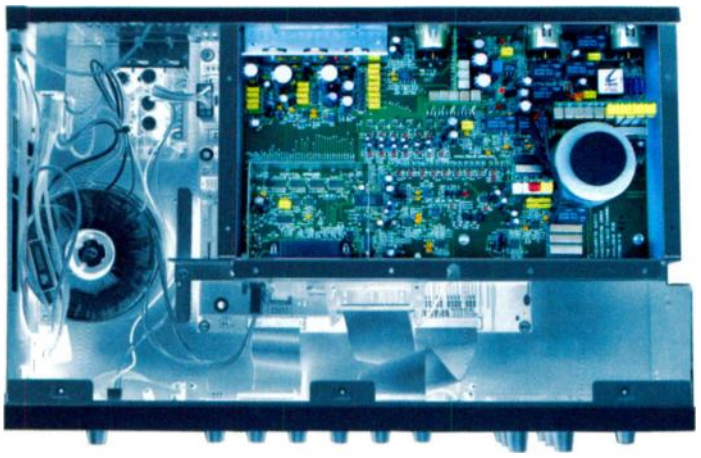
System Requirements

- Windows 2000 or XP.
- 1.2GHz processor.
- 512MB RAM.
- 2.5GB hard disk space.
- 1024 x 768 or larger 16-bit display.

Focusrite

digital head

analogue heart



Before any digital processing occurs within The Liquid Channel, meticulous attention is paid to the quality of the analogue signal as it flows through the most elaborate and powerful analogue pre-amp ever designed.

Silence is golden: At the start of the signal flow, a specially custom-wound choke is employed to ensure optimum rejection of common mode noise with zero colouration of the signal.

Isolation is key: Every effort is made to ensure that the analogue signal remains unaffected by digital signals within the Liquid Channel. The analogue and conversion circuits are isolated within a steel shell, while the digital section of the conversion circuitry is further enclosed within a second coated steel shell. To improve isolation still further, each of the circuits is powered by its own discrete power supply.

Flexibility: To physically mirror the impedance of the pre-amp being emulated, The Liquid Channel features a unique matrix of resistors and capacitors. This matrix switches between different combinations in order to match the input impedance of the original.

Precision: The analogue pre-amp features fully switched gain to allow total and precise recall of gain settings to the nearest dB. A special circuit is employed utilising a zero-crossing detector to prevent zipper noise as you switch through gain settings.

With or without: To allow matching of both transformer-based and transformer-less designs, the Liquid Channel passes the analogue signal through its own custom-wound Liquid transformer or through a discrete Class A pre-amp (specifically designed so as not to impart any colouration on the sound).

Transparent conversion: The Liquid Channel features the finest A-D and D-A converters (AKM 5394 and 4395 chipsets) running at 192kHz, 24bit and boasting class-leading performance specifications (123 dB dynamic range).

And finally: The signal is then ready to be processed through the dynamic convolution section which features a number of the world's most powerful SHARC chips. 688 million samples are required for 1 second of emulation at 192kHz. Here begins the other half of the story (with its total recall happy ending).

THE LIQUID CHANNEL
Any mic pre and compressor in history

To hear what the Pros are saying, see what's in the box or learn more about Liquid Technology, visit **www.focusrite.com/liquid**

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small complaint about automation is that opening it on one track opens it on all, reducing the screen size of the patterns themselves. But these are minor points.

Effects & Synths

The above is all well and good, but doesn't matter unless the effects and synths are good, because *P5* v2 is a soft-synth sequencer only: with the included VST to DXi adaptor, it will run your VSTi synths as well as its own, but as standard, what it won't do is provide a MIDI output to any external synths. However, all is not lost. *P5* v2 operates as either a Rewire host or client, so that all-important sound from a favourite keyboard or module can be captured through a Rewired DAW. The Rewire implementation works fine, at least with Cakewalk's own *Home Studio* DAW, but I've never been a big fan of running one program through another, and it certainly detracts a little from the ergonomics of *P5* itself. For those, like me, who prefer the directness of addressing physical MIDI ports without going through a DAW, Cakewalk have also made available for download a utility from soft-synth creators RGC Audio. Unfortunately, I didn't have time to test this before we went to press, but it can be found at the *Project 5* web site (www.project5.com).

The original *P5* review went over the effects and synths of version 1 in detail, but before opening the sack of new goodies I'll add a few comments on the old ones. Most of the effects are pretty basic and share the same green hardware emulation look. Whether one prefers a more graphic look or not, emulation certainly doesn't hurt the sound. In fact, I find it somewhat comforting to have virtual hardware where one can grab a knob, just like on the real thing. It seems more natural to me. *Studioverb* is an above-average reverb, and requires a third-party authorisation (ie. payment) to open it up for use in other programs. *Para-Q* is a two-band parametric EQ. It sounds good, and much of the time, two bands are enough to trim some fat from the bottom end, tame or peak a small frequency or just add some high-frequency sheen. *Para-Q* will do all that, though not without opening two instances of it. Since *P5* version 2 eschews a virtual mixer, EQ must be placed on the track itself. Finally, *Spectral Transformer* is a unique and tasty effect with two caveats; it is processor-intensive and quite capable of overwhelming any sound. It comes with only a few presets, and therefore requires time to dial in the proper amount of effect in each of its four slots. Otherwise, the track ends up sounding like *Spectral Transformer* rather than anything else.

The only new effect is *Alias Factor*, which is a bit cruncher and sample-rate mangler. It can emulate sampling rates as low as 100 Hertz, and bit depths go down into the single digits. There is also a resonant filter that can go above the Nyquist point, to create those aliasing effects the music industry has spent billions getting rid of. So you can 8-bit those pristine samples and rehear the glory of yesteryear. I've had the most success mangling clean sounds, and, like *Spectral Transformer*, *Alias Factor* is best used judiciously, even if you are going for an effected sound. As with *Spectral Transformer*, there is nothing else quite like it, and both effects can add that little something extra to make a track stand out.

The new kids on the block: the *Roland Groove Synth* and *Dimension*.

The new synths include the *Roland Groove Synth* and *Dimension*, a sampling synthesizer. *Groove Synth* is part of the collaboration between Roland and Cakewalk and was first available as a plug-in for *Kinetic*, itself sort of a *P5* 'lite'. *Groove Synth* is a GM2-compatible soft synth. Think of it as a bread-and-butter virtual sound module which leaves more CPU cycles for the processor-intensive functions in *P5* v2, but don't think of it as your father's cheesy General MIDI sound board. It is more of an S&S virtual engine using Roland sounds. And there are 256 of them, along with nine drum sets, so it covers the basics and more. As you can see in the screenshot above, *Groove Synth* doesn't include a lot of controls, but it does have knobs for the most important ones.

New Dimensions

The other new synth is *Dimension*, a multisample playback instrument. It uses four voices or Elements for each patch and, with over three gigabytes of sounds, is the reason why *P5* v2 comes on a DVD, not a CD. The sample set puts it in the heavyweight division of synths, and it can duke it out with the best of the stand-alone sample soft synths. Its library might not be quite as detailed as the 10-gigabyte orchestral triangle someone is likely to put out, but is an impressive collection nonetheless. As a pure emulator it does gorgeous strings and pianos, along with the other standard acoustic instruments. As a pure synthesizer, it includes the usual analogue waveforms as well as the Dimensions category of presets, which is full of *Absynth*-like evolving soundscapes.

Dimension's four Elements are each self-contained sample-playback synths. Each Element consists of a sample, either a preset or your own PCM wave file or Ogg Vorbis file. Any Element will also act as a wavetable oscillator, if the file is short enough, or it can operate as a waveguide generator for plucked sounds. Unfortunately, the promised appendices explaining how to implement your own wavetables and waveguides are missing in the pop-up help and manual. While the world waits for the writers to catch up with Cakewalk's new synth, this doesn't have much

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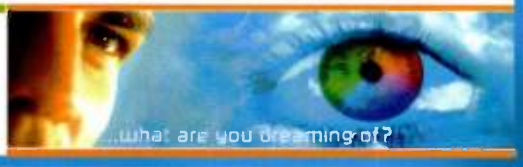

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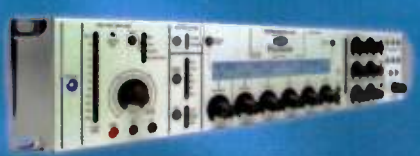

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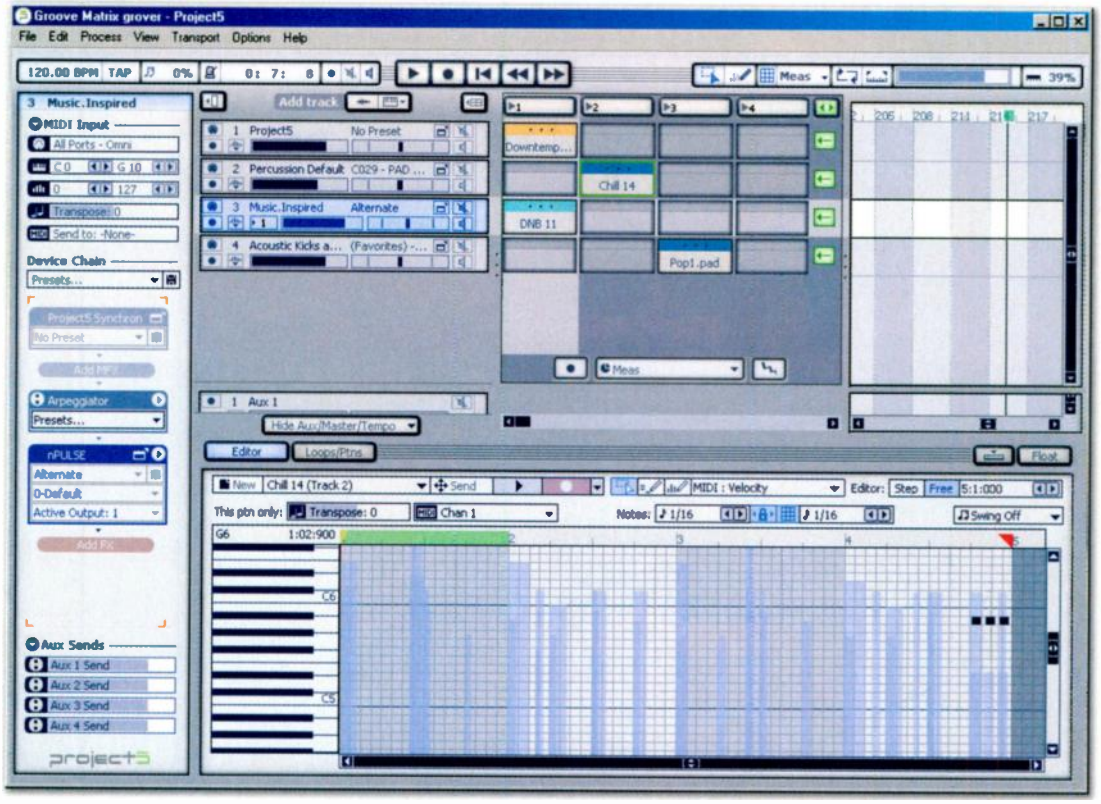

The Groove Matrix allows you to play your loops and patterns live.

bearing on the good old-fashioned sample playback of Elements.

A pane at the upper left takes care of all the common sampler housekeeping functions like keyboard range, transpose and so on. From there, the sample goes into a bit reducer/decimation effect, a multi-mode filter and distortion unit. Below that are the EQ and delay lines for each Element. The bottom pane contains modulation for pitch, filter cutoff, resonance, pan and amplitude. Each modulator page contains both a multi-point envelope generator and host-sync'able LFO. A mixer for each Element resides at the very bottom with on/off, volume/pan and global effects and output limiter.

All this control wouldn't make much difference if the samples themselves weren't any good. They are. You can load in one of Cakewalk's complete multisample presets, or load in single samples and roll your own four-voice monstrosity. There are 17 preset categories, from basses to trance, and covering the usual assemblage of instruments in between. Many categories contain 100 or more presets, so there is plenty to work with. As mentioned above, the pianos and strings are very tasty. While not measuring up to the specialist libraries available, they should work fine as long as you're not planning on giving a solo classical recital. The strings, especially the 'cellos, have plenty close-miked rasp in them which blends together in the larger string sections. If you find the rasp too much, there are plenty of other synths out there that make 'pretty' string sounds.

The Dimensions category of sounds shows off the evolving nature of the synth rather than the sheer size of the sample set. It contains almost 200 presets which run the gamut from pretty to scary. Many of these would be fine for movie scoring by themselves. Some of them, like many multi-layer synths, are simply too much sound at once, but the on/off switch lets you hone in on the most important Element(s) or bring in an alternative sample that better fits the song.

There is also a pop-up MIDI matrix for assigning controls to destinations and a vector mixer, which mixes the four Elements on a two-dimensional plane, providing shades of the Prophet VS or Wavestation. In fact, if I have any complaint with *Dimension*, it is that I want more. I am a greedy so and so, and with its vectoring and waveshaping capabilities, *Dimension* is well placed to supplant several classic hardware synthesizers. I asked Cakewalk about this, and they had no comment except to expect some surprises. I'm keeping my fingers crossed, but in the meantime the four voices, 20 separate envelopes and LFOs, and more voice DSP than you can shake a sound with will have to do. If you like sound design, *Dimension* is the perfect way to keep off the streets and out of trouble, at least for a while.

Matrix Revolutions

The final major addition in *P5* v2 is Cakewalk's Groove Matrix, which might seem familiar to users of Ableton *Live*. It allows you to place loops and patterns into cells that correspond to tracks vertically, and each loop or pattern plays when triggered, with shorter loops and patterns repeating while the longer ones play through. Each cell has its own MIDI remote control selection with learn function, so you can set your favourite controller to trigger it, and each cell has options for playing in time with a song, play from start, or one shot. You can play the Groove Matrix and record the results to each track, or use it live. Using *P5* this way, DJs and dance musicians can riff the night away. And not just with audio clips, but with all the *P5* v2 and VSTi synths as well.

That just about wraps up the major new features in *P5* version 2, though there are other more minor additions such as tap tempo and a Freeze function borrowed from *Sonar*. I didn't mention installation, because there were no issues with installation or recognition with my other programs and hardware. Cakewalk provide each copy of their software with a serial number, so there are no dongles or other troublemaking hard- or software. No doubt that raises the number of lost sales to the crackheads out there, but it saves big headaches for paying customers. A shout out to Cakewalk for that.

Overall, *P5* version 2 is not the cheapest program of its kind, but it will turn an entry-level DAW into a recording soft synth on steroids. And if you're already a *P5* user, don't even stop to think about upgrading — the £49 cost wouldn't buy the sample collection, much less the synth to play them with. The second incarnation of *P5* is not just another 'me too' program: it sets a new standard for the rest of the loopers out there. SOS

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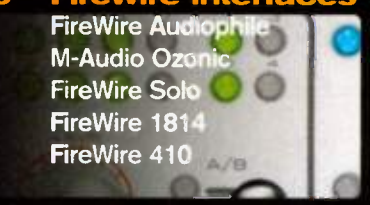

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Arturia Minimoog V

Version 1.5 Virtual Analogue Synth For Mac & PC

Although we only reviewed this Minimoog-emulating software instrument four months ago, Arturia have now thoroughly redesigned it, taking into account many of the points made in the original *SOS* review. So let's take a second look...

Gordon Reid

Like you, I'm an enthusiast. I love keyboards, synthesizers, recorders, effects, and anything else that allows me to impose my musical ideas on anyone careless enough to listen. Since the early 1970s, I've wanted every piece of equipment I've owned or played to sound great and do everything that it promised... and more. Sometimes I've been happy, other times frustrated, and it pains me when something fails to live up to expectations. Furthermore, I take no delight in expressing that dissatisfaction, particularly when I know that the people involved have tried hard to develop a good product and market it at a competitive price. So when I reviewed Arturia's *Minimoog V* (or *MMV*) earlier this year, I really wanted it to be superb. Unfortunately, a number of serious problems presented themselves, so I described these as fairly as possible, and thought that was that.

However, following the publication of the review, the people at Arturia got in touch. They explained that they were working on a new version which they hoped would address many of the points that I (and others) had raised. The result is version 1.5; a free upgrade from www.arturia.com/en/minimoog/miriupdates.php. So, did Arturia get it right this time? Let's find out...

It's simple to obtain v1.5 — you just click on a link at the above-mentioned page on Arturia's site. Once you've downloaded and run the installer, you will be prompted for the ▶

SOUND ON SOUND

Arturia *Minimoog V* (version 1.5)

pros

- The oscillator waveforms are now extremely authentic.
- The filter response is now much *more* authentic.
- The envelope response is extremely fast, and more authentic than before.
- The oscillator 'drift' mechanism no longer produces abrupt changes of timbre.
- The glitches have gone.
- It's a Minimoog!
- Or rather... it's a Polyminimoog!

cons

- It remains very CPU-hungry.

summary

Version 1.5 of *Minimoog V* not only looks like a Minimoog, it now emulates one. It's also an excellent, although power-hungry, polysynth in its own right. If you liked version 1.1, you're going to *love* this. If you were deferring a decision until the bugs were ironed out, you can now stop waiting.

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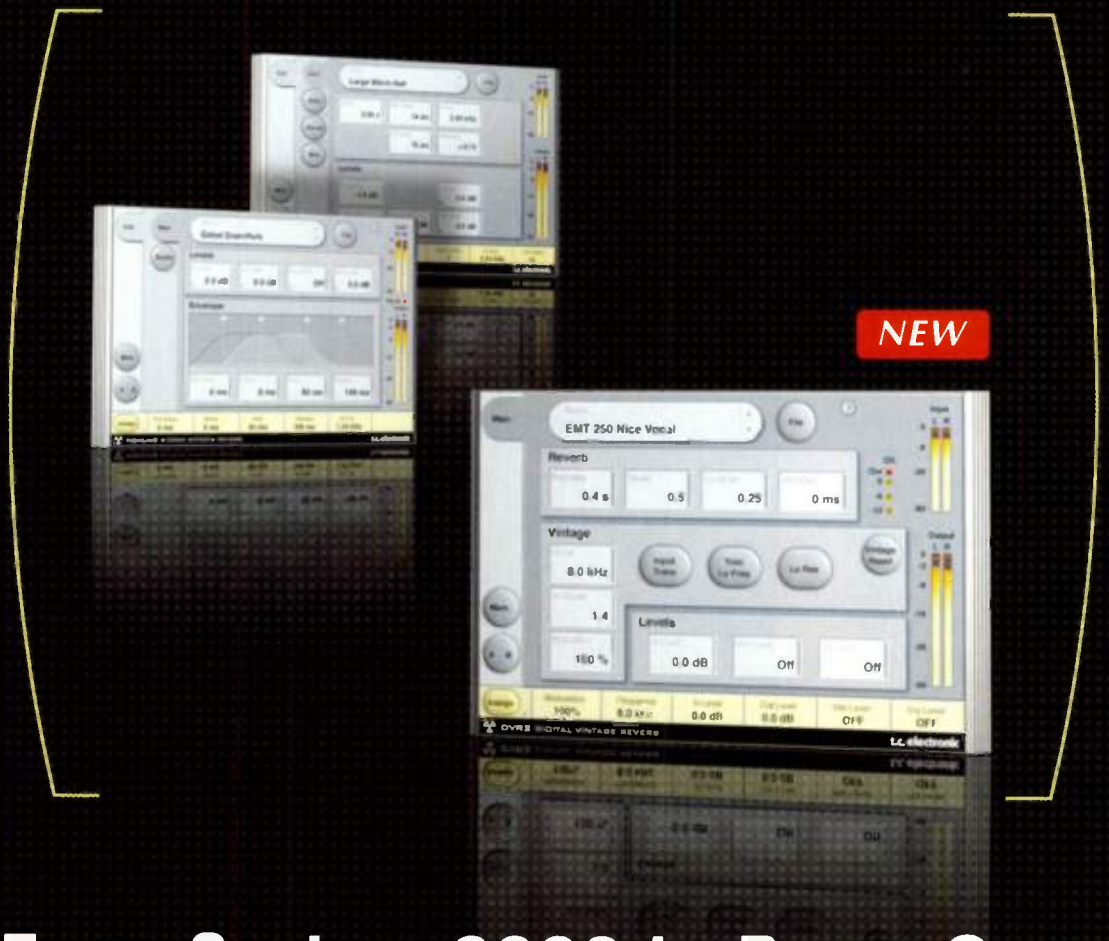

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original CD, and once you've inserted this (a sensible anti-piracy precaution), the new version will appear soon after.

At first sight, it appears that v1.5 is installed alongside earlier versions, but this is not the case. Although my Powerbook now has folders containing v1.0, 1.1 and 1.5, it invokes the v1.5 audio engine no matter which front end I launch. Happily, this addresses the same user files as the earlier versions, so patches created on v1.0 and v1.1 are immediately available in v1.5. On the other hand, some significant changes to *Minimoog V*'s oscillators and filter mean that these patches do not always sound the same on the new version. All of which brings us neatly to...

The Oscillators, Mixer & Filter

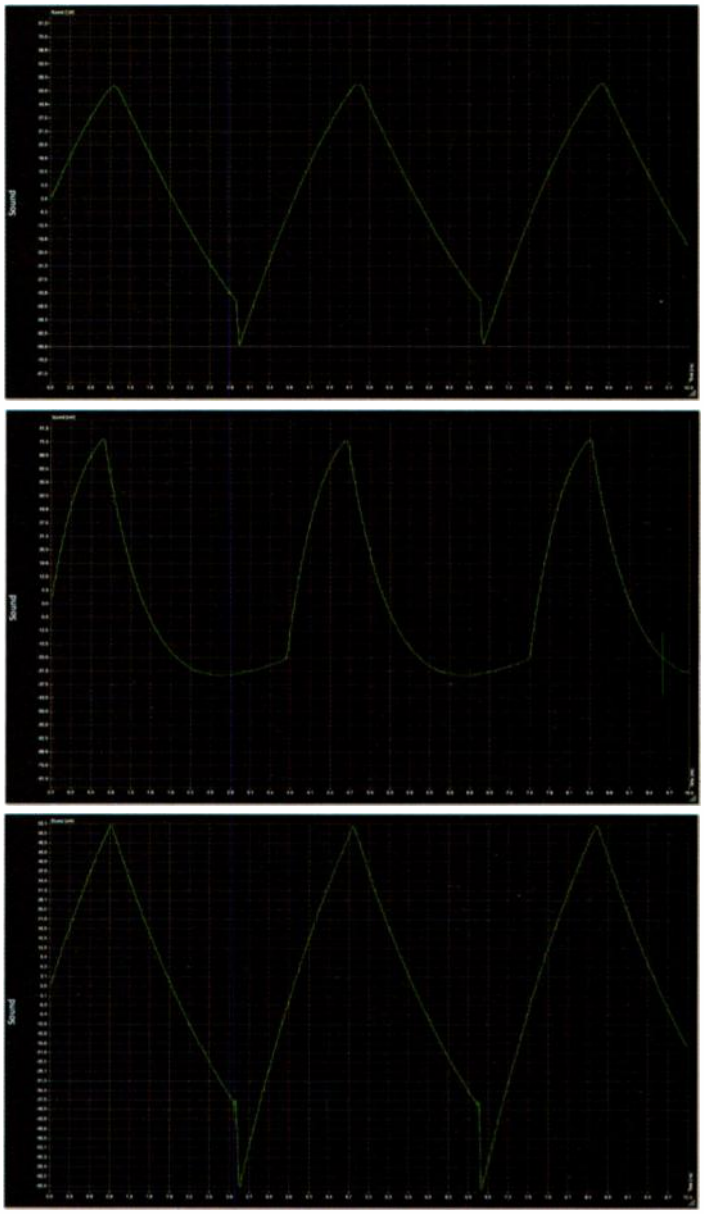
When testing the sounds of the oscillators in v1.1, I found that the square wave sounded much 'hollower' than on my Minimoog. This was because Arturia's wave was too close to the ideal; real Minimoogs produce non-ideal square waves with duty cycles that are not exactly 50 percent. In *MMV* v1.5, the square wave has been modified, and its default duty cycle is now 48 percent. The result is that the sound is amazingly close to that of my Minimoog, from the bottom of the keyboard at 32' to the top at 2'. Nonetheless, if you want perfect square waves, you can have them. As I noted in March, *Minimoog V* allows you to adjust the duty cycles of its pulse waves, so the choice is yours.

A more significant problem in v1.1 lay with the ramp+triangle wave, which was very different from that of the Minimoog itself. The improvement in v1.5 is clear to hear and to see — see the three graphs on the right. The first of these shows the ramp+triangle from my Minimoog, while the second shows the same wave produced by *Minimoog V* version 1.1, as reviewed in March. The third graph is the same wave from the updated *MMV* v1.5, and as you can see, it's all but identical to the real thing. Sonically, the improvement is remarkable.

A lesser error lay in the triangle wave, which was significantly 'woodier' than on my Minimoog. Again, a direct comparison with my Minimoog shows that Arturia have sorted this out in v1.5, and it would be a braver man than I who would now claim to be able to distinguish the software synth from the lump of wood and metal. In addition, the ramp wave settings now produce ramp waves, and the sawtooth wave settings now produce sawtooth waves (on version 1.1, the polarities were swapped). In short, this is all excellent.

While I am happy that *Minimoog V*'s oscillators are now a remarkable recreation of the Minimoog's, the same is not quite true of the mixer. As before, this exhibits a strange effect whereby, if you switch oscillators off and on again, their relative phases jump instantaneously to new values, thus changing the tone of multi-oscillator sounds considerably. However, in a marked improvement over v1.1, the new version exhibits a slight drift so that multi-oscillator timbres change gently over time. This is as it should be.

Another important area in which earlier versions of *Minimoog V* fell short of the Minimoog's distinctive character was in the nature of the filter; both in its response to Emphasis, and in the way that it reacted to its dedicated contour generator.



The ramp+triangle wave generated by my original Minimoog (left) did not much resemble the wave of the same name generated by *MMV* v1.1 (centre). However, that from v1.5 (bottom) is much improved.

Test Spec

- 1GHz Apple Mac G4 with 1GB of RAM running Mac OS v10.2.8.
- Arturia *Minimoog V* v1.5.
- Minimoog Model 'D' (serial number 11235).

The good news is that v1.5 is much closer to the original. Firstly, its maximum cutoff frequency, while not in the supersonic range of my Minimoog, is now up from 18.6kHz to 19.8kHz, which is a small but welcome improvement. Secondly — and far more significant — the Emphasis is much improved and, as on the Minimoog itself, this now decreases as the cutoff frequency drops lower and lower into the bass frequencies. What's more, the amplitude of the self-oscillation obtained with maximum Emphasis is much more realistic, starting at zero amplitude in the deep bass, and rising with increasing frequency. The point at which self-oscillation begins is not the same as on my particular Minimoog (it's about an octave lower) but I'm happy to accept that it now lies in the range of responses that one would obtain from a selection of real Minimoogs.

The next improvement relates to the

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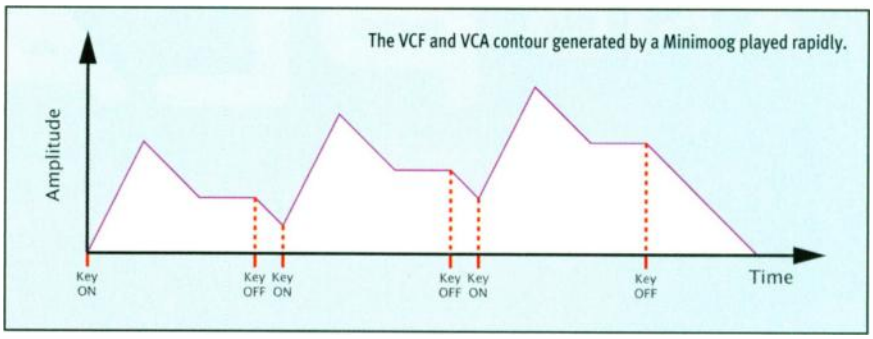
'climbing' VCF/VCA contour that I drew and explained in my original review in March, and which I've reproduced here as the graph on the right. Version 1.5 of *MMV* now generates this, although the response is still not quite right. To be precise, the 'climbing' effect in version 1.5 of *MMV* is only obtained when both the filter and amplitude contours have non-zero Decay times. This is not correct; you should be able to open the filter by playing quickly even when the amplifier contour is 'square'. Nevertheless, Arturia's amplifier and filter now respond in ways that — for many patches — let you play *Minimoog V* as you would an original Minimoog.

While on the subject of the contours, an instantaneous Attack/Decay envelope still does not produce the characteristic click of a Minimoog when all five audio sources are off, but the envelopes thus generated are now even faster than in v1.1, with an Attack/Decay duration in the region of two milliseconds. This is remarkably rapid. I don't think I've ever measured an analogue synth with a response that fast, so *Minimoog V* now sounds very snappy indeed!

Other Fixes & Niggles

In my review of v1.1, I pointed out two further errors that plagued earlier versions of *MMV*. The first concerned a strange method of emulating oscillator drift, in which the relative phases of the oscillators, and therefore the timbre of the sound, would jump after every handful of notes played. This error has been eliminated in v1.5, and you can hear (and see on an oscilloscope) that the oscillator drift is now gentle and free running, as it should be. At the same time, Arturia have also tweaked the Unison mode, adding some inter-oscillator drifts to produce what they call 'a fatter and larger sound'. To my ears there is more detuning and drifting going on than before, so I found myself reducing the values of appropriate parameters to bring my patches back to where they were in v1.1.

The other error in *MMV* v1.1 was the generation of random clicks when the envelopes were set to be as near instantaneous as possible. These clicks appear to have been eliminated. The same is true of the digital overloads that I experienced in v1.1. Other than when I created polyphonic patches that demanded too much processing power (which, to be honest, wasn't hard on a 1GHz Powerbook), or when I reduced the latency too far, no glitches occurred.



Inevitably, there are a handful of issues that Arturia have not addressed in this release. For example, the response of the pitch-bend wheel still lags the physical movement of an external wheel by a noticeable amount, slewing to the final point of travel rather than following the wheel movement. That's one for v1.6, chaps... And likewise, the soft clipping is still not right. Invoking this increases the peak-to-peak voltage (and, therefore, the level) of the output by about 10 percent.

"The reaction of many manufacturers would have been to defend their product to the death. In contrast, Arturia have corrected all the major problems."

Staying with clipping for a moment, Arturia claim in their v1.5 release notes that the CPU demands exerted by the soft-clipping feature have been reduced. To test this, I set up a polyphonic sound that generated a digital overload consistently on the eighth note. I then switched on clipping, and the overload occurred on the third note. This means that invoking soft clipping trebled the amount of processing power required. Clearly, this is still a feature to be used with great care!

Other issues remaining to be addressed include the audio rate FM of Oscillator 1 by Osc 3, which still isn't quite the same as on my Minimoog. Most obviously, the maximum modulation depth is much lower on *Minimoog V* and, although I'm not overly concerned by this, it would be nice to see whether this could be improved. Finally, I note that *Minimoog V* still suffers from parameter stepping, although this is only really discernible if you hunt for it, perhaps by adjusting the cutoff frequency knob when the filter is self-oscillating. I'm confident that this could be reduced or even eliminated by parameter interpolation (as it is on some virtual-analogue keyboards) so I hope that Arturia will address this.

Conclusions

In March, I made the point that although *MMV* looked like a Minimoog on screen, it didn't really sound like one. Today, it sounds and responds like the hardware original. In fact, it's now a remarkable imitation that I would happily use and be confident that you would never realise that it was not the 'real thing'.

Secondly, *Minimoog V* remains a superb polysynth that exhibits great depth and character. OK... it's still hungry for processing power, so it's not ideal for people with older computers. Indeed, I think that overloading a 1GHz Mac G4 processor with just three notes is some achievement, but Arturia are hardly alone in this, and judging by its suggested minimum specification, Gmedia's forthcoming *Minimonsta* emulation threatens to be even hungrier, so maybe I should not labour the point.

In conclusion, I can only commend Arturia for responding so quickly and positively to the criticisms of earlier versions of *Minimoog V*. The reaction of many manufacturers would have been to defend their product to the death. In contrast, Arturia have corrected all the major problems and undertaken to look at the issues that remain. As a result, *MMV* is now an excellent emulation of the Minimoog, and the improvements have been achieved without sacrificing any of the good things in earlier versions. SOS

Downloads

Downloading *MMV* version 1.5 is not for the faint-hearted using 56K dial-up connections. The update for Windows is 17.1MB in size, whilst that for Mac OS 9 is a modem-busting 40.6MB. The OS X updater is only slightly slimmer and trimmer at 40.1MB.

information

£ The Arturia *Minimoog V* v1.5 upgrade is free of charge; v1.5 when bought new is £149.99 including VAT.
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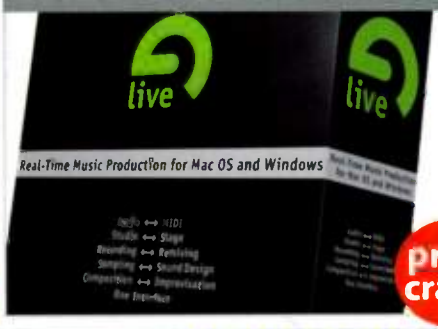

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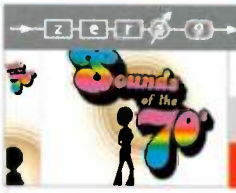

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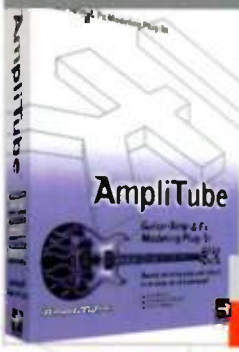

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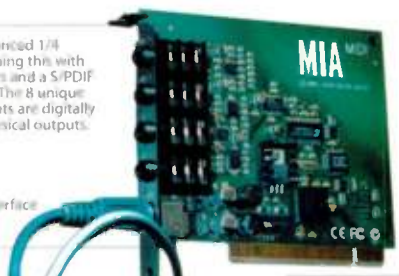

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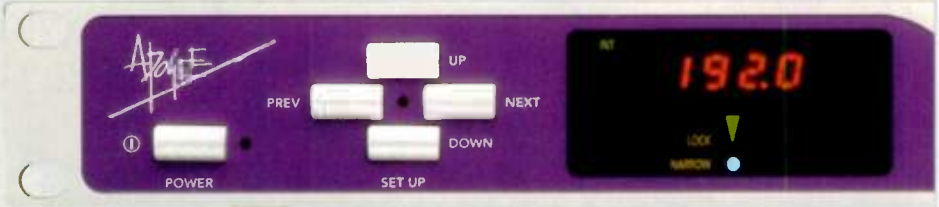

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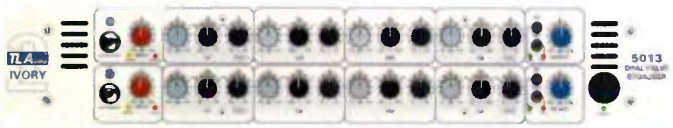

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Digital Multitracker

Boss BR1200

Tom Flint

This latest multitracker from Boss boasts powerful effects processing and built-in USB facilities.

Boss have been developing their BR range of multitrack recorders for several years, every so often replacing aging models with improved versions. At present, the BR1600 (reviewed in *SOS* May 2004) sits at the top of the range, the BR1180 v2 in the middle, and the BR864 at the bottom. The BR1200 reviewed here seems to be a replacement for the BR1180 v2, and its release coincides with that of the BR900, which I suspect will supersede the BR864.

The biggest reason for the upgrade must surely be to introduce a USB interface, which is now a feature we've come to expect from a modern digital multitracker. Being able to make computer backups of Song files or stereo mixes via USB is welcome, but there are other advantages too, not least the prospect of being able to shift samples back and forth when using a complementary computer-based software editing program. Nevertheless, a 'stand-alone' multitracker, by definition, should single-handedly provide all the tools necessary to finish an album or demo. Many people spend their days working on a computer, so when they begin recording music they don't want to be faced with more of the same.

Key Features

The BR1200 has 12 tracks, each with its own set of 15 virtual tracks that can be used for

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pros

- USB data and audio backup, as well as sample import/export.
- Plenty of creative effects and processors.
- Pretty easy to use given the feature set.
- Comes close to being a complete studio in a box.

cons

- Only two-track simultaneous recording.
- No expansion options.
- Using the rhythm machine, bass synth, and sampler reduces the number of audio recording tracks.
- No solo function.
- You can't use all the different effects sections at the same time.
- Backing up projects via USB is disappointingly slow.

summary

A neatly designed multitracker which makes it possible for the solo performer to build complete compositions to a high standard without having to hire a band.

storing alternative takes. That makes a total of 192 tracks, which should be enough for even the most indecisive performer. There isn't a fader for every track, though, just 10 plus a master level fader controlling the output signal. This is because tracks 9+10 and 11+12 are fixed as stereo pairs, and therefore require just one level control each. The first pair is intended to record stereo sound sources such as keyboards, sound modules, and drum machines, whereas tracks 11+12 need to be reserved for stereo mixdowns.

The large 40GB drive means that compressing audio files to a small size is not necessary, so the BR1200 operates at the commercial CD playback standard of 16-bit, 44.1kHz. Arguably, the most significant limitation of the product is that it only records two tracks simultaneously. There are no hardware opportunities for adding input expansion cards, so anyone wanting to multi-mike a drum kit or band, for example, will be unable to do so. To help matters, Boss have included a stereo drum machine with its own pattern sequencer and song arrangement facility, and you can also program in bass sounds from an onboard synth.

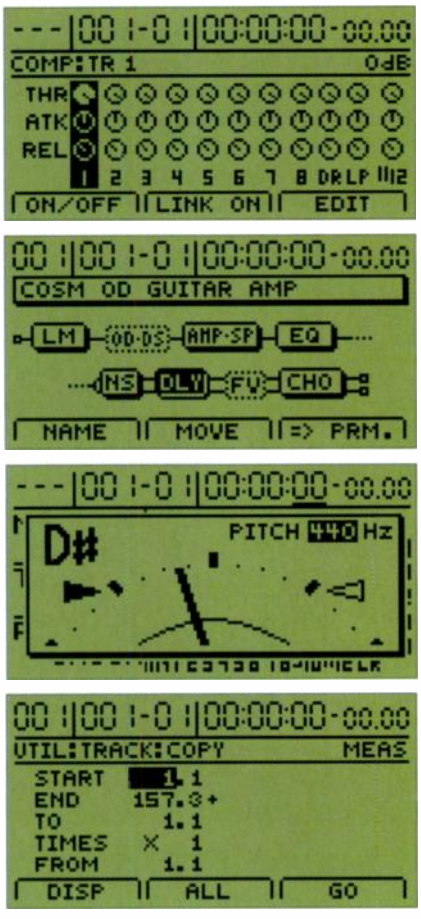
Boss seem to be targeting musicians who build their tracks bit by bit, perhaps using loops and samples as a foundation for overdubbing vocals and guitars. To this end, the multitracker has its own sampler, which makes it possible to cut audio into segments or Phrases, so that they can be sequenced and looped in time with a composition. Phrases can be taken from an audio track, loaded from CD-ROM using the onboard CD-RW drive, or imported via the USB connection.

When it comes to recording guitar and vocals, the Roland/Boss COSM (Composite Object Sound Modelling) effects offer a selection of amplifier, cabinet, and preamp simulations, as well as a good collection of standard reverb, modulation, and distortion effects. There's even an in-built tuner, so that a guitarist will require nothing other than their six-string and a jack lead to get started. Having replaced most of the band and their equipment, the BR1200 courts the solo performer further by providing a three-part vocal harmony generator in its Vocal Tool Box, which also includes a pitch-correction program for tuning wayward singing.

I/O & Interfacing

Although I/O is not one of the BR1200's strong points, the CD-RW drive and USB connector lessen the need for multiple hardware connector formats. Firstly, proprietary Song file backups can be saved ▶

onto both CD-RW media and computer hard drive. It is also possible to save individual tracks, regions of audio or stereo mixes as WAV or AIFF files for use in other audio programs. Alternatively, the CD drive allows the creation of normal stereo audio CDs for playback on domestic CD players. Usefully, the CD-RW drive doubles as a vehicle for loading Standard MIDI Files and drum and loop sample files into the recorder. For ease of use, Boss have provided three dedicated hardware CD-RW buttons labelled Audio CD Write/Play, Data Save/Load, and Loop Phrase Import. As for USB, the BR1200 is compatible with any Mac running OS 9.1 and upwards, or any PC running Windows ME, 2000, or XP.



A selection of the BR1200's display pages (top to bottom): channel compressor settings; effects-block setup; tuner; and the audio copy function.

On the front is a high-impedance instrument input and a headphone jack with its own volume knob, but it's round the back that all the rest of the connectors live. To the far left is the power input which, unfortunately, requires an ungainly power adaptor. Past the on/off switch is the aforementioned USB port, plus a pair of MIDI sockets labelled In and Out (there is no Thru). These make it possible to control things like the internal drum sounds from an external keyboard, and allow MIDI instruments to be run in sync with the recorder using MIDI Clock or MTC. Next is an optical S/PDIF output, offering a method of recording to digital media such as DAT without subjecting the signal to the D-A conversion process. In the centre are two jack sockets, one for connecting an expression pedal and the other for a footswitch. The former works with the Wah, Vibrato, and Pitch Shifter effects, and acts as a volume control in the effects loop, while the footswitch can be used for punching in and out when recording.

The main audio output is served by a pair of unbalanced RCA phono jacks, which are accompanied by a pair of line inputs. Lastly, there are two XLR input sockets which can be supplied with 48V phantom power by activating a software switch in the Utility menu. Unbalanced inputs are also catered for by two quarter-inch jack sockets.

The Effects Engine

When it comes to effects and processing, the BR1200 has a lot to offer. Firstly, there are the COSM insert effects, which can be applied to the two input channels during recording. The effect algorithms are divided into fairly self-explanatory categories labelled Guitar/Bass, Vocal, and Line, each with its own button. Algorithms are made up of a combination of effects, carefully chosen, arranged, and named for specific recording tasks.

Having selected a category, a press of the conspicuous COSM Effects button opens an on-screen menu page from which a new preset or user patch is chosen. Pressing the F1 key (Edit) summons a diagram to the display, showing the arrangement of the current algorithm's effects blocks. The Cursor keys are used to select an effect, and the Time/value wheel turns it on/off. If an effects block is highlighted, pressing F3 calls up its editable parameters for adjustment.

Once audio has been recorded to tracks, EQ and compression can be applied, along with a selection of loop effects. Pressing the Compressor button brings up a screen showing the threshold, attack, and release settings for each of the 12 tracks. It's possible to pair tracks (for stereo processing), and channel compression can be bypassed where necessary. The EQ page is much the same, offering high and low shelving bands and a mid-range peak. The bands can be swept over 40-1500Hz, 200Hz-4kHz, and 500Hz-18kHz respectively, the mid-band's Q value adjustable over a 0.3-16 range. Each band offers up to 12dB of cut or boost.

In The Loop

The choice of loop effects is limited to three reverbs, two delays, and a chorus. The first delay is pretty standard, with a time value ranging from 10ms to 1s. The second is designed to emulate double-tracking by having a short 0.5-50ms range. The chorus and delay live on the same send/return loop and cannot be used together, but the reverb

Speaker Modelling

One of the more unusual processing tools offered by the BR1200 is the Speaker Modelling Kit, designed to allow mixes to be heard through an emulation of a well-known studio monitor. It is wishful thinking that a little software trickery can turn a budget pair of boom boxes into a set of expensive studio monitors, but at least the facility provides a way to demo a mix through approximations of TV speakers, small radios, professional nearfields, and so on. Unfortunately, the settings are optimised on the understanding that Roland's own DS-series digital monitors are connected, so anyone using a different variety of monitor is likely to get unpredictable results!

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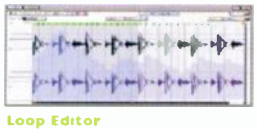
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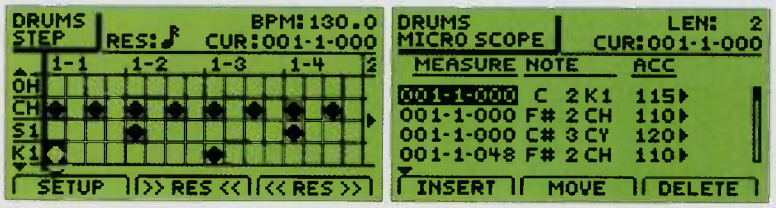
Getting Rhythm

One of the things that sets the BR1200 apart from many multitrack recorders is its comprehensive programmable rhythm section, comprising a bass, drum, and percussion sequencer, plus a sample loop arranger. Such facilities allow solo composers to build up entire compositions without a band, and therefore suit the bedroom studio owner very well.

Running the show is a basic step sequencer with a drum grid in which drum or percussion notes can be entered. It's also possible to record a performance in real time by using the track selection buttons as drum pads, or by triggering the internal sounds from an external keyboard connected to the MIDI input. As with any sequencer, there is an event list function for precise performance editing, and there are some quantising options for adding a particular feel to the pattern, or for sorting out wayward playing. Sadly, though, as with the Roland VS2000 I reviewed last year, there is no way to pan drum sounds, even though the drum track is a stereo one.

Standard MIDI File (SMF) patterns can be loaded via the CD-RW drive, and so can drum sounds themselves. The onboard sounds are actually reasonably good, though, and are divided into kits labelled STD1, STD2, Room, Heavy, Jazz, Hip Hop, House, Reggae, and 808. There is also a selection of synth bass sounds to choose from, which can, again, be programmed into patterns using the track buttons.

Loop phrases can either be taken from a performance, or imported from a CD-ROM sample collection. Up to 400 phrases can be stored in eight banks, and as many as 190 are pre-installed. Loop phrases can be assigned to the track buttons and triggered just like a drum sound, and are arranged in the same way. To a certain extent, the BR1200 can tempo-match phrases, although real-time audio stretching requires a lot of processing, so it is better to adjust them off line, effectively resampling the loop to the correct timing.



has its own send and may be used simultaneously with any one of the other effects. Reverb options have been kept simple so that there is a pick of just Hall, Room, and Plate patches. Listening to a long reverb tail revealed that the algorithms are not of the highest quality, although in practice they're still very usable. Each reverb type has quite a number of controls, so tailoring the sound can be done quickly and easily. I particularly like the way you can adjust the reverb's high-frequency damping in terms of 'Dark', 'Norm', and 'Bright' labels, instead of having to juggle percentage figures.

Because many multitracker owners want to produce finished CDs straight from their recorder, it is becoming common to find onboard mastering tools including multi-band compressors, stereo limiters, and wide-band EQ controls. Indeed, the BR1200 does have just that in its Mastering Tool Kit, so creating a commercial release is a possibility, although there is no facility for adding CD sub-code information.

Although the various Tool Kits, effects, and dynamics controls form an impressive array of processing options, only a few can actually be used at any one time! For example, neither the individual track EQ or the loop effects can be used when the Mastering Tool Kit is in play, and if the channel compressors are active then the Vocal Tool Box, Speaker Modelling, and Mastering Tool Kit are out of action! Thankfully, Boss have programmed each section so that it automatically switches off if a conflicting one is called into use by the press of another button. Although such no-fuss measures are welcome, they don't change the fact that the multitracker has limitations. For example, before using the Mastering Tool Kit on a stereo mix it is necessary to mix down using the active channel EQ, send effects, and compressors. Only then can the Mastering Tool Kit be turned on, at which point the mix will need to be bounced again to a spare pair of virtual tracks.

Setting the practicalities of operation aside for a second, it's worth noting that the various effects and processors do sound very good, albeit after a little customisation in most cases. As for the insert effects, there is something for all

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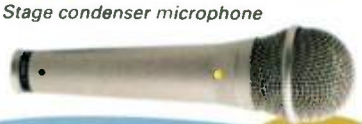
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occasions, including all the usual modulation, delay, and distortion effects one would expect to find in a dedicated effects processor. Guitarists and bassists have a variety of speaker and amplifier simulations to choose from, and enough control to make most budget outboard obsolete. The choice of insert effects is impressive, and it could well take a lifetime to try them all out during the normal course of recording!

Although there isn't an internal sequencer for recording fader moves or EQ adjustments, it is possible to save up to 100 Scenes per Song, and then to recall them using associated Marker points placed in key positions. Furthermore, a certain degree of remote automation is possible if a MIDI sequencer is connected, including the playback of fader moves and effects patch switching.

The BR1200 does offer a set of digital editing tools, although they are hidden in the Utilities menu. Unfortunately, audio can't be examined with a waveform display, and there are no processing tools for such things as time-stretching or reversing audio. It is, however, possible to Copy, Move, Exchange, Insert, Normalise, Delete, and Erase.

The BR1200 On The Job

Potential buyers of the BR1200 will be keen to know if the product is as immediate to use as it claims. The manual introduces its subject as having been designed for beginners, and compares its ease of use to that of a tape recorder. Nevertheless, with its 362 pages of fairly economically-written text, the handbook itself will worry some beginners!

It is certainly true that making a basic recording is extremely easy. Given that there are only a couple of inputs, it's just a matter of arming the destination track. The array of dedicated hardware buttons also makes it pretty simple to access and apply processing. The screen is perhaps a little small, making it hard to judge meter levels, but it does attempt to provide as much information as it can in a small space. Nevertheless, when adjusting an effects algorithm, for example, scrolling from one page to another to access the various parameters becomes a little bit tiresome, even though the software-assignable function keys and knobs are assigned cleverly to each on-screen effect.

The rhythm section is one of the least intuitive bits of the BR1200, mainly because of the inherent complexity of the process of building drum samples into patterns, editing and synchronising loop phrases, programming bass lines in a musical way, and then arranging the whole lot into a cohesive song structure. Although it is possible to record to a metronome and then fill in the arrangement afterwards, anyone wanting their overdubs to interact with the rhythm part will need to sort out their arrangement straight away.

The multitracker's biggest design fault (one which it shares with other BR products) is the way that the undeniably useful rhythm facilities can only be used at the expense of the playback of three of the audio tracks. If, for example, at some stage during recording it becomes desirable to use the onboard bass synth or drum loop sequencer, then anything which has already been recorded on tracks eight or 9+10 becomes unavailable for mixing, although the audio on those tracks still remains intact. What's more, as mentioned above, tracks 11+12 need to be kept free for mixdowns, further reducing the practical track count. A further compromise is that loop phrases share the same mixer channels as the drum track, and therefore have to be balanced on screen. Although the adjustment can be made quickly, it's not quite the same as having dedicated mixer channels.

Despite all this, the various hardware controls and on-screen menus work well together, so that once the principles of operation are understood, the rhythm section becomes quick to use. There's also an EZ Compose function which offers a limited menu of settings so that arrangements of drum and bass patterns can be constructed more rapidly.

The BR1200 is a little slow in some areas, and starting up takes a whole minute. The USB implementation is the worst offender though. Converting files into WAV or AIFF format and

then porting them into the computer is fast enough, but I nearly choked on my tea when I saw how long it was going to take to back up a Song file to my PC's drive. Even after optimising the Song file, it looked set to take an hour and a half! Thankfully, backups to CDs can be made in only a few minutes. There are also lengthy delays following every command, making USB use in general rather frustrating.

Operating noise is very low, although the hard drive managed to vibrate my desk, creating a significant low-frequency drone! A block of foam between the two rendered the machine almost silent, however. I also found the line outputs noisy, but at least the problem did not affect the recorded audio itself. One final niggle is that, as with too many budget multitrackers, there is no track solo function — only mute buttons. This means, for example, that there is no quick way to check a mixdown recorded to tracks 11/12.

Final Impressions

Although the BR1200 is designed to allow its users to get on with recording without becoming bogged down in engineering issues, there is so much sophisticated technology on board that it remains quite a complex bit of kit. This fact aside, anyone who takes the time to get their head around its basic rationale will find the BR1200 pretty straightforward. Fulfilling its brief, the BR1200 does stand alone without needing much external hardware. I didn't experience any nasty computer-style glitches or crashes during use, which is sadly becoming a rarer quality in digital hardware these days.

Creating a rough rhythm track, bass line, and loop sequence takes no time at all, and recording is just a matter of plugging in, pressing a button or two, and playing the part. Building a detailed rhythm arrangement does take a little longer and requires some planning, but it's still a reasonably straightforward process.

As with most budget digital multitrackers built for speed and simplicity, the mixer is basic, lacking most of the flexible bussing found on more expensive digital mixers. Then again, without much in the way of I/O, and with no expansion options, the mixer doesn't really need to be any more complex. However, the lack of a solo function is certainly one cut too far in the mixer department, and the fact that the bass, drum, and loop facilities take up valuable tracks is a very bad idea. The powerful effects and processing options are really the jewel in this particular crown, even though the multitracker has to juggle them around a bit.

To sum up, this is not the most powerful product in terms of features, tracks, and processing allocation, but it performs extremely well and efficiently, making it possible to create high-quality demos or reasonably competent album and single releases using very little outboard equipment. SOS

Sizing Up The Competition

Going by the number of record tracks, the most obvious competition comes from Korg's D1200 MkII, which is similarly priced in the UK. Although Korg's multitracker lacks the sophisticated rhythm features of the Boss, it can record four tracks simultaneously, has a slightly larger mixer, and offers 24-bit recording. It also challenges the COSM effects by employing Korg's own REMS modelling system. Yamaha's aging AW16G and Tascam's 2488 also present serious competition due to their low retail prices, although both concentrate more on serious mixing facilities and less on the hands-on Boss/Zoom-style rhythm sequencer tools.

However, it is Zoom's MRS1608 16-track digital multitracker which casts the biggest shadow by offering a wealth of features for not very much money. Like the BR1200, it provides a stereo drum machine (but with real soft pads to hit) and bass synth, both of which can be sequenced and sync'ed together with the recorded audio. What's more, it has a Phrase Loop facility similar to that of the Boss unit, and a FAST compose facility in place of the EZ Compose facility.

Boss are renowned for their guitar effects, but so are Zoom, who have added amp modelling and a tuner to their effects section so that guitarists/bassists can plug and play. Where the Zoom scores most points over the Boss is in its lack of track compromises. The rhythm section is additional to the 16 tracks, and there is a separate stereo mixdown track too. Even more importantly, the MRS1608 matches the pricier BR1600 by allowing up to eight tracks to be recorded simultaneously.

information

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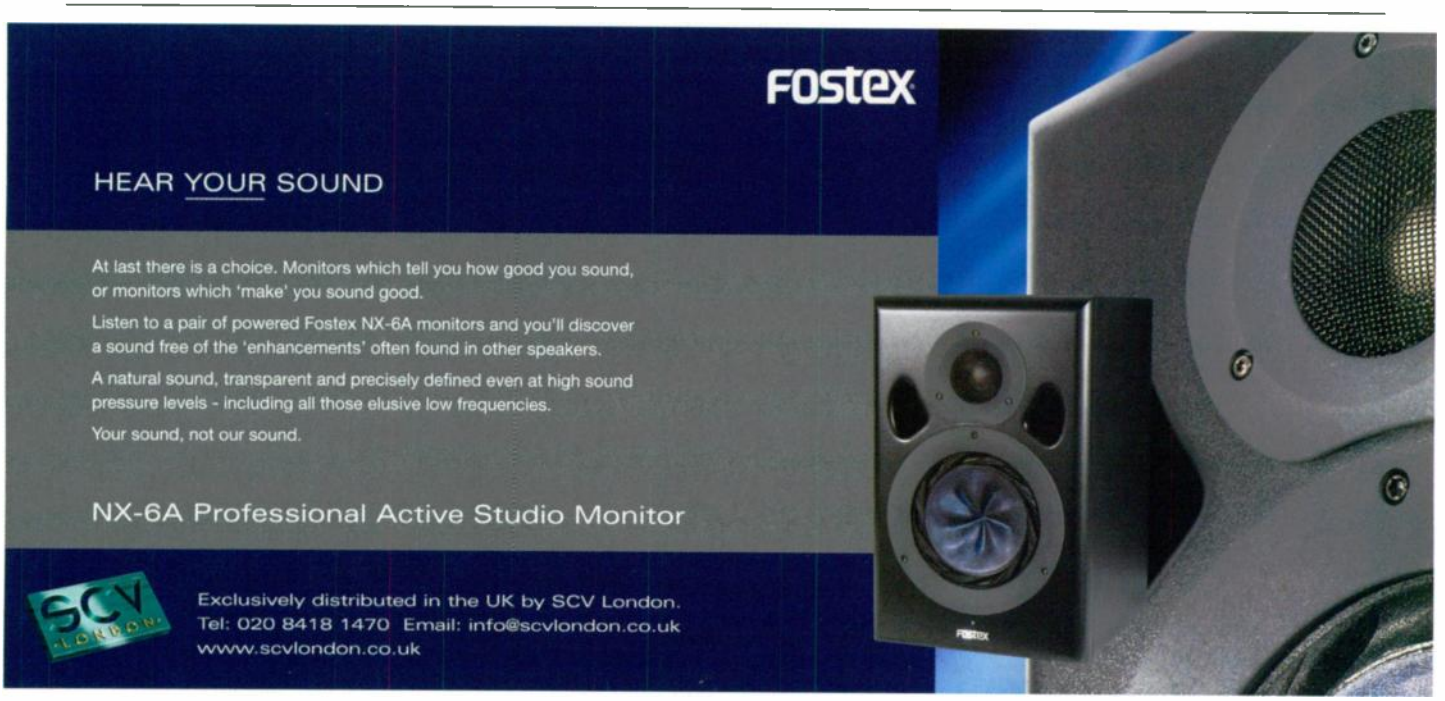


Recording The Neptunes

Andrew Coleman & Hovercraft Studios

It's not a bad gig, being chief engineer to the world's hottest production duo. But it takes a lot of hard work to keep up with the Neptunes...

Dan Daley

Andrew Coleman has what many would consider a dream job: primary engineer to hitmaking duo Pharrell Williams and Chad Hugo, better known as the Neptunes. And, as you might expect, he loves every minute of it, even though 15-hour days in the studio are not unusual, and Coleman logs as many miles as a touring musician, following the Neptunes between studios in Los Angeles, New York, Miami and their home base of Virginia Beach.

"It's been an amazing thing to be there in the middle of the creative process with Pharrell and Chad," says Coleman, 35, a native of Torrance, California, who learned recording as an apprentice at a small studio in the Pocono Mountains of Pennsylvania, where he went to college, before rounding out his education at the Full Sail academy in Florida. "I walked into that studio almost 15 years ago and said 'This is the coolest thing in the world. I have to do this.'"

He did. A blast of CVs after graduation in 1994 landed him a job at Master Sound, the largest studio in a small town on the East Coast, and a place that was about to become the world's busiest music factory (see box, right).

Hovercraft

Coleman and the Neptunes became acquainted when the producers were clients of Master Sound, where he was a staff engineer. After their production of Noriega's 'Super Thug' in 1997 put them on the map, they began to spend more time in Virginia Beach, and they soon became one of Master Sound's regular clients. "I was their guy in Virginia," Coleman says of the early days of their collaborations. "They were using studios like Quad and Right Track in New York, South Beach Studios in Miami and Record Plant in Los Angeles. The travelling really started with [*Neptunes band*] NERD."

Ironically, however, it was the Neptunes' success and their proclivity to use studios all over the country that undermined them as a major client at Master Sound, contributing to the studio's failure as a commercial facility, and Master Sound Studios is now the private province of the Neptunes after they purchased it out of bankruptcy two years ago. The equipment and Coleman came with it.

Hovercraft, as it's now known, still has

Studio A at The Neptunes' Hovercraft Studios. Clockwise from top left: the control room, the live area, a few spare keyboards, and the JBL PA speakers used for loud monitoring.

the same layout as the studio that preceded it. Three studios hold four Pro Tools rigs; the Amek G2520 console, one of seven prototypes made, is still in Studio A, with Digidesign Pro Controls in Studios B and C. The latter is also Chad Hugo's personal studio, and is filled with his seemingly infinite collection of Moog and other vintage synths. The monitoring arrangements could be described as eccentric: Studio A has JBL PA speakers with a pair of 18-inch subs under the console, for what Coleman calls "serious SPL" mix referencing. Hugo has small Genelecs as mains in studio C, and all rooms share several pairs of Yamaha NS10, Mackie and Proac nearfields. Hovercraft also has a new Studio Network Solutions system, with each studio connected via fibre-optic cables to a 15-drive RAID array.

The Thick Of It All

Whether on the road or in the studio, Coleman acts as the technical hub for the hectic producer pair. During one stretch of several weeks, the Neptunes had all four main rooms at the Record Plant in Los Angeles churning as they worked simultaneously with Snoop Dogg, a Nelly/Christina Aguilera duet, Mariah Carey and new artist Slim Thug. "Everyone winds up on everyone else's record," says Coleman, who worked with another engineer, Brian Garten, to keep the wheels of a very busy machine rolling. "I would start a track and do vocals in one studio," he explains. "In another studio, Slim Thug would do vocals with Brian and they would get sent into the studio where we were working. We had a hard drive that was constantly floating from room to room. [*Interscope Records president*] Jimmy Iovine would stop by and see all of this going on and say 'You guys are crazy.' He couldn't believe what was going on there. But it was amazing productivity. And 14 hours of work zips by pretty fast when you're moving like that."

The mechanics of the process don't overwhelm the creative aspect, though, as Coleman stresses. "Pharrell is amazing. He has a vision for where each of the artists is going. He adapts to them, not the other way around. The artists aren't going into the same mould and coming out sounding the same at the other end." Williams and Hugo complement each other perfectly, he says. "Pharrell is pretty much behind the keyboards or doing vocals while I keep the technical end running," he says. "He's incredibly creative and he expects things to be able to happen when he wants them to, that moment. He doesn't want to have to think about the technical part, and I will travel to where the artist is, get the songs written and do the tracks and the reference mixes. Chad will usually stay in Virginia Beach and handle all the mixes as they come in, putting other touches on.

"It's funny," he adds with a wink. "You ▶

Greetings From Virginia Beach

Bruce Springsteen made Asbury Park famous, but even the Boss would have to work a bit harder to match the sales power that has emanated from another coastal town a little further south. Virginia Beach is a resort town, and from the hotels along its shores you can just about see Hampton Roads, the naval nexus of the US Atlantic Fleet. If you time it right, you can hear the roar of F14s and F/A18s when the carrier air groups are back on dry land at nearby Oceana Naval Air Station.

It's a little harder to pinpoint the locus of Virginia Beach's music cortex, but it has left its footprint all over the industry. In addition to the Neptunes, whose rap work in the late 1990s with artists like Wu Tang's ODB and Jay-Z helped them branch out into multi-platinum pop with productions for Britney Spears, N'Sync and Usher, as well as rap heavies like LL Cool J and Busta Rhymes, the city is also home to Timbaland, whose production discography includes hits for Aaliyah, Genuwine, Justin Timberlake, Ludacris and Snoop Dogg. Missy Elliott, the first lady of hip-hop, grew up in Virginia Beach and has recorded and produced there periodically since her star rose. Despite having cribs in LA and Miami, Elliott and other hip-hop artists seem drawn to the normalness of Virginia Beach.

The city is more than an accident of the music business, however. Elliott went to high school across the street from Future Records, the studio founded by R&B legend and 'King of New Jack Swing' Teddy Riley in the mid-1990s. It's easy to compare Riley to Chet Atkins, and Virginia Beach to Nashville: both cities have become destinations for a specific genre of music, and each created an infrastructure of people and facilities independent of the traditional major music centres. (It's a sad coda to the city's story that Future Records and Riley, who had produced hits for artists including Mary J Blige, Keith Sweat, Michael Jackson and Al B Sure, filed for bankruptcy several years ago, but that fact does not diminish the credit Riley deserves for developing Virginia Beach as a musical centre.)

"The Neptunes have deep roots in Virginia Beach," says Andrew Coleman. "Pharrell went to high school across the street from Teddy Riley's studio. They had a talent show at the school that Teddy helped judge and the winners were Pharrell, Chad and [*future member of Neptunes spin-off NERD*] Shea. So the city has kind of cultivated the scene in its own way for a while."

Coleman had done some of his early work here with Timbaland and Missy Elliott, and recalls that both of them came back to work in Virginia Beach around the same time that the Neptunes were beginning to create chart-toppers. "Back in the day, the 1990s, Virginia Beach was a place you could network," says Coleman. "The Neptunes and Tim and Missy were all in town and everyone would go to everyone else's place and check out what they were doing. You don't get that as much anymore now that Missy is living and working a lot more in Miami and New York. We [*the Neptunes*] even go up to New York to work at Right Track or LA for the Record Plant. But there's still a sense of community here, and those early days before everyone got so big were great and I believe they resulted in a lot of great music."

On The Buses

NERD, the group formed by Williams and Hugo as an outlet for their own music, are more like a rock band than a hip-hop act, and tour aboard a bus that Williams ordered new from builders Entertainment Coach. While this bus would get a designer interior, it fell to Andrew Coleman to design and install perhaps its most important feature. The Neptunes' travelling recording studio takes up the rear third of the bus, and also doubles as Williams' bedroom. "It's console-free," says Coleman wryly. Instead, Desk Doctor active DI boxes, Coleman Audio and Avalon 737 preamps and an AKG C12VR microphone form a direct signal path to Pro Tools, with cabling prewired by Coleman as the bus's interior was being outfitted.

Coming in from the front of the bus, one enters a vocal booth just in front and to the side of the main rear cabin-cum-control room/boudoir. The rear wall of the room has soffited Genelec 1037A monitors. (The monitoring configuration is virtually identical to the wall of the B studio at South Beach Studios in Miami, a Neptunes favourite.) Keyboard modules and other outboard gear occupy a centre rack.

The bus is no audio scratch pad; during Jay-Z's Liquid Mix tour in 2003, NERD were the opening act, and each night after the shows the artist and the producers would return to the bus to write beats and record tracks for what would become parts of a Jay-Z LP. Tracks done this way would be finished at Baseline Studios in New York City.

DI recording obviates the need for isolation from road vibrations. Vocals are done while the bus is stationary and use the same vocal chain that Coleman set up there and uses at Hovercraft. "The C12 and the Avalon are the basics," he says. "But I do like to sit and talk with the artists for a while before doing vocals. You get an idea of what the sound of their voice is really like and make adjustments accordingly. A few weeks ago we had Robin Thicke in here and he loved the Telefunken 251. It's very rich-sounding and I had never used it before."

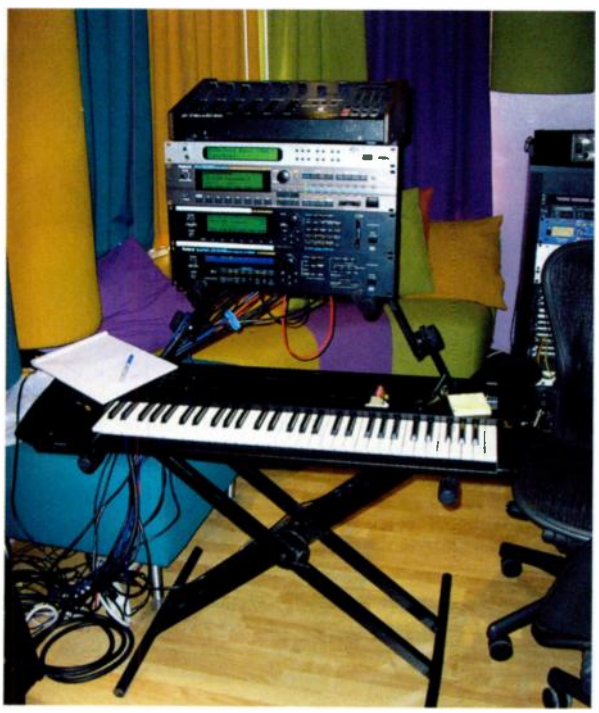
The Neptunes' custom-built bus-cum-recording studio. Left to right: the bus itself, the main monitors and gear rack on the back wall of the bus, the workstation area with vocal booth behind and to the left, and the interior of the booth.

never see them in the same place together. Sometimes you wonder if they're the same person. But no one person could do that much work."

Watching Coleman work, one might say the same about him. To maintain workflow, tracks done on the bus or in remote studios are sent back to Hovercraft or wherever else mixes are to be done with a combination of CDs and DVDs via overnight express and FTP sites. "If a mix has to get started and Chad can't be there right then, the mix engineer will send a session file to him via FTP and Chad will do some level rides and muting, things like that, then send the file back with the changes and some notes. They'll go back forth like that before it's done. It's long-distance mixing, and it works."

Tools Of The Trade

The methodology definitely works: the hits and the Grammy Awards speak for themselves. The streamlined approach to vocals helps; Coleman will tell you that a good large-diaphragm condenser microphone like the C12 through the Avalon 737 is a pleasantly neutral signal path. Variations on the microphone are the one of the few slight adjustments he makes for different artists. On Justin Timberlake's 2004 Grammy-winning album that spawned 'Like I Love You' and 'Rock Your Body', Coleman used a modified C12 owned by producer Brian McKnight, which Timberlake brought to the session. "It had just a little more high end, a little crisper-sounding in the upper mids, to the point where I rolled some of that off for monitoring," he says. "But it recorded his voice beautifully." Timberlake is also very specific about how he likes his headphone mix. "He would want the doubles and triples split on the other side from the vocal he was doing then," says Coleman. "The new one on one side and the others on the other. Singers will often take off one side of the headphones for pitch, but Justin keeps both sides on. You have to be ready to pan as soon as he goes for the double, because he's fast."



Pharrell Williams's travelling keyboard rack, here at Hit Factory, consisting of master keyboard plus Korg and Roland sound modules.

NERD's recordings span hip-hop and rock techniques. On 'Rock Star' and 'Lap Dance', Williams will play a standard drum kit, then Coleman will cut 16 bars of it into a loop, before using the same method for other instruments including guitars the Neptunes will occasionally call on him to play. (That's him on the Papa Roach track the Neptunes produced for the film *Biker Boys*.) "Sometime they'll play the entire song down and I'll move parts in and out with multitrack edits," he says. "That's where a lot of the feel of their records comes from — it's not just machines and loops."

The Neptunes very much complement the technology of their generation; speed is a hallmark of digital recording, and they are nothing if not fast. "I use Pro Tools as a console — I'll use the Pro Control sometimes, but I'm really a mouse guy," says Coleman. "We all come from the days of analogue but we try to keep those values

More of Pharrell Williams's mobile gear, including a healthy selection of vintage compressors and EQs.

alive while working in digital. We use a lot of analogue gear, like compressors and microphones, and analogue synths, to warm up the front end. We know which combinations work, like templates, so we can get there pretty quickly. I have all my busses preset and normalled, so I know exactly where to go for delays and other effects. Vocals are always on input one; the reverb sends is aux one and two; the delays are auxes three and four, and so on. Pharrell's favourite outboard equipment — Tube-tech CL1, Dbx 160, LA2A, Neve 9098 EQs, Summit EQ/compressors — are all normalled. It's not a whole lot — about 18 channels of [*processing*], plus plug-ins like Metric Halo's *Channel Strip* and Waves' *Renaissance* compressors and the Sony *Oxford Compressor* — but we know exactly what to expect from each combination."

Jimmy Iovine's reaction to the Neptunes' output is not surprising. Coleman says one of his regular tasks is to manage a vault of songs Williams and Hugo have written that now numbers into the thousands. He notes a session one night with Gwen Stefani that produced three songs inspired, written and tracked in the time just one was scheduled to be recorded. "I've had to come up with my own system to manage all of them, using colour codings for dates and genres," says Coleman. "Periodically, I'll go through the archives and try to reintroduce some of them when I think it's right for a session."

Somehow, Coleman manages all of it, and he and his wife have a new baby on the way. "It's a lot to juggle," he admits. "But it's all good." SOS

SE Electronics SE1A, SE2A & SE3

Condenser Microphones

A new set of small-diaphragm mics offers solid and versatile performance at a fiercely competitive price.

Paul White

Since SE Electronics set up their own factory last year, many of the models in the range have undergone extensive redesign and new models have been added to the range on a regular basis. The three models reviewed here all have diaphragms of a small to medium diameter, and the bodies are of the 'stick' type. The SE1A and SE3 are cardioid mics, and the SE2A has interchangeable heads for cardioid, hypercardioid, and omni operation.

The new SE1A is the upgraded and slightly longer successor to the SE1 cardioid mic, and combines a diaphragm a little over half an inch in diameter with a single FET

SOUND ON SOUND

SE Electronics SE1A, SE2A & SE3

pros
- Nicely engineered.
- Clean, open sound.
- Attractively priced.

cons
- SE2A has no figure-of-eight capsule.

summary
While these mics have quite ordinary paper specifications, they actually sound very open and musical and offer extremely good build quality and performance at very affordable UK prices.

preamp driving a transformer-balanced output stage. Like the other two models in this review, it is built at SE Electronics' factory in Shanghai, China, which helps explain its very low UK price. However, the standard of design and construction is nevertheless impressive, and all three review models came complete with shockmount. The SE1A weighs 200g.

With a sensitivity quoted as 10mV/Pa at 1kHz, the SE1A has a slightly extended frequency range of 20Hz-20kHz compared with its predecessor, and manages an Equivalent Input Noise of 16dBA, which is around the average figure for this type of microphone. These numbers may not mean much to the non-technical user, but in a practical test the sensitivity was much the same as (or even slightly higher than) that of other models of capacitor mic of a similar type I used for comparison, and certainly sensitive enough for any normal studio application. The noise level is also low enough to be negligible in most real-world situations, and was inaudible at normal monitoring levels when conducting close-miked instrument tests using an SPL Channel One mic preamp. For more distant or very low-level sound work, a specialist low-noise microphone may be a better option, but these tend to be costly.

The maximum SPL for one percent THD at 1kHz is 130dB, so even though the mic comes with no pad or filter switches, it can handle pretty much everything it is likely to encounter in day-to-day studio work. A very subtle presence hump centred at around 8kHz adds a natural airiness to the sound, and, as can be expected from a cardioid capsule of this type, the response becomes a little less flat when you move around to the side of the mic and work off axis. All three of these mics requires a 48V phantom-power source, and connection is via a three-pin XLR connector at the base of the mic. Similarly, all three mics are solidly machined, with a satin-silver finish embellished with the red SE logo.

The SE2A is designed along similar lines, but has interchangeable capsules to provide a choice of omni, cardioid, and hypercardioid pickup patterns. Connection between the circuitry and the capsule is via a spring-loaded, gold-plated pin, the ground return path being through the case metalwork itself — a fairly standard arrangement for this type of microphone. Changing capsules is simply a matter of unscrewing one and screwing on another. Technically, the SE2A has a frequency response covering 30Hz-20kHz, with a fairly high presence peak up at around 10kHz lending a slightly airy quality to the sound. The sensitivity is 10mV/Pa at 1kHz (-40dB ±2dB where 0dB is 1V/Pa) with an Equivalent Noise Level of 17dBA, very close to the figure for the SE1A. Certainly, when checked side by side, the sensitivities and noise seemed very similar. The maximum SPL (for 0.5 percent THD at 1kHz) is 137dB. Unfortunately, there's no figure-of-eight capsule available for this mic, which would have added further to its flexibility.

The SE3 is a slightly wider-bodied 'stick' mic with a larger diaphragm, providing a fixed cardioid response and a more extended low-frequency range. The nominal frequency response is 20Hz-20kHz, but again we have that high presence peak. The noise and sensitivity figures are identical to those of the SE2A, while the maximum SPL is just 2dB less at 135dB. Supplied in a wooden box with a tough-looking shockmount, the SE3 is fitted with switches for both low-cut filter and 10dB pad, and these are located between the grey band and the capsule housing. Although the capsule is slightly larger in diameter, it's probably fair to think of the

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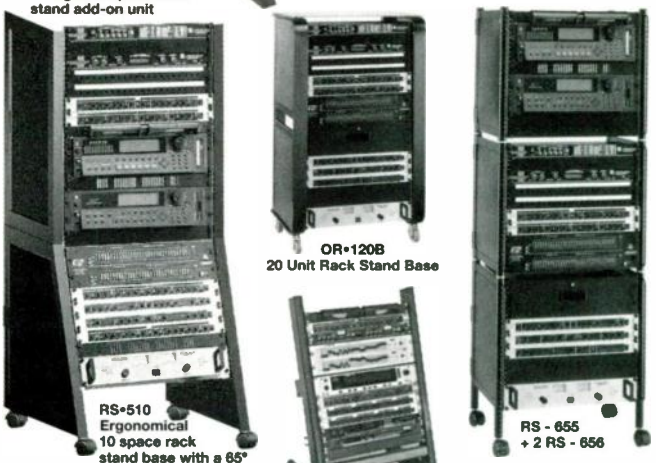

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SE3 as a deluxe equivalent of the SE1A, and it has similar instrument-recording applications.

The shockmounts that come with these mic are reassuringly substantial, with fabric-covered elastic belts holding the inner cage in place. The mic is gripped by the spring action of the inner metal sleeve, which has a foam lining to protect the mic body. A decent-sized thumbscrew enables the swivel bracket to be tightened adequately, and the plating on the shockmount matches that of the microphone.

Studio Tests

I carried out most of my tests on these mics during an acoustic music recording session, where the SE1A was used on both acoustic guitar and on a small accordion. It worked predictably well on the acoustic guitar, capturing a solid and well-focused sound with both depth and detail. However, as always with acoustic guitars, even a relatively small change in mic position can result in a large subjective change in tone, which makes it very difficult to compare two different mics in the same application. The SE1A also worked nicely on the small accordion, where I used a stereo pair to pick up the instrument from both sides.

The character of the SE2A isn't significantly different to that of the SE1A, though the repositioning of the presence peak means that the response of the top end is very slightly changed, and I interpreted this as a very slightly more open sound. As expected, the omni capsule gives a less coloured, more natural sound than the cardioid variants, as that's the nature of pressure mics versus pressure-gradient mics, but the cardioid capsules both sound quite like the SE1A. The SE2A makes a great acoustic-guitar mic, but it can turn its hand to just about anything short of kick drums.

Finally, the slightly wider SE3 has greater bass extension than the other two mics and so may be better suited to bass instruments in addition to its other duties, but it also has a nice transparent and airy sound that works well with any sound source that needs detailed coverage. Again it works nicely on acoustic guitar, but also sounds pretty good on electric-guitar cabinets and just about any acoustic instrument you can think to point it at. The low-cut switch works effectively without interfering with the tonality of voice, acoustic guitar, or other non-bass instruments, while the pad does pretty much what it claims — drops the output by 10dB. In comparison with some other capacitor cardioid mics I dug out for comparison purposes, these SE Electronics models weren't any quieter, but they seemed just as sensitive and were in many cases able to capture a less congested sound that retained a strong sense of space and depth.

The SE Electronics SE2A fitted with its cardioid capsule.

Verdict

The SE1 was already fantastic value, but the new SE1A comes with a redesigned capsule and an updated technical specification for the same UK price. It is a ridiculously inexpensive microphone by professional standards, but it certainly doesn't look or sound cheap in any way that I could tell. Even though you can buy better-specified and more natural-sounding mics if you're prepared to pay out a lot more money, I really don't think you'd hear the difference unless you were working in a very well-specified professional studio with top-flight mic preamps and monitors or trying to capture extremely distant or low-level sound sources.

So, if you already have a large-diaphragm capacitor mic that you're happy with, would I recommend that you buy an SE1A for recording instruments? The honest answer has to be 'no' — I think you'd be mad not to buy a *pair* at this price! Small-diaphragm mics like this come in useful in all kinds of situations and having two means you can work in stereo.

Although significantly more costly than the SE1A, the SE2A is still pretty wallet friendly and offers greater versatility because of its interchangeable heads. I still think a figure-of-eight head would have made a nice addition, but in all it's a great little workhorse for instrumental and choral recording. It has the same family sound as the SE1A and SE3, but gives you omni and hypercardioid options, which are very welcome. If you need one general-purpose instrument mic that doesn't cost a fortune, this model is a strong contender.

Being a fixed cardioid, the SE3 isn't quite so versatile as the SE2A, but it does offer a high level of performance combined with good bass extension — thinking of it as a better SE1A at a higher price is probably fair. All three mics will work well as drum overheads, as well as for more conventional instrument miking, and the SE3 also has the benefit of greater bass extension, which is obviously a bonus when working with bass instruments. However, if you can only afford the budget SE1A, don't feel you're in some way buying a poor relation, because it certainly doesn't sound like one! SOS

Options & Pricing

- **SE1A cardioid microphone, £69.** Includes shockmount.
- **SE1A matched pair, £199.** Includes shockmounts, stereo mounting bar, and aluminium flightcase.
- **SE2A multi-capsule microphone, £149.** Includes shockmount and aluminium flightcase.
- **SE3 cardioid microphone, £149.** Includes shockmount and aluminium flightcase.
- **SE3 matched pair, £349.** Includes shockmounts, stereo mounting bar, and aluminium flightcase.

All prices include VAT.

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monitoring

"Just wanted to say thanks for the fantastic gear and set up that your company gives. I ordered a computer, some software and DMX soundcard and all was beautifully set up and customised for music. I am very impressed with the job and care that the company took and appreciate the effort. The machine itself is very powerful and perfect for music production."

A. Baker

GENELEC

1029A £517.99
1030A £999.99
7060A £dv247.com
8040A £999.99
8050A £1728.99

8030A (pair)

£594.99▼

event

on demo@ dv north london

SP8 £[illegible]
TR6 £339.99
TR8 £399.99
20/20 Bas V2 £569.99

TR5 (pair)

£264.99▼

MISSION PRO

The Mission SM6A's outstanding accuracy neutralises the usual speaker colourations to reveal the way instruments 'really' sound.

SM6P £299.99

price crash

SM6A (pair)

£499.99▼

TANNOY

Reveal 5a £299.99
Reveal 6 £99.99
Reveal 6d £249.99
Reveal 66d £299.99
Reveal 8d £349.99

price crash

Reveal Active (pair)

£270.99▼

adam

ANF10 (pair) £379.99
P11-A (pair) £899.99
P22-A (pair) £1199.99

price crash

Artist (pair)

£799.99▼

dynaudio acoustics

For the full range of dynaudio monitors go to dv247.com

BM15A £1574.99
BM6A £1049.99

BM5A (pair)

£680.99▼

MACKIE.

HR626 £dv247.com
HRS120 £899.99
HRS150 £dv247.com
HR824 £dv247.com

price crash

HR624 (pair)

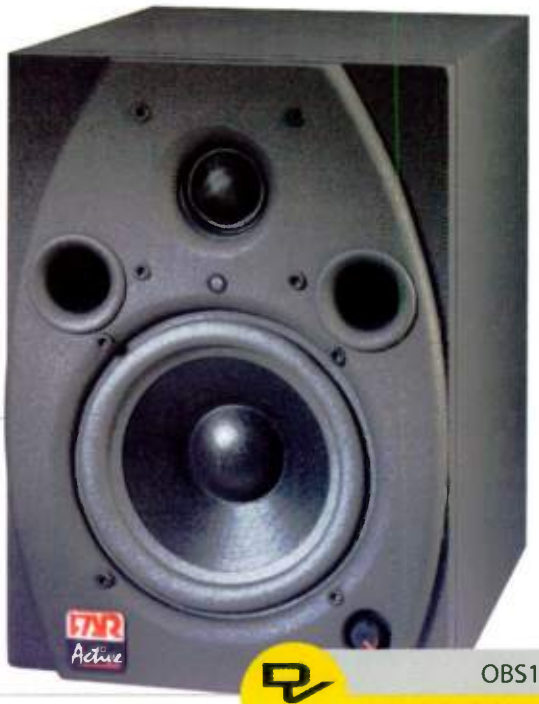
£695.99▼

FAR

OBS5 £2283.99

The OBS5 represents an innovative philosophy, an original look, new home-designed components and some pioneering technologies which give this professional monitor a real high-efficiency. A high-pressure tweeter and its symmetric wave-guide ensure accuracy and time alignment whilst the high power and high sensitivity woofer offers an exceptional power handling thanks to its large magnet system and to a specific cone treatment. The blue LED placed at the sound center allows the sound engineer to focus the perfect listening position.

OBS10 £2755.99



The small but remarkably high quality OBS is a powerful two-way monitor including a 1" tweeter and a 5 ½" woofer dedicated to OB work, TV station, music production and computer editing tasks. Thanks to its small physical size, this new magnetic shielded active close field monitor can be used anywhere for accurate listening, especially where space is limited and listening must be highly accurate.

exclusive

OBS1

£599.99▼

M-AUDIO

LX4 Expansion £119.99

LX4 - 2.1 £179.99

The latest M-Audio monitors provide reference monitoring in a simple solution by way of this range of active, magnetically shielded solutions. The BX5's five inch low-frequency drivers and one inch high-frequency drivers accommodate a small cabinet design that allows placement just about anywhere to provide maximum flexibility for any monitoring situation, including surround sound.

BX8 £269.99

price crash

BX5 (pair)

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monitoring/headphones

beyerdynamic

Beyerdynamic has a long history in the Pro Audio industry and number amongst their products, many "Industry Standards", such as the ubiquitous DT 100 studio monitoring headphones. They offer a wide range of products and solutions for all your audio & video requirements whether for live, installation, recording and broadcast use or as specialist products for the conference market.

DT770 Pro £79.99

DT150 £94.99

DT231 £29.99

@ Summer Expo '05 EDIROL beyerdynamic M-AUDIO

the industry standard

DT100s, the industry standard for reference monitoring and recording. For full specs and information go to dv247.com or contact your nearest store.

Talk to the experts...

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DT250 (80 OHM) £74.99
Dynamic DT 990 £89.99

price crash DT100 (400 OHM) £79.99▼

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Monitor One Active £225.99▼

BEHRINGER

HPM1000 £9.99
HPS3000 Headphones £12.99
HPX2000 Headphones £12.99
Monitor 1 C £dv247.com
MS16 £39.99
Truth B2031P £102.99
Truth B2030P £82.99
Truth B203A £174.99

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D.Harman

audio technica

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Pro 25 £65.99

ATH-910 Pro £44.99▼

EDIROL

MA7 £79.99
MA10A(black) £69.99
MA10D £99.99
MA15D £111.99
MA20D £139.99

price crash MA10A £69.99▼

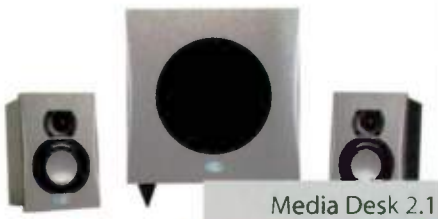
TAPCO

S5 £dv247.com

S8 (pair) £299.99▼

blue sky

Media Desk 5.1 £799.99
System One 5.1 £dv247.com
System One 2.1 £1099.99
Pro Desk 2.1 £799.99



Media Desk 2.1 £399.99▼

PMC

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TB2S (pair) £1615.99▼

JBL

Control 1 (pair) £79.99▼

FOSTEX

PM-01 £348.99
PM-05 £249.99

new PM-2 (pair) £419.99▼

SAMSON

Resolv 120A £119.99
Resolv 50A £149.99
Resolv 65A £199.99
Servo 170 £99.99
Servo 260 £140.99

price crash Resolv 65 (pair) £99.99▼

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microphones

RØDE

NTK £279.99

NT5 (matched pair) £244.99

NT1000 £159.99

new

NT1A inc. NTSM Shockmount £119.99
- Large 1" amp;quot; Capsule with gold plated membrane
- Cardioid polar pattern
- Ultra low noise transformerless circuitry
- Internal shock mounting system
- Gold plated output connectors
- True condenser (externally biased)
- Comes supplied with NTSM shockmount

- HF1 1" edge terminated, gold sputtered, dual 5um diaphragm capsule.
- 3-position variable polar pattern: Omni, Cardioid & Figure 8
- 3-position variable high-pass filter: Flat, 80 Hz or 40 Hz.
- 3-position variable pad: 0 dB, -5 dB or -10 dB.
- Ultra low noise, transformerless SMT circuitry.
- Supplied complete with soft pouch and clip.

K2 £349.99
NT3 £89.99
NT4 £255.99
NT2000 £279.99

exclusive

NT2A
£199.99▼

NEUMANN

TLM193 £599.99

price crash

KM184 £429.99
M147 £1339.99
M149 £2499.99
U87 £1399.99

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TLM103 + Shockmount
£579.99▼

M-AUDIO

"The Luna provides both professional looks and quality at a consumer price. The cardioid design has a 1.1" evaporated gold diaphragm with a solid brass capsule and Class A solid state electronics to provide faithful reproduction of the initial sound source."

Solaris £dv247.com

price crash

Luna
£109.99▼

OKTAVA

price crash

MK319
£89.99▼

SHURE

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Beta 57 £89.99
Beta 58A £109.99
SM57 £69.99

SM58
£69.99▼

"As a working musician, I want to recommend the team at DV Birmingham. In setting up my home studio, they have been amazing. Sales and after sales with backup has been second to none. Keep On Rocking!"

P. Mitchell

AUDIX

DP5 £669.99
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D2
£101.99▼

Blue

price crash

Baby Bottle £339.99
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SAMSON

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Q7 £26.99
SKit £129.99
7Kit £195.99

C01
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B5 £50.99
XM1800S 3 Mic Pack £18.99
XM8500 £15.99

B2 Pro
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Pro 25 £65.99

AT2020
£69.99▼

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microphones/headphones

sE electronics

Z3300A £299.99

- 20Hz-20KHz
- Sensitivity: 16mV/Pa +-36±2dB
- Polar Pattern: Cardioid, Omni, Figure 8
- Impedance: <=200 Ohm
- Equivalent Noise Level: 20dB(A weighted)
- Connector: 3-pin
- Max SPL for 0.5% THD @ 1000Hz: 125dB
- Power: Phantom power 48V±4V
- XLR Size: 60mm×192mm

MUSIC TECH RECOMMENDED

"I love sE mics - they quite simply record what I play - nothing added, nothing taken away. Superb. I would happily recommend SE. Great mics."

Geoff Dugmore
(Robbie Williams, Elton John , Dido)

SE3A £148.99 **SE2200A £139.99**

- Dual Valve Microphone
- Frequency Response: 20Hz to 20kHz
- Polar Pattern: Cardioid
- Sensitivity: 20mV/Pa +-34±1dB
- Output Impedance: <=200Ω
- Equivalent Noise Level: 16dB (A weighted)
- Connector: 8-pin army connector
- XLR Size: 80mm×205mm

Z5600A £399.99

@ Summer Expo '05

"In this day and age of digital recording, anything that can add character to the signal path is worth it's weight in gold. With a microphone like the Gemini you can really push the limits. With multiple applications like mono drums, beautifully warm but clear vocals, bass, acoustic guitar and piano, this mic could be the only one you need in a recording situation."

Troy Van Luuewen
Queens of the Stoneage

SE1A ~~£69.99~~
SE1 Matched Pair ~~£199.99~~
SE2 Matched Pair ~~£149.99~~
ICIS ~~£339.99~~

Gemini
£799.99▼

AKG

C1000S £dv247.com
The new PB 1000 Presence Boost Adapter provides an additional 5-dB high-frequency peak in the cardioid mode adding brilliance in the 5 to 9 kHz range.

C3000B £141.99
The C 3000 B is a large-diaphragm cardioid condenser microphone for universal use, designed and made specifically to suit the needs of musicians as well as the rigours of the stage.

For the full range of AKG please go to dv247.com

K55 £17.99

The K271 headphones are extremely light and easy to use, yet still provide a natural, pristine sound. The closed back, circumaural earphones provide maximum attenuation of high ambient noise, ideal for all applications where no sound must leak from the headphones.

K141S ~~£59.99~~
K240DF ~~£49.99~~
K66 ~~£19.99~~

K271S
£95.99▼

exclusive

D68S £37.99
The Swiss Army Live & Recording Mic at a fantastic new DV price.

Buy 3 D68S for only £99.99
D68S + Quiklok A300 stand + mic cable for £49.99 or 3 packs for only £129.99

Kick Drum/Bass Microphone + Bundled adaptor, K+M floorstand, 5M Cable And Gigbag.

C2000B ~~£105.99~~
C4000B ~~£269.99~~
C414B-XL2 ~~£699.99~~
C414 XLS ~~£579.99~~
C418PP ~~£91.99~~
C419PP ~~£95.99~~
C451B ~~£189.99~~
D68S ~~£37.99~~
D550 ~~£dv247.com~~
Drum Mic Set ~~£dv247.com~~
Solid Tube ~~£375.99~~

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D112 Punch Pack
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13/14

DIGITAL VILLAGE

microphones/headphones

SENNHEISER

HD25 £105.99
Whether in the studio or in live sound recording: detailed sound reproduction, ease of use and excellent attenuation of ambient noise is what you expect of a pair of monitoring headphones. The HD 25 offers all this - plus an extremely rugged construction with a steel cable for high durability.

This system is ideal for vocal applications and features nine frequency banks with four directly accessible presets each – ready for immediate use.

- 1440 tunable UHF frequencies
- Absolutely reliable transmission
- High-quality true diversity reception
- Automatic frequency scan feature
- User-friendly menu operation
- Mute function

EW135
£319.99▼

EW152 £349.99

For full Sennheiser range go to dv247.com

E865 £145.99
Studio quality microphone with the ruggedness demanded for on stage use. The 865 has all the subtlety and accuracy of a studio microphone with a build quality for road use.

E815 £35.99

EH250 £35.99
The EH250 features a closed, circumaural design for great attenuation of ambient noise which makes it ideal for bar and club DJ use. The cable and leatherette ear pads are also replaceable!

EW112P £369.99
EW122 £379.99
EW135P £319.99
EW152 £339.99
E604 £89.99
E606 £74.99
E815 SJ £35.99
E815 SX £35.99
E825S £35.99
E845 £64.99
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MD421 £279.99
ME4 £45.99
PC150 £59.99

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mixers

Soundcraft

Compact 10 £129.99

The COMPACT 10 features 4 mono & 6 stereo inputs, with additional line input 1/4" jack sockets on 4 of the stereo inputs.

- 10 channels
- XLR and 1/4" jack inputs
- High-quality Class A mic preamps
- 3-band EQ on all input channels
- Switchable +48V phantom power and indicator
- Direct injection for basses, guitars, and keyboards
- Switchable RIAA turntable equalization
- Zero-latency monitoring

Perfectly suited to many applications requiring simple mix facilities, but it comes into its own when used for recording vocals and music onto computers using a soundcard.

- Microphone, line and 'DI' input
- Stereo inputs for keyboards CD/tape or turntable
- Use 'blend' to control the mix
- 3 band EQ on the inputs
- Independent engineer & artist headphone outputs

Spirit FX16 £499.99
Spirit Notepad £69.99
Spirit SX £289.99

Compact 4
£69.99▼

BEHRINGER

ADT1616 £104.99
Eurodesk SL2442FX £229.99
Eurodesk SL3242FX £339.99
Eurorack MX3242X £349.99
Eurorack UB1002 £37.99
Eurorack UB1202 £48.99
Eurorack UB1204FX £85.99
Eurorack UB1204 £34.99
Eurorack UB1222FX £111.99
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MX8000A £62.99

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TLAudio

M-3 Traker
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PHONIC

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MR2443
£369.99▼

TAPCO

The compact TAPCO 6306 is a great-sounding six-channel mixer with genuine Mackie-designed mic preamps and robust construction.

price crash

6306
£69.99▼

EDIROL

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M100FX
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keyboards/studio recording/drums

YAMAHA

DTXpress £599.99

ES6 £1259.99

Not only do the new MOTIF ES Music Production Synthesizers feature the largest wave ROM of any workstation keyboard available (175 MB in 16-bit linear format), but an extensive sonic library is at the heart of the most expressive, most musical synthesis system on the planet, bar none.

Summer Expo '05

YAMAHA TASCAM

AW16G £649.99

- Dynamics processing and 4-band parametric EQ on all channels
- Two blocks of high-quality multi-effects
- 13 types of studio-quality mastering effects
- Quick Loop Sampler with 4 stereo sample pads
- Sound Clip function
- Built-in 20MB hard disk

Boasting many features of Yamaha's flagship AW4416 Professional Audio Workstation, including 2 pro-quality multi-effects processors, the AW16G offers musicians of all backgrounds a complete music production solution - all the way to CD. It can record up to 8 tracks simultaneously, offers a built-in loop sampler, 4-band parametric EQ and dynamics on all channels, 36 channel mixing capabilities and a Sound Clip function that lets you quickly capture musical ideas while practicing.

Motif Rack (ex display & ltd supply) £529.99

Motif ES Rack £849.99

P250 £1249.99

01V96 £1599.99

01X £899.99

DV DEAL!!
Steinberg Cubase SX3 £289.99
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Juno D £dv247.com

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Fantom XR Rack £dv247.com
Fantom X6 £dv247.com
Juno £dv247.com
MC909 £dv247.com
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VS2480CD £dv247.com
VSynth £dv247.com
XV2020 £dv247.com

TD3K+P
£dv247.com▼

Ion

The iED01 drum kit features everything you need to start playing drums right out of the box, including headphones!

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IED01 Drum Kit
£299.99▼

Fostex

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VF-80EX £298.99
CD1A £199.99
Di10 £99.99

new

MR 8S
£237.99▼

BOSS

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BR864 £dv247.com
SP-303 £dv247.com

price crash

BR1180 CD
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ALESIS

ML9600 Masterlink £514.99

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SR16 £79.99

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CDR830 BurnIT
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DP01FX £299.99
DVRA100 £969.99
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2488
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Virus TI Desktop
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KORG

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MicroKorg £243.99
MS2000B £464.99
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PXR4 £199.99
SP200 £465.99
SP300 £695.99
Triton Extreme 61 £1379.99

Triton LE
£679.99▼

AKAI

MPC 2000XL £dv247.com

MPC1000
£529.99▼

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NI Kontakt 2

Software Sampler For Mac & PC

Nick Magnus

Native Instruments' *Kontakt* has become one of the most popular software samplers since its release in 2002, and the new version, with its many excellent new features, should keep it near the top of the heap.

Version 1.0.2 of NI's *Kontakt* was reviewed in *SOS* back in August 2002, and has since become a major player amongst software samplers (see the review at www.soundonsound.com/sos/aug02/articles/nikontakt.asp). To recap briefly, *Kontakt* is a sophisticated software sampler, offering sample creation from compatible file formats, sample manipulation and performance capabilities similar to programs such as Tascam's *Gigastudio*, Steinberg's *Halion* and Emagic/Apple's *EXS24*. Samples can be streamed directly from disk and processed by a large variety of effects: time-stretching, filtering, modulation, looping and beat-slicing are just a small selection of the armoury of tools on offer. Version 2 has had a major cosmetic overhaul, with loads of new features and a much improved interface.

Kontakt 2 is a cross-platform application, although it only runs under Windows XP and Mac OS X from revision 10.2.6 and up. NI recommend a minimum spec of 512MB of RAM on both platforms, and that Pentium PCs should have processors no slower than 1GHz (Athlon XP-based machines have a suggested minimum speed of 1.4GHz, though). Mac users can apparently get away with 800MHz G4 processors, although my test was carried out on a PC, so I can't comment further!

The program is provided in stand-alone, DXi, VST, RTAS, and Audio Units flavours, and installation proved straightforward. Note that version 2 of *Kontakt* installs into its own folder, so anyone nervous about upgrading from version 1.xx can relax — your old installation remains unharmed. This is very reassuring if you wish to return to using the earlier version for any reason. For reasons I'll explain later, if you are a Sonar user (like myself...) and would normally install the DXi plug-in version, it is advisable to install the stand-alone, DXi and VST versions. As is now customary with current NI products, you have

full functionality of the program for 30 days, after which you must authorise the software using NI's key code system. This can be done on line (via any computer) or by snail-mail.

Version 2 employs a 192KHz, 32-bit sample engine able to replay samples up to 24-bit resolution. The polyphony is theoretically unlimited, depending on your PC's capabilities. It is also 64-part multitimbral, having four 16-part banks, or Multi-pages, each of which is addressable on its own physical MIDI port when run as the stand-alone version. When run as a plug-in within a host sequencer, you will need software capable of supporting virtual MIDI ports to access all 64 channels. Even when *Kontakt* is addressed through only one physical or virtual port, all 64 parts can still be used to layer sounds — although only 16 MIDI channels are available between them.

The Browser, showing the drag-and-drop Effects.

The Interface

As before, the *Kontakt* screen is divided into two main windows — the Browser and the Instrument Rack, and the Browser still provides the means to navigate your computer's drive directories. However, there are now five tabs at the top bringing new functions into play. Firstly, an improved Database system offers extensive search and file-management facilities, a crucial necessity for anyone with a burgeoning library of sounds (for more on *Kontakt*'s file architecture and hierachy, see the box below). The Database can be configured to show exactly the file types that you wish to see — simply choose the desired hierarchical levels (ie. Multis, Banks, Instruments, Samples) and select 'Build Database'. Cataloguing a large library can take quite a while the first time you do it, but by selecting 'Rebuild' you can subsequently add new library content to the Database very quickly. Custom 'views' can be created — for example, you could 'tag' all the guitar instruments in your library, and create a category called 'All Guitars'. When that view is selected, only those Instruments appear in the Browser. A Search function makes finding specific instruments a breeze — simply type 'bass' into the search box, and all Instruments with 'bass' in their titles will be displayed. If a sound's author is included as part of its embedded description, that too can be used as a search term.

The Browser's Modules tab displays *Kontakt*'s processing tools in three selectable categories: Effects, Filters and Modulators, as you can see on the left. When an Instrument is in Edit mode, these processing modules can be dragged from the Browser pane and dropped onto the desired destination. If you attempt to drop a module onto an 'illegal' destination, *Kontakt* doesn't let it happen — for example, you cannot drag a modulator (say an LFO or envelope) into an Effects slot. This is a vast improvement on the previous version's drop-down menu routing system, and speeds the workflow considerably.

The Engine tab contains information on memory status, CPU and DFD usage (NI's direct-from-disk sample-streaming mode), as well as two buttons — one to restart the *Kontakt* engine if it stops for any reason, and one to put *Kontakt* into Offline Bounce mode, which some DAWs need to do in order to get a clean, glitch-free result when bouncing down or 'freezing' *Kontakt*'s performance in non-real time to an audio track. Finally, the Auto tab displays the current parameter automation assignments.

Instrument Editing

When an Instrument (ie. a collection of keymapped, ranged samples in Groups) is loaded into the rack, it is displayed in its minimised form — a narrow strip showing a Wrench icon, Instrument name, Mute, Solo, Volume and Pan controls, and level meters. Clicking on the '+' symbol at the far right of the strip expands the view to include MIDI port/channel, output, polyphony and memory info, part-polyphony setting, tuning and ▶

Test Spec

- 2.4GHz Pentium 4 PC with 1GB of RAM running Windows XP.
- NI *Kontakt* v2.0.1.
- Cakewalk *Sonar* 4 Producer Edition.

SOUND ON SOUND

Native Instruments *Kontakt 2*
£380

pros
- First-class sound quality.
- Imports samples in practically any format.
- KSP scripts are a revelation — almost like having a Korg KARMA thrown in!
- Amazingly flexible effects routing and modulation possibilities.
- Built-in convolution reverb.
- Very intuitive operation.
- Surround compatible.
- I could go on...

cons
- The tempo bug in the DXi version.
- Zeroing of modulators causes CPU spikes.
- Watch your CPU meter — especially when using convolution!

summary

Kontakt 2 ups the ante in spectacular fashion. It's versatile and creative to use, with a simple interface, and offers excellent sound quality. Whether you want superb realism or mind-warping weirdness, *Kontakt* has the tools to do it. Universal sample import not only provides access to all the major new mega-libraries, but if you've got large old hardware sampler libraries, it breathes new life into those as well.

Architecture

***Kontakt*'s hierarchical structure begins at the lowest level with the humble single Sample.**

ZONES
Samples are placed onto the keymapper and given key and velocity ranges — the resultant entity is then known in *Kontakt* nomenclature as a Zone. Any number of Zones can be placed into a Group.

GROUPS
Groups are rather like sub-Instruments, having their own independent parameters such as filters, envelopes, insert and send effects, and output routings. You can define as many Groups as you like to create the final Instrument. So a piano, for example, might have all of its pedal-up Zones in Group 1, its pedal-down Zones in Group 2, and its release Zones in Group 3. By selecting only Group 1 for editing, only the pedal-up samples will be affected.

INSTRUMENTS
All the Groups are combined into an Instrument. In traditional synthesizer terms, this could be compared to a Patch. Insert and send effects can be applied to the entire Instrument, or to the individual Groups that make it up.

INSTRUMENT BANKS
A collection of Instruments pre-loaded into single Instrument slots that can be altered with program changes — just like a Bank on hardware synths.

MULTIS
Up to 16 Instruments/Instrument Banks can be loaded into one Multi Page (each instance of *Kontakt* has four Multi Pages) and can be addressed on their own MIDI channels (and MIDI ports, if available).

a mysterious button named 'Purge' — of which more on page 86. Clicking on the 'Aux' button to the right adds a small strip below containing four Auxiliary Send faders, also explained in detail later. Clicking on the '-' button minimises the Instrument, keeping the rackspace neat and tidy. To edit an Instrument, you click on its Wrench icon, and the Instrument expands to fill the entire rackspace (all other instruments disappear from view) revealing the parameters for the currently 'active' sample Group. Opening the new-style Group Editor (one of five buttons at the top of the edit window) provides a clear overview of all the Groups in an Instrument, and selecting one or more Groups can be done either with the mouse or automatically simply by playing notes on your MIDI keyboard. Groups can be edited globally, individually or in specifically selected combinations. The Mapping Editor now supports two different views — the 'normal' key range/velocity range view, and List view, which is a great help in isolating specific Zones where two or more Zones are layered over the same key range.

The Loop Editor is the place to edit a sample's start, end and loop points; it also functions as a 'beat slice' editor for any samples being played in Beat Machine mode (see the box above). Both the Mapping and Loop Editors can be 'broken away' into their own floating windows (for display on a second monitor, say) when running *Kontakt* in stand-alone mode — very useful for intensive programming sessions.

As can be seen from the screenshot below, the Edit window is substantially different from previous versions. Most notably there are three groups of Effect rows, each with eight 'slots'. Highest up are the Group Insert slots, where effects can be inserted on an individual Group basis. This includes effects such as Compressor, Saturation, Filters and EQ. The seventh and eighth slots in this row can be configured either as pre- or post-Amplifier.

The middle Effect row is for Instrument insert effects — that is, if a chorus is added here, it will affect the entire Instrument, not just individual groups, and the third Effects row is for Send Effects. Either individual Groups or the entire Instrument can be routed through these effects. To this end, both the Group Insert and Instrument Insert effect rows can have Send modules added to enable you to route the desired amount of signal to these effects. Assigning effects to the slots couldn't be easier — you just drag the required effect from the Browser onto the slot.

The Instrument Edit screen, including the on-screen Keyboard showing its keyswitch triggers.

Kontakt now offers two further effect routing options — global Auxiliary Sends and global Insert Effects per output port. Certain effects, such as reverb, can be CPU-intensive, so rather than repeatedly insert a reverb into each Instrument that needs it, especially if the reverbs are all the same, wouldn't it be better to have one global reverb that can be addressed by any Instrument in the rack? Now you can, thanks to the new Output Configuration window, which enables you to configure *Kontakt*'s virtual outputs how you want them, including surround-capable ones (yes, *Kontakt* is fully surround-compatible!) and Aux channels if you wish. Each of the Aux channels has four (in-series) effect insert slots; thus any effects inserted into one of the stereo channels will be applied to all Instruments routed to that output. Any effects inserted into one of the Aux channels can be 'sent to' by any Instrument in a Multi. Remember the four Aux faders that can be displayed beneath each Instrument? This is what they are for.

On the synthesis side of things, *Kontakt*'s filters have undergone a few changes. Gone are the one-pole band-pass and two-pole notch filters; instead, there are new four-pole band-pass and four-pole notch variations. The *Pro 53* filter from NI's excellent *Pro 53* virtual Prophet 5 also makes an appearance, as does a four-stage ladder filter — bringing the total up to 13 'synth-style' filters. The Vowel A, Vowel B and Phaser effect filters and

Sample Modes

Any Group within an Instrument can use one of six sample-playback modes, as follows:

SAMPLER
This mode loads complete Samples into RAM, and is suitable for Instruments using short samples, when disk streaming is not necessary.

DFD
DFD, or Direct From Disk, is a disk-streaming mode used on many other NI products. As its name suggests, it conserves RAM when playing long samples by playing them from hard disk. It's essential when using large commercial libraries.

TONE MACHINE
The Tone Machine imposes an overall musical pitch onto a sample (drum and percussion loops work well) whilst keeping its tempo constant or sync'ed to the host. It's a slightly unearthly effect, rather like the classic 'drums through a vocoder' trick popular in the '80s, but it's great for rhythmical chord parts.

TIME MACHINE
A real-time time-stretch function that allows samples to be played back sync'ed to the host tempo whilst following pitch changes. It also allows the tempo to be changed without changing pitch.

TIME MACHINE II
Similar to the above, this offers greatly improved quality, with parameters specially optimised for rhythmical loops.

BEAT MACHINE
The Beat Machine takes a rhythmical loop and slices it up into segments — very similar to 'Acidised' loop-slicing. The loops will then sync to the host DAW's tempo changes. If desired, each segment can then be mapped to discrete keys for individual triggering.

The keymapping process generates a small (exportable) MIDI file which represents the loop as a sequence of notes. When imported into your host sequencer of choice, this sequence plays back the individual loop segments exactly as the original loop sounded. This is strikingly similar to Spectrasonics' Groove Control concept, as seen in the likes of their *Stylus* instrument, and allows you to change the tempo much further than by time-stretching, as well as affording you the possibility of re-arranging the note orders to produce different patterns from the same sample data. Beat Machine can also work directly on existing REX and Acidised files.

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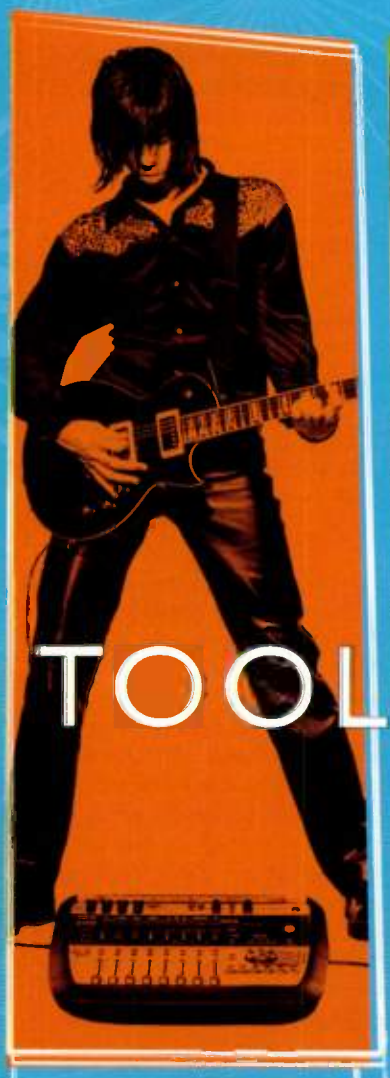

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the one-, two- and three-band EQs have been retained from previous versions.

The Effects have been augmented by the addition of two new features, a convolution reverb and a Surround panner. The reverb (below) offers control over a variety of parameters, such as early reflections, reverb tail lengths and pre-delay time, and impulses can be reversed. An optional eight-stage envelope can be superimposed upon the IR window to further tailor the amplitude shape of the reverb. A 130MB library of impulse responses is provided to get you going, and of course you can drag impulses onto the IR window from your own collection. There are many IRs available for free on the internet — try visiting www.noisevault.com and www.voxengo.com for starters! The process is fairly CPU-hungry, but you can compensate for this by reducing its sample rate and selecting 'Preserve Length'. This way you can trade off CPU usage against sound quality.

Logically enough, the Surround panner is used as an Insert Effect, and it can be applied at the Group or Instrument level. 42 Surround types are catered for, from simple 1.1 mono through quad, 5.1 cinema, 6.0 hexaphonic (shown below), all the way up to 16-channel theatre setups. Depending on the Surround format chosen, an appropriately configured virtual output channel needs to be present — for example, 5.1 cinema needs a six-channel output configuration for the left, right, left surround, right surround, centre and low-frequency channels. Fortunately, the *Kontakt 2* manual provides a chart showing the channel assignments for each Surround format. There is a choice of constant power, sinusoid and logarithmic pan curves, which when used in conjunction with the Divergence and Distance controls, can alter the subjective directional impression. Air Absorption and Size combine to simulate high-frequency damping effects according to source distance, whilst the Delay Effect automatically calculates the distance of each sound source for each loudspeaker in real time. The Surround panner's X-shift, Y-shift, Angle and Distance parameters can be automated by external MIDI controllers, host automation and internal modulators, allowing for such niceties such as circling or random-positioning effects. The possibilities here defy detailed description — ultimately it's down to your specific mixing environment and, of course, your own judgement, but the tools are there if you can use them. However, I did find a stability issue here — altering certain parameters whilst inputing MIDI notes caused *Kontakt* (and *Sonar*) to crash repeatedly. I hope this will be addressed in a future update.

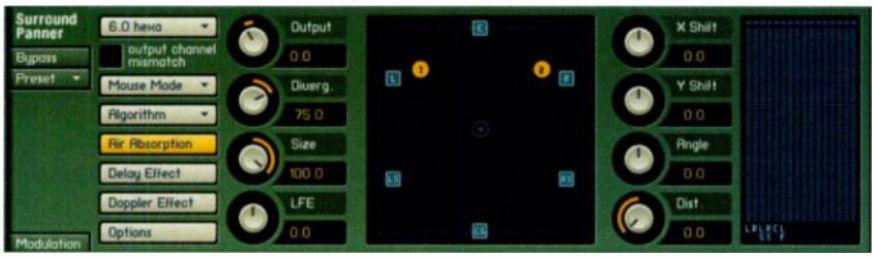
Down At The Library

***Kontakt 2* comes supplies with a 15.3GB library on two DVDs — and it's no trivial grab-bag of sundry bits and pieces, but a well-presented affair containing many sumptuous, top-quality instruments (detailed contents and descriptions can be found at www.native-instruments.com/index.php?id=kontakt2samlib_us&ftu=5503f1bb2b). Pride of place must go to the orchestral selections supplied by VSL (the Vienna Symphonic Library). A 30-piece orchestra to go? I'm loving it... Along with this are numerous pianos, electric and acoustic guitars, basses, organs, synths and drums. Many of these have been painstakingly programmed to take full advantage of *Kontakt 2*'s new Kontakt Script Processor feature (for more on the KSP, see the box on the last page of this article). Notable KSP instruments include the 'Akkord Guitar', which is designed to replicate strummed acoustic guitar parts. This instrument employs 3500 samples and a pattern-based user-programmable 'sequencer' to reproduce 43 individually sampled chord types in several playing articulations and in every key! Also of note is the 'Elektric Guitar', which uses some natty KSP programming to vary the neck position and picking styles, creating realistic-sounding guitar parts that would be otherwise unattainable using a traditional sampled guitar patch. PDF documentation is supplied for the library and explains every instrument in detail, including full instructions on how to use the KSP scripts for those instruments that employ them.**

Automation

Virtually any parameter with a knob or fader in *Kontakt* can be automated, either live or from within a MIDI sequence, using MIDI controllers or host sequencer parameter numbers. Selecting the Auto tab in the Browser brings up two lists — one of MIDI controller numbers, or one of host parameter numbers. Assignment is a doddle — for example, to automate a filter's cutoff frequency with the modulation wheel, click on MIDI controller CC1, then drag and drop it onto a filter's cutoff knob in the Instrument edit window. The Browser changes to reflect what has occurred — CC1 now displays 'cutoff', and the small pane at the bottom of the Browser tells you which Instrument has the assignment, as well as which Groups are affected. Each assignment can be given a minimum and maximum operating range (the default is 0 to 100 percent) but you can narrow this down to as specific a range as you

A convolution reverb, showing the optional eight-stage amplifier envelope.



The built-in Surround panner in 6.0 Hexa format.

More On Instrument Banks

Instrument Banks are visually differentiated from normal Instruments by their grey colouring. Double-clicking on any instrument loaded in the Bank opens it for editing, and individual Instrument Banks can be archived to disk for subsequent re-use. Note that Instrument Banks do not have the four global Aux Send faders found on 'normal' Instruments.

Normally, individual Instruments in a Multi do not respond to MIDI program changes. However, when an Instrument Bank is inserted into the rack, it can be pre-loaded with up to 128 Instruments that do respond to program changes on the MIDI channel assigned to that Instrument Bank. In theory, if you have several Instrument Banks in a Multi, and as long as your computer's RAM is up to it, a staggering number of Instruments could be made available. However, *Kontakt* appears to only receive program changes in the Stand-alone version — it certainly refused to respond to them while I was running it under *Sonar*. Additionally, the *Kontakt* user forum on NI's web site reports that program changes can only be received on MIDI channel 1 (for each MIDI port). Subsequent tests proved this to be true, so it looks like a little further work is due in this area.

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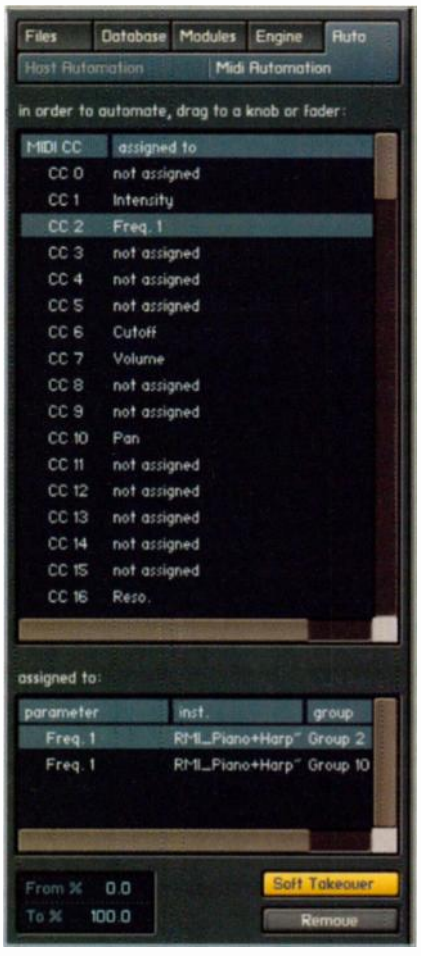
need, which is very useful, say, for exercising subtle control of a very narrow filter range. Any MIDI/host controller can be sent to multiple destinations if desired. Even some Effect parameters which cannot be assigned modulators can still be assigned MIDI controllers — thus practically anything in *Kontakt* can be animated one way or another.

Purge

If you've ever had too many redundant samples loaded, or if your mega-orchestra setup has caused you to run out of RAM, even when using disk streaming, you need *Kontakt 2*'s Purge function. Consider this scenario: you've loaded an entire violin section, complete with five different keyswitched articulations, yet you actually need only a handful of notes using one articulation. No problem — once you've finalised the part and recorded it into your sequencer, simply play back the sequence, click the Purge button on that particular Instrument and choose 'Update Sample Pool'. *Kontakt 2* then unloads from memory all the samples that were not used, freeing up a considerable amount of RAM. The Purge function can also be performed globally — a 'master' Purge button above the Instrument rack cleans up an entire Multi's redundant samples in a single pass. Purging will of course leave Instruments with gaps on the keyboard where samples are now missing. So what if you subsequently wish to change a part so that it includes some of those missing samples? *Kontakt* makes this a no-brainer; you simply select Purge again for the Instrument whose part you wish to alter and choose 'Reload Samples'. All the samples for that Instrument will then be reloaded, returning it to normal. Once you've re-recorded your new part, you can of course Purge that Instrument again to clean up the RAM. Interestingly, a similar facility was available on Roland's S700 and S760 hardware samplers, and its appearance in *Kontakt 2* is very welcome indeed.



The Browser, showing Automation assignments.

Universal Import

***Kontakt 2* is compatible with a satisfyingly large number of sample and sampler formats, including Apple/Emagic's *EXS24*, Tascam *Gigastudio*, Steinberg's *Halion*, Akai S1000/3000, Akai S5000/6000, Akai MPC, Propellerhead REX I & II, Emu Soundfont2, NI *Battery* 1 & 2, Emu EOS/E48, Roland S7xx and S5xx series, AIFF, WAV, SND, Acid WAVs and Apple Loops. Files can be imported individually, directly from their native CD-ROMs or DVDs. You simply insert the source sample CD, and refresh the *Kontakt* Browser's File view. The disc now appears in the list, and expanding the item displays the file architecture appropriate to the parent sampler format. You drag the item (Patch, Program, or whatever) that you wish to load onto the Instrument rack, and conversion begins. When complete, the item is ready to play, and can be re-saved in its new *Kontakt* format if desired. Batch (bulk) conversions are also possible, whereby complete CD-ROMs are automatically converted and saved in *Kontakt* format.**

NI bravely claim that their file conversions are very accurate, so I put this to the test by importing some of my sizeable Roland S-series libraries. The results were variable — simple patches tended to work very well, although the filter settings almost invariably needed some adjustment. However, only the most minimal tweaking was required to achieve perfectly acceptable representations of the original versions. Some of the more complex patches, such as those on commercially produced discs, threw up some unexpected issues (silent Zones, iffy tunings, occasional missing samples) and required rather more intensive troubleshooting to bring them into line. Converting *Gigastudio* files was generally quite successful, although when problems did occur, it was usually due to incorrect sample groupings or mis-translated keyswitch functions. Nevertheless, the results were on the whole no worse (and occasionally better) than those produced by Chicken Systems' *Translator*, which I have been using for the past couple of years. It's a terrific bonus to have this facility available within the one software program — full marks to NI!

Further Enhancements

The Master Kontrol view, located at the top of the main window, shows the master tempo for all sync'able parameters and effects, and can be switched from internal to external (host) sync. A Tap button allows the internal tempo to be set by clicking with the mouse, and an optional metronome is also provided, together with its own volume control. Master Tune sets the overall tuning offset for the entire Multi. The built-in reference tone is a great help in the absence of a tuner, and can be set to whatever reference pitch you like.

The optional Keyboard view displays not only an Instrument's keyrange (in blue), but also shows which keys are acting as keyswitch triggers (in pink) — a very handy visual reference when an Instrument has several articulations loaded.

Splendidly, Groups can be copied and pasted between different Instruments in a Multi — as well as between different instances of *Kontakt 2*. When a copied Group is pasted to a new location, you have the choice of pasting with or without samples — the latter choice is extremely useful if you simply want to copy a Group's parameters to another Instrument.

The Instrument Options menu allows for further customising of individual Instruments, including settings such as global transpose, key range, and velocity range. The behaviour of the sustain pedal (continuous controller message 64) is definable per Instrument, unlike older versions where this was a global setting that applied to all instances of *Kontakt*. This is good news for those wanting to use *Kontakt* to combine instruments from *Garritan Personal Orchestra*, say, which use CC64 in different ways. Finally, category-based icons can be assigned to Instruments. They serve no real function other than being cute, but they're fun nevertheless.

Bugs & Niggles

What would an *SOS* review be without negative points? Some bug-related issues inevitably raised their heads during the review period, and one matter in particular has to be mentioned. I call it the DXi Tempo Bug. As this suggests, only the DXi plug-in version (for use under *Sonar*) suffers from this problem. When playing back a sequence that contains smooth (sloped) tempo changes, the recorded note lengths are corrupted throughout the course of the tempo change. As a rule, notes tend to become excessively lengthened during an accelerando (often hanging indefinitely) or shortened during a rallentando. Apparently the DXi version can't make the calculations to change them to fit the constantly varying tempo. This is why I suggested also installing the VST version, which has no such problems.

In fact, why bother with the DXi version at all? NI have been aware of this issue for at least a year and a half, so it's a mystery why they haven't given the matter priority. Incidentally, the DXi version of *Kontakt Player* provided with *Garritan Personal Orchestra* (and therefore presumably any other similar package) suffers from the same problem.

The Akkord Guitar KSP script has problems when running with *Kontakt* as a plug-in with sequencers such as *Sonar* or *Cubase*. If, after recording an Akkord part, you interact with the *Kontakt* or sequencer interface in any way, the KSP grinds to a halt — it appears to ignore all incoming note data. Closing and reopening the Akkord instrument restores functionality, but only until you attempt to tweak something else. This bug was mentioned on the NI user forum, in response to which a thread has been posted which contains a new downloadable script to cure this (see www.nativeinstruments.de/forum_de/showthread.php?t=24317. Well, I say 'new' but in fact, it's an older version. Nevertheless the 'new' script is a big improvement over the one supplied on the library DVD, although it's still not entirely reliable.

After noticing unusually high CPU usage when playing mod-wheel crossfade instruments, further tests revealed a major bug — also a hot topic on the NI user forum! Any modulation-driven events (such as crossfading samples with the mod wheel, or controlling filter cutoff with a fader) create a hefty CPU spike whenever the controller returns to zero. The more notes you're playing at the time, the higher the CPU spike. So, playing a piano patch (which tends to use a lot of notes) and releasing the sustain pedal (thus causing continuous controller message 64 to output a value of zero) can sometimes max out the CPU completely, resulting in the audio being muted until all the keys are released. This has been made known on the user forum, but no response from NI has been forthcoming at the time of writing. This is a serious bug that needs to be afforded immediate priority.

Finally, the sample 'D_D3_UP_3.wav' in the Elektric Guitar patch is corrupted on the original disc — and there may be other similar corruptions elsewhere, but I haven't found any others yet. Hopefully this and the above problems will be fixed and offered as updates on the NI web site at the earliest opportunity.

Conclusions

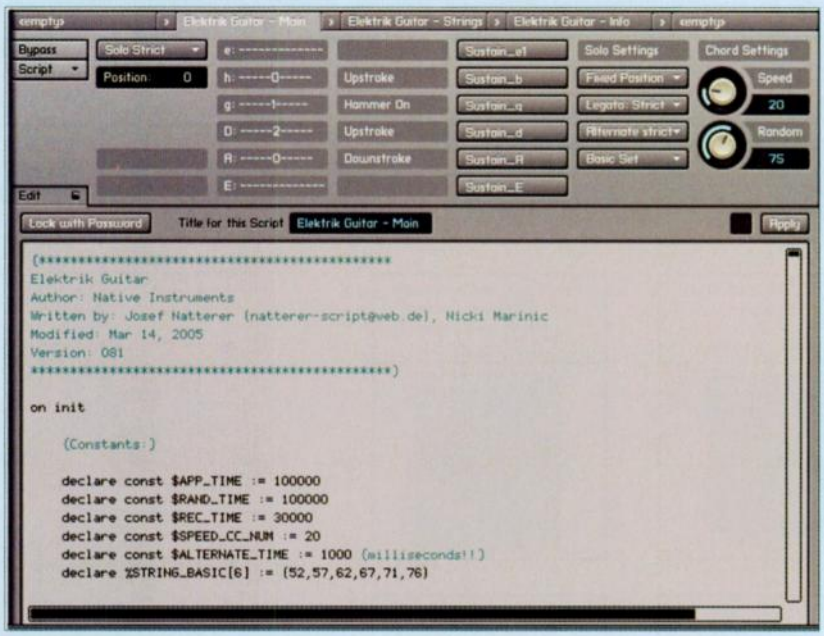
Version 1 of *Kontakt* was always an impressive and user-friendly program. By the time it had reached version 1.5, it bristled with flexible and easily accessible features that, frankly, made working with other software samplers seem like boot camp. Now, *Kontakt 2* is simply stunning, and current bugs notwithstanding, it is extremely intuitive to operate, especially to anyone already familiar with earlier versions. So much was this the case that the only reason I read the manual from end to end was to make sure I hadn't missed anything!

Inevitably, there are always going to be some 'wish-list' items in any software, however packed with features it may be. For example, I would like to see a 'smoothed' random waveform in the LFO modulator, a multi-tap delay, shelving options in the EQs, some alternative waveform options included within self-modulating effects such as the phaser, chorus and flanger, and the means to route external (or the host sequencer's) audio through the convolution effect. But these requests seem somewhat petty in the light of what *Kontakt 2* already provides, both in terms of features and flexibility. The long-standing DXi tempo bug and the 'zero-modulation' CPU spikes really do need to be addressed, but these are the only serious criticisms I can level at an otherwise brilliant and inspirational piece of software. The Universal Import facility alone may well persuade many prospective software-sampler buyers to take a good look at this package. In tandem with its fine sample library, *Kontakt 2* is an amazingly versatile, one-stop music-production tool that is bound to become the centre of any studio. For many people, it could quite conceivably *be* their studio. SOS

KSP — The *Kontakt* Script Processor

This remarkable and hugely powerful feature transforms any *Kontakt* instrument by adding what is effectively a super-charged MIDI processor to its front end. KSP scripts are inserted before an Instrument's Source modules, and operate upon the entire Instrument. Numerous KSP scripts are supplied with *Kontakt*, featuring such exotic features as automatic harmonisers, unison detune, arpeggiators, microtuning, chord recognition, virtual drum machines and instrument simulators. It's a bit like having a built-in Korg KARMA!

Instrument-specific KSPs include automatic harp glissandi and bisbigliandi, and a script that simulates the una corda, sostenuto and sustain pedals of a grand piano. As mentioned elsewhere in this article, many of the Instruments in the supplied *Kontakt* sample library utilise their own specifically written KSPs to great effect, such as legato and repetition tools for monophonic instruments, and the Akkord Guitar and Elektric Guitar programs. Full details and instructions for the included KSP library can be found as PDF documentation in the *Kontakt* installation folder. Many of the supplied scripts are 'open source' and can be edited and re-saved as your own variations. If you're into Boolean operators and Array functions, you'll be delighted to know that scripts can even be written from scratch — a very friendly tutorial is provided as PDF documentation. However, I suspect that many users (myself wholly included) might opt to hide behind the sofa of the KSP library presets...



The KSP Script window opened for editing.

information

- £ *Kontakt 2*, £379.99 including VAT; upgrade from version 1.xx, 149 Euros (approximately £100); upgrade from Kompakt, Intakt, Kontakt Player; 339 Euros (approximately £230).
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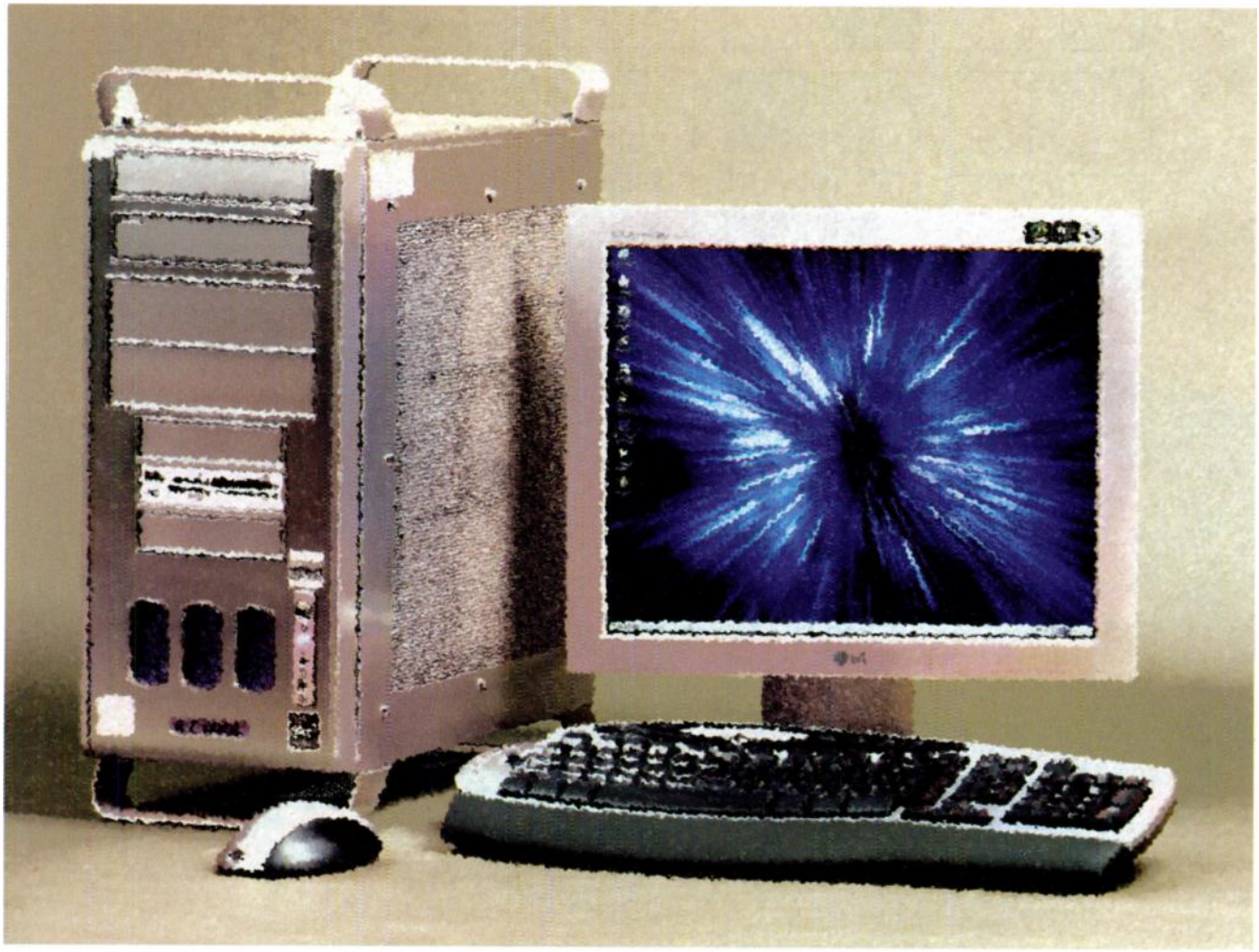

Pushing The Limits

What Can You Achieve With A Single Music PC?

If your PC is beginning to feel a bit tired, even though it's a comparatively recent model, do you really have to abandon it in favour of a new machine, or can clever upgrading restore cutting-edge performance?

Martin Walker

There comes a time in the life of every PC when its perceived performance moves from inspiring to workaday, and you start to wonder how you can improve on the current limits for track count, plug-in count or polyphony. Depending on how 'future proof' your original purchase was, this generally happens sometime between six and 18 months after you purchased or built it, and once you hit this point you may increasingly find yourself wondering whether adding or upgrading to faster hardware components is in order. Should you consider radical measures, such as replacing the motherboard with one that supports a faster processor, or perhaps several processors, or installing a significantly faster hard drive, or even choosing RAID (Redundant Array of Independent Disks)? Just how much performance can you squeeze from a single PC? Let's find out.

Boosting Your Memory

By far the easiest upgrade to do is adding RAM, assuming you've still got some spare memory slots available to house it. Many motherboards support up to 4GB of RAM (and some even more), although, as I discussed in May's PC Notes, making use of more than 2GB with the familiar 32-bit versions of Windows XP can be tricky, and may not benefit that many applications at present. Adding more RAM, if you're short of

it, can improve performance, so anyone with just 512MB should definitely upgrade to 1GB if at all possible, but beyond that the advantages are debatable. Many music PCs are supplied with 1GB of RAM as a matter of course, and I've never personally needed any more than this, but 2GB is starting to become the new standard. If you feel you'd personally benefit from more than 2GB of RAM, you ideally need to 'go 64-bit' (see later), when you'll be able to install and make use of 4GB or more.

RAID Basics

Much higher on many musician's agendas when considering greater performance is adding another hard drive and creating a RAID array, especially since so many motherboards offer RAID as an option. After all, if you've already got a suitable motherboard with untapped RAID features, it will only cost you the price of an additional hard drive to get started. Even if your motherboard isn't so obliging there are some inexpensive PCI RAID controller cards available that should do the same job. So let's examine the various RAID options...

Most motherboards with RAID offer a choice of RAID 0, RAID 1, RAID 0+1, and JBOD (Just a Bunch Of Drives). JBOD (also known as spanning) takes all the drives in the array and turns them into one huge logical drive. If you want to record a large multitrack work of long duration this might be tempting, but you'll achieve no extra performance, and if any one of the drives fails you won't be able to fully access the data recorded on any of the other drives.

- **RAID 0** is the option most musicians get excited about, since it offers 'data striping': reading and writing of data across two drives in parallel, doubling the sustained transfer rate, and hence the number of potential audio tracks or soft-sampler voices. The only disadvantage of RAID 0 is that if either of your drives develops a fault you may not be able to retrieve your data, so you have to make sure you back up regularly to another medium.
- **RAID 1** provides 'data mirroring' for added security. The second drive holds a mirror image of the first (wonderful for long-term backup purposes), and also offers faster access times, but its writing speed is halved.
- **RAID 0+1** offers combined 'data striping and data mirroring', so you would need four drives to put it into practice. While this scheme offers improved reading performance and added security, write performance is still slow, since every piece of data needs to be written twice, and for the musician, four drives mean more noise and more heat generation. I think we can assume overall that musicians will be most interested in RAID 0.

All motherboards that feature RAID options provide copious instructions on how to enable this feature in the BIOS, make your choice of array mode (0, 1, 0+1 or span), and (for the 0 and 0+1

Installing a RAID '0' array consisting of two identical audio drives, as in this Carillon Core 4 music PC, can boost maximum track counts or soft-sampler polyphony significantly, or help you run video alongside your music.

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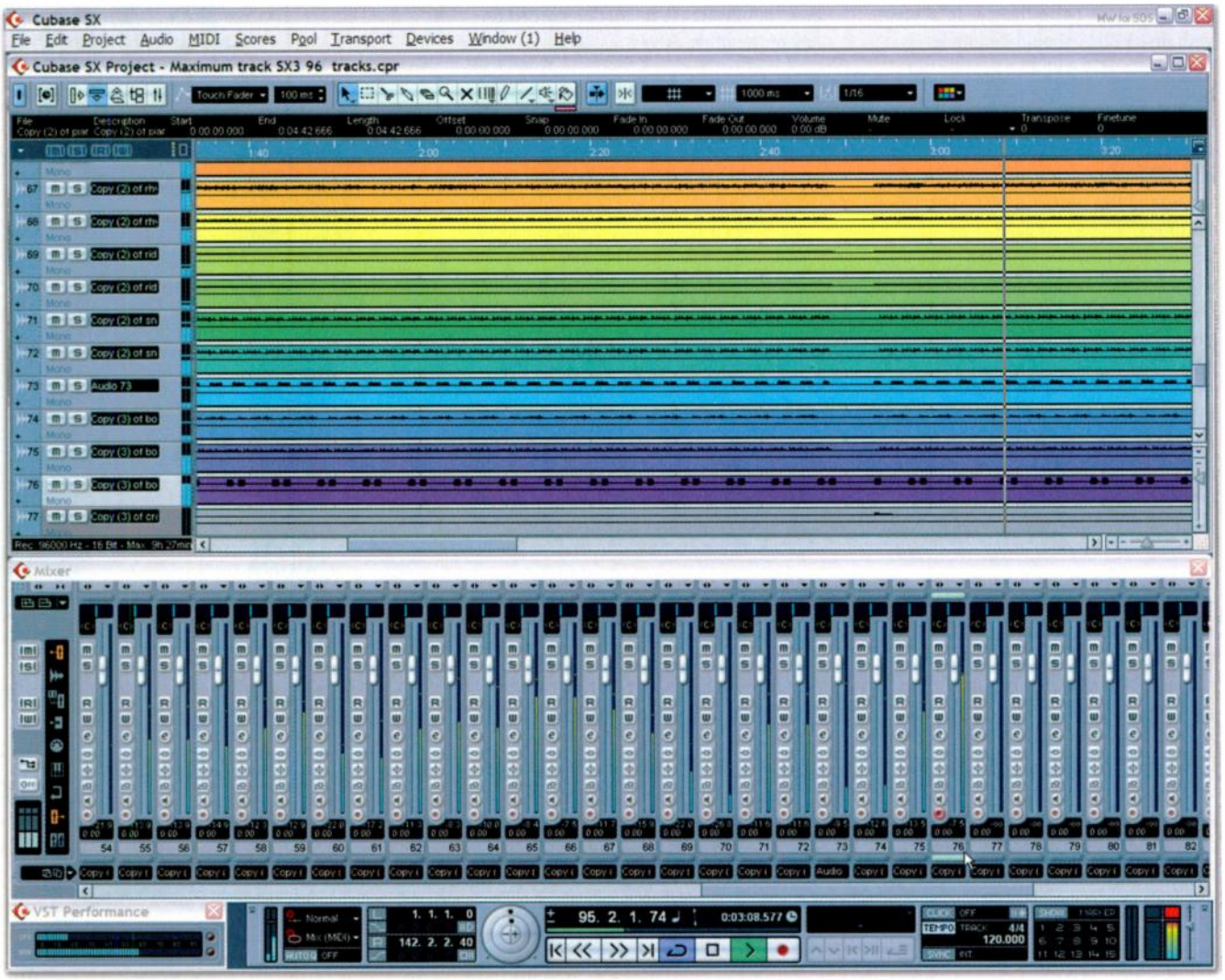

RAID is an excellent tool for increasing performance, but many musicians simply don't need it. Here you can see my single SATA Seagate Barracuda audio drive managing playback of 76 simultaneous mono 24-bit/96kHz audio tracks.

options) choose a 'stripe' size that determines how the data is split between the drives. This figure can range from 2K to 64K or so, and audio playback performance generally benefits from higher values (see 'Technical Terms' box for details).

Single-drive Performance

So should everyone with a RAID-equipped motherboard rush out and buy an extra drive so that they can split their audio and sample data and achieve double their current performance, while the rest of us replace our existing motherboard with one that can handle RAID or buy a PCI RAID controller card? Actually, in the majority of cases I've come across, the answer is probably no.

Many musicians are still unaware of just how capable the typical modern 7200rpm hard drive actually is. Way back in *SOS* June 2003, in 'The Right PC For The Job', I stated that "There's still some confusion about which drives are best for audio recording and playback, but it will help greatly if I start by saying that the vast majority of modern IDE drives will be perfectly fast enough for most musicians, without considering the added complications of SCSI or RAID." I also offered the advice to "stick with a single 7200rpm EIDE hard drive for audio purposes. It should be perfectly capable of running around 48 tracks of up to 24-bit/96kHz audio."

Nothing has since changed my mind, especially now that modern SATA drives provide even faster performance than the IDE drives of 2003. To reinforce this point, I spent some time creating a *Cubase SX* song containing multiple mono tracks recorded at 24-bit/96kHz, and kept increasing their number until I began to experience drop-outs during playback. With my 7200rpm Seagate Barracuda SATA 80GB ST380013AS audio drive I managed a massive 76 tracks before this happened. The majority of musicians who are still running at 16-bit/44.1kHz should manage well over 100 tracks from a single drive without getting involved with RAID at all.

If you want to run more tracks than the figures above, you could simply try a faster single drive, such as one of Western Digital's 10,000rpm Raptor models. One of these could boost your track count significantly, as its sustained transfer rate exceeds 70MB/second on the outer parts of the drive, compared with about 60MB/second for the 7200rpm Seagate Barracuda drives more commonly used in musicians' PCs. Moreover, its random access time is significantly better, which should help those among you who are sample streaming. On the other hand, opinions seem divided about its acoustic noise levels, so bear this in mind if you want to build a quiet music PC. In addition, the largest model available was just 74GB when I looked, and that may not suit every musician.

If you're considering RAID because you're currently having problems running more than a couple of dozen audio tracks, you've

got a problem elsewhere in your system. One thing to check is that your hard drives are benefiting from DMA, by looking in Device Manager in the Advanced Settings page for your various IDE ATA/ATAPI controllers. For each device on the chain, the Transfer Mode should read 'DMA if available', while the Current Transfer Mode should have an entry such as 'Ultra DMA Mode 5'. If you see any mention of PIO mode, this is the cause of your problem. Although Windows is supposed to make the optimum setting for you automatically, it's not unknown for it to make a mistake.

The Case For RAID

So when does RAID move from desirable to necessary? Well, there seems to be a case for those running streaming samplers such as *Gigastudio*, particularly when creating virtual orchestras. This scenario gobbles polyphony like nothing else and can easily consume more than 200 voices. On well-tuned systems this seems to be about the limit for a single fast 7200rpm drive. Ironically, orchestral sample libraries also tend to be vast in size, so you may have to install more than one drive to be able to access all the instruments. If you need to run two drives anyway, it makes sense to turn them into a RAID array and get a performance benefit, and if you need three, your performance will go up again.

On the other hand, for sample streaming there's a school of thought that says that you may get better overall performance by letting those multiple drives act individually, with different sample libraries (for example, strings, brass, woodwind) on each one. This is because you're generally trying to access small sections from lots of files simultaneously, rather than reading or writing one huge file at enhanced speed. I don't have a definitive answer to this, but suspect the truth will depend on how you write your music, and how big an orchestra you're scoring for. Of course if your soft-synth polyphony requirements are beyond the capabilities of any one PC, installing each of these different instrumental groups on separate drives in independent PCs is another popular approach, and one that I'll be covering in more depth next month.

Tascam report typical polyphony counts of between 250 and 300 voices with a twin-drive RAID setup, lots of RAM and a fast processor, which certainly ties in with the various user results I've been tabulating. As a single drive may sometimes manage 200 voices (although most users seem to achieve fewer), this equates to an improvement of between 25 and 50 percent. Comparing Carillon's published track-count figures for their RAID-equipped Core 4 system with their single-drive systems, the numbers jump from about 75 to between 98 and 108 mono 24-bit/96kHz tracks — so you can also expect an improvement of 30–45 percent for audio track counts.

RAID could also benefit those who are using high sample rates, such as 192kHz. I still doubt that many people will really notice increased audio quality using this rate rather than 96kHz (most people seem to agree that it's largely a marketing 'feature' at the moment), but if you happen to be indulging in multitrack 24-bit/192kHz audio, RAID may be the only way to achieve more than around 40 simultaneous tracks.

The other obvious potential beneficiary of RAID is anyone involved in video recording and playback, as the bandwidth ▶

Improving Performance Without Upgrading

Don't forget that if your current PC is running out of steam, there are various ways to increase its processing power that don't involve physically upgrading the processor...

- **Freeze Frame: Without spending any money, you can run many more plug-ins and soft synths by taking advantage of the 'freeze' functions offered by most major MIDI + Audio sequencers. When you're happy with the sound of a particular audio or soft-synth track that's using lots of plug-ins, freezing it will create a 'mixed down' audio track version with embedded effects, releasing the processing power they previously consumed for use elsewhere.**
- **Card Tricks: The most processor-intensive effect is still usually reverb, which is why dedicated DSP cards such as TC's Powercore and Universal Audio's UAD1 running high-quality effects are so popular for 'taking the strain' off your native processor. Moreover, you generally get better-quality results compared to most native plug-ins.**
- **The Hard Way: Yet another way to offload some of your effect processing is using a hardware effects unit, connected via a send/return loop to your sequencer. I discussed this approach back in *SOS* March 2004, but it's become even easier since for *Cubase* users, due to the new 'External FX' settings of *Cubase SX 3*.**

"I didn't want to believe that such a simple idea could work. Unfortunately, it does." - Steve Levine

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required for that is far greater than for audio. In the past, many musicians scoring for TV and film have locked their PCs to stand-alone video-playback machines, but it's generally far more convenient to have your MIDI + Audio sequencer running a video window. It seems to be the drive's seek time that limits the advantages of RAID over a single drive for sample and audio track streaming, because so many individual files are being accessed. However, if you're streaming a single huge video file alongside your audio tracks you'll probably find RAID benefits you rather more.

64-Bit Processing

Extra processing power is the key to really pushing the boat out with PC performance, as it will let you run more plug-ins, soft synths, convolution reverbs and so on. In the past, increasing your processor power usually meant installing a faster version of the same model of processor in your motherboard, or buying a new motherboard to take advantage of a different and potentially faster range of processors. However, there are now so many processor ranges that making the best decision is

"There comes a time in the life of every PC when its perceived performance moves from inspiring to workaday and you start to wonder how to improve it."

rather more complex, even if you're absolutely determined to stick either with AMD or with Intel products.

As I explained in PC Notes June 2005, anyone considering a new, faster PC at the moment would be wise to make sure it's 64-bit capable, to ensure they have the potential for improved performance without increasing the clock speed of the processor. Early indications are that having a fully 64-bit system may boost the performance of typical music applications by as much as 30 percent, which is equivalent to replacing one of today's fastest 3.8GHz processor models with one of 5GHz. Moreover, for anyone who needs more RAM, a fully 64-bit system removes the 4GB ceiling of 32-bit systems.

Intel introduced their first 64-bit Itanium processor back in 2000, but few people bought one, partly because the first Itanium chips weren't designed to run 32-bit applications at all. AMD's Opteron, introduced in 2003, could run 64-bit applications under a 64-bit operating system, but also had 64-bit 'extensions' in its core that allowed it to run 32-bit applications under a 32-bit or 64-bit operating system, and therefore proved rather more popular. Intel's subsequent Itanium 2 had a 32-bit emulator that translated 32-bit instructions into code that could be run on the Itanium chip (although this entailed a performance 'hit'). For the musician, the best news on the 64-bit front was AMD's follow-up to the Opteron, the Athlon 64, which was intended for low-end servers and personal use and was therefore significantly cheaper, but could run 32-bit applications with ease.

In July 2004, Intel came back with the Xeon EM64T (Extended Memory 64 Technology) processor, previously

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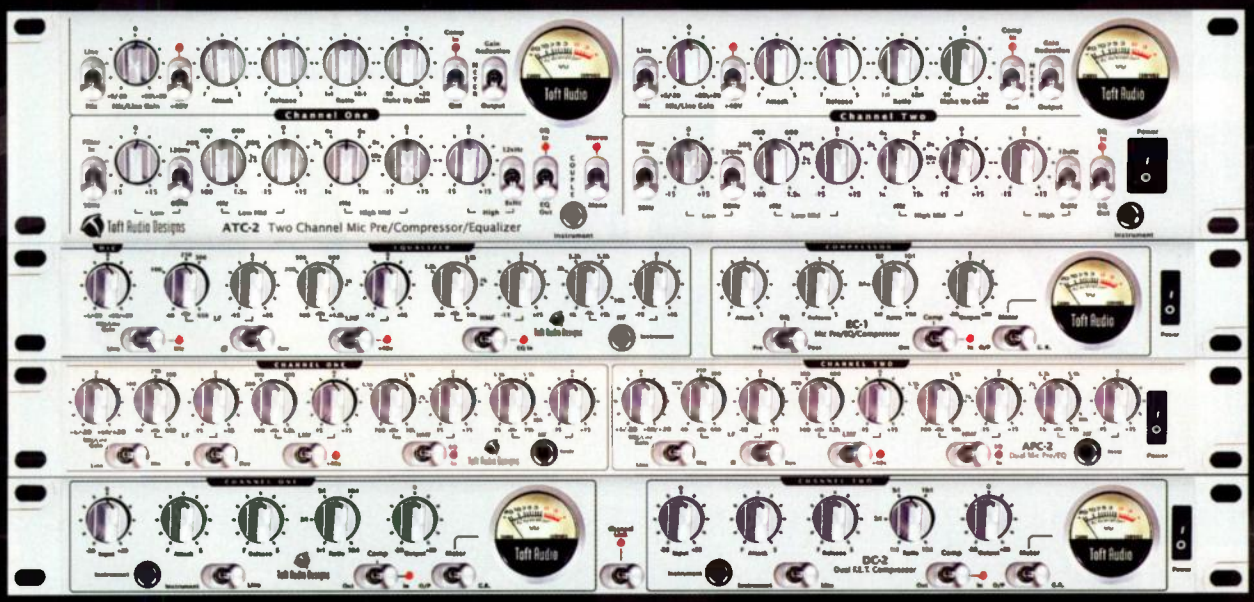

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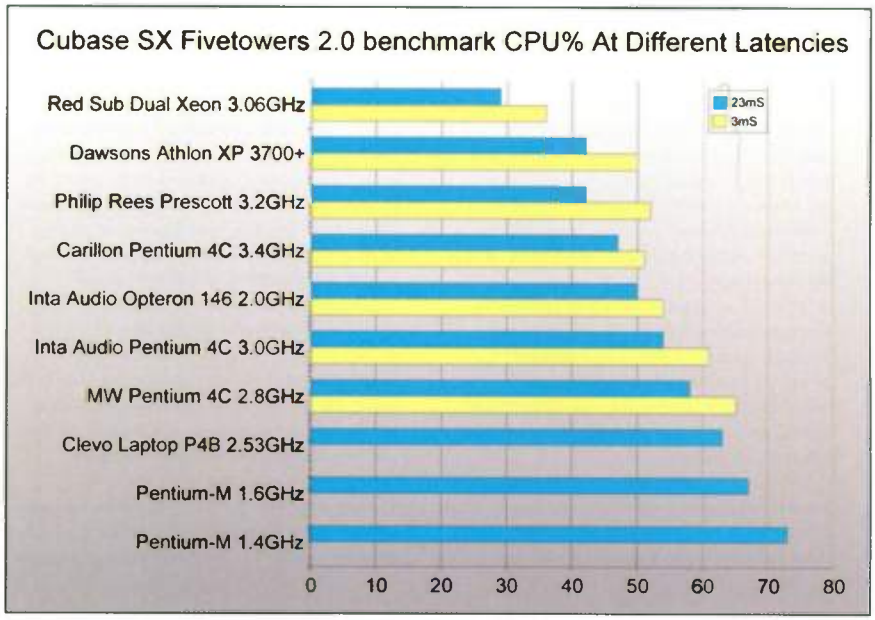
code-named Nocona, which also had 64-bit extensions compatible with the AMD ones. For the budget-conscious musician, Intel's latest Prescott Pentium 4 600 models also add 64-bit capability, courtesy of the same EM64T extensions. They also run at significantly lower temperatures when compared with the non-64-bit Pentium 4 500-series processors of the same clock speed, which would seem to remove the Prescott's previous disadvantage of requiring far more complex (and therefore expensive) cooling arrangements to remain quiet.

If you're after lots more processing power, I would personally recommend that you opt for a 64-bit-capable processor now, even if you intend to carry on running the 'traditional' 32-bit Windows XP for a while. A '64-bit-only' PC may not be a wise move at first, at least until any unforeseen hardware and software problems have been resolved, and because any hardware you own that doesn't have 64-bit drivers can't be used at all.



Having more than one processor in a PC is a sure-fire way to boost its performance beyond the competion, as you can see from this chart. The dual Intel Xeon processors of the Red Submarine system reviewed in *SOS* June 2004 provided better performance with plug-ins and soft synths than any other system reviewed before or since.

Multiple Processors

Both the Athlon 64 and Pentium 600 series are ideal for anyone about to buy a 64-bit capable PC that has a reasonable longevity, but for those who want the fastest performance available, sticking with one processor is no longer the ultimate solution, especially now that (as I reported in PC Notes January 2005) clock speeds seem to ▶

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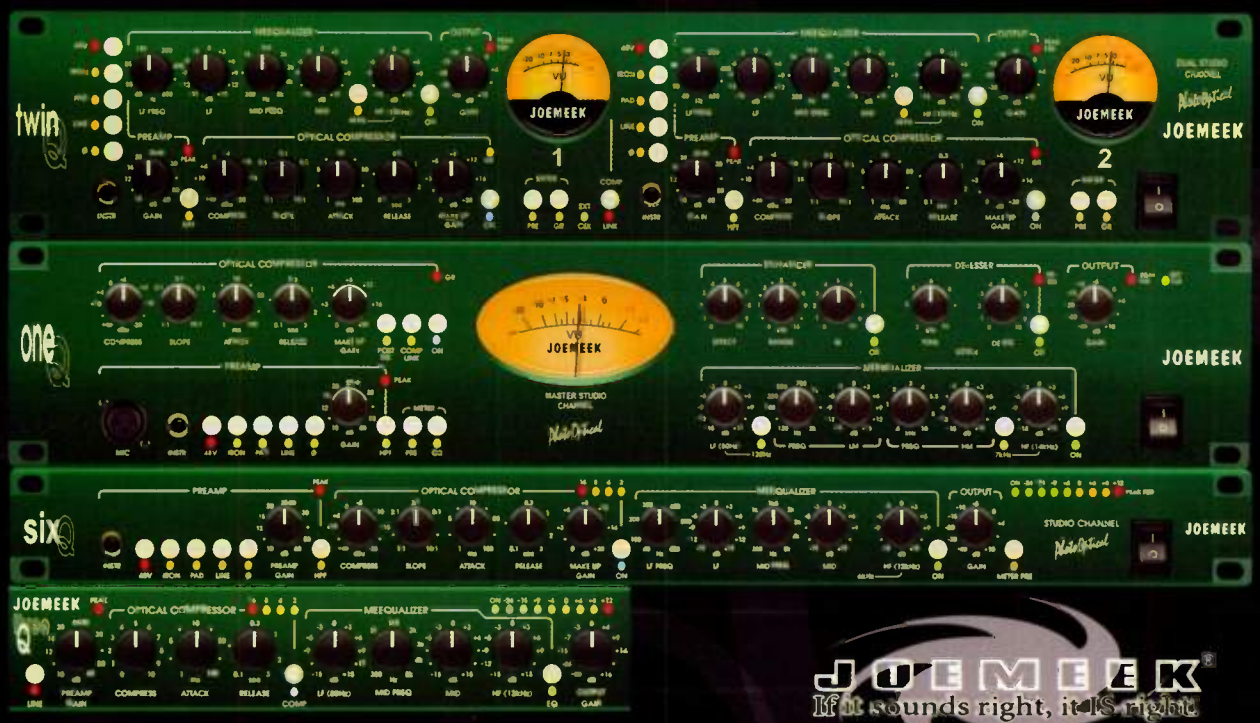

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Technical Terms Explained

- **Dual Core:** A processor that combines two independent processors and their respective caches and controllers in a single die and package. Some advantages over running dual processors include the ability to clock some of the internal circuitry much faster than if the signals had to travel 'off chip', less space taken up on the motherboard, and slightly lower power consumption.
- **Dual Processor:** Two independent processors, each mounted on its own die and in its own package. To run more than one physical processor you need a motherboard and associated chip set that supports this, plus an operating system that does the same, such as Windows XP Professional.
- **Hyperthreading:** An Intel technology, available on some Intel processors such as the Xeon, Pentium 4 Northwood and Prescott ranges, which lets processors appear to Windows XP and Linux 2.4x as two 'virtual' processors instead of one physical one. They each share the various internal 'sub-units', including the all-important floating-point unit, but can run two separate processing 'threads' simultaneously. According to my measurements, this can result in a typical 10 percent reduction in CPU overhead at low audio interface latencies with applications that specifically support it, but doesn't provide anywhere near the same performance improvement as true dual processors.
- **Multi-threading:** Separating the software application into multiple fragments of code is the key to multi-processing: individual threads can run on different processors simultaneously. Even with a single processor, switching rapidly between the various threads ensures that multiple processes appear to run simultaneously. However, on a computer with multiple processors different threads can run on different processors in true parallel fashion. Operating systems that support multi-threading (and, indeed, use it themselves) include Windows 2000 and XP.
- **RAID (Redundant Array of Independent Disks):** A technique that turns two or more hard drives into a single, higher performance drive, either by duplicating data for greater security, or splitting it among the drives for faster performance.
- **Stripe Size:** Not to be confused with stripe width (which refers to the number of simultaneous stripes that are read from or written to a RAID array, and always equals the number of drives in the array), stripe size is also referred to as block or chunk size. When data is passed to the RAID controller, it is divided by the stripe size to create one or more blocks. These blocks are then distributed among drives in the array, leaving different pieces on different drives. In most cases, the relatively large sizes of audio and sample files tend to benefit from a large stripe size such as 64KB (or more).

▶ have reached a ceiling — for the time being, anyway. The answer is to run multiple processors in parallel, with each handling part of the total load, and by choosing a motherboard and associated chip set that supports two physical processors rather than one, (along with a compatible operating system like Windows XP Professional), you can typically boost your performance by between 50 and 70 percent compared with a single processor of the same clock speed.

For example, by far the best processor performance I've measured to date (running plug-ins and soft synths) came from the pre-EM64T Dual Xeon PC supplied by Red Submarine and reviewed in *SOS* June 2004. At the time, its twin Xeon 3.06GHz processors provided roughly equivalent performance to a Pentium 4 Northwood of a theoretical 5.6GHz! Other musicians have created systems running dual AMD Opteron processors with similarly impressive results — and with this CPU range, systems using up to eight processors are possible, although I've never heard of any musician running more than two, because of current audio software limitations (see Hyperthreading in the 'Technical Terms Explained' box, above, for more details).

Peering Into The Future

Of course, the next logical step from a dual-core system must be one that also has dual physical processors. To the operating system this will appear as four processors, but it's currently difficult to predict how audio software will benefit — or, indeed, cope. Steinberg currently recommend disabling the Hyperthreading feature of Intel's Xeon processors if you're running a dual Xeon PC, as otherwise the dual processors will appear to the operating system as a total of four processors (two physical and two virtual). Many plug-ins and soft synths may have severe problems with this arrangement — at the moment, anyway. However, as more and more musicians start trying out similarly-equipped computers, it seems inevitable that 'quad' processing will eventually become the next goal for musicians aiming for the ultimate PC, so I suspect that software developers will have to sort out any current teething troubles.

The Near Future: Dual-core Processing

While PC systems running dual Xeon or Opteron processors have already proved their worth for anyone seeking a significant hike in performance, there's now another way to have multiple processors in your PC. Both AMD and Intel have abandoned their pursuit of ever-higher clock speeds in favour of a dual-core approach, where two processors sit side-by-side on the same chip to provide faster performance.

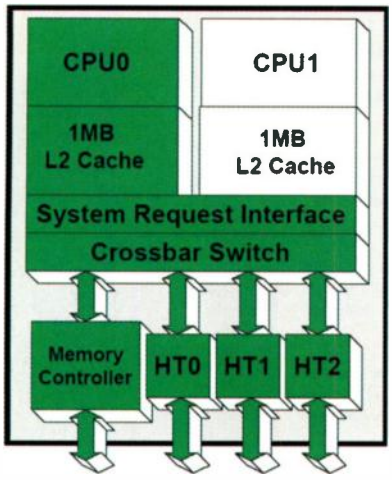
As I write this, AMD have just officially launched the world's first dual-core 64-bit processors. The 800 series Opteron is available now and designed for high-end four- to eight-way servers, while the Opteron 200-series is aimed at two-way servers and more general-purpose workstations, and should also be available by the time you read this. However, for the musician probably the best news is the unveiling of the dual-core Athlon 64 X2, due to be launched in June.

These new ranges have two cores on a single die, plus memory, I/O and dedicated caches, but use the same infrastructure as their predecessors, including the same physical package as the single-core versions. The dual-core Opterons use the familiar Socket 940 format, while the dual-core Athlon 64s will use Socket 939. So for many AMD motherboard owners, moving to dual-core simply involves buying a new processor and updating the BIOS.

Performance benefits for the musician are uncertain at the moment, but it seems that a dual-core Athlon X2 could provide more than 60 percent more power than a similarly clocked Athlon 64. Some of the Opteron benchmark tests I've seen also suggest that a dual-core model outperforms twin processors of the same clock speed, probably because having both cores on the same chip neatly bypasses some of the potential bottlenecks of dealing with two individual cores on physically separate chips, interfaced via the motherboard. The dual-core model also generates less heat, which should make it better for use in a quiet music PC. Overall, it looks as if dual core may be the preferred route of the future if you're considering any sort of PC containing multiple processors.

Meanwhile, Intel have

The secret to increasing the performance of a single processor package beyond its current clock-speed ceiling is to place two processor cores in the same chip, as in Intel's forthcoming Pentium D and EE (Extreme Edition) models.



AMD have a head start over Intel when it comes to dual-core processors: their Opteron and Athlon 64 were designed from the ground up for multiple-core operation, but were only initially shipped with a single core.

produced a dual-core Xeon, due to ship in early 2006, and are also developing dual-core versions of their Itanium and Pentium 4. The new Pentium 4 (codenamed Smithfield) will be released as the Pentium D range, and is expected to out-perform the existing P4 Prescott by something like 40 percent when running at the same clock speed, depending on the application. This is probably the most interesting new dual-core processor from Intel for most musicians, since it will be the cheapest, and because it's expected much earlier than the dual-core Xeon, in the latter half of 2005. It won't feature Hyperthreading, like its predecessors, although this will feature in a new and more expensive dual-core Pentium Extreme Edition.

Sadly, all these new dual-core processor ranges from Intel will require specific motherboards with new chip sets, which not only means a more expensive upgrade, but also a longer wait before you can go ahead, especially since new chip sets may result in teething troubles. For anyone wanting to buy a new PC at the moment, the AMD option is more enticing: you can buy a machine with a single-core processor right now that should be compatible with the forthcoming dual-core Athlon 64s or Opterons, and then buy a dual-core processor for it later on.

Final Thoughts

It used to be possible to buy a computer that would last you unchanged for at least 18 months, but nowadays this is more difficult. If your current PC is running out of juice, fitting more RAM may improve its performance in some cases, and at the very least let you load more simultaneous soft synths. Installing a faster hard drive or RAID array may also let you run more audio tracks, although, as I've explained, many musicians shouldn't find this necessary. However, for the vast majority of musicians the only real way past a genuine bottleneck is more processing power, and this generally means a more radical upgrade. If you already have a 64-bit-capable computer based on an Athlon 64 or Opteron you may be able to achieve this by moving across to Windows XP Professional x64, once things have settled down. All the signs are that you'll also be able to pop a dual-core equivalent of these processors into the same motherboard later on, for even better performance — assuming that the motherboard manufacturer releases a suitable BIOS update to permit this. I can't guarantee that this will happen in all cases; sometimes it makes more sense for motherboard manufacturers to introduce a new model to support a new processor, even if the old one could be forced to do it with a little development effort. Nevertheless, many existing AMD users have some cause for celebration.

Unfortunately, for the rest of us keen to achieve a serious improvement in processor performance, going 64-bit will probably mean buying a new motherboard as well as a new processor, or even buying a completely new PC. If you really must have lots more CPU power now, upgrading to a motherboard supporting Dual Xeon or Dual Opteron processors will provide lots more guaranteed performance, and if you want to buy a completely new PC there are certainly some extremely capable new systems already available from specialist music retailers in these formats.

However, so many major technological changes have either just arrived, are imminent or are on the horizon that, unless you really must have that much faster new computer immediately, I'd advise you to sit tight for a month or two until the dust settles. Then the various new processors will actually be available to the public, and systems built using them will have started to appear for testing with 64-bit versions of existing audio software. Overall, I don't envy anyone about to make a major upgrade to their current PC (or buy a completely new one for music purposes), since there are so many changes afoot. All I can say is that it's a very exciting time! SOS

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The HP4 from PreSonus answers the need for a headphone distribution amplifier with professional specifications in a small package at an affordable price. The HP4 features four discrete headphone outputs on the front panel each with its own volume potentiometer and 150mW of amplification per channel. The HP4 also features adjustment over control room monitors with a separate volume control, monitor mute switch and mono switch.

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The Eureka is a professional recording channel strip containing a discrete class A transformer-coupled microphone preamplifier, compressor, and three-band parametric equalizer. The microphone preamplifier features variable input impedance so that the Eureka can be matched and "tuned" for all types of microphones and recording applications.

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It's a well-built, high-performing channel strip
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The DigiMAX LT is essential to the modern digital studio. Eight channels of pristine mic preamplification, inserts on every channel, and an internal power supply set this unit apart from anything on the mar
Each channel features our award-winning, high performance, dual servo microphone preamplifiers with 48V phantom power, and -20dB pad..

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BlueTube DP

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The new BLUETUBE DP two channel microphone/instrument preamplifier with Dual Path technology delivers the best of both worlds offering a solid state preamplifier stage and a tube preamplifier stage in each channel. This new Dual Path feature delivers the most flexible preamplifier in its price range by delivering both fat warm tube tone or invisible solid state transparency. The BLUETUBE DP replaces the original award-winning BLUETUBE as PreSonus' most affordable two-channel microphone/instrument preamplifier.

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The FIREBOX is the most powerful 24-bit/96k FireWire recording interface that fits in the palm of your hand. The FIREBOX is a complete 24-Bit/96k personal recording studio combining two high quality PreSonus microphone/instrument preamplifiers, 24-Bit/96k sample rate and Steinberg's Cubase LE 48-track recording software. The FIREBOX is the perfect hardware and software combination for a powerful professional quality and compact computer-based studio. The FIREBOX has the highest record/playback track count of its size with the ability to record six inputs and playback through ten outputs simultaneously all at pro-quality 24-bit/96kHz.

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Cubase LE is the new music production software based on award-winning Cubase SX technology featuring 48 audio tracks, VST plug-ins and full VSTi support. Cubase LE combines powerful audio and MIDI recording features with fessional editing and effects. Cubase LE and all included plug-ins are compatible with both Mac and PC systems. Also, Cubase LE sessions are npletely upward compatible with both Cubase SX and Nuendo. So if youchoose to upgrade down the road to Cubase SX or Nuendo, you can seemlessly grade all of your existing sessions when you upgrade your software.

"One of the **best laptop-orientated interfaces** we've seen to date, the **FireBox is a winner.**" Computer Music, June, 2005

Firepod

24-bit/96K FireWire Recording Studio with 8 Preamplifiers and CUBASE LE Recording Software

FIREPOD is a complete 24-bit/96k recording studio combining eight high-quality PreSonus microphone preamplifiers, 24-bit/96k sample rate conversion and as an added bonus, Steinberg's Cubase LE track recording software. The perfect hardware and software combination to deliver professional quality at an amazing price.The FIREPOD is loaded with eight custom-designed ultra low noise, high headroom crophone preamplifiers perfect for recording a wide variety of sources including vocals, drums, guitars, bass, piano, keyboards, guitars, synths, horns, orchestras, choirs, and more. Eight potentiometers are on front panel to easily control the input level of each preamplifier. Inputs one and two of the FIREPOD can be switched between microphone or instrument level while inputs three thru eight can be switched ween microphone or line input. Phantom power (+48V) is available on every channel in groups of four. Channels 1 and 2 feature fully balanced send and return TRS connectors on the rear of the rugged metal ssis for inserting outboard dynamics, EQ and effects processors. The FIREPOD has eight balanced TRS line outputs as well two balanced TRS MAIN outputs as well as CUE outputs for addtional monitoring.

"The **Central Station** is bound to be the catalyst for many studios to off-load their mixers because it **provides all of the control features** that a desk gives in one very compact unit." Future Music, August, 2004

Central Station

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Central Station is the ultimate studio-monitoring interface for the modern digital studio. The Central Station features three sets of stereo analog inputs to switch ween input sources such as: DAW, mixer, CD/DAT/Tape player, or keyboards/samplers. Two stereo analog inputs feature TRS balanced and the third stereo input features A inputs with trim control for level matching of input signals. In addition, the Central Station will accommodate two digital inputs via S/PDIF or TOSLINK providing D/A version up to 24Bit/192kHz. This allows you to monitor DAW and CD/DAT outputs through the same professional quality converter for the most accurate A/B comparison highest quality monitoring environment. The digital to analog converter offers the highest possible audio quality with over 117dB dynamic range and ultra high quality log circuitry. The Central Station features three sets of monitor outputs, each with their own set of passive trim controls. The monitoring section also provides MUTE, and MONO switches. In addition, the Central Station includes a set of CUE outputs that can feed headphone amplifiers and a separate stereo MAIN line level output.

FREE CSR-1 WITH EVERY CENTRAL STATION PURCHASE

Central Station Remote Control (CSR-1) can be connected to the rear of the Central Station via DB9 connector to control VOLUME, TALKBACK, MUTE, input source ching and speaker output switching functions. Keep the Central Station in your rack with your gear and use the CSR-1 for ultimate control and flexibility.

BlueTube DP

Two-Channel Microphone Preamplifier

Each channel of the BLUETUBE DP includes a -20dB pad, polarity reverse, 80Hz filter, and +48v phantom power. Front panel controls include solid state GAIN control and switchable on/off TUBE DRIVE. When the TUBE DRIVE is clicked off, the tube preamplifier stage is bypassed delivering ultra-quiet and transparent preamplification. The front panel also includes illuminated analog VU meters for each channel for easy visual monitoring.

"As a desktop unit, the **Blue Tube DP looks great**, it's very easy to use and it has no obvious vices." Sound on Sound, June, 2005

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"the **Studio Precision** range has placed Event amongst the **front runners**."

Sound on Sound, April, 2004

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Each and every day, a host of award-winning producers, engineers, composers, and sound designers are making the switch from their old monitors to the Studio Precision. Follow the link below to see what they have to say about the Studio Precision, to check out their Web sites, and to see listings of their discographies and awards.

Find out more at www.handinhand.uk.net

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For the past seven years, the 20/20bas™ has put true world-class reference monitoring into the hands of musicians previously shut out by the high cost of those systems. As the favorites of the music press, project studios, and recording professional worldwide (such as recording engineer extraordinaire Francis Buckley, who took the very first pair of 20/20bas™ and won a Grammy for the project he mixed on them), the 20/20bas have set the standard for excellence in biamplified direct field monitor systems. And now the legacy continues with the 20/20bas V2.

What is it that makes the 20/20bas V2 so special? To be frank, a whole lot of things. First, it uses the time-tested low and high frequency driver elements found in the original 20/20: a 1" silk dome high frequency driver specially designed to be superbly accurate yet non-fatiguing to your ears - even after an all-night session--and an 8" mineral-impregnated polypropylene cone low frequency driver that delivers fat, punchy, un-hyped bass. Also from the original: the active asymmetrical fourth-order crossover—one with phase response so accurate that the resulting stereo imaging simply must be heard (make that seen) to be believed.

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Do your mixes suffer from buried vocals, overwhelming bass, screetchy guitars, or other sonic unpleasantries? No doubt your monitors simply aren't giving you an accurate picture of what's going on in your mix. How to make the problems go away? Switch to Event monitors -the monitors famous for their "mixes you can trust" sound. (Just ask the people who have won Grammy awards for mixes they've done on them.) And now it's easier than ever to make the switch. Introducing the Tuned Reference™ 5, Tuned Reference 6 and Tuned Reference 8. Their names tell the whole story: These monitors are precision tuned to provide flat frequency response and uncolored sound, giving you a true sonic reference for mixing. So when you mix on a Tuned Reference monitor, you know your mixes will translate accurately to other playback systems. (Which is, after all, the whole point.)

"a practical solution to **affordable** project studio monitoring they do a great job, and at the **price they're a tough act to follow**."

Sound on Sound, December, 2003

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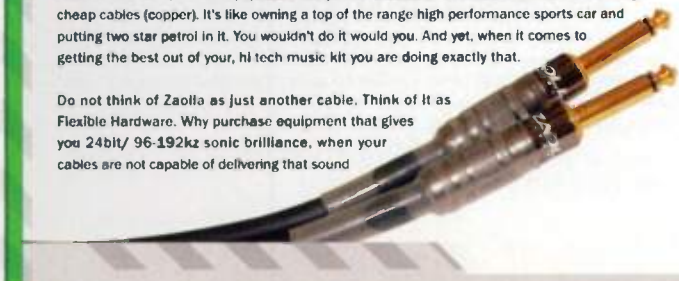

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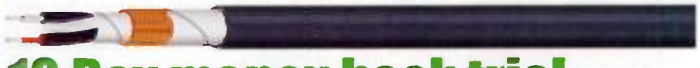

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EVENT ELECTRONICS

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Nord Modular G2

G2X - G2 - G2 Engine

Editor's choice award Future Music, May 2004

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No doubt, computers have become a natural part of today's music production. The process of editing sounds and sequences is so much easier from a computer screen. Still keyboard players feel the need for portable instruments. Clavia proudly presents the second generation of the Nord Modular- the Nord Modular G2. Nord Modular G2 offers you the better of two worlds and provides an effective solution for the working musician. With the G2, Clavia introduces a truly innovative hardware platform with focus on live performance features. The G2 offers fully assignable controllers to turn, bend and tweak. In fact, the ultra-flexible user interface of the G2 takes real-time editing to a higher level. While remaining true to the traditional modular synthesis concept it manages to go where no modular synthesizer has ever gone before...

Nord Electro 2

Virtual Electromechanical

Clavia's goal when developing the Nord Electro 2 was to create the best emulations of traditional electromechanical keyboard instruments on the market, and to make the instrument compact and lightweight. Nothing else. No brass banks, no orchestral sounds. No compromises. Just outstanding electromechanical keyboard sounds with true feel, from fast keyboard response to authentic sound.

The organ in the Electro 2 is based on a digital simulation of the mechanical tone wheels of the B-3 organ. It offers a number of very innovative solutions to mimic the typical B-3 sound. The piano section comprises several carefully multi-sampled electric piano instruments. As a bonus we also included an acoustic grand piano (concert model). The Electro 2 also sports a USB interface for quick and easy download of new piano sounds. The Electro 2 also features a very flexible effects section including a Rotary Speaker simulation out of the ordinary. Nord Electro 2 is available in three versions: the 5 octave Nord Electro 2 SixtyOne, the 6 octave Nord Electro 2 SeventyThree and the 19" rack version Nord Electro Rack 2.

Voted Best Stage Piano 2002/03 - Voted Best Organ 2003/04 M.I.P.A

Nord Lead 3

Performance Synthesizer

With the Nord Lead 3 Clavia takes Virtual Analog to the next level and introduces the Advanced Subtractive Performance Synthesizer. 'Advanced Subtractive' because of the extremely flexible sound engine, featuring a combination of traditional shapable waveforms and a very intuitive 2 or 4 operator FM engine. All this can be routed through the top quality multi filter for further shaping. Performance Synthesizer' because of its unsurpassed user interface and play control functions such as keyboard hold, parallel polyphonic glide in legato mode, single-key triggering of whole chords and even clusters of slightly detuned voices for super-unison effects. A very important thing for creativity is to always have total control of the parameter settings. The solution is to use high -resolution rotary encoders combined with circular LED graphs for each knob. The LED graphs around the knobs guarantee that you always have total and instant control over your sound! To put it simple: what you see is what you hear.

The synthesizer is available as a 4 octave keyboard model with Velocity and Aftertouch, the Nord Lead 3, and as rack version, the Nord Rack 3.

Outstanding Synthesizer 2002 M.I.P.A

Nord Lead 2X

The rebirth of a classic

NORD LEAD 2X NOW ONLY £495inc VAT

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Hammond XK3/XLK3 & Leslie 2121/2101

Modelled Tonewheel Organ & Rotary Speaker System

Photos: Mark Ewing

Hugh Robjohns

Hammond's New B3 was the best-ever digital emulation of an electromechanical organ, but at over 15 thousand pounds, it didn't come cheap. Fortunately, the XK3 puts the New B3's sound engine into a much more affordable package...

Two years ago, Hammond-Suzuki introduced the 'New B3' organ, which proved to offer the closest ever digital reproduction of the original Hammond B3 organ's sonic and performance characteristics (see my review in *SOS* July 2003, which can be read at www.soundonsound.com/sos/jul03/articles/hammondb3.asp). Naturally, there is a lot of very clever digital technology involved in the New B3, but this is combined with some relatively crude mechanical switching techniques which were derived directly from the original Hammond keyboard design dating back nearly 80 years! This rather bizarre combination of old and new technologies was required because no other way could be found of replicating the unique multi-contact switching action and contact-click characteristics of the original. These factors have a profound effect on playing technique and are essential to reproducing the character of this fantastic keyboard instrument.

The New B3 has been a success, and was widely acclaimed on its release by B3 *aficionados* including the late Jimmy Smith. It achieved what many attempts — by Hammond themselves as well as other manufacturers — failed to do, which is to accurately recreate the original B3's characteristics. However, because of the way it has to be made, the New B3 is inherently a very expensive instrument — £15,000 pounds in the UK. So although every keyboard player needing that classic organ sound would undoubtedly want one, it is priced well beyond the means of many. It is also very large, and, although a lot lighter than the original B3 and its stablemates, still a bit of a beast to be lugging around to gigs in the back of a car.

From B3 To XK3

Enter the new Hammond XK3, which was launched towards the end of last year. This is an all-new single-manual performance organ following on from the well-known XB-series keyboards, but the XK3 is particularly significant because it embodies all of the sophisticated digital tone-generating technology of the New B3. However, instead of the complex, expensive and bulky multi-contact keyboard design of the New B3, the XK3 controls the sound-generating electronics with a much simpler standard MIDI keyboard design, and the organ is housed in a more easily portable package. So if the playing characteristics have been compromised slightly from a purist's point of view, the result is a greatly reduced price and a far more convenient package for the gigging musician. However, from a sound point of view, this new keyboard has to be the

best-sounding single-manual Hammond yet, and by quite some margin.

Overview

For the intricate details of the digital technology I would recommend reading the earlier review of the New B3, since the underlying VASE digital technology is identical. To briefly recap, though, the system digitally emulates two complete sets of 96 independent tonewheels (to provide independent upper and lower keyboard configurations), complete with controllable amounts of 'leakage' (crosstalk) and different settings for foldback (the duplicated notes at each end of the keyboard which play an important part in the characteristic Hammond sound).

Instead of switching the individual outputs through multi-contacts below each key, the XK3 employs a much cheaper digital switching arrangement, coupled to a sophisticated and configurable key-click generator to create something close to the multi-contact glitching of a real tonewheel organ. Furthermore, this 'standard' keyboard incorporates note velocity facilities to control external keyboards or sound generators via MIDI. The keyboard is a traditional 'waterfall' design with flat-fronted keys, and has the familiar reverse-coloured preset keys in the bottom octave — although these are not the heavy latching switches of traditional console Hammonds (or the New B3, for that matter).

While the New B3 was designed for use with the XB122 Leslie and its integral valve power amplifier, the XK3 has a clever valve preamp built in to provide genuine tube-amp overdrive and distortion effects. In fact, the valve preamp is configured as a dual-band affair to ensure the harmonic clarity and detail is retained even when being heavily overdriven.

The XK3 also employs the same DSP-based scanner-vibrato system as the New B3 organ to provide the complex chorus and vibrato effects unique to tonewheel Hammonds, but takes this signal processing a step further by also incorporating a DSP-based reverb and Leslie simulation as well. This can be disabled if you wish to use a genuine external Leslie (or similar) cabinet, but it does provide a very convincing and convenient built-in effect for live sound applications. A standard 11-pin interface is provided to couple the XK3 to modern Leslie systems such as the XB122 or the new portable 2121/2102 system, which although sold separately, was also supplied with the review XK3, and which I'll be discussing in detail towards the end of this review. In addition to the 11-pin Leslie output, there's a pair of unbalanced line outputs on quarter-inch sockets, which provide a stereo signal if the internal Leslie and/or reverb effects are used. Nor does the connectivity end there — in addition to a headphone jack, there's a mono insert point with separate send and return sockets operating at a nominal +4dBu (the return socket can be used as an external input as well, if required), plus further quarter-inch sockets to accept footswitch and standard volume pedal control inputs, and even a latching DIN socket for the dedicated Hammond EXP100 expression pedal which uses traditional opto-sensors.

While the New B3 only offered MIDI Out, the XK3 has a pair of MIDI In sockets in addition to MIDI Out. The multi-contact keyboard arrangement of the New B3 prohibited external MIDI control, but as the XK3 employs electronic note switching, MIDI control is available here, allowing the new organ to be controlled remotely from a sequencer, for example. The two MIDI In sockets are provided to allow separate external keyboards or controllers to access the lower manual and pedal sound-generating elements independently. The MIDI Out socket contains merged data from the external lower and pedal controllers (if in use) and allows other devices to be controlled from the keyboard. Up to three external zones can be configured through the menu system, specifying the keyboard note ranges which are sent to the required MIDI channels.

Like its big brother, the XK3 also has a socket for a Compact Flash memory card which can be used to store all of the keyboard's settings or to load new settings. Power is connected via the usual IEC inlet with an adjacent power rocker switch, but there is no provision to select the mains voltage — European models will only accept 230 to 240V.

While the XK3 is a single-manual keyboard, its sound engine offers two complete sets of digital tonewheels and consequently, there are two sets of real drawbars to allow the keyboard to be split for upper/lower configurations. There is also a separate bass pedal section derived from the lower keyboard tonewheel set. For many players, this ability to split the keyboard is perfectly sufficient to allow the traditional left-hand bass with right hand comping or solos, but with only 61 playing keys available, things ▶

The rear panel of the XK3 (shown here still attached to the XKL3 dual-manual expander underneath) features the MIDI I/O sockets, the Compact Flash slot for data and patch storage, and the connections for a standard footswitch, an expression pedal, and the traditional Hammond EXP100 pedal. In addition to the standard stereo line out and headphone jacks, there are also send and return connections for use with outboard effects, as well as the traditional 11-pin Leslie connector. The XK3's internal valve can be seen glowing away through the grille on the right.

SOUND ON SOUND

Hammond XK3 £2199

pros

- Affordable price for a fully featured, great-sounding performance organ.
- Authentic-sounding tone from the VASE sound engine, as used in the New B3.
- Offers both MIDI In *and* Out, unlike the New B3.
- XKL3 option allows expansion to two manuals.
- Decent built-in Leslie simulator (although the results from the stand-alone units reviewed in this article are even better).

cons

- Detailed control over the modelled tonewheels is accessed via a complex menu-driven system.
- Lowest octave of the keyboard cannot be used for playing. This is as on original Hammonds and the New B3, but given that the lowest keys on the XK3 *are* keys and not switches, it would be nice to have the option of using all 73 notes.

summary

The XK3 successfully combines the portability of Hammond's XB-series digital organs with the New B3's more faithful rendition of the tonewheel sound. The result is an affordable, great-sounding performance keyboard for both studio and live applications, especially when used with the Leslie options also reviewed here.

can get pretty cramped sometimes. However, the second set of tonewheels and drawbars can be controlled independently from any external MIDI keyboard, and the bass-pedal section can be controlled from a suitable MIDI pedalboard such as Hammond's own 13-note XPK100, for example.

The ability to hook in an external MIDI keyboard is great, but it gets better! Hammond have produced an optional lower keyboard specifically for the XK3 called the XLK3. This is simply a second keyboard — identical to that of the XK3 and complete with reverse-coloured preset keys — housed in a matching wooden frame that sits neatly beneath the XK3 to form a composite dual-manual organ, as shown in the picture at the head of this article (the XK3 is also sold together as the XK33 Prolite package, which includes the XLK3 and the optional stand). The wooden side panels are styled to resemble a traditional console organ, and the whole thing makes a very portable and very playable dual-manual organ system.

Performance Controls

A large part of playing the Hammond is, well, how you play the Hammond — by which I mean the tactile way the player manipulates the controls, especially the drawbars and Leslie controls. The XK3 is set up in a very similar way to a traditional console Hammond organ, and most of the functionality will be immediately familiar to Hammond players, but there are also some significant departures to enable a range of additional features and facilities more appropriate to this kind of live-performance keyboard.

To the left-hand side are three rotary controls to adjust the master volume, tone and valve overdrive. There is also a backlit LCD screen with four 'soft' keys and a pair of page up/down buttons to navigate the various configuration menus, plus a data input knob. By default, the display shows the current drawbar settings, either as graphical bar-graphs or as slider numbers, along with the preset key and name, and the current tone control value. Below the LCD panel are seven more push buttons to access the menu system, store or recall presets, and to select various functions such as the tube distortion or the frequency band affected by the single tone control knob. Since the reverse-coloured preset keys don't latch down, LEDs above each key are used to identify which preset is currently in use, and when separate upper and lower presets are in use, the upper preset is shown by a steady light, and the lower by a blinking light.

To the right of this control section is the start of the more traditional-looking controls: the rotary vibrato/chorus selector is accompanied by a single on/off button, and two sets of nine drawbars are separated by a pair of pedal drawbars. These two sets of nine can be switched to operate either as the A# and B preset's live drawbars operating on a single manual, or as separate upper and lower live drawbar sets when using the split-manual mode or when using an external MIDI manual or the XLK3.

At the right-hand side of the XK3 are eight more buttons, each with an integral LED. The first four control the percussion effect: second and third harmonics, fast decay and soft modes. Traditional console organs offered the choice of second- *or* third-harmonic percussion. However, the XK3 allows both at the same time, and although this confused me at first it allows for a more interesting tone combination.

The next two buttons configure the keyboard to allow the bass pedal section to be played from the bottom end of the keyboard, and to engage the split keyboard mode with separate upper/lower drawbar settings. The last two buttons select the built-in digital reverb and activate the Demo song playback mode — although this last button can (sensibly) be reprogrammed for a variety of other functions including activating an external MIDI zone, switching the vibrato/chorus on/off, or switching the Leslie speed. The last two are very handy options as they allow these features to be controlled with the right hand (even while holding down the keys, at a stretch), instead of the left, which can make it easier to add effects without breaking the rhythm or flow of a left-hand bass, for example.

To the left of the keyboard, where you'd find them on a conventional synth, there's a pair of wheels for pitch-bend and modulation. These aren't usual tools on a Hammond, but they're useful for controlling other keyboards, and can be assigned to control the actual pitch or virtual tonewheel motor speeds and the Leslie speeds, respectively, if required. The Leslie Brake, On and Fast controls can be found on the side cheek too — although if you prefer the traditional half-moon Fender switch screwed to the front rail, you can apparently order this as a custom option from Hammond instead.

The reverse-coloured presets provide

The complexities of the VASE tonewheel modelling engine have to be dealt with via the two-line LCD and menu-driven operating system, but otherwise the controls are either fairly self-explanatory, or like those of a real Hammond. The pitch-bend and mod wheels might seem out of place on a Hammond, but they're useful when controlling other sound sources via MIDI, or can also be assigned to virtual tonewheel speed and Leslie speed if you wish.

The XK3 offers two complete sets of nine drawbars — one for each manual — plus two bass drawbars for pedal sounds.

a significantly greater range of control than on a traditional Hammond. Not only can you select different preconfigured drawbar settings by pressing the different keys, but each preset also stores a range of other keyboard parameters including vibrato/chorus settings, Leslie parameters, distortion characteristics, tone controls and so on. So selecting a different preset can completely change the sound of the instrument in a way which the vintage console organs could never do. Furthermore, there aren't just the nine preset keys to play with (C normally being a cancel mode and A#/B being live drawbar selectors). Every preset key can store a different configuration, and can also access a different memory bank — so by my reckoning there are 132 different preset memories available, which should cover every possible eventuality, no matter how complex your gig is or how diverse your playing style!

Configuring the instrument is a relatively painless process once you have become familiar with the LCD menu system. Pressing the menu key accesses the last-used menu screen (there are five in all), showing up to four sub-pages. The different menu pages are called up using the Page up/down buttons to the left and the sub-menus are accessed by pressing the appropriately numbered soft key. Each sub-menu page then shows four parameters and additional parameters are found by pressing the Page up/down keys again. Pressing the relevant soft key for each of the four displayed parameters assigns the data knob to that function so that it can be changed.

The usual controls for Percussion and setting up splits are accessed at the far right of the panel, as is the button that triggers the built-in Demo — but it can be reassigned to more useful Leslie- and effects-control functions.

This process involves a lot of button pushing, accompanied in my case by quite a lot of cursing as I accidentally navigated away from the thing I was trying to change! Clearly, it's not something you would want to try to do live on stage, but with 132 presets available, there is no reason why you should ever need to. However, within these menus are the facilities to tweak and fine-tune pretty much every possible facet of the instrument. Highlights include changing the tonewheel ▶

type from a traditional early console organ to the more mellow last-generation types, or the transistorised X5 type of sound, along with individual levels, resonances, leakage noise and distortion artefacts. The key click can be controlled precisely in terms of attack and release levels, rates and brightness, the overdrive distortion can be made constant or to respond to the expression pedal, and the vibrato/chorus rate can be changed. The foldback at each end of the keyboard can be selected from individual notes, the sound generation for the bass pedals can be selected between a traditional console organ sound, the simpler X5 sound, or a preset synth bass, and there are various options for sustain, polyphony and even note velocity. What's more, every conceivable attribute of the DSP Leslie system can be configured, including cabinet and horn resonances, bass and horn rotor speeds and levels, rise and fall times, the virtual mic positioning, and so on.

Many of these menu configurations allow the instrument to be honed to reflect specific characteristics of traditional Hammond console organs, but many others allow the XK3 to do things no vintage instrument ever could. Two of the more useful examples are that the percussion volume can respond to the note velocity, and the envelope can be retriggered with every note even when playing legato.

The Leslie 2121 & 2101

Anyone who knows anything about the Hammond organ sound knows that a very large part is down to the Leslie rotary speaker. The original mechanical designs have (arguably) never been bettered, and employ contra-rotating horn and baffle arrangements to distribute the organ sound in different directions and at different speeds. This produces a very complex and constantly changing combination of direct and reflected sounds, with both amplitude and frequency modulated components. Modern DSP-based simulations are pretty good these days, especially for live applications, but in a recording situation — and for the top-flight live performers — it is hard to beat the real acoustic impact of the sound being splashed around a room by a rotating horn.

Hammond-Suzuki acquired the rights to the Leslie name a long time ago, and have been making a small range of Leslie models to accompany their organs ever since. The portable system reviewed here, which was supplied with the XK3 for review, comprises the 2101 rotary treble horn unit and its matching 2121 stationary/bass unit. Both were intended for live performance rather than home installation. Although designed to complement compatible Hammond organs and sound modules, these units can also be used with a broad range of instruments including other keyboards and synths, guitars, and even vocals.

The larger of the two Leslie units is also the simplest — the floor-standing 2121 stationary speaker. This self-powered, two-way reflex design incorporates a static 15-inch woofer and a compression treble driver which is coupled to a wide dispersion fixed horn — much like a standard compact PA speaker (you can see a picture of it with the 2101 at the top right of the web page at www.hammondorgan.co.uk/leslie.htm). The frequency range is quoted as 40Hz to 15kHz, crossing over between the two drivers at a nominal 700Hz, and the system is capable of a substantial 121dB SPL at a distance of one metre thanks to its internal solid-state 150W bass amp and 50W treble amp.

The XLK3 on its optional stand, without the XK3 attached.

The vinyl-covered wooden cabinet measures 506 x763 x 506mm (whd) and weighs 39kg, so the wheels and chunky side handles make moving it around a little easier. Although the review model was black, there are also silver and walnut cabinet versions available, identified as the 2122 and 2123 respectively.

The rear panel caters for three input channels (the first with a insert point), two-band equalisation, master volume, and a line output (to feed a second self-powered cabinet or front-of-house desk). The first input channel is equipped with a rotary level control, an XLR combi-jack socket, and a switch to select the unbalanced line (jack) or balanced mic (XLR) inputs.

The mic mode has a nominal sensitivity of -40dBu, while line is -20dBu, and there is a slide switch to activate a 24V phantom power supply for the XLR input. It has to be said that the mic input circuitry seems to be an odd design. Not only does it provide an unusual phantom voltage which limits the range of condenser mics that can be used, but it also presents an unusually low input impedance of 600Ω.

When switched to line input, the impedance is relatively high at 50KΩ, and I presume this is intended to serve as a guitar input. Only the first channel benefits from an insert point, and is the usual unbalanced arrangement using tip and ring contacts on a three-pole quarter-inch socket, operating at a nominal -6dBu signal level.

The second and third input channels are unbalanced line inputs on quarter-inch jacks, with a nominal level of -15dBu and 10KΩ input impedances. Each input has a rotary level control and all three inputs are mixed together and made available as an unbalanced line output at a nominal 0dBu — useful for providing a DI feed to the front-of-house desk or for driving a second powered speaker.

This mixed input signal is also routed through a simple bass and treble tone control arrangement, and then to a master volume control feeding the internal amplifiers. A small trim control allows the treble amp gain to be adjusted over a ±5dB range to fine tune the spectral balance of the system independently of the tone controls.

Beside the usual IEC mains inlet connector and rocker-style on-off switch is a co-axial DC socket labelled 'Remote'. This accepts a control signal from the 2101 unit (see overleaf) to switch the speaker's mains power on automatically when the 2101 is powered on and off, which is a nice idea.

Sadly, the amplifier chassis is cooled by a small, high-speed fan mounted on the rear panel. On the review model — which, to be fair, had already suffered from a hard gigging life — this fan was incredibly noisy. I am told that the fan was in need of replacement and the noise it made is not representative of the model in general, but this may be something to watch out for, nonetheless.

The 2101 treble unit, although rather more compact than the 2121, is by far the more complex product of the two, and acts as the control and signal processing hub for the complete system. Like the stationary speaker, the 2101 is a self-contained, self-powered design, incorporating three separate channels.

A 50W solid-state amp drives a compression driver coupled to the rotating horn, while a further pair of 50W amps drive two fixed speaker channels — effectively a stereo replay system built into the one cabinet — and each channel comprises a five-inch 'woofer' and a two-inch tweeter. The black vinyl-covered cabinet measures 510 x 520 x 330mm (whd) and weighs 23kg, with strap handles on both sides.

The signal flow within the unit is quite complex but fundamental to the way the unit operates, both alone and with the 2121 stationary unit. The system accepts four inputs: two for the rotary horn, and two for

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the stationary stereo speakers. The first of these is a line input via a quarter-inch jack to feed the rotary channel. The other three are all provided via the standard 11-pin Leslie connector.

There are also four outputs, all on unbalanced quarter-inch sockets. The two stationary channels are made available directly at the 'Stationary and Bass' line outputs, and incorporate the very low-frequency element of the rotary input channel as well. The remaining two outputs carry a stereo digital Leslie simulation for the low and mid-range frequencies of the rotary inputs.

The two rotary feeds from the direct line input and Leslie connector are combined together and fed to a three-band crossover. High-frequency signals above about 800Hz are routed directly to the rotary horn amplifier and on to the horn itself, while very low-frequency signals below 125Hz are separated and passed directly to the left and right stationary amplifier channels, unprocessed in any further way. Although it seems a little odd, this is actually a standard feature of most modern Leslie speakers (ie. those with 11-pin interfaces) — although the notable exceptions include the 705, 720 and 122XB models. This very low-frequency component is also made available at the 'stationary and bass' line outputs as mentioned above.

The rotary signal between 125 and about 800Hz is processed with a digital rotary speaker simulation, emulating the relatively straightforward characteristics of the bass rotor in a conventional Leslie. The stereo output of this DSP simulator is passed to the internal left and right stationary channels, as well as to the stereo 'low-rotary' channel line outputs, as already mentioned above.

So, to summarise, the high-frequency part of the rotary channel signal is handled by the horn rotor, the mid-frequency part is processed digitally with a Leslie simulator and reproduced in stereo from the fixed speaker channels, and the low-frequency part is left unmolested and reproduced by the fixed channels (in mono).

With this level of signal-flow complexity, it will come as no surprise that the rear control panel is equally complicated. On the left-hand side is a rocker switch to power the unit, an 11-pin Leslie connector, and IEC mains inlet, and a co-axial remote control socket. The last is provided for linking with the 2121 stationary speaker to switch that unit on automatically when the 2101 is powered. It is also worth noting that the 2101 is itself switched on remotely when a control signal is received via the 11-pin Leslie connector (something which is provided automatically when a suitably equipped organ is switched on). Besides the ability to transfer the mono rotary channel and stereo stationary channel, the 11-pin Leslie connector also conveys the speed-switching control signals.

The 2101 with its grille removed, revealing the treble horn, five-inch woofers and two-inch tweeters.

A separate eight-pin DIN socket is provided to accept the signal outputs from older digital Hammond products like the XB1 keyboard and XM1 sound module, and is, in effect, a miniaturised and simplified version of the 11-pin Leslie connector. The separate mono line input quarter-inch socket allows other instruments to access the rotary channel, but there is no provision for external inputs to the stereo stationary channels. Two more quarter-inch sockets accept footswitch connections to control the rotor speed and to switch between two DSP configuration presets. MIDI In and Out are catered for, the former to enable remote control and adjustment of various DSP parameters in the 2101, and the latter to allow a second 2101 to be controlled remotely (and for data dumps).

The operational controls consist of three level controls (left and right stationary channels plus the rotary channel), and there are recessed trimmers to adjust the bass (under 125Hz) and horn (above 800Hz) levels relative to the mid range. A fourth rotary control sets the amount of amplifier overdrive affecting the rotary channel, and a recessed slide switch reconfigures the stereo stationary channels to operate in mono, or mutes them completely. This last mode is employed when the 2101 is used in conjunction with the 2121 stationary bass unit, which can handle far higher replay levels than the 2101 alone. There's also a small group of controls to adjust various aspects of the system, comprising a rotary selector, a data wheel, two touch buttons and a numeric LED display.

When the 2121 and 2101 are used together, the organ signal is connected to the 2101 via the 11-pin socket and three connections are made from it to the 2121 bass unit. The left channel of the Stationary/Bass output is hooked up to input two of the 2121, the left channel of the low rotary channel is linked across to input three, and the power-switching remote lead is plugged in so that everything comes on together. If a second 2121 is available, then the right stationary/bass and low rotary channels can be patched in to give a wider stereo effect (as well as more volume). It's all very quick and simple to rig up.

The complete system is capable of serious volume — enough to keep up with the most efficient guitar amps or the loudest drum kit — and provides great Leslie sound. The horn is clearly the key to this, but the DSP system makes a very convincing job of simulating the

The involved connection panel of the Leslie 2101. There are four inputs, one of which comes via the quarter-inch input jack, while the others are carried via the 11-pin connector. The digital Leslie simulator is controlled by the buttons, knob and Value dial on the right. Footswitch and MIDI control is also available, and the knobs in the middle govern the output levels of the stationary speakers, the rotary horn, and the rotary amp's overdrive. The four outputs are at the bottom.

The XK3 on its own, as sold separately.

lower rotor of conventional Leslie cabinets too. Of course, everyone has a slightly different idea of what makes the ideal Leslie, and history documents dozens of different tweaks that the professionals have made over the years to their classic 122 and 147 Leslies. To that end, the 2101 can also be customised in a variety of ways to tailor the sound precisely as required. For example, the fast and slow running speeds of the mechanical rotor and the DSP bass-rotor simulation can be adjusted independently and with considerable precision to simulate different pulley sizes and motor speeds. Similarly, the time taken for each element to speed up, slow down, or come to a complete stop can be changed to simulate belt condition, type of rotors, and so on. The rotor speed can also be controlled directly using a modulation wheel on a suitably equipped keyboard, or by an expression (volume) pedal, if desired. If controlled via a simple footswitch, the system can be configured for latching or momentary actions.

The direction of the horn rotor can be reversed (useful when more than one 2101 is used) and its resonant character can be altered to simulate horns without baffles or different drivers. The crossover frequency between bass rotor and horn, and the low-frequency cabinet resonance can also be adjusted to simulate different traditional Leslie systems, and the virtual microphone angle and stereo spacing can be adjusted to change the character of the DSP low-rotor simulation.

Facilities are also provided to assign the MIDI control channel (for remote parameter changes) and program change channel (for recalling one of the two preset settings). Once set up, any combination of settings can be programmed as one of two Presets, allowing two different sound and operating characters to be stored for instant recall.

On its own, the 2101 lacks the power and weight to deliver a convincing low end for on-stage levels, and partnering it with at least one 2121 makes a lot of sense. However, in situations where a full PA and powerful foldback is being used, the 2101 would suffice on its own, with DI's being taken for the low end and mid range, and a couple of mics being used for the horn rotor. This Leslie system is very compact, and because it comes in two parts, it's far more easily transported than a full-size 122 cabinet, for example, or even a 147. Indeed, the complete Leslie system with XK3 organ, stand, pedalboard and accessories all slotted into the back of a modest estate car without any problem whatever. The Leslie sound is very good indeed, especially if a little care is taken to fine-tune the frequency balance and optimise the speed parameters to personal tastes. The idea of combining mono bass, synthesized rotary mid-range and a real rotating horn sounds too complex to work, but work it does, and very impressively.

Overall Impressions

In 2003, I was mightily impressed with the New B3, because it was such a remarkably faithful recreation of the real thing, physically and sonically, and yet still provided a lot of facilities to modify and tweak the sound to suit personal preferences. However, its appeal to the typical gigging musician in a band was limited because of its vast cost and size.

Hammond's XB series of digital portable organ keyboards have generally been well received over the years, but have never quite reached the holy grail of the vintage sound so many have aspired to. The new XK3 is where the two conflicting requirements meet, offering the sonic quality and flexibility of the New B3's VASE engine combined with the practical convenience and usability of the XB-style single-manual keyboards.

I'm confident that the absence of the multi-contact switching will go completely unnoticed by the vast majority of players, and the bonus of external MIDI control will more than make up for it for most people. The key-click generation is very controllable to suit personal preferences, and although it doesn't have quite the tactile response of the multi-contact arrangement, it certainly exudes the right sound character. Indeed, the quality of the organ sound is exemplary, and I can think of no similarly priced equals. Only the New B3 and arguably the best of the recent software emulations match or better it — and the latter obviously lack the physical and tactile control elements necessary for a live performance keyboard. The XK3's internal DSP Leslie simulation is also among the best I've heard, although there is still nothing quite like a real rotating horn. However, that's what Hammond's various current Leslie options are for, such as the impressive 2101/2121 system supplied with the XK3 for this review.

The optional and removable XLK3 lower manual is a nice idea, allowing you to expand the XK3 to a dual-manual and pedal combo if required. I think this will appeal to the jazz trio set, although multi-keyboard players can gain much the same practical playing benefits with any MIDI keyboard, of course. The fact that it is a separate unit not only makes transportation easier, but also enables the organ to be expanded later, as funds and playing requirements allow.

However, one thought that struck me about the two-manual combo version is the potential limitation of its 61-note keyboard. For example, you might want to control a piano or string sound from the lower keyboard during a gig. If you were playing with two hands on the same keyboard, it would be really useful if the lowest reversed-colour octave could be allowed to send MIDI note data with the rest of the keyboard to give a six-octave span instead of five. Although not possible with the current operating system software, this is apparently something that Hammond are considering for a future update.

If Hammond sounds feature large in your compositions or live keyboard repertoire, then the XK3 should be at the top of your wish lists, because it represents the absolute pinnacle of this kind of live performance keyboard. The sound is absolutely authentic, the design and ergonomics of the performance controls make playing the instrument a dream, and the extensive configurability of the instrument caters for a wide range of personal preferences, playing styles, and external control options. What more could anyone ask? SOS

information

£ Hammond XK3, £2199; XLK3 second-manual expander for XK3, £1099; Optional stand, £TBC (expected to between £200 and £300); Leslie 2121 Bass unit, £899; Leslie 2101 Treble unit, £999. All prices include VAT.

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Classic Tracks

Artist: Supertramp
Track: 'The Logical Song'
Label: A&M
Released: 1979
Producers: Supertramp, Peter Henderson
Engineer: Peter Henderson
Studios: The Village Recorder, Crystal Studios

Producer and engineer Peter Henderson spent nine months recording an album that neither he nor the A&M label could afford to fail. Yet when he handed in the masters, Henderson was convinced that Supertramp's *Breakfast In America* would finish his career...

Richard Buskin

Peter Henderson started out as an assistant at AIR Studios on Oxford Street in 1973, and quickly teamed up with Grammy Award-winning engineer Geoff Emerick, who served as his mentor over the next couple of years. During that time, Henderson also worked with other seasoned pros such as Bill Price and John Punter, yet it was Emerick who taught him the fundamentals, from recording vocals to entire orchestras, while working with artists such as America and Robin Trower.

"When I began working with Geoff the standard was 16-track," Henderson recalls. "He would put two [*Coles*] 4038 ribbon mics over the drums and wouldn't even mic the toms. There'd be [*an AKG*] D90 on the snare and probably [*an AKG*] D12 on the bass drum, and that was it. There wasn't even a hi-hat mic. We had Neve consoles and Fairchild limiters, and everything leaned towards performance. I remember one of my first engineering jobs, working with Paul McCartney on *Wings At The Speed Of Sound* [*1976*] — he'd do two vocal takes and ask, 'Which is the better one?' And when he played guitar, he'd really lean into it and give it everything he got. Well, Geoff was very much like that. Everything had to be performed, and he'd always say that he liked the sound to jump out of the speakers."

That having been said, Peter Henderson's very first engineering gig was alongside another Beatles alumnus, producer George

Martin, on the 1976 Jeff Beck album *Wired*. "I listened to that a few years later and it sounded like it had been recorded direct to cassette," Henderson remarks. "I don't think it was one of my finer moments. The thing is, when you started off at AIR, you'd usually spend about 18 months assisting and then overnight you would become an engineer. You'd do adverts and record orchestras, and as time went on you'd be trusted to work with better and better artists."

Going South

After engineering Supertramp's *Even In The Quietest Moments* and Frank Zappa's *Sheik Yerbouti*, Henderson went freelance in 1978 and co-produced the Climax Blues Band's *Gold Plated* and a Tubes live album. The following year he nabbed his biggest album production credit to date, collaborating with Supertramp on *Breakfast In America*. "Geoff Emerick had been asked to engineer *Even In The Quietest Moments*, and when he couldn't do it I ended up doing the recording and he ended up doing the mix," Henderson explains. "Then I was asked to engineer the follow-up, and ended up co-producing with the band."

By 1978, Supertramp — then comprising keyboardist/vocalist Rick Davies and his songwriting partner, guitarist/keyboardist/vocalist Roger Hodgson, together with vocalist/saxophonist/woodwind player John Helliwell, bass player Dougie Thomson and drummer Bob Siebenberg — already had five albums behind them, and hit singles like 'Dreamer', 'Bloody Well Right' and 'Give A Little Bit'. Courtesy of producer Ken Scott and concert sound engineer Russell Pope, the British five-piece had established a reputation for lush, catchy, carefully crafted pop, and it was in the middle of a post-tour break that Roger Hodgson wrote the lyrics to 'The Logical Song', a wistful four-minute ode to separation from the simple, innocent joys of childhood and the confusion this engenders. It was just one of nine new compositions demoed at Southcombe Studios, a rehearsal space within the band's management office in Burbank, California, during late April and early May of 1978.

"I went to LA thinking we were going to start recording, but nothing was quite ready, so we ended up doing very, very basic eight-track demos for the whole album," Peter Henderson recalls. "As it turned out, this was a good opportunity to work out the arrangements for most of the backing tracks — 'Take The Long Way Home' wouldn't arrive until much later in the project — and we even assembled the running order for the album. We were pretty organised.

"The home demos of each song were pretty much all keyboard-based — vocal and

From left to right: Roger Hodgson, Peter Henderson and Rick Davies at the Village Recorder during the recording of the *Breakfast In America* album.

Photo: Russell Pope

piano or vocal and Wurlitzer — and then [*at Southcombe*] the whole band would run through them. However, by the time we completed the eight-track demos, we didn't have any of the parts that would be overdubbed on the finished record. We just worked on the live backing tracks and overdubbed the guide vocals."

Village Life

Next stop was Studio B at the Village Recorder in West LA, housed within a Masonic temple and featuring a 48-channel Harrison console, as well as two Ampex 1200 24-track machines. The band members all gathered there on the first day, yet Peter Henderson didn't show — while driving to the studio from Topanga Canyon, he and his new wife were involved in a head-on collision with a drunk driver. Fortunately, nobody was too badly injured, and Peter eventually turned up at the Village Recorder with two enormous black eyes. "I looked like I'd been in the ring with Muhammad Ali," he says. "It wasn't the best of starts, but we were very lucky to get off so lightly."

The delayed start was then compounded by a week-long effort to determine the desired sound setup, which involved positioning the drums in various parts of the room, experimenting with mics and even trying out three different grand pianos.

"We weren't going to start recording until everything was just right," Henderson says. "No one was prepared to compromise on anything, and although I remember the management raising their eyebrows, I really think it paid off in terms of the results. That having been said, we took this approach because we didn't want to spend a lot of time on the mix, but as it happens the mixing process was quite laboured and we did actually run into some difficulties."

In 1978, the Village Recorder's Studio B comprised a control room facing the wooden-floored live area and adjoining drum booth at the far end. For 'The Logical Song', the backing track consisted of Bob Siebenberg's drums, positioned close to the main room's left-hand wall; Dougie Thomson playing bass, also in the live room; Rick Davies on the right side of the live room, playing a Clavinet part that was subsequently mixed out; Roger Hodgson's Wurlitzer electric piano, placed in the drum booth; and John Helliwell's sax, played in that smallest room of all, the toilet.

"John kept moaning about his lot, but I think he actually quite enjoyed it," asserts Henderson. The same setup largely applied to all of the tracks, and about two or three days were expended on each song.

"We'd get the sound, do a couple of takes and then take half an hour off while Russell Pope and I would tune the drums with Bob," Henderson recalls. "Russell was another ear, almost part of the band, so we'd go in there while Bob was having a breather and change a few things. The whole idea was to get a really good band performance, and I think the backing tracks we got were terrific. Everything was fresh, and that's what I liked about the album — even though it ended up taking about nine months to complete, there's still a really, really vibrant, fresh feel to the tracks. For instance, on the song 'Child Of Vision' the entire grand piano solo was live, and across the whole record we did get to keep a lot of stuff that never needed to be redone. It was just five people playing in a room. There were no click ▶

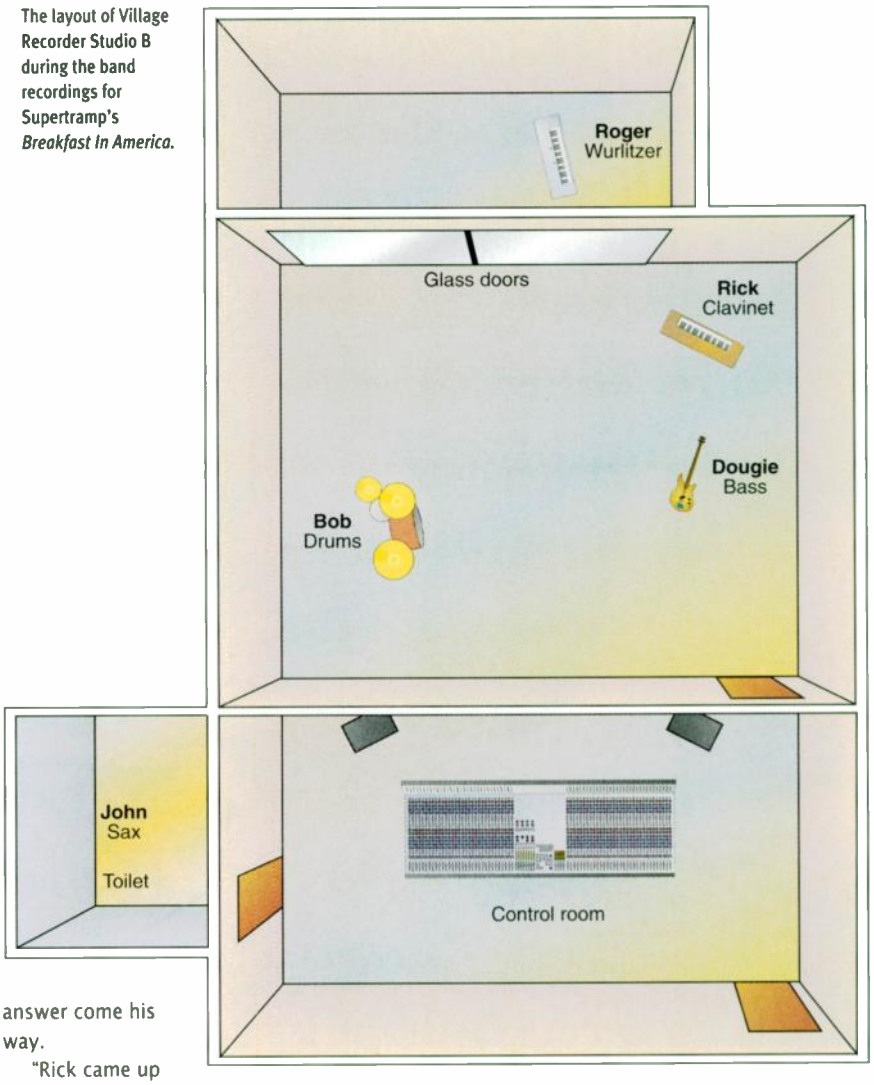
tracks and there was no splicing of the backing tracks."

A Relaxed Schedule

After each backing track had been completed, a slave reel was made with the drums bounced down from nine tracks to four, comprising bass drum, snare, cymbals and toms. Within four weeks, the live band sessions were at an end and the multitracks were put away until the mix. However, since said mix would take about four weeks and the overall project about nine months, that leaves seven months for overdubbing... That's right, seven months.

"Considering how much we'd actually managed to achieve, I do have to say the overdubbing took a long time," Henderson admits. "After we'd bounced down and made a slave for all the songs, we then began working on the missing parts. With vocals, we would try one, and if it worked that was great, and if it didn't, we'd come back to it later. Again, it was always about trying to get a fresh performance and not over-labouring. We'd spend a lot of time getting sounds, particularly guitar sounds, and then return to a vocal and try doing it again."

Again, the Neumann U47 came into play for Roger Hodgson's lead vocals, recorded through an 1176, and although Peter Henderson would have normally opted to use a Fairchild limiter, none was available at the Village Recorder. Hodgson double-tracked his vocal lines and took care of the backing harmonies, and this was the case for the choruses and third verse of 'The Logical Song' while verses one and two remained single-tracked. Still, he felt that something extra was needed to lift the number. He just didn't know what. Only towards the very end of the project did the answer come his way.



The layout of Village Recorder Studio B during the band recordings for Supertramp's *Breakfast In America*.

"Rick came up with the answering vocal on the second chorus and Roger was really pleased with that," Henderson recalls. "Roger himself was a really good singer and he was brilliant at double-tracking, although you had to catch him on the right day. Sometimes he would over-sing and he'd have to make the effort to sing a little bit quieter. When he did that, it was more natural and it kind of helped the sound. And we also did some punching in with the

Soft And Bright

For the recording of *Breakfast In America*, Bob Siebenberg's Ludwig drum kit — featuring a more pop-oriented 24-inch bass drum in place of his usual 26-inch kick, Superphonic snare, and Fiberskin-covered 13, 14, 16 and 18-inch toms — was accorded an unconventional miking setup that Peter Henderson has never used again: a Sennheiser 421 on the bass drum, 421s on the toms, a Neumann KM84 on the snare, and AKG 451s overhead and on the hi-hat.

"The main thing about the drum sound was probably the KM84 on the snare, influenced by Alan Parsons' work on [*Pink Floyd's*] *Dark Side Of The Moon*," Henderson explains. "It's very soft-sounding, but it's also right in your face, very bright, and it added so much energy. It was just a weird combination of mics, and although one could use it again, these days I think people want more power from the drums."

Meanwhile, Dougie Thomson's brand-new Music Man Stingray bass, DI'd with plenty of EQ, was, according to Henderson, "one of the best basses I've ever recorded. He played with flat-wound strings, and while I wasn't a big fan of the Harrison desk, it really worked well for bass. We put a ton of EQ on it — literally +10dB at 100Hz and +10 at 200Hz — and then put it through a [*Urei*] 1176. The console had a really good low end, and the way Dougie played it, the bass also had so much depth. Dougie was very underrated as a bass player, even within the band, but I think his contribution was great. He'd always play the right thing for the song and I particularly like his bass parts on 'Take The Long Way Home' and 'Child Of Vision'. What's more, because Bob played the bass drum very lightly, we had the bass guitar very, very loud in the mix."

Roger Hodgson's Wurlitzer, fed through a Roland Jazz Chorus on previous albums, was DI'd and the signal then split through a Boss chorus pedal to create a semi-straight, semi-modulated sound. "Roger's a naturally gifted musician — everything comes very easily to him — but he always employed a very heavy-handed style for the Wurlitzer," Henderson says. "John used to refer to him as 'Hammer hands'. He was also singing the entire track, miked with a U47, and we ended up keeping his vocal on the end section from the original track."

Not that this was sufficient excuse for John Helliwell to find himself with nowhere else to play sax but the loo. Still, he plunged on, so to speak, his instrument recorded with an STC 4038 ribbon mic in the bell and a U87 about two feet away. "Everyone was playing together on the track, and we couldn't have John's sax bleeding onto the drums," says Henderson. "As I've said, he made a song and dance about it, but in a nice way. The live sax solo from the backing track was fantastic, so we kept that except for one small punch-in and re-recorded the end section."

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▶ vocals."

In the meantime, the song's percussion intro combined John Helliwell's heavy breathing with Bob Siebenberg hitting a small cymbal and playing the castanets... after a fashion. It took some time for Siebenberg to master the little clickers, but master them he did, and he also played cowbell and timbales for the song's outro, which was further embellished with overdubs of Rick Davies' wah-wah Clavinet and the 'd-d-digital' sound emanating from a Mattel football game that belonged to English producer/engineer Richard Digby-Smith, who was working in the next room.

On the choruses, the arpeggiated guitar part was created via two Les Paul electrics going through Leslies and miked with a couple of Neumann U87s top and bottom, compressed with two 1176s, as well as a pair of double-tracked Guild 12-string acoustics miked with U87s. Synth strings comprised 'cello in the form of an Oberheim Four-voice, and an Elka Rhapsody string ensemble fed through the Boss chorus pedal for the high parts. "We did that pretty much throughout the whole album," Henderson states. "We used a lot of Oberheim Four-voice, and the Elka just sounds brilliant going through the Boss chorus."

The normal working day during the *Breakfast In America* sessions was 2pm to 11pm, Monday to Friday, yet while these hours contributed towards the lengthy timeframe for overdubbing, everything was on course and going according to plan.

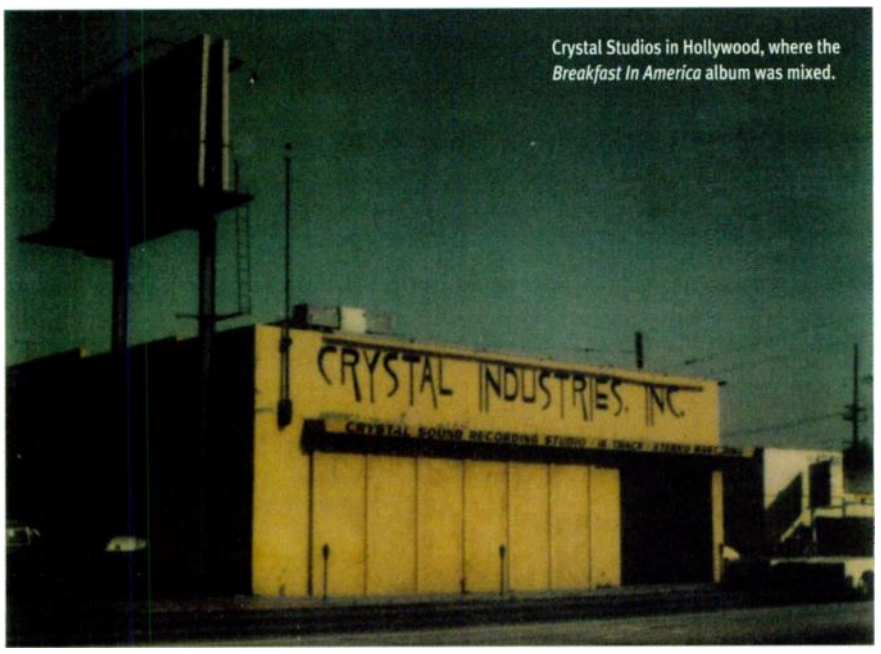
"Sometimes, for inspiration, we'd go down to SIR — Studio Instrument Rentals — and see what was lying around," says Henderson. "I remember we rented a calliope and various percussion instruments, and some of these things helped inspire ideas. We might spend a whole day just doing one part — getting the sound for it and then working on the performance — so it was a slow process, but an interesting one, and it was a very, very joyous experience for everybody."

Photo: Richard E. Aaron / Redferns

Supertramp: left to right, Dougie Thompson, Roger Hodgson, John Helliwell, Rick Davies and Bob Siebenberg.

Then came the mix. Suddenly, it was as if everyone had lost the plot.

"We spent three or four days trying to mix at the Village, but the Harrison EQ was so harsh, it was impossible to brighten things without making them sound electronic," says Henderson. "The funny thing was, before we started mixing I spent a couple of hours doing rough mixes of the whole album on that Harrison desk, and for a long time afterwards a lot of people really liked those mixes, even after we finished the main mixes as well. However, part of the problem we had was that, over a long period, you get so used to hearing things a certain way, you almost need to go somewhere else to re-evaluate."



Crystal Studios in Hollywood, where the *Breakfast In America* album was mixed.

Crystal Balls

Thus, the decision was made to relocate to Crystal Studios, famous as the Hollywood facility where Stevie Wonder had recorded *Songs In The Key Of Life*, and now called Barefoot Studios. Back then, Crystal had two studios: the one in which Stevie had recorded and a small mix room that had just opened, housing a custom 56-channel console with no automation. It was here that the problems really kicked in.

"Having worked on the record for so long, everyone had different ideas as to what it should be," Henderson explains. "For some reason we weren't pressurised, although we should have been pressurised because it was a very tough time for A&M and this was kind of a pivotal album for them. Some band members wanted it to be a little bit more hi-fi and ultra-clean, while the others kind of liked the way it was sounding, which was a more full sound. As a result, we ended up going around in circles — when we tried to clean it up, it lost a little bit of the energy, and then we went through the process where we had the drums too loud. After that we had a big meeting, and then we started again. This was nearing the last week of February '79, and now we were up against a really, really tight deadline to

get the album mastered by the 22nd.

"We were mixing half-inch but we were doing the mixes in sections. We'd mix a verse up to the chorus, and then, because we didn't have enough hands on deck, we'd mix the chorus, mix the next verse, and literally do the whole song like that. In the end, we mixed each song three or four times, and we were losing our objectivity as well as our patience. I mean, the stuff generally sounded pretty damned good as it was, but over the months we'd developed different ideas as to how the record should sound and now we were each trying to get back to that point. It was really confusing. What's more, there was a lot of concern over the effect this was having on the budget and whether or not somebody else would be brought in. No one could decide which was the final mix, and there was tremendous pressure on us during the last three days. In fact, on the final day we literally worked through the night remixing four songs and pretty much went straight to the mastering. It seems that when you're doing something by instinct, you can do it really quickly, whereas when you go into mix mode you quite obviously start thinking about things. Well, as time ran out and we got down to the wire, the instinct came back in a hurry and we just got on with it. Thank God it all kind of worked out."

He can say that again, and the A&M execs certainly did when *Breakfast In America* topped the US charts for a month and went on to sell 18 million copies worldwide. Thereafter, Supertramp would make one more studio album, 1982's *...Famous Last Words...*, before mounting tensions between Rick Davies and Roger Hodgson would come to a head and Hodgson would depart to pursue a solo career. However, there was evidently no such animosity between the two men during the *Breakfast* sessions.

"They got along fantastically well and everyone was really happy," says Peter Henderson who, in addition to Supertramp, has since produced and/or engineered records by Paul McCartney, Rush and the Raindogs, among others, and has most recently been working on an updated version of Harry Smith's *Anthology Of American Folk Music* and Toontrack's *Custom & Vintage* virtual drum instrument with drummer Chris Witten. "There was a very, very good vibe and I think everyone was really buoyed up by the recordings and A&M's response to them. The only contention I remember had to do with the first track, 'Gone Hollywood', which originally had different lyrics. Roger and the other guys in the band thought they were too downbeat and not very commercial, so they asked Rick to rewrite them and, although he wasn't too happy, he did go along with it."

Peter Henderson today.

The mix room at Crystal Studios featured a custom 56-input desk.

A Moment Of Doubt

'The Logical Song' became one of the fastest-breaking singles in A&M's history, reaching number six on the *Billboard* singles chart, and *Breakfast In America* spawned other hits in the form of 'Goodbye Stranger' and 'Take The Long Way Home', turning out to be Supertramp's finest hour; critically, commercially and artistically.

"The success of that record was basically down to its great songs," Henderson comments. "I never tired of hearing them over the entire time, and I think the album has a very uplifting feel to it. To my mind, it still sounds fresh, the tracks have a real energy and a real vibrancy to them, and it doesn't sound dated. Despite the time we spent on it, [*Breakfast In America*] still sounds like a band album. At one point, there was a discussion as to whether or not we should use sound effects — because they'd used them on their previous albums — and real strings, but I personally preferred the intimacy of the band feel, and fortunately that's what we went for."

It was a wise decision. As for Peter Henderson, he scooped the Grammy for Best Engineered Album of 1979. However, when he accepted the award, it wasn't without a sense of irony.

"The album was mastered by Bernie Grundman at A&M," he recalls. "Russell and I arrived there having had virtually no sleep following the final mix, and when Bernie first listened to the tape there was a lot of chin-scratching going on, along with worried looks. Then, I remember we did a test pressing and it was taken up to a guy called Marv Bornstein who was in charge of quality control at the time. Again, there was all this shaking of heads and discussions between the two men. Bernie was saying 'You've put a lot of bass on here,' and I said 'Well, actually, that's the way we do it in England. We like a lot of bass on our records.'

"Still, the head-shaking continued along with the worried looks and negative comments. They were kind of intimating 'I'm not sure about this,' and by the time I left that mastering session I was convinced that the whole thing had been totally fucked up. It was literally a 'This is the end of my career' situation, and the next day I got on a plane and was out of there.

"Well, when I won the Grammy, I made my speech and said thank you to the members of the band, their management, Russell Pope and also to Bernie Grundman. Then I saw him afterwards and he said 'Thank you for mentioning me. I always knew, from the first time I heard that album, that it was going to win a Grammy.' I don't know if he remembered all the shaking of heads, but he was dead serious, and that was a sweet moment, I guess."

What a business. SOS

Sequis Motherload

Dummy Load & Speaker Simulator

Dave Lockwood

Using a combination of dummy load and speaker simulator lets you record your favourite valve guitar amp at full tilt without disturbing your neighbours. The trouble is, none of the designs so far have managed to sound close enough to a real speaker. Could this be the one that finally nails it?

The Motherload, a combined dummy load and speaker simulator, was originally launched a few years ago as a two-channel unit in a 2U chassis. It offered a reactive (as opposed to purely resistive) dummy load, like a real cone driver, and a series of sophisticated passive filters designed to replicate the response of a typical guitar speaker. It worked, in so far as amps were happy driving it, and it certainly didn't have the choked, gutless sound of most other passive speaker sims. What it did have, however, was some of the fizz and grit in the 5-6kHz region that real loudspeakers are so adept at getting rid of to give us what our ears have become attuned to as a 'proper' distorted electric guitar sound. Responding to feedback from guitar players and recording engineers, UK-based Motherload designer Rick Cawley, manufacturing under the Sequis name, continued to refine the filter stages until he came up with this, the 'new improved' Motherload, reborn as a single-channel 1U chassis, with a sound to make even the most sceptical sit up and take notice. (Original Motherload owners can get their units upgraded to the latest spec by contacting the manufacturer).

The Design Challenge Of Speaker Simulation

Most of the sounds we think of as classic electric guitar tones are the product of two primary components; the distortion produced by a valve output stage driven into clipping, and the inherently bandwidth-limited response of a guitar speaker. Take away the latter, and the former does not sound 'nice' at all, full of fizzy upper-harmonic trash that leaves single notes and especially chords sounding harsh and unmusical — OK, I know there are styles of music where the sound of a DI'd fuzz box is appropriate, but for most people this is the audible equivalent of sucking a lemon. It was only ever the inherent low-pass filtering of guitar speakers that made the first forays into distorted sounds seem at all attractive, throwing away the less harmonically related overtones and leaving us guitarists with the richer, punchier, more interesting sounds that we have come to love.

But therein lies the challenge for designers of speaker simulators, because the top-end response of a guitar speaker in a cabinet exhibits some quite complex behaviour that is not easily replicated with electronics. Pioneering designs in this field from the likes of Groove Tubes (the SE and SEII), Palmer (the now almost legendary PDI03 and the current PGA04 model), and Hughes & Kettner (the Red Box series) are all noted for their somewhat less characterful and slightly darker tonality, shaving off the dreaded crackle and fizz at the expense of much of the life and soul of the sound (in my opinion, at least; 'your mileage may vary...'). Feed any of these boxes a maxed-out, ultra-distorted signal and they can sound quite authentic, but give them a valve amp just on the edge, where so much of the subtlety and expressiveness lies, and the top-end filtering is always too much.

At the other technology extreme, digital products like the Line 6 Pod range (and its many derivatives) use physical modelling DSP to simulate the tonal characteristics of the entire guitar system's signal chain from preamp to power amp to loudspeaker/cabinet to the microphone that picks it all up. This offers both great convenience and flexibility, but whatever your opinion on the sound of the products in this category, for some players there will never be a substitute for the touch-sensitive feel and sheer sonic vocabulary of a real valve amp running at sweet-spot volume. No problem if you've got a large recording

space, well insulated from your neighbours, but for most people's home studios, something a little more controlled is more of a necessity than a luxury.

Premium Hardware

The latest Motherload, like the original model, is still an entirely passive device, which means it contributes no noise of its own to the signal path, taking the full speaker output of an amp and attenuating it to line level, passing it through multiple filter stages designed to replicate the response of a typical guitar speaker. Of course, passive filters can only cut, rather than offering the boost/cut option of active filter stages with gain. However, with so much signal to, effectively, 'throw away' (a guitar amp's speaker output can be pushing 20 Volts, whereas the eventual line output from this unit only requires around one or two Volts) the Motherload is able to use multiple 'lossy' passive filter stages to achieve the necessary response. Nevertheless, it is still quite a design feat to offer the degree of effective control available from the Motherload front panel using just passive filtering.

The Motherload is beautifully built, both inside and out: the pots feel just right, the switches and preset trims are all positive in action, and the load resistors, custom-wound components, and heavy-gauge wiring inside all serve to give you confidence in entrusting your amplifier's precious output stage to this device. It's not cheap, of course, but you can certainly see what you are paying for.

The controls are far from self-explanatory, especially as many of them are rendered inactive in all but the Custom position of the six-way Preset selector switch. Presets one to five offer a spread of basic tonal characteristics corresponding to a range of viable front-panel control positions, with an increasing mid-range peak as you go up through the settings until you reach preset six, which by contrast has a significant mid-range scoop. The top-end roll-off point of each of these presets can then be individually fine-tuned using screwdriver-adjusted trimmers. The response of these filters is actually quite complex, for example position one has a -3dB point at 5kHz and a -6dB point at 5.6Hz, whilst position six is -3dB at as low as 1.8kHz, but the -6dB point is still up at 4.2kHz. Their primary function is to let you tune out fizzy harshness within distortion without at the same time depriving the signal of the degree of brightness necessary to still sound 'right'. In preset mode, the only other active front-panel control is the ▶

SOUND ON SOUND

Sequis Motherload £599

pros

- Records like a guitar speaker.
- Safely loads amplifier output stage.
- High build quality.
- Filter stage can be useful with other sound sources.

cons

- None.

summary

The closest thing yet to the sound of a real miked speaker in a DI recording situation — allows you to use a real valve amp flat out for silent or low-monitor-level recording.

Line Out level pot.

The other front-panel controls come into play in Custom mode (preset zero). First up is a six-position Filter control which replicates the action of the screwdriver trims, followed by a pair of Resonance controls: Resonance Plus offers five preset amounts of resonant band-pass, ranging from 60Hz in position one to 2.6kHz in position five; and Resonance Minus is a band-cut filter, switchable from 600Hz (position one) to 1.7kHz (position five). Used separately or in combination, these controls have a more significant effect on the overall character of the sound than the Bass, Mid Shift and Treble controls that follow. Dialling both Resonance knobs to their neutral setting allows you to hear the subtler effects of the other controls rather better. The Bass control really means bass here, behaving more like a console low-frequency shelving EQ than a guitar amp's bass control. It is very effective at simulating the thump of a real speaker driven hard without muddying the audible part of the signal, so long as there is already enough low-frequency energy in the signal, but it won't do anything to warm up an already thin, brittle guitar sound from the amplifier.

The Treble control gently determines overall brightness, from quite low in the mid-range up to the Motherload's overall upper cutoff point. Although I never set it below halfway, I also never found myself wishing for more range either. That leaves Mid Shift, which is the most subtle of all and yet in some ways the most useful, once you've got everything else set to your satisfaction. It appears to move a minor mid-range peak up and down the middle of the spectrum, but the audible result is rather more complex than that, suggesting perhaps that there is a complementary mid-range dip that moves with the peak. Sonically, the effect is rather akin to moving a mic to very slightly different positions in front of a speaker cone — not as obvious as just 'brighter near the centre dome, warmer near the edge', for it still preserves fundamentally the same tonality and also doesn't affect overall level. It is more like the tonal change you get from slightly varying the mic's angle in front of the cone: very useful when you get to the final stages of nailing the tonal focus of a particular guitar sound.

Round the back, the Motherload offers a nominal 8Ω dummy load input (rated 100W RMS), a speaker Thru connection, and a highly attenuated (2.5 percent of input) speaker output governed by a rotary control. A send and return pair offers patch points for effects to be inserted prior to the speaker simulator's filtering. There is a significant loss around the loop, so it should really only be used with devices with plenty of I/O level range that also won't add much in the way of noise: I can verify that it works fine with a TC Electronic G Major and a Rocktron Intellifex. In practice, it seems that with any reasonable input level there is always enough signal available at the output, which is taken from either a balanced 600Ω TRS jack (uncontrolled) or an XLR governed by the front-panel level control.

Is It Live Or Is It Motherload?

Comparing the Motherload output directly to a guitar speaker is always going to be somewhat misleading; the real comparison that needs to be made is with the sound of a guitar speaker miked up and heard only over studio monitors. Recording guitarists are all too familiar with the scenario where you tweak your tone to perfection in front of your amp, stick an SM57 on it... and then wonder where all your sound went when you listen to the playback of what you just recorded. Standing in front of a cranked guitar amp, you are in fact hearing very little of the direct sound that the mic is picking up, and you are certainly not hearing it from two inches away from the speaker cone! Reflections from the floor and any adjacent walls, plus the natural attenuation of high frequencies that occurs just with sound waves propagating in air over any significant distance, all serve to both colour and warm the sound. In comparison, a close-up SM57 or Sennheiser MD421 will always seem rather sterile and harsh, and if you are using a lot of distortion, you can even get a bit of crackle and fizz in there too — yes, real speakers do fizz sometimes, you just can't normally hear it! The fact is, close-miked guitar speakers always need a bit of work, whether that be a second mic, a more distant 'room' mic, a bit of artificial 'dimensioning' from reverb or delays, or just plain old EQ.

Switching directly from a dry SM57 three inches from the speaker to the Motherload output set to 'neutral' (everything at 12-o'clock in Custom mode) on a medium crunch tone, the sound of the latter is actually slightly deeper, although a little less complex in the mid-range, but still identifiably the same amp. Advancing the Motherload's Treble from five to eight and dropping the Filter setting to three/four allowed me to get rid of a hint of grit that was creeping in on harder struck notes.

Richter Control Speaker Attenuator

Sequis also offer the Richter Control — an attenuator, with no speaker simulation, for simply knocking down the volume of a loud valve amp. This allows you to turn your amp up, to get the output stage distortion that guitarists love, but independently turn your speaker down to precisely the volume you want. The front-panel control varies from 6dB attenuation, which equates to a subjective loudness of just over half the unattenuated level, right down to no output. Significantly, the Richter Control manages to maintain a consistent sound at all attenuation levels, whereas most competing products in this area get progressively less real as their output is trimmed back. A dedicated output is provided for feeding into a Motherload, connecting to the loop return — in other words after the dummy load and before the filters.

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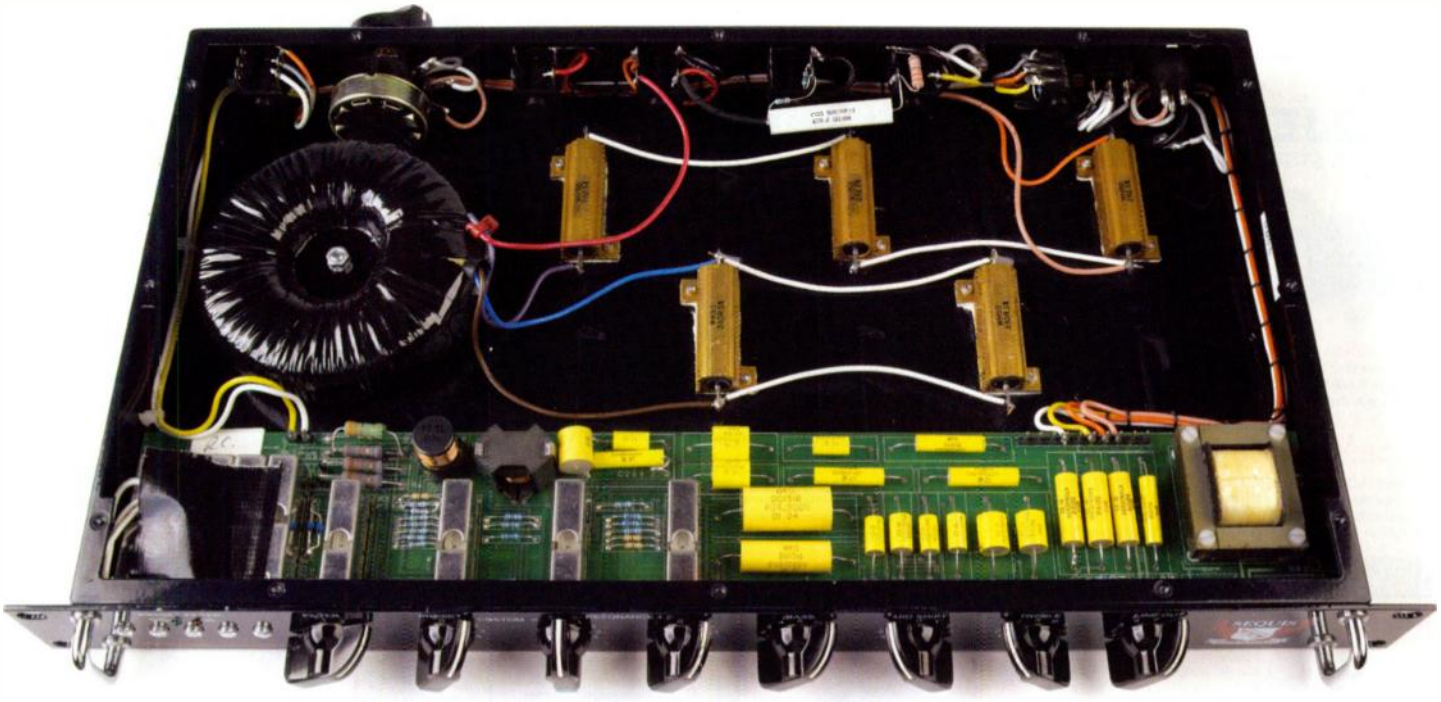

Advancing the Bass control fully or going to the first setting of the Resonance Plus control actually made the Motherload sound bigger at the bottom end than the speaker/mic signal path, but there seemed to be no tweak I could make to match the speaker's slightly recessed mid-range character. I settled on a Resonance Minus setting of three, taking out some 1.1kHz as the best compromise between the clean tone's requirements and the lead voicing; the former always benefiting from a hint more 1kHz dip.

I certainly wouldn't say that the Motherload sounded in any way fake or wrong; it just sounded like a different, rather more smooth speaker. In fact, the more distortion I dialled in from the amp, the more I actually preferred the mid-range of the Motherload on single-note lines. At these settings there was a just hint of fizz audible in crunch chords when listened to in isolation, but certainly not in the context of a track. Thickening the upper mids with a smooth-sounding, symmetrical clipping pedal, like a Tubescreamer, masks this to the point of insignificance, to my ears, just as it does with a real speaker.

Returning to the miked speaker after 15 minutes or so of listening to just the Motherload output, I am struck by just how brittle and hollow it now sounds. There's a distinct mid-range 'hole' that I immediately feel I want to fill out with EQ, although the urge to do so goes away as soon as I play along to a track. One tweak I invariably apply to a close-miked guitar speaker signal is a hint of fairly dark-sounding stereo room reverb just in the monitoring, to give a more natural sense of scale when playing. Applying this same process to the Motherload actually makes me want to open up the top end a bit: experimenting with both the Treble and Filter controls, I ended up consistently preferring the sound with the Filter on two or three and the Treble backed off to five or six, rather than Treble wide open and the Filter clamped down hard at five or six, as I had initially dialled up.

"I can pay the Motherload no higher compliment than to say that I kept finding myself just playing through it, for hours on end, when I should probably have been doing something else."

"This One Goes Up To Eleven..."

Ditching the real-speaker reference altogether, I found myself drifting towards some rather different settings on the EL84-based Cornford Hurricane amp that was forming the basis of most of my testing at this stage. Master volume went up to max, input gain to the amp's usual seven/eight sweet spot, bass backed off a bit more than usual (just under 50 percent) to take out the beginnings of 'flubbiness' in the distortion, mids up a bit more (eventually to maximum), and treble backed off a hint — say, 60 percent rather than my normal 75 percent. I now had a fat, singing lead tone that would clean up to warm and clear when I backed off the volume control, with a crunch stage somewhere in between. Above all, the amp felt entirely normal when playing; warm and dynamic when backed off and either edgy or smooth, according to how I attacked it, when flat out. With a hint of audible space added via a room reverb in the monitoring it was easy to forget there was no speaker and mic in the signal chain. Opening up the front-panel filter setting all the way with this amount of distortion brought back just enough fizziness to diminish the illusion of reality, confirming just how effective a job it does when you get the right setting for the sound you are using.

Testing across a variety of amps confirmed my feeling that the Motherload/amp combination needs to be regarded holistically — settings that work well into a speaker don't necessarily translate directly into recording well with the Motherload. My MkIV Boogie displayed its best characteristics with its master on maximum, intermediate (channel) masters as near to maxed as channel balancing would allow, and front-end gains backed off to about 60 percent — a condition I have certainly never run it in on gigs. The change in character from the harder-sounding preamp valve distortion to sweeter output

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▶ valve distortion is immediately evident, and allows you to back off the treble and push the mids a little, making the sound rounder and more musically satisfying.

Although speaker differences had obviously been removed from the equation, the distinct character of each of the amps I tried still came through; my little Fender Deluxe sounded sweet and singing (its valve rectifier 'sag' helped a lot here with the feel), my little 6W single-ended Cornford Harlequin still did its lovely Fender/Vox hybrid thing, and with no lack of level out of the Motherload in spite of its diminutive output. I found I could get a usable sound out of all of them, but I could also make some pretty ugly noises when I failed to get everything right. You have to be prepared to work with the Motherload, but the more you do the more you will find within it.

On the whole I'd say recording with the Motherload takes about the same amount of tweaking as painstakingly optimising the position of a mic in front of a speaker, although leaning over and turning the Motherload's controls is obviously a bit more convenient, and once you've got it right, it's a lot easier to recreate next time! The sound requires precisely the same amount of post-processing as a close-miked cone driver (indeed, many of the same processes worked for me) to achieve a recorded signal that sounds natural and that will respond to effects and EQ in the normal way. The one tweak that I consistently applied to the Motherload signal that I don't normally do to a speaker was an EQ cut, about half an octave wide, centred around 1kHz, which just seems to sit the sound into a recording rather better. Setting the Resonance Minus control to number three will get you somewhere near, but an external EQ as well seems to be the optimum solution.

With large wound components on board and passive circuitry, the Motherload needs careful siting in the studio: at least one and preferably two rack units' distance from any power transformers, or it will hum; and if you are planning on using it with single-coil pickups, you need to get it at least an arm's reach away, or it will squeal at high gain settings. I didn't hit it with anything more than 85 Watts, but it didn't get unduly hot at any stage and I didn't manage to get the overload warning light to come on.

Sequis Motherload Versus Line 6 PodXT

Comparing the Motherload/amp combination to a PodXT, with all its effects switched off, I could actually get the PodXT to sound pretty close. Surprisingly, there was often more fizzy/crackly top in the PodXT signal, but the characteristic real-speaker mid-range dip was already there, and the bottom end was comparable, although the Motherload was better at really deep 'thump' frequencies, so long as they were present in the source. The thing I could never match was the clean-to-distorted range of the real amps. Most of these could go from warm clean to singing distortion just on the guitar's volume control, whereas the PodXT always needed a gain tweak to get either end just right. Plugging the PodXT into the filter stage of the Motherload, switching off the PodXT's cabinet simulation, and using the effect return input actually improved some of the PodXT sounds, to my ears, whilst failing to match others. This could be a useful strategy for anyone who needs the versatility and immediacy of the PodXT, but who isn't quite convinced by the sound. Where it works, it seems to shave off a bit more of the high top end than the Pod's own cabinets, somehow leaving what remains sounding far more focused, and just more convincingly real, especially if you then apply room simulation after the Motherload output. The original Line 6 Bass Pod proved even more successful, with the Motherload invariably providing a more usable recorded bass sound than the Pod's own cabs, to my ears, with a smoother, more extended bottom end. One thing to watch out for when connecting a unit like the PodXT in this way is that the Motherload chassis is not grounded, for safety reasons, and the PodXT chassis isn't grounded either. This can produce a lot of noise pickup in some situations, for which the only cure is grounding the PodXT chassis. I did this by connecting the other output to my mixer, but connecting both sockets sends the PodXT's output into stereo mode — not ideal if you are using any of the PodXT's stereo effects, as you'll only then be recording one side. A shallow self-tapping screw into one of the mic stand adaptor holes on the underside of the PodXT crocodile-clipped to something earthy (like the sleeve of a jack lead coming from your mixer perhaps) seems to solve the problem completely, although this isn't recommended if your PodXT is still under warranty.

A Real Alternative For The Discerning Player

Having checked out a Motherload in its earliest form, the performance of this latest version was a real surprise — products don't normally change this much from one incarnation to another. Whilst I would hesitate to say that it sounds exactly like a miked speaker cab, I certainly can say that I believe it provides a viable alternative that will satisfy even the most discerning of players. Matched with an appropriate amp and the right settings, it makes for a 'silent' recording system that retains those elements of a good electric guitar sound that matter most to me. The Motherload manages to pull off the trick of retaining just enough top end to sound right without allowing fizziness to creep in, whilst no previous speaker simulator even comes close to matching its capacity for authentic bottom-end chunk. I can pay the Motherload no higher compliment than to say that I kept finding myself just playing through it, for hours on end, when I should probably have been doing something else — an activity I actually engage in all too often, but normally only when real speakers are involved!

If you're one of those people who is entirely happy with the sound of a digital amp simulator or guitar amp software plug-in, you probably don't need this; if you are happy with the sound of your valve amp with its master volume really low you probably won't see the point of it. For the rest of us, recording authentic electric guitar sounds in a home studio environment just got a whole lot easier. SOS

information

£ Motherload, £599; Richter Control, £299. Prices include VAT.
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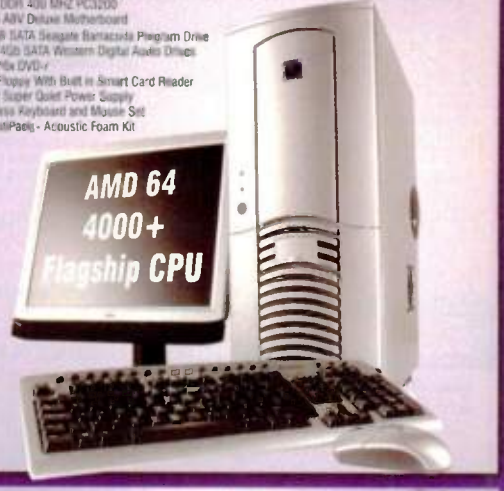

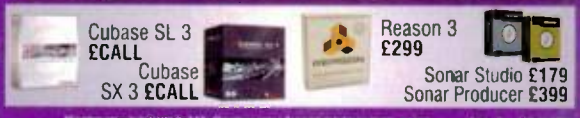

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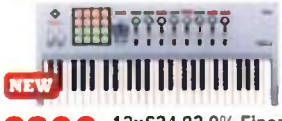

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£169 6x£28.17 0% Finance
NO DEPOSIT REQUIRED.

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APPLE

NEW

LOGIC PRO 7 £649
0% FINANCE AVAILABLE
Apple bring you Logic Pro 7. The new package includes: A new modelling synth, new drum machine & guitar amp software, more plug ins & improved performance.

LOGIC EXPRESS £179
An entry level kit featuring Logic Audio, EVP73, EXSP24 & ESI.

ALL UPGRADES IN STOCK

STEINBERG

CUBASE SX3 £469
Dual platform music creation & production system. Audio & midi recording/editing/mixing. Advanced score editing & printing.

CUBASE SL3	£229	0% NO DEPOSIT
SYSTEM 4	£279	0% NO DEPOSIT
CUBASE SE	£85	ON DEMO!!!

PLUG-INS

THE GRAND	£130
D'COTA	£119
PLEX	£119
V GUITARIST	£134
HYPERSONIC	£225
X-PHASE	£99
HALION STRINGS	£242
GROOVE AGENT 2	£169
WALDORF ED	£49
HALION 3	£249

IK MULTIMEDIA

SAMPLETANK 2XL
£339 6x£56.50 0% NO DEPOSIT

AMPLITUBE	£204
AMPLITUBE LIVE!	£POA
SONIK SYNTH 2	£299
SONIK CAPSULES	£79
EXPANSION TANK	£79

Buy either Amplitube or Sampletank 2L & get the other FREE!!! Ends 30th April 05

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ARP 2600 £199
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Arturia bring you these incredibly faithful reproductions of the originals. Using TAE technology these VST instruments bring you analogue warmth with digital flexibility.

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MINI MOOG	£129
CS-80V	£159
STORM V2	£CALL

NEW

EAST WEST

COLOSSUS NEW
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An unbelievable 32 gigabyte sound library with Kontakt front end. Includes stunning electric & acoustic piano samples.

NEW	SILVER EDITION PRO	£399 12x£33.25 0%
NEW	GOLD EDITION PRO	£1299 12x£108.25 0%
NEW	PLATINUM EDITION PRO	£3999 24x£166.63 0%

FXPANSION

BFD gives you your own drum studio with complete control of 7 real drum kits plus additional hats, snares & cymbals. Every drum is recorded from 11 different mics positioned around the kit, & more.

BFD	£179
BFD XFL	£149
8 BIT KIT	£115
VST TO AU WRAPPER	£59
RTAS TO AU WRAPPER	£59

SPECTRASONICS

STYLUS RMX
£139 NEW

Vastly improved version of the original. Now featuring Dream Designer & SAGE technology giving users dramatic new control over groove production & performance.

TRILOGY	£CALL
ATMOSPHERE	£CALL
STYLUS	£CALL

DRUM DROPS £99

Exquisite collection of multitracked drum takes. Packed full of soul & old skool flavour, these DVDs will not fail to impress. Huge variety of styles from 60s pop to straight up funk. A must for any true beat head.

NEW

WAVES

VER. 5 NEW

These high end plug-ins are available in various packages. From high quality reverb to multi band limiters, waves excel in every aspect of digital signal processing. An invaluable tool to any digital based studio.

GOLD BUNDLE	£929
PLATINUM BUNDLE	£1515
RENAISSANCE MAX	£439
MASTERS BUNDLE	£639
RESTORATION BUNDLE	£879
MUSICIANS BUNDLE	£199

0% FINANCE AVAILABLE

PROPELLERHEADS

REASON 3 £299

New Reason 3.0 gives you one stop loading of complete, customisable instruments and effect setups, a new instrument-packed soundbank, instant integration with MIDI controllers, a new intuitive file browser, plus a suite of mastering tools.

NEW

REASON 3 UPGRADE	£69
RECYCLE 2.1	£105
SONIC REFILLS	£49
PRO SESSIONS	£35

NATIVE INSTRUMENTS

ABSYNTH 3	£CALL
REAKTOR	£279
REAKTOR SESSION	£150
B4	£109
BATTERY 2	£125
KONTAKT	£219
KOMPAKT	£129
INTAKT	£119
KOMPLETE 2	£CALL
VOKATOR	£169
ELEKTRIK PIANO	£139

GUITAR RIG £299
The ultimate hardware/software combination. Models of classic amps & vintage pedals.

PC AUDIO SYSTEMS

GAK STUDENT TOWER £679
Intel P4 2.8 GHZ, DVD + CDR W, 120 GB 7200 PRM HD, 512MB DDR, 333 MHZ RAM & 6xUSB 2.

GAK CLASSIC TOWER £829
Intel P4 3.0 GHZ, DVD + CDR W, 120 GB 7200 PRM HD, 1GB DDR, 400 MHZ RAM & 6xUSB 2.

GAK PCs come fully configured & tested for optimum audio performance. Simply choose the system you require add hardware/software to let us take care of the rest!! At our desktop & rack PCs come with a 3 year warranty!!

GAK RACK LE £599
Intel Celeron 2.4, 52x24x52 CDR W, 80 GB, 7200 RPM HD, 512 MB DDR RAM, 6xUSB 2 + mouse & k/board.

POWER RACK £999
Intel P4, 3.0 GHZ, DVD + CDR W, 120 GB HD, 1GB DDR, 400 MHZ RAM, 6xUSB 2 + mouse & k/board.

MOBILE MUSICIAN

SYSTEM A £1049
Pentium M 1.4 GHZ, 40 GB UDMA 100 HD, 512 MB DDR RAM, Intel wireless LAN, DVD + CDR W, 14.1" XGA TFT screen, 2xUSB 2 + FW

SYSTEM B £1269
Pentium P4 3.06 GHZ, 60 GB ATA 100 HD, 512 MB DDR RAM, DVD - CDR W, 15" SXGA TFT screen, 2xUSB 2 + FW & 56K modem + gigabit LAN.

These laptops are available as different systems to suit you. Systems are pre loaded & installed with hardware/software purchased from us, & are fully tested & configured.

M-AUDIO

NEW

CONTROLLERS

KEYSTATION PRO 88 £344

K/STATION 61ES	£109
K/STATION 49	£69
OZONE	£179
OXYGEN 8	£POA
RADIUM 49	£109
RADIUM 61	£136

MIDI INTERFACES

MIDISPORT UNO	£36
MIDISPORT 1X1	£39
MIDISPORT 2X2	£45
MIDISPORT 4X4	£77
MIDISPORT 8X8	£179

AUDIOPHILE-192
£119 NEW

PCI CARDS

AUDIOPHILE-2496	£59
DELTA 44	£99
DELTA 66	£116
DELTA 1010	£329
DELTA 10101LT	£175
OMNI STUDIO	£279

MIC PRE

TAMPA	£199
OCTANE	£349
A/BUDDY	£69

USB CARDS

FAST TRACK
£69

One in, two out, interface packs with guitar FX & a mic pre.

NEW

AUDIOPHILE	£149
MOBILE PRE	£125

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1814	£349

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Bus powered Firewire audio solution

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MX4	£229	MACH 5 £POA

E-MU
EMULATOR X STUDIO
£419 6x£69.83 0% NO DEPOSIT

1820 M	£325 0% Finance Available
1820	£279 0% Finance Available
EMULATOR X	£205
1212 M	£129
PROTEUS X	£119
0404	£65

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New expanded range available in three sizes

X STATION 49	£449	6x£74.83 0% NO DEPOSIT
X STATION 25	£395	6x£65.83 0% NO DEPOSIT
REMOTE 61	£429	6x£71.50 0% NO DEPOSIT
REMOTE 49	£359	6x£59.83 0% NO DEPOSIT
REMOTE 25	£225	6x£37.50 0% NO DEPOSIT

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X SESSION
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425 C Midi Control Keyboard	£99
449 C Midi Control Keyboard	£137
461 C Midi Control Keyboard	£159
E KEYS 49 Midi Keyboard	£75
UC 33E Midi Control Surface	£149

AKG
C414B XLS £599
6x£99.83 0% Finance

C1000S	£99
C2000B	£109
C3000B	£149
C4000B	£269
D112	£139
K55 Headphones	£18
K66 Headphones	£20
K141 Headphones	£CALL
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AT2020 + Samson C Valve
inc. pop shield, stand and lead!!!
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AT3035	£129
AT4040	£175
AT4050	£POA
ATH M40 Headphones	£52
ATH M30 Headphones	£39

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NT2A NEW
+ Focusrite Trakmaster Pro
including boom stand and lead!!!
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NT1A	£125
NT3	£89
NT4	£269
NT5	£245
S1	£165

KRK

V8	£839	24x£34.96 0% Finance
V4	£415	12x£34.58 0% Finance
V6	£579	12x£48.25 0% Finance

EVENT

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MACKIE

HR824	£999	6x£166.50 0% Finance
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S5	£259
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BM5A	£699	6x£116.50 0% Finance
BM6A	£1049	6x£174.83 0% Finance
BM15A	£1579	6x£263.17 0% Finance

GENELEC
NEW

8030A	£649	6x£108.17 0% Finance
8040A	£999	6x£166.50 0% Finance

SAMSON

RESOLVE 65A	£229
RESOLVE 80A	£249

BEHRINGER

2030A	£199
2031A	£229

FOCUSRITE
PLATINUM SERIES.
TRAKMASTER PRO NEW
£199 6x£33.17 0% NO DEPOSIT

COMPOUNDER	£275
TWINTRACK PRO	£329
OCTOPRE LE NEW	£349
VOICEMASTER	£329

LIQUID CHANNEL £2149 12x£179.08 0% Finance
Dynamic convolution processor

ISA430 MK2	£1539
ISA428 MK2	£POA
ISA220	£POA

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NEW

LA 610	£1399	12x£116.58 0% NO DEPOSIT
UA 1176	£1265	12x£105.42 0% NO DEPOSIT
UA 6176	£1749	12x£145.75 0% NO DEPOSIT
UA LA2A	£2099	12x£174.92 0% NO DEPOSIT
UA 2-610	£1799	12x£149.92 0% NO DEPOSIT

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BLUE TUBE A/DS
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Stereo tube pre amp NOW IN STOCK
FIREPOD 8 ch. interface £489 6x£81.50 0% NO DEPOSIT

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COMP 16	£79	HP 4	£79

MANLEY
MASSIVE PASSIVE
£3399 12x£283.25 0% NO DEPOSIT

SLAM!	£4199	12x£349.92 0% NO DEPOSIT
VOX BOX	£2339	12x£194.92 0% NO DEPOSIT
VAR. MU	£2649	12x£220.75 0% NO DEPOSIT
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CALL NOW TO ARRANGE A DEMO!!

TC ELECTRONIC
NEW

HELICON VOICE PRO	£2049
12x£170.75 0% Finance NO DEPOSIT REQUIRED.	
M-ONE XL Multi FX	£339
M 300 Dual FX	£159
D2 Multi tap delay	£345

TC Helicon available, call now for info.

LEXICON
PEDIGREE DIGITAL REVERBS & MULTI EFFECTS.
MPX1 NOW ONLY £419 6x£69.83 0% Finance
professional quality multi FX & reverb!!!

PCM81	£1350	6x£225.00 0% NO DEPOSIT	
PCM91	£1350	6x£225.00 0% NO DEPOSIT	
MPX550	£239	MPX110	£139

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ALL IN STOCK

DT990	£90
DT150	£95
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BEHRINGER DDX 3216

This brilliant digital mixer packed full of features and connections as standard has now been dropped in price to an unbelievable...

£469 6x£78.16 0% Finance NO DEPOSIT REQUIRED.

TC HELICON VOICEPRO

TC Helicon release their latest voice processor. Combining a complete suite of voice optimized tools and effects with an application based user interface...

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MACKIE SRM 450

These now industry standard active PA speakers have been massively reduced in price. 400 Watts, bi-amped, with unrivalled sound quality, these are the choice for pros & pub duos alike...

£999 6x£166.50 0% Finance NO DEPOSIT REQUIRED.

TASCAM DP-01FX

40 gig drive, 8 track, 2 simul inputs, USB 2.0 & stunning digital FX. Ideal intro into the world of digital music...

£349 12x£29.08 0% Finance NO DEPOSIT REQUIRED.

BOSS BR 900

NEW

Brand new from the Boss HQ, 9 track recorder, built in CDR & a whole host of guitar FX. Available early April. Only...

£449 12x£37.42 0% Finance NO DEPOSIT REQUIRED.

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Groundbreaking new rack synth from Roland feat. their incredible elastic audio synthesis.

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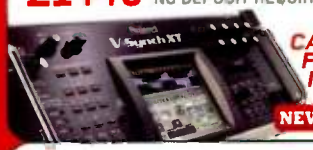

CALL FOR INFO

NEW

FANTOM X 6

Roland's new flagship work stations.

NEW

£1449 6x£241.50 0% Finance NO DEPOSIT REQUIRED.

76Key £1779 6x£296.50 0%
88Key £1899 6x£316.50 0%

JUNO D

Stunning new 61 note, 64 note polyphony, 22 rhythm patches, 768 radio ready patches & 47 FX!

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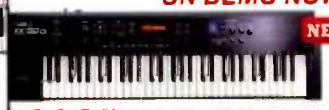

NEW

£385 6x£64.17 0% Finance NO DEPOSIT REQUIRED.

NEW **RD 700 SX** £1599
24x£66.63 0% Finance Available. No Deposit

NEW **RD 300 SX** £999
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Stunning *new* pianos from Roland...

TD-3 Electronic Kit

£749 24x£31.21 0%

TD-20 Electronic Kit

NEW

The flagship model.

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NOW AVAILABLE IN WHITE!

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12 track HDR, built-in CDR, superb COSM guitar FX. All for only...

£799
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0% Finance
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NEW

YAMAHA

AW 16G

Yamaha's main stay 16 track recorder, 2 onboard multi effects & CDR as standard.

IN STOCK NOW

£679 6x£113.17 0% Finance NO DEPOSIT REQUIRED.

MOTIF ES 6

Yamaha's flagship workstations.

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76Key £CALL 0% Available
88Key £1799 0% Available

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Fabulous mic pre's, EQ & build quality.

MG10-2 £69
MG12-4 £115
MG16-4 £CALL
MG16-6 F/X £225

01V 96

Updated 24 channel digital mixing desk with 24 bit/96k ready, new F/X algorithyms + 16 analogue inserts.

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02R 96 Digital Mixer £6985
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01 X

Yamaha's digital mixing studio combines hardware controller, stand alone digital mixer, 8 quality mic preamps, 2 multi FX processors & audio interface.

INCLUDES VOUCHER FOR 1/2 PRICE CUBASE SX

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P90 Stage Piano

Professional 88 weighted key piano.

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P60/P60's £POA
P120 £769

KORG

D32 XD

32 track, 56 inputs, 14 bus, 32 channels of automated fader playback.

NEW

£1899 6x£316.50 0% Finance NO DEPOSIT REQUIRED.

IN STOCK NOW

D16 XD 16 Track Recorder £1499

TRITON EXTREME 61

Korg's flagship workstations.

NEW

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76Key £1679 6x£289.83 0%
88Key £2199 6x£366.50 0%

MICROKONTROL

Multi coloured LCD, 12 pads, 8 sliders & knobs. USB powered.

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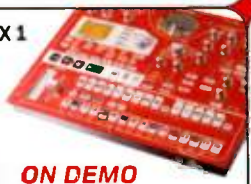
LEGACY

Software/ hardware hybrid. Micro controller front end with MS20, Polysix & Wavestation software. All classic retro sounds.

£339 6x£56.50 0% Finance NO DEPOSIT REQUIRED.

ESX 1/EMX 1

Tube driven dance production stations.



£469 ON DEMO
6x£78.16 0% Finance NO DEPOSIT REQUIRED.

EA/ER-1 MK2 £189
ES1 MK 2 £229

MICROKORG

Mini synth 128 patches, arpeggiator & vocoder + built in mic.

£249 6x£41.50 0% Finance NO DEPOSIT REQUIRED.

MS2000B DSP Synth £CALL
Analogue modelling inc built in mic & vocoder.

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Behringer's UB Series offer a variety of configurations to suit your individual needs

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UB802	£36
UB1202	£59
UB1204 FX	£85
UB1622 FX	£129
UB2442FX	£209

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COMPOSER PRO XL	£75	ADA 8000	£149
AUTOCOM PRO XL	£75	TUBE COMPOSER	£129
MULTIGATE PRO	£85	TUBE ULTRA Q	£99
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TRUTH SERIES

Truth monitors offer an unrivalled value for money. High performance bi-amped reference speakers for all applications

B2030A	£199
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B2030P	£125

IN STOCK & ON DEMO

MACKIE

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SPIKE £299
6x£49.83 0% Finance
NO DEPOSIT REQUIRED.

Complete digital recording solution from Mackie. USB 24-bit 96kHz Audio/M DI Interface. Mic preamps, onboard SHARC dynamics processing & VST plug-in support.

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NEW

1640	£1099 6x£183.17 0%
1620	£699 6x£116.50 0%
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FINANCE AVAILABLE
0% NO DEPOSIT

BIG KNOB £295

6x£49.17 0% Finance

Monitor switching & level control box with built-in talkback functions that sits on your desktop

NEW

MACKIE PA

SRM450	£999 6x£166.50 0% Finance
SRM350	£POA 0% Finance Available
C300	£599 6x£99.83 0% Finance
CFX 12	£449 6x£74.83 0% Finance
CFX 16	£629 12x£52.42 0% Finance

TASCAM

NEW

FIREWIRE

FW 1884
£799 6x£133.17 0% Finance

FW 1804
£469 12x£39.08 0% Finance

FW 1082
£609 6x£101.50 0% Finance

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6x£199.83 0% Finance NO DEPOSIT REQUIRED.

US 428 £CALL US 122 £154

MULTITRACKERS

NEW

DP-01 FX
8 track, 40 GB HD, mic pre's & FX...
ONLY £349
12x£29.08 0% Finance
NO DEPOSIT REQUIRED.

DP-01 £299
6x£49.83 0%

2488 £835
12x£69.58 0%

FOSTEX

NEW

VF-160EX	£450 6x£75.00 0% Finance
VF-80EX	£299 6x£49.83 0% Finance
MR8 S	£249 6x£41.50 0% Finance

New range in silver now available...

...IN STOCK & ON DEMO
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ACTIVE MONITORS

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£199 6x£33.17

RESOLVE 85A
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POWER AMPS

SERVO 170	£115
SERVO 260	£140
SERVO 550	£179

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C01	£39
C03 Multi Patterned	£49
CL7	£119
CL8 Multi Patterned	£POA

STUDIO OUTBOARD

C-COM 16	£POA
C-CONTROL	£89
C-QUE 8	£69
C-VALVE	£79

ALESIS

NEW

MICRON £299
6x£49.83 0% Finance
NO DEPOSIT REQUIRED.
Single part version with added FX board.

ION £449
Powerful 8 voice, 4 part analogue modelled synth. Stunning modulation matrix. Like a lion in Zion...
ON DEMO!

MULTIMIX 16FXD
£299 6x£49.83 0% Finance
NO DEPOSIT REQUIRED.
Affordable compact range of mixers

MULTIMIX 6 FX	£79
MULTIMIX8 FX	£129
MULTIMIX12 R	£189

NEW! USB mixers available in 8, 12 & 16 channel versions. Call for details...

AKAI

MPC 1000 £549
6x£91.50 0% FINANCE AVAILABLE

The latest edition of the classic sampling beatbox. Upgradable memory & PC link.

MPC 2000XL	£CALL 0%
MPC 4000	£CALL 0%
MPD 16	£CALL

CALL FOR DETAILS

ELEKTRON

High quality Swedish synthesis...

MONOMACHINE SFX-60 £949
6x£158.17 0% FINANCE

MACHINEDRUM SPS-1 £949
6x£158.17 0% FINANCE

SFX-6 ALSO AVAILABLE. CALL FOR INFO

NORD

More high quality Swedish synthesis...

NEW

G2X £1895 12x£157.92 0% NO DEPOSIT

G2 £1339 6x£223.17 0% NO DEPOSIT

Classic retro sounds...

ELECTRO 61	£1069
ELECTRO 73	£1129
ELECTRO RACK	£799

0% AVAILABLE. CALL FOR DETAILS.
NORD MAIN DEALER!

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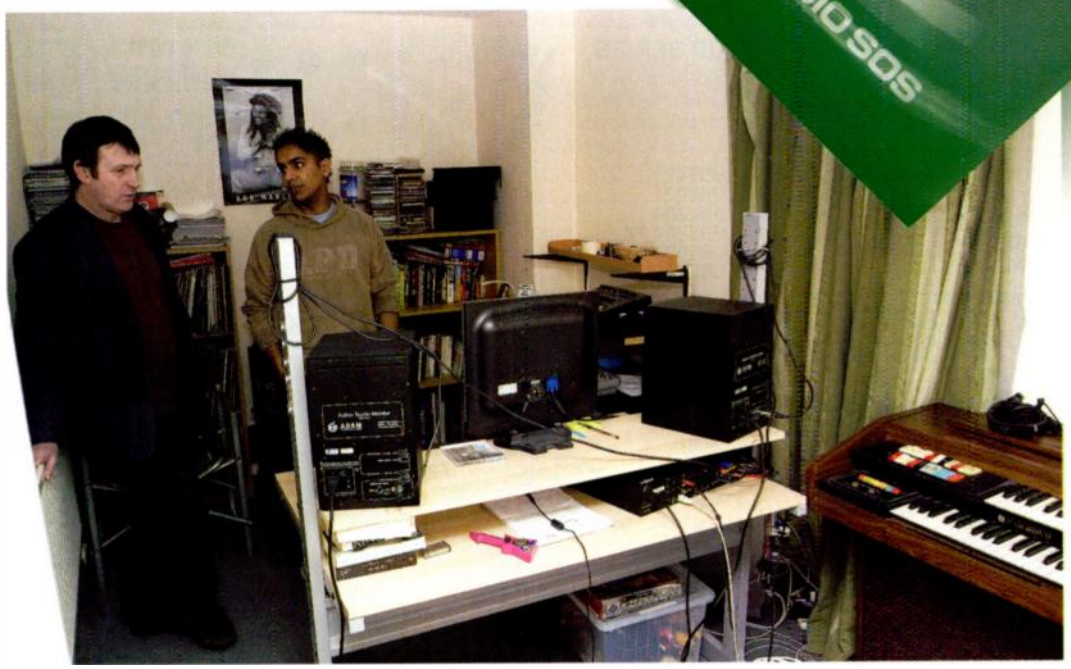
Studio SOS

The *SOS* team return to Cambridge, turning another home studio upside down in search of improved vocal and guitar sounds.

Paul White



Paul surveys Jazz and Alessia's home studio setup, and listens to some test tracks over the monitors to assess its performance.

Jazz and Alessia met while on an SAE course in Glasgow, and have now set up their own home studio in Cambridge to enable them to carry on composing and producing. They've already had some success in this field while studying in Glasgow — Jazz and his former production outfit had the same management company as Ms Dynamite, and did both composing and remixing work for the company. The work included remixes/work for Ms Dynamite, 50 Cent, Lisa Mafia, Da Endz, Working Title (for the film 'The Guru'), Lamya, and various Bhangra artists. Alessia writes, sings, and co-produces with Jazz. The pair are currently finishing their own album and hope to produce other artists as well as themselves in their own project studio.

The studio is set up in a first-floor room that is relatively long and narrow. After Jazz contacted us asking for help he sent over some photos of the room, and Technical Editor Hugh Robjohns and I both suspected that there might be monitoring problems to address. However, Jazz specifically wanted help with his vocal recording and mixing.

Although the judicious application of some acoustic foam helped to clean up the stereo imaging somewhat, more drastic measures were clearly required for dealing with the room's uneven bass response.

Bass Inconsistency

When we arrived, the desk supporting the computer monitor and a new pair of ADAM P11A active speakers was set up approximately halfway along the length of the room, the idea being to divide the room into a control-room area and an area for recording vocals. Jazz was toying with the idea of building a vocal booth in part of the available performing space. The studio setup itself was pretty simple, with a Mac G5 running a Digidesign Digi 002 rack interface, and Ableton *Live* was used for creating and assembling ideas before mixing in *Pro Tools LE*. For processing, Jazz was using only the plug-ins that come with *Pro Tools LE*, though it turned out that these worked pretty well for the type of music he was working on.

As the ADAM monitors were new, Jazz wanted to check that they were performing correctly, but after playing a selection of material through them, it became evident

that the level of bass dropped away rapidly if you moved back from the speakers, and the computer monitor was also set up slightly forward of the speakers, which can cause problems with reflections, particularly at high frequencies. In addition to the low-end consistency problem, the bass was not as well defined as it should have been and the stereo imaging was quite poor because of the proximity of bare plaster walls to either side.

Fortunately, we'd brought three large Auralex foam panels with us (supplied by the UK distributor Audio Agency) that we felt would improve the imaging if placed on the side walls. We also suggested that a pair of foam isolator pads under the monitors would improve the solidarity of the bass end, given that the monitors were set up on a computer desk shelf rather than on rigid stands. We improvised a pair of these using the packing that the speakers came with and, even though they were not ideal for the purpose, the sound improved noticeably, so we arranged for a pair of Auralex's MoPad speaker supports to be sent on later so that Jazz could evaluate the final sound.

While our little fixes improved the general sound and imaging of the monitoring quite noticeably, the unreliable bass variation with listening position wasn't so easy to fix — we've found that most small rooms have a Bermuda Triangle (well, a Bermuda sphere really!) in the centre where bass sinks without trace if you mix from there, and if you put your monitors there too things get even more uncertain.

Room Reorganisation

After talking about what Jazz and Alessia hoped to get out of the room, we persuaded them to try moving everything around so the monitor desk was at one end of the room, facing the wall. In long narrow rooms, it is invariably better to fire the speakers down the length of the room rather than across it, as the reflections from the close wall behind the engineer tend to be very difficult to deal with when working across the room.

We spent a few minutes removing everything from the bookshelves currently occupying the end of the room where we wanted to set up the desk, then began clearing that half of the room ready to set up the studio in its new location. I even vacuumed the floor before we moved the desk — this is getting to be a habit — while Alessia polished the bare cupboards. To reduce the risk of ground-loop hum, we used a 'star' mains system, which is to say we plugged a distribution board into one mains socket, then ran other distribution boards from this so that everything was powered from the same place. Hugh taped one of the distribution boards to the rear support of the computer desk to get the wiring off the floor and to give me yet another excuse to photograph him clambering under furniture!

Jazz re-connected the G5 and the Digi 002 as we tried to organise the rest of the room. In a very short space of time, we had a much more spacious setup with ▶

After some discussion it was decided that the best way to tackle the acoustic and operational problems Jazz and Alessia were encountering would be to reorganise the layout of the studio. This involved moving the shelves from the end wall, allowing the main studio workstation to be set up in that position instead.

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Once the main workstation was in its new position, Hugh set to work creating an efficient 'star' mains wiring scheme. This included fixing mains distribution boards to one of the main desk's supports, allowing the mains cables to be tidied off the floor.

all the necessary gear within easy reach of the engineer's seat and with plenty of clear floor space for recording vocals and guitars. During this process, the impressive mound of top-quality chocolate biscuits provided by Alessia diminished greatly!

The studio's car-boot-sale Hammond organ (a bargain at £10) was repositioned to the other side of the room, and the bookshelves were moved to the back of the room, against the side wall close to the bay window. A new purpose-designed table was being built to support Jazz's turntables and DJ mixer, and it would sit neatly between the bookcases and the keyboard rack.

As the house belongs to Alessia's father, I suggested that we prop the Auralex foam up in a temporary fashion to find the best place for it, then Jazz could procure some quarter-inch MDF panels, stick the Auralex to that, and hang the panels up like pictures using hooks. This would save the mess that invariably ensues if you ever need to remove foam that has been stuck directly to the wall. Either spray carpet adhesive (as supplied by Auralex) or a Liquid Nails-type adhesive works well for this.

Both Jazz and Alessia thought this was a good idea, so we proceeded on that basis, putting one panel on each side wall with the vertical centre of the panel at about seated head height, and the horizontal centre of the panel just forward of the listening position. Fortunately a radiator on the left wall gave us a temporary mounting option in about the right place, while a shelf unit on the right-hand side was almost as obliging. The third panel was propped up centrally on the wall behind the speakers using the desk as a support.

Playing our test songs now confirmed that we had a much more even bass response as we moved back from the normal listening position, and the bass was also more solid and far less 'tubby' sounding. The foam at either side brought better focus to the stereo imaging as well.

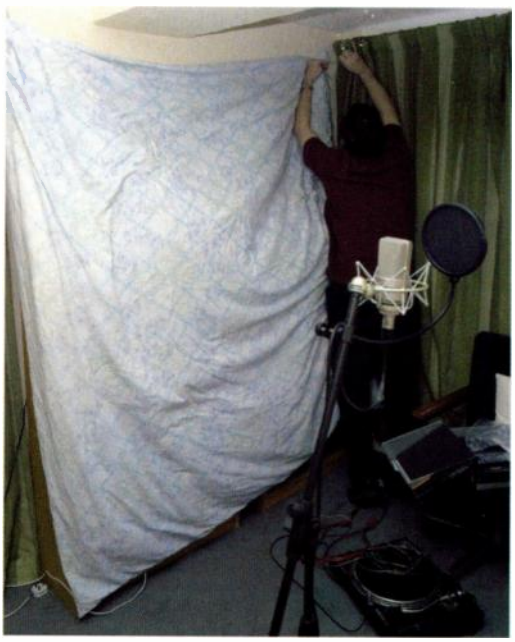
Jazz mentioned getting some foam bass traps, and we agreed this would be a good idea — he'd probably want to place them over the full height of the two front corners of the room.

Vocal Recording Advice

With the monitoring now performing far better, we felt we could move on to the vocal-recording problems. The couple had recently bought a Neumann TLM103 vocal condenser mic, which we set up in its shockmount with a pop shield positioned a couple of inches in front of it. Alessia volunteered to do some singing so we could check our results, but before doing that we loaded in a couple of songs she'd already been working on to see what the vocal was like when heard in isolation.

Both Hugh and I were extremely impressed with Alessia's contemporary vocal style, but we could hear some room coloration clouding the lower range of the vocal mic. There was also a tendency for the mic to sound as though it was on the verge of popping sometimes. Alessia often records vocals when Jazz is at work, and she usually hangs a double duvet off the curtail rail that runs across the bay window. Duvets can be great low-cost problem-solvers, but there were so many bare plaster surfaces on the other walls that some room coloration was still clearly audible.

An impromptu solution was to pull the curtain across the bay window (it was fairly heavy and absorbed sound reasonably well) and then to hang the duvet on the adjacent side wall by tying loops of string to the top two corners, then looping these over the ends of the bay-window and side-door curtain poles — these were almost ideally



With the studio workstation set up at one end of the room, a corner at the other end was now set up as a vocal recording area. In order to reduce the amount of room sound reaching the vocal mic, Paul closed the heavy bay-window curtain and also deadened the wall by hanging a double duvet between the two windows — the existing curtain rails made convenient fixing points.

The reorganised studio layout instantly improved the evenness of the bass response, and a quick test vocal take indicated that the vocal sound was also much improved.

placed for this purpose. We now had a corner that was reasonably dead on two sides, so if the vocals are recorded with the mic facing into the corner, most of the rogue reflections should be intercepted before getting into the mic (which has a cardioid polar pattern). Using a thicker duvet over the bay window curtain might also help. There was space on a roof beam to hang yet another double duvet to act as a screen between the booth and control room areas, and which would effectively form a three-sided vocal booth. Alessia also suggested hanging another duvet over the door to hide the reflective wood surface — every bit helps!

We felt that working like this would be better than trying to build a separate vocal booth, as these nearly always sound boxy and are quite difficult to treat in an acoustically neutral way.

To test our 'one duvet and adjacent curtain' setup, Jazz opened up a song they'd been working on and Alessia overdubbed a new vocal verse. This was also to serve as the test-bed for any processing we decided to try. She worked about six inches from the pop shield with her back facing the duvet. Just one take and we had a perfectly respectable piece of test vocal. We never did figure out why she was getting traces of popping before, as she always used the pop shield and also the bass-cut switch on the ▶

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Once the test vocal had been recorded, Paul worked with Jazz and Alessia on refining a usable vocal ambience setting using the built-in plug-ins within *Pro Tools LE*. This worked so well that no appreciable improvement in quality could be achieved even using a dedicated external Lexicon MPX550 reverb unit.

002 preamp, although it was possible that the pop shield had been arranged too close to the mic itself — there should be a gap of a couple of inches of still air between the shield and mic. However, with our setup, we didn't get any hint of popping at all.

Listening back to what we'd recorded, we noticed straightaway that the room coloration was much reduced and that we had a good basic tone to work with before using EQ or other processing. Jazz had been using the *Pro Tools* reverb, but I felt a much shorter, brighter setting than the one he'd been using would better suit both the song and Alessia's voice. I hadn't used the *Pro Tools LE* plug-in reverb before, so I was interested to see what I could get out of it. I ended up using the medium plate with the decay time turned right down to 650ms and with a 70ms pre-delay. I left the filters at a fairly bright setting and turned the diffusion down to 45 percent to try to coax something closer to an ambience effect out of it. I didn't want an obvious reverb, but the vocal needed a sense of life and space.

This combination of parameters worked astonishingly well, and both Jazz and Alessia really liked the result. Jazz had been considering buying and using an outboard reverb, so we patched in a Lexicon MPX550 that I'd brought with me and set it up to give a similar sound to the plug-in reverb. None of us felt that it was any better in this application — which pleased Jazz, as he didn't want to have to budget for an outboard reverb if he could help it.

Although the new room arrangement and duvet hanging had removed most of the room coloration, there was the mildest hint of boxiness to the vocal sound which we tamed with a very gentle 200Hz dip using the *Pro Tools LE* four-band EQ plug-in. I also added a little 'fairy dust' boost centred at 10kHz to give a hint of 'air'. The amounts of EQ gain involved were only 2-3dB, but the vocal clarity improved and it felt much more upfront in the mix, which is what Jazz and Alessia wanted to achieve.

The final tweak was to add some compression. Alessia has really good mic technique, so compression wasn't needed to keep the level even at all. Instead, we were able to use it to add a little 'punch' and to create a more contemporary sound. We settled on a hard-knee, 8:1-ratio compression with an attack time of 3.7ms and a 100ms release time. The threshold was adjusted to give a maximum gain reduction of around 6dB on peaks and it was working pretty much all the time Alessia was singing.

I felt the result sounded really crisp and solid, and as a further demonstration of compression as an effect, I pushed the gain reduction up to around 15 to 20dB (by reducing the threshold) to show how compression could be used to produce a more assertive sound — almost like singing through a limiter. Of course, compression brings up background noise, breath sounds, and room ambience between phrases, so you really need good acoustics and a quiet room to get the best out of this technique. Using a gate or expander on the vocals prior to compression can also help.

Jazz then asked about panning strategies for backing vocals, as Alessia likes to layer a considerable number of different harmony parts. Hugh pointed out that extreme panning can lead to perceived balance problems when the mix is heard in mono, so we suggested keeping the main vocals in the centre as usual, panning the main backing vocals to around 10 o'clock and two o'clock, and saving extreme panning for any extra backing vocals that wouldn't cause the overall mix to suffer too much if they lost a little level when played back in mono. It's also possible to add space to a multi-layer backing-vocal mix by rolling out all the low end, say below 200Hz, and adding more reverb to those parts that are panned towards the edges. This retains

In order to improve Jazz and Alessia's acoustic guitar recordings, Paul set up an acoustic reflector (otherwise known as a spare desk shelf!) to liven up the sound reaching the mic. Paul then encouraged Jazz to move the mic around while listening to his playing on headphones, so that he could hear how much difference small position changes can make.

Jazz & Alessia's Comments

Moving the furniture around has spread the bass evenly throughout the studio, and hanging the acoustic foam on the walls has also helped to give a clearer and wider stereo image. Another welcome side-effect of the reorganisation is that the room now appears larger and more inviting! Our vocal recordings are much dryer with a lot less coloration thanks to the correct mic positioning and duvet padding. It has made a huge difference overall — thank you *SOS*!

transparency in the mix and also adds a nice gloss to the production.

Miking Classical Guitar

Our final task was to try miking Alessia's Encore nylon-strung classical guitar. This turned out to be very easy, as classical guitars tend not to boom in quite the same way as metal-strung models, so you don't have to worry as much about aiming the mic too close to the soundhole. All acoustic-guitar recordings seem to benefit from some early reflections, either from a hard wooden floor, or from some kind of 'acoustic mirror'. The only suitable sized reflecting board to hand was one of the computer desk's side shelves, but this served the purpose when supported on a handy cable box and angled to bounce some of the guitar's sound back into the mic.

Jazz was considering replacing the studio carpet with laminate flooring, but I felt this would be a disadvantage, as the noise from the computer would become more evident with nothing to soak it up. A reflective floor isn't always great for vocals either, as it can colour the sound. The compromise solution is either to floor only a small section at the end of the room for recording acoustic guitars, or simply to put a wooden panel over the carpet when recording those instruments that need a bit of reflective help.

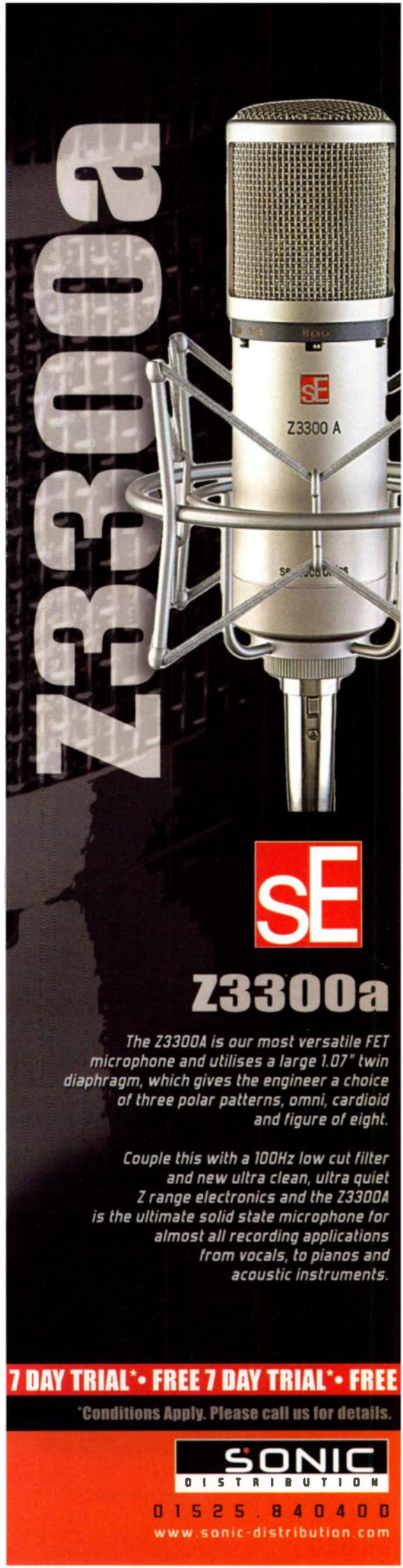
While wearing headphones, I moved the guitar relative to the mic until we found a sweet spot that came close to the natural acoustic sound of the instrument. I encouraged Jazz to move the mic around while listening on headphones to hear for himself how moving the mic small distances dramatically changes the recorded sound. In this case, the best result turned out to be achieved by aiming the mic from 12-18 inches away at a point midway between the end of the neck and the soundhole.

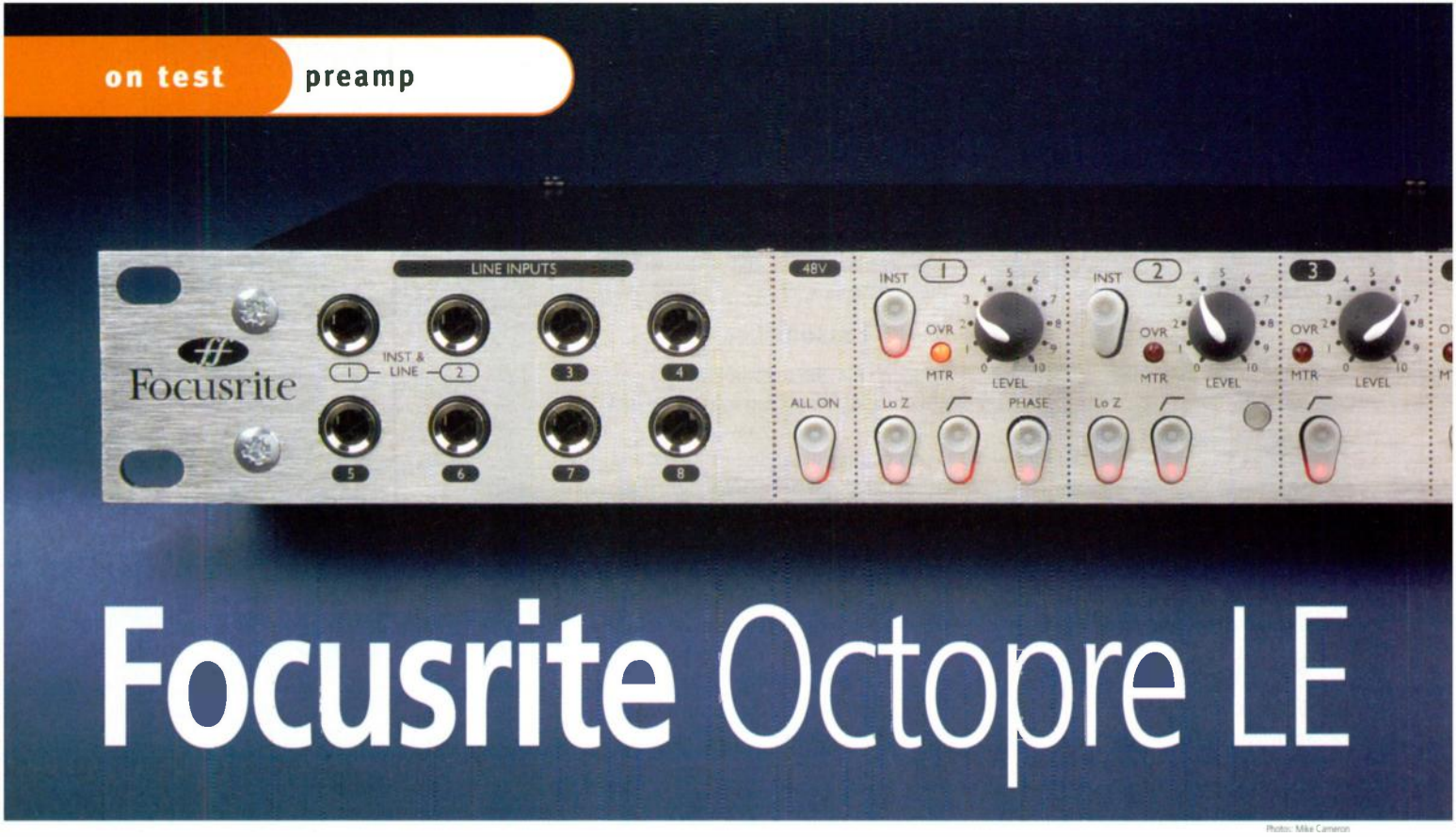
Lessons Learned

Although moving the whole studio around and re-plugging everything took a little time, I feel it really paid off in terms of more accurate monitoring and better use of the available space. The simple Auralex treatment took care of the worst local reflections around the listening position, and while our improvised speaker pads weren't great, they helped too. Switching these for the Auralex MoPads when they arrive should tighten up the low end even more, and adding bass traps to the room corners will further improve the evenness of the bass.

Jazz said that he might get a second computer monitor, in which case there wouldn't be room on his existing speaker shelf for both monitors and both speakers. One solution would be to cut off the metal vertical supports protruding above the current monitor shelf, fitting a wider shelf on top, but a more acoustically sound solution might be to use rigid speaker stands either side of the computer desk (provided that these don't place the monitors closer than around one foot from the side walls). Flat screen monitors aren't affected by the magnets in monitor speakers, so you can put them as close together as you like.

The simple duvet treatments really worked well for the vocal recording area, and adding more duvets, as suggested by Alessia, should improve things further. As stated earlier, this will almost certainly lead to better results than offered by a small, enclosed vocal booth. Our final experiments with processing confirmed that Alessia's already excellent contemporary voice could be made to sit better in the mix with just a little EQ, compression, and a short, bright reverb. Too much reverb can swamp a voice, but the treatment we chose actually helped pull it to the front of the mix. The final challenge before hitting the road and heading back to the Midlands was to eat a portion of Alessia's home-made pasta without coming back for seconds. We failed! SOS





Focusrite Octopre LE

Photo: Mike Cameron

Eight-channel Mic Preamp

Focusrite hot up the competition by offering eight channels of Platinum-series preamplification, with optional digital conversion, at a surprisingly affordable price point.

Paul White

Focusrite have a well-deserved reputation for building analogue outboard studio equipment, and their Platinum range is well established in the UK project-studio market due to its low cost and good audio quality. However, it is no secret that much of the analogue market is being hit hard by the relentless rise of software plug-ins, so for mass-market analogue gear to survive in the project studio world where the computer is king, it has to be designed to integrate easily into the computer environment. Focusrite's new Platinum-series Octopre LE has been designed with that consideration very much in mind, although the 24-bit digital I/O is available as an option rather than being fitted as standard, in order to save on cost.

As the name implies, this 1U rack unit comprises eight channels of mic/line preamplifier, using Class-A op amp design, but the secret to its integration into the DAW world is in its input/output options, which offer ADAT digital I/O as well as balanced analogue outputs. Having an 'ADAT to analogue line level' output stage enables the Octopre to be used for feeding, for example, a mixer or surround monitoring system. Without the digital card, you simply have eight mic/line preamps feeding eight balanced line outputs, which is ideal for feeding multi-channel audio interface cards that have only line-level inputs, or for feeding multitrack recorders without the need for a mixer.

The preamp circuitry features the same high bandwidth (-3dB at 200kHz) as for other Platinum designs, in order to preserve transients and prevent phase degradation at high frequencies. A gain range of +14dB to +60dB is available. The first two channels also boast high-impedance DI jack inputs for the easy connection of instruments. The THD is quoted as 0.003 percent for a 0dBu input (maximum gain) with a signal-to-noise ratio of 124dBA. When the digital option card is fitted, the dynamic range is 110dBA.

The eight line-level inputs and outputs are balanced, where the line inputs are on the front panel, the XLR mic inputs on the rear panel, and the analogue line output jacks are also on the rear panel. Rear-panel digital connections comprise a pair of ADAT optical ports (input and output) plus word-clock inputs and outputs on standard BNC connectors, though these are only available when the digital card is fitted. Power comes from an external supply coupled via a locking connector.

A front-panel stepper button with corresponding status LEDs allows the sample rate to be set to 44.1kHz, 48kHz, ADAT sync, or word-clock sync. Unlike the more professional (and more expensive) Octopre, there is no high-sample-rate option and no built-in dynamics processing. A further source option accommodates 256x clock for use with Pro Tools systems, and in all cases a red Lock LED shows that sync has been achieved. The unit has eight line-level jack sockets that can output the analogue mic-channel signals or monitor an ADAT digital input from a DAW or other source — a pair of rear-panel DAC To Line Out switches configure the outputs in two blocks of four.

Front Panel

The front panel is divided into three main sections. the first housing the eight line-input jacks, the first two channels of which have a high-impedance mode to suit instruments

SOUND ON SOUND

Focusrite Octopre LE £349

pros
- Platinum sound quality.
- Easy to operate.
- Flexible analogue and digital options.
- You don't need to buy the converter if you don't need it.

cons
- The metering is a little rudimentary.

summary
Either as eight analogue preamps or as a DAW expander, the Octopre LE offers a good combination of audio quality and features at the right UK price.

with passive magnetic pickups, such as guitars and basses. All eight mic inputs have gain controls, low-cut switches (operating 12dB/octave two-pole high-pass filters turning over at 120Hz), and overload LEDs, but there's no individual channel level metering. Instead, a small, circular moving-coil meter designed for peak reading monitors the output level of any selected mic channel (selected using the Source button). The overload LED doubles as an indication of which channel is selected for metering, but seems to be defeated for whichever channel is assigned to the moving-coil meter. There's a global 48V phantom-power switch just to the left of the first mic channel.

Compared to the rest of the channels, the first channel has additional Low Z and Phase buttons, while the second channel has just the additional Low Z button. Having variable input impedance is currently fashionable, as it allows mics to be more accurately matched to the preamps into which they are connected. To save on cost, this concept has been simplified to a switch offering one lower impedance setting, but, as always, the setting that sounds right *is* right! As a rule, the low impedance settings work best with ribbon mics — they just make capacitor mics sound quieter. The first two channels also have switchable instrument settings affecting the line inputs, so they can be used as regular line inputs as well as for instruments. Despite the Octopre LE's modest UK cost, the mic circuitry turns in a very pleasing performance, balancing clarity with weight.

Testing

Perhaps the most popular uses for the Octopre LE are expanding the I/O capability of a digital mixer with one or more ADAT I/O ports, or giving your DAW audio interface more I/O. Many DAW interfaces have ADAT ports, so expanding the channel count this way makes a lot of sense. I tested the Octopre LE by connecting it to the ADAT port of a MOTU 828 MkII interface. I selected ADAT sync and it worked right off with no fuss. I connected the unit via both input and output ADAT lightpipes so that it could be slaved to the MOTU 828 MkII. However, depending on which unit in your system has the best clock, you could also opt to use the Octopre LE as the master and slave your interface to that.

To my ears, the mic preamps sound similar, if not identical, to those used in other Platinum products, and operation of the Octopre LE is very straightforward. Having the option to split the outputs into two groups (ADAT or mic/line channel) adds to the flexibility. I don't think the Low Z option is particularly important unless you have ribbon microphones, but as more affordable ribbon models are starting to appear on the market it's nice to know it's there if you need it. Recording via the high-impedance instrument inputs provides a clean, uncoloured DI feed, and, overall, if you're familiar with the audio quality of a regular Platinum box, there should be no surprises. My personal preference would have been for a bar-graph meter rather than the small moving coil provided, but I understand that concessions have to be made to fashion occasionally.

Final Judgement

The Octopre LE sits comfortably between budget units like the Behringer ADA8000 (around £160 with ADAT I/O as standard) and the more costly, more professional Focusrite and RME solutions. Fitting the converter card adds to the cost, but the complete package is still very attractive if you need to expand your system's number of mic/line inputs and line outputs. Where corners have been cut to meet a price, it has been done thoughtfully. There are no high sample rates, but then there's very little reason for the majority of project-studio users to be concerned with these anyway, especially where the end result is going to be a 44.1kHz CD. The metering is a compromise, with a shared meter and individual overload LEDs, but it's a practical enough solution. You can't output all eight mic channels as analogue at the same time as using the ADAT-to-analogue output option, but then why would you need to?

Overall the Octopre LE is a nicely presented, straightforward rack box that delivers Platinum quality to the DAW owner with ADAT connectivity, but it is equally at home as a stand-alone rack of eight analogue preamps if you don't need the digital I/O option. The build quality and styling matches that of the rest of the Platinum range, right down to the style of switches and knobs, so if you have used a Focusrite Platinum preamp before, you'll know exactly what you're getting. Platinum may not be quite esoteric, but you do get extremely good preamps for your money. SOS

Information

£ Octopre LE, £349; optional eight-channel A-D/D-A card, £129. Prices include VAT.
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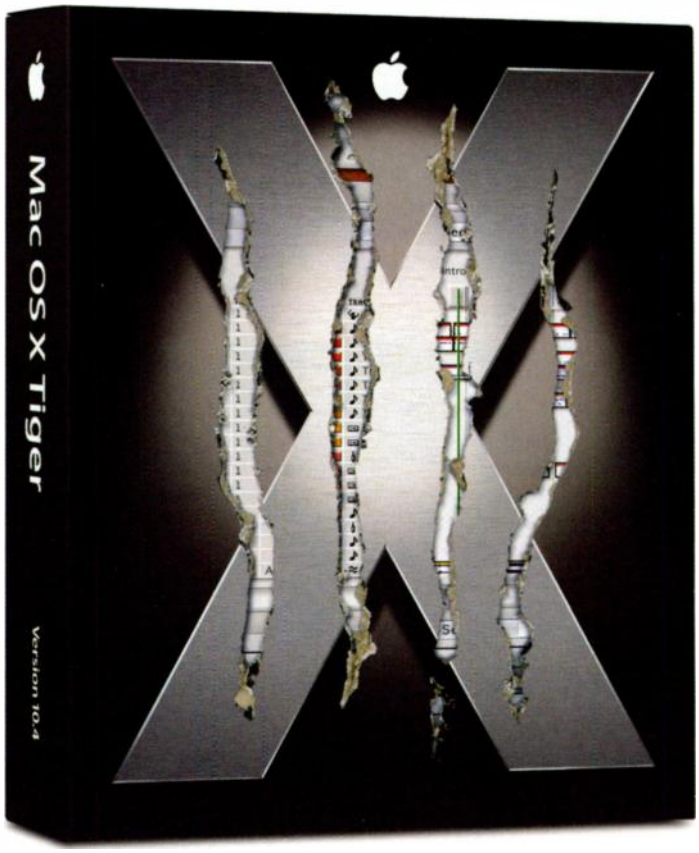
Burning Bright?

A Musician's Guide To Mac OS X Tiger

The latest version of Apple's Mac OS contains some excellent new features aimed at musicians and audio engineers. Is this one OS upgrade you won't mind performing on your studio computer?



Mark Wherry

Without wishing to be too nostalgic, it's hard to believe that Mac OS X has been with us in a final, released state for over four years — v10.0 was released on March 24th 2001 after many public and developer previews. 2001 also saw the release of Microsoft's Windows XP operating system, but while musicians and audio engineers were up and running pretty quickly on this operating system (an evolution of Windows ME and 2000), Mac OS X represented a more radical change for both users and developers of Mac audio and MIDI software, breaking away from 17 years of the 'classic' pre OS X Mac OS tradition.

However, while some Mac-based musicians clung to OS 9 for the first few years of OS X, the new Mac operating system, while not initially great from a MIDI and audio developer's standpoint, just got better and better. With the later releases of 10.1 (Puma) and, more significantly, 10.2 (Jaguar), the audio and MIDI feature of OS X matured and stabilised. The release of *Pro Tools 6* probably helped, but Jaguar was really when Mac-based musicians began migrating to the new operating system in serious numbers. And the release of 10.3 (Panther) made everyone feel much more confident. Considering the functionality now in Mac OS 10.4 — codenamed Tiger — it's amazing how far Apple have come in just four years.

Bonjour, Monsieur Le Tigre!

It's worth mentioning right away (as we'll be coming back to it later), that one well-known technology introduced back in Jaguar has been renamed due to a trademark settlement. Rendezvous, the technology for automatically locating computers, devices (such as printers) and services (such as the one used to share users' *iTunes* libraries across a network), is now known as Bonjour in Tiger, and literally every reference on Apple's web site and in the operating system to Rendezvous has been changed to Bonjour.

Most of Tiger's new general features will be fairly well known by the time you read this, since there's been a large amount of coverage in the mainstream computer press and, of course, on the Internet. Among the headline non-musical features you'll probably have heard about already is Spotlight, which is a new searching technology that allows you to find files based on content and metadata: for example, if you click on the new blue and circular Spotlight icon at the top right of the menu bar and type someone's name, Spotlight will find all information related to the name in all supporting applications on your Mac. *Address Book* will give you a link to the relevant entry, *Mail* will give you links to any emails to and from this person, and so on.

There's also Dashboard, which is activated by pressing F12 (by default) and displays a collection of Widgets on the screen, which you can move around, remove, or add new ones. A Widget is a small application that displays information or provides access to a commonly used service on the Internet, and among the Widgets included with Tiger are a calculator, a weather display, a calendar, a world clock and a word translator. Automator is a new Applescript-based application that enables you to create automated workflows more easily; but while it looks pretty neat, most music and audio applications don't support Applescript directly, so at the moment it's mostly going to be useful for creating workflows for encoding audio files or burning them to CD.

As discussed in September 2004's preview of Tiger in Apple Notes (www.soundonsound.com/sos/sep04/articles/applenotes.htm), Tiger also offers significant improvements for those writing 64-bit applications for the G5 processor, and applications can now address much more physical and virtual memory than in Panther. Another significant technological improvement in Tiger, and one more relevant to music applications, or at least to their developers, is Quartz 2D Extreme,

which accelerates 2D graphics by moving the drawing operations over to the GPU (graphics processing unit) on the video card. This offers the same substantial performance improvement for 2D graphics that the original Quartz Extreme brought to 3D graphics in Jaguar, as long as you have a video card capable of running Quartz Extreme. It's therefore and especially important for music applications, where the user interfaces rely much more heavily on 2D than 3D graphics. In order to make use of Quartz Extreme, Apple state that you need to have a video card with at least 16MB of RAM and either an Nvidia GeForce2 MX or better graphics card, or an ATI Radeon GPU.

Changed To The Core

So far, this is pretty much what any magazine will have told you about Tiger. So what of the stuff that will improve the lives of *SOS* readers? These can broadly be summed up in two ways, which we'll cover in detail over the next few pages. Firstly and perhaps most importantly, Tiger finally removes the OS-level restriction on the number of simultaneous audio I/O devices that can be addressed by the Mac OS, restoring the ability to use multiple interfaces for audio I/O that has been missing in action since the switch from OS 9 to OS X (unless you're a user of MOTU's *Digital Performer* that is, which got around the problem at an application level — but this new development is a permanent, OS-level fix, so *any* application can now benefit from it). Secondly, Tiger introduces many new features that make the networking of music computers much more viable than previously. If you want to set up multiple Macs to handle complex, processor-heavy audio tasks, or stream MIDI easily from one central computer to others that contains all your library sounds or CPU-hungry virtual instruments, it's now easier than ever before.

Before starting explanations in detail, the first thing to say is that the basic foundations of Mac OS X's MIDI and audio technologies have remained the same since the publication of the original *SOS* article on Mac OS X For Musicians, which looked at Mac OS 10.2 (see *SOS* April 2003 or check out www.soundonsound.com/sos/apr03/articles/osx.asp). So, if you want to know more about the background to these, you might want to check out this previous article.

The audio and music-related abilities in OS X are represented by three different technologies: Core Audio, Core MIDI, and Audio Units. Core Audio deals with how applications send and receive audio data from either your Mac's built-in audio hardware or other devices you might attach via USB, Firewire or PCI, while Core MIDI handles how OS X deals with MIDI devices attached to your system. The Core prefix is adopted by the majority of OS X's frameworks that provide functionality (such as audio and MIDI) to applications — other examples introduced in Tiger include Core Data (a data-modelling framework for providing database-like features) and Core Image (which is to image processing what Core Audio is to audio processing).

Finally, Audio Units is a format for developing audio instrument and effects plug-ins that work in compatible audio and music applications under OS X (Apple's nomenclature, incidentally, is consistent — so plug-ins for image processing that work with the new Core Image format are called Image Units). Audio Units are equivalent to DirectX plug-ins in Windows, providing a non-application-specific format for audio plug-ins that means developers can produce one plug-in and have it work without alteration in applications from multiple vendors.

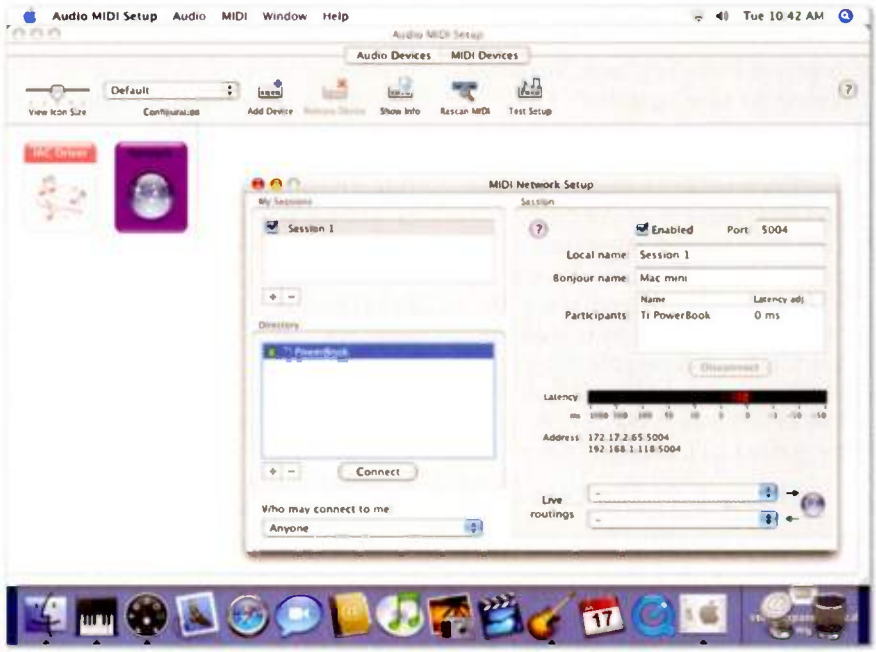
From a user's perspective, the details of configuring how different audio and MIDI ▶

Tiger's Dashboard is activated by pressing F12, and displays various Widgets you can move and arrange as you like for translating words, looking up words in a dictionary, checking the weather and more. More Widgets can be added and many others can be downloaded from Apple and various third-party developers.

devices are used by Core Audio and Core MIDI are taken care of with the Audio MIDI Setup (or AMS) tool, which can be found in the Applications/Utilities folder of your boot disk. The first change you'll notice in the new version 2.1 of AMS supplied with Tiger is cosmetic, although this rather belies the significant new features of Core Audio and MIDI that can be configured in this application — the brushed-metal look has been replaced with a regular Aqua application window appearance. Also on the subject of appearance, you'll notice that in keeping with other areas of Tiger, the various windows and sheets of AMS now contain lilac-coloured circular buttons with question marks to indicate there is help documentation available for this part of the program via OS X's Help Viewer.

Core MIDI Networks

OS X has always had a well-thought-out MIDI subsystem in Core MIDI, and this is perhaps no surprise given that one of its architects is Doug Wyatt, who previously worked for Opcode and developed, amongst other things, the most widely used MIDI subsystem in the days of OS 9, OMS, and Acadia, the audio engine used by later versions of Opcode's old *Vision* sequencer. Indeed, as has been discussed in the past, the structure of the MIDI Devices page of AMS bears a resemblance to the OMS Studio Setup application of yesteryear, and the most visible new MIDI-related feature added to OS X with Panther from the user's perspective was the IAC (Inter-Application Communication) Driver device. The IAC device (or buss) was a concept originally introduced in OMS to provide MIDI ports for sending and receiving MIDI data between multiple applications running on the same computer.



This is what the MIDI Network Setup window looks like on a Mac receiving MIDI data over a network under Tiger. The Local name also appears in the Participants list on the transmitting Mac (see the screengrab overleaf). The Latency monitor showing the timing of incoming MIDI events.

Core MIDI in Tiger takes the idea of sharing MIDI data between applications one step further with the addition of a Network device (shown above), which makes it possible to send MIDI data between applications running on different Macs via a network — so long as each machine is running Tiger, of course. This feature has many possible uses, the most significant being the idea of using other Macs to run software instruments that can be played from your main sequencing application, either with hosts such as Steinberg's *V-Stack*

Installation & Requirements

The installation process for Tiger is pretty much the same as for previous versions of Mac OS X: you can either boot from the supplied DVD directly, or run the application provided on the disc that will restart your Mac and boot from the DVD automatically without you having to hold down the 'C' key. You read correctly; it's a DVD-ROM, not a CD-ROM. In fact, Tiger is supplied *only* on DVD, so those with older systems should note that they'll need a DVD drive in their Mac in order to install it. Other minimum requirements from Apple include having a PowerPC G3, G4 or G5 processor, a Firewire port, and 256MB of RAM. On this latter point, I would say 512MB is probably a more practical minimum for day-to-day applications, and 1GB for doing anything with audio or MIDI applications.

It's possible both to upgrade existing versions of Mac OS X or install a clean version, either by archiving your previous System folder or by erasing your entire boot disc. I tried both procedures and had no problem upgrading Macs running Panther to Tiger, with no obvious issues arising or lost data due to the upgrade. While the upgrade might be the better option for general-purpose Mac computers, I still favour the clean install on dedicated audio and music systems. While wiping and starting again with your day-to-day computing needs is a pain, audio and music workstations tend to have less installed on them in the first place, so there is less to reinstall. And remember, many applications and certainly drivers will need upgrading for Tiger anyway, so why not get a completely clean system while you upgrade with a new OS, application version and drivers? Just remember to clone the disk when you're finished with a utility like Carbon Copy Cloner (www.bombich.com/software/ccc.html) to avoid having to repeat this tedious process in the future.

Before the installation process proper begins, you'll have the option of performing an Easy or Custom install, and, as with Panther (see November 2004's Apple Notes or www.soundonsound.com/sos/nov04/articles/applenotes.htm for more information), it's best to chose a Custom Install to eliminate a large number of files you'll probably never need. Unless you plan on using your Mac in multiple languages or require fonts for Chinese, Korean, Arabic, and so on, you can save a considerable amount of space on your hard drive. Disabling Language Translations saves you 449MB, skipping Additional Fonts saves 129MB, and it's well worth weeding through the 1.2GB of printer drivers OS X would like to install by default. Generally speaking, I usually leave the family of printer I use myself, such as HP, and also leave the Gimp drivers required by some applications. Installing just the HP, Canon and Gimp printer drivers requires just 404MB.

In the end, my basic Tiger installation required just 1.7GB (only 200MB more than my basic Panther installation), saving an entire Gigabyte on the drive, although I later added the X11 window server (required for some applications ported from UNIX), which required around 80MB and isn't necessary for any audio and MIDI software that I've seen.

After you've installed Tiger, and your Mac boots up for the first time running the new operating system, you'll need to enter the usual registration information and confirm various time, date and network settings. Users upgrading from a previous version of OS X will notice an Assistant appear so you can confirm your registration information, although it's possible to quit this Assistant application without completing the information if you wish. After this, if you've performed an upgrade rather than a clean install, you might notice your hard drives spinning away rather feverishly; this is due to the new Spotlight feature that basically needs to index your drives before it can work. I didn't see a way of skipping this step, but you can check on the progress by clicking the Spotlight icon at the top right of the menu bar. Spotlight can be useful, so your patience will be rewarded.

As reviewed in the March 2005 issue of Sound on Sound.

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The name of the MIDI Networking Session is used as the name for the corresponding MIDI input and output ports in Core MIDI Applications, as seen here in *Logic Pro 7*, where 'Session 1' shows up as an available MIDI Output port.

▶ or instruments that can run as stand-alone applications, like NI's *Kontakt*. Another possible use is when you want to send MIDI timecode from one Mac to another Mac. For me personally, this is usually the only reason I have a MIDI interface on a Pro Tools rig, so hopefully using the new MIDI networking facilities will enable yet more hardware to disappear from the studio.

The configuration of a MIDI network is fairly easy. In AMS, you open the MIDI Devices page by clicking on the MIDI Devices tab at the top of the main window, and double-click the Network device to open the MIDI Network Setup window (see the screenshot below). The MIDI Network is based on the concept of Sessions, where computers on your network can participate in a given Session to send and receive MIDI data. Each Session you have in the MIDI Network Setup window represents a single pair of MIDI input and output ports on your system.

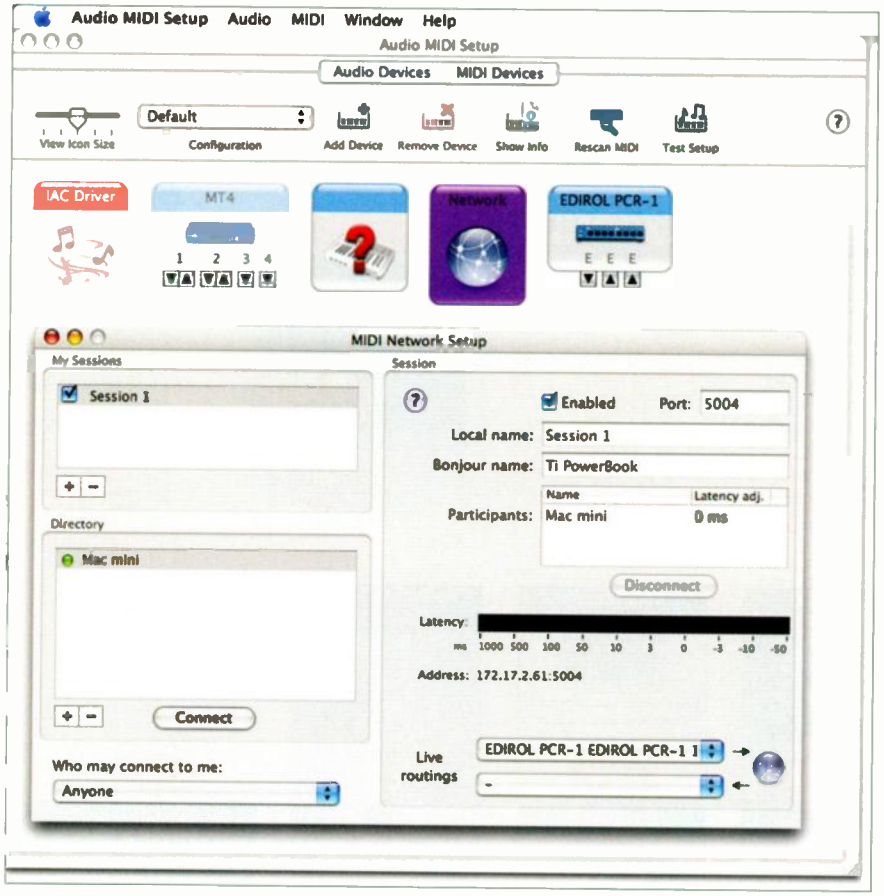
To create a new Session, you click the '+' button in the 'My Sessions' pane at the top left of the MIDI Network Setup window. The various settings in the 'My Sessions' pane are configured in the 'Session' pane on the right-hand side of the same window. The name of the Session is displayed under the 'Local Name' setting and can be changed by simply typing in a new one; this is also the name that will identify the Session's MIDI port in the MIDI applications. You can also specify a Bonjour name for the Session, which is the name OS X's Bonjour service will use to publish that Session on your local network (the default setting is that your computer's name from the Sharing Preferences Panel is used here). Underneath the 'My Sessions' pane is the Directory, which lists all the available Sessions you can join on your network, also listed by their Bonjour names.

The next step is to select a Session in the Directory from another computer on the network to connect with the Session you're currently setting up. If the connection is successful, the Session name from the Directory will be listed in the Participants list in the right-hand Session pane. At this point, you should have a functioning MIDI network.

If you send MIDI data to an active Session on one Mac (by selecting the name of that Session as your MIDI output port in whatever MIDI application you're running — see the screenshot above to see what this looks like in Apple's *Logic*), it should be received by all the other Macs participating in that same Session. The neat thing is that if you have two other Macs participating in the same Session, both Macs will receive the same data from the 'master' Mac, which is useful for slaving multiple machines to the same timecode stream, or layering instruments from two computers playing the same music.

The latency of incoming MIDI data for a selected Session is plotted by red lines on the black Latency bar in the MIDI Network Setup window, and ideally you obviously want the latency of events to be as close to 0ms as possible. If you notice timing errors in the MIDI events that are sent across the network, you can set a number of milliseconds by which to offset incoming events to smooth out the timing errors by double-clicking in the 'Latency adj.' column in the Participants list next to the Participant you want to offset. Entering a positive value will cause all incoming events from that Mac to be delayed by the given number of milliseconds.

A nice touch in the MIDI Network Setup window is the 'Live routings' option at the bottom of the window, which allows you to route the input or output of a Network MIDI Session to or from another MIDI Device on your Mac without having to run any other MIDI software. For example, if you want to play MIDI input from a keyboard and send this via a Session to another computer on the network (but without running a sequencer like *Logic*, for example), you select the appropriate Session, and then, in the 'Live routings' section at the bottom right of the MIDI Network Setup window, you set the uppermost pop-up menu (with the arrow pointing to the network symbol) to the MIDI port to which you've connected your keyboard. ▶



Here you can see the MIDI Network Setup page for a Mac *sending* MIDI data over a network. The receiving Mac Mini, from which the grab on the previous page was taken, is listed under Participants. Note the 'Live routings' settings that enable the MIDI data from an Edirol PCR1 keyboard to be transmitted across the Network via 'Session 1'.

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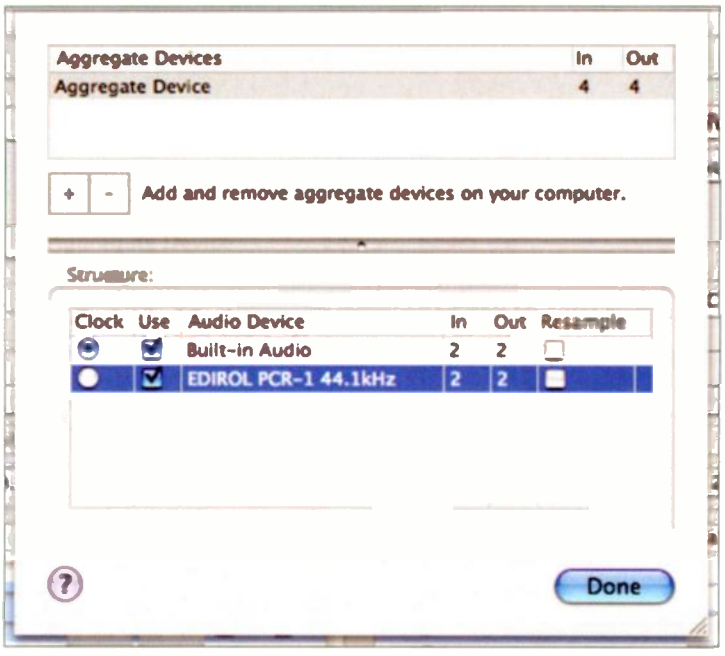
Alternatively, if you want MIDI output from a Session on the network to be output to a sound module, or some other hardware sound source, then again, you simply choose the appropriate Session and, in the lower pop-up menu in the bottom right of the window, select the MIDI port where the sound source is connected. Any MIDI data received from this Session across the network will then be automatically output to the selected MIDI port.

Finally, if you have your Macs connected to a network that's populated by many other people's Macs, (as in many larger studio environments), there are some permission controls you can exert by using the MIDI Network Setup's directory list. In addition to displaying available Bonjour sessions, you can also add systems manually to the Directory by clicking the plus '+' button underneath and entering the Name to identify a Session on another computer and the host address of that computer before clicking OK. The host address must include a port number to identify a specific Session on the computer, since the computer could be hosting multiple Sessions, potentially with other Macs. A neat side-effect of this is that because you can enter a specific host address in this sheet, it's even possible to add the address of a computer that's not even connected to your local network, and exchange MIDI data with another Mac somewhere else in the world!

Once you've added the other Sessions to the Directory, you can control who connects to Sessions on your Mac by selecting an option from the 'Who may connect to me' pop-up menu below the Directory. Setting this option to 'Anyone' will allow any other system to connect to a Session on that Mac, while selecting 'Only computers in my Directory' allows only those computers with the specified addresses and port numbers to connect to a Session. In this way, you can allow only a specific Mac to join a specific Session, blocking access to all other Sessions you might be hosting. Finally, you can set this permission option to 'No one', which doesn't allow anyone to connect to a Session on your Mac.

Networking in Core MIDI is definitely a great addition to Mac OS X, and the only slight disappointment is that there's no compatibility with Windows-based systems, which would be perfect for those who use Mac-based sequencers with computers running the Windows-only *Gigastudio* software. I guess Apple's idea is that everyone needs to swap to entirely Mac-based systems...!



The Aggregate Device Editor sheet in Audio MIDI Setup enables you to configure Aggreate Devices. The upper list details the available Aggregate Devices, where you can create new or remove existing Devices, while in the lower part of the sheet you can configure the Structure of the currently selected Aggregate Device.

Core Audio Aggregation

As mentioned earlier, Core Audio under Tiger finally resolves the OS X restriction on using multiple simultaneous audio I/O devices. Rather than providing this solution such that each application developer has to rewrite their software to support it individually, Apple have elegantly implemented a new type of audio device that can be created by users from the Audio MIDI Setup window: the Aggregate device.

In many ways, Aggregate devices simply extend ideas that were already in Mac OS X; those based on the idea of the Hardware Abstraction Layer (or HAL). In computer science, a HAL is a software layer that's created between physical hardware and software running on a system, so that the software can talk to the hardware in a consistent way without having to know the specifics of the actual hardware device. At the heart of Core Audio, a HAL is used so that no matter what audio hardware device is connected to your Mac and irrespective of its individual features, the device's Core Audio driver allows Core Audio to present the device to an application in exactly the same way as it would any other device. In other words, so long as an application supports Core Audio devices, it doesn't matter which Core Audio device you use: an application won't deal with the act of playing audio out of the built-in headphone port of your Mac or through a USB audio device any differently.

As their name suggests, Aggregate devices simply combine multiple audio devices connected to your Mac as if they were one virtual audio device. So if you have two audio devices connected to your Mac, each offering two inputs and two outputs, you can now create an Aggregate Device in AMS that combines these two devices into one device with four inputs and four outputs. Core Audio, thanks to the HAL, presents an Aggregate Device to an application as if it were any other audio device, so when you select the Aggregate Device in your application, the application essentially thinks it's talking to a device with four inputs and four outputs. It's also possible for an application to *know* that it's talking to an Aggregate device, so that it can gather more information about the individual devices in the Aggregate for clocking and other properties, but the basic operation is exactly as described above.

To create an Aggregate device, you select the Audio Devices page in AMS and select the Open Aggregate Device Editor option from the Audio menu, or hold down Shift and Command/Apple and hit the 'A' key. Clicking the button marked '+' below the (initially empty) Aggregate Devices list adds a new Aggregate device to that list. Similarly, you remove an Aggregate device by selecting it on this list and clicking the '-' button. It's worth noting that there's no warning when you do this, or any other way to bring back the Aggregate device afterwards other than by recreating it from scratch.

The structure (or configuration) of the currently selected Aggregate Device is shown in the lower part of the Aggregate Device Editor sheet and is a list of the audio hardware available to Core Audio (see the screenshot above). To add audio devices to the Aggregate device, you click the Use tick box in the structure list for every audio device you want to include, and as you do this, you'll notice that the number of inputs and outputs changes for the Aggregate device listed in the top part of the sheet.

Each Aggregate device uses one of the included hardware devices for a master clock source, and by default this is usually the clock Mac's built-in audio hardware. However, you can change the clock source by simply clicking the Clock radio button in the structure list for the device whose clock you want to act as the master. If you run into problems with clocking Aggregate devices, you might notice that each device in the structure list also has a Resample option, which performs a sample-rate conversion at the current sample rate that effectively reclocks the incoming audio to the master clock.

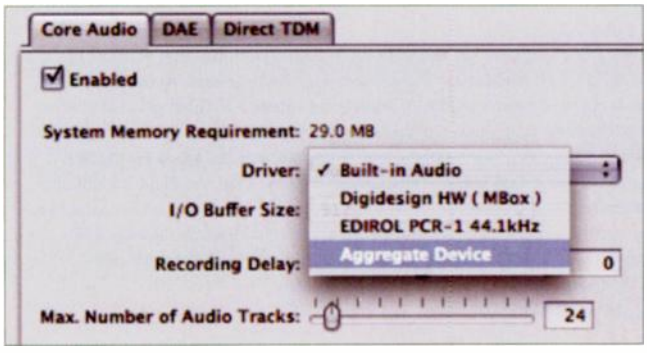
Once you've configured your Aggregate device, you simply click the Done button to close the Aggregate Device Editor sheet and return to the main AMS Audio Devices page. One of the neat things about Aggregate devices is that it's possible to create multiple Aggregates on the same system comprising different combinations of the audio devices attached to your computer, for different possible tasks.

At the top of the Audio Devices page in AMS is a section for System Settings where you can choose the audio devices used for the default audio Input and Output by Mac OS X applications that don't specifically let you set which audio devices to use, such as *iTunes* (see the screenshot on page 146). You can also set an audio device to use as the System Output, which is the device through which you'll hear various system sounds, such as alerts and user interface sound effects as configured in the Sound Effects page of the Sound Preference Panel. While you can select an Aggregate device to be used for either the Default Input and Output, or both, you can't choose an Aggregate device for the System Output — which some might consider a blessing!

The Audio Devices page also offers controls for setting various audio device properties, such as master levels, sample rate and bit depth. You can see the properties for an audio device by choosing that device from the 'Properties For' pop-up menu underneath the System Settings section, which lists all Core Audio audio devices — including Aggregate Devices. If you select an Aggregate, you can modify the structure properties for this device without opening the Aggregate Device Editor sheet by clicking the Configure Device button in the main Audio Devices page instead. While this also opens a sheet, you don't get the option of adding or removing Aggregate devices, which provides a slightly safer way of configuring these devices.

For devices that have their own configuration window or sheet, the Configure Device button will also be visible when that device is selected in the 'Properties For' pop-up menu. You can also select the clock source (where the device supports different clock sources) underneath the 'Properties For' heading, although this will be greyed out if an Aggregate device is selected — even if the master clock source for that Aggregate device can be selected from different clock sources on the corresponding hardware device. In this case, you need to switch the Properties back for the individual device before you can change the clock source.

Two columns in the lower part of the Audio Devices page show the Audio Input and Audio Output properties for the device selected in the 'Properties For' pop-up menu, both of which are laid out identically. At the top of the pane is a pop-up menu that selects the Stream to be configured. Which brings me to...



Aggregate Devices can be selected in applications just the same as any other Audio Device, as you can see here in Apple's *Logic Pro 7*.

Streams & Streaming

In Core Audio speak, each audio Device is regarded as being comprised of multiple audio Streams that deal with how the audio data is passed between the Core Audio driver and the application. The reason for this hierarchy of devices and Streams is easier to understand if you consider an audio device capable of supporting up to 96kHz with analogue I/O and a single I/O pair of ADAT ports. If we run at a sampling rate of 44.1kHz you get 16 channels of audio (eight analogue plus eight ADAT); however, if we change the sampling rate to 88.2kHz, two ADAT channels are required to send and receive a single channel's worth of 88.2kHz audio. Therefore, at 88.2kHz you get 12 channels of audio from your device (eight analogue plus four ADAT).

The sampling rate and bit depth are described as the Format in Core Audio, and each Stream within a Core Audio Device can theoretically have a different Format. So when writing a Core Audio driver, developers split the different banks of inputs and outputs into different Streams within the single device so that each Stream can contain a different number of channels with a different Format. If you take MOTU's 828 MkII Firewire audio device as an example, this device has five input Streams (Mic/Guitar, Analogue, S/PDIF, Mix1 and ADAT) and five output Streams (Main Out, Analogue, S/PDIF, Phones, ADAT) to support its capabilities. ▶

OpenAL

Tiger's Open Audio Library, or OpenAL, is designed to make it easier for developers to add audio to applications, especially where the placement of sound sources is required in a three-dimensional space. Games are what has really driven OpenAL's development, so that there is a common, OS-level way for developers to provide 3D sound in applications. There have been plenty of non-Apple solutions to this problem, such as Creative Labs' EAX and Microsoft's DirectSound3D technologies, but using these means that developers have to rewrite parts of their code for different platforms.

The development of OpenAL started in 1998-99 at Loki Entertainment Software, with Creative Labs getting involved for the 1.0 specification, which was released in 2000. OpenAL is similar in conception to Open GL (Open Graphics Library), a cross-platform standard for 3D graphics that has hardware acceleration support in most graphics cards on the market today. When you want to draw a Cube in OpenGL, for example, the basic code looks the same no matter what computer or graphics hardware you're using. In the same way video cards usually offer hardware acceleration for OpenGL, there has also been hardware support for OpenAL in hardware from manufacturers such as Creative Labs and Nvidia.

Mac developers have been able to download and utilise OpenAL for some time now, and OpenAL was even supported by companies such as Creative Labs back in the OS 8 and 9 days with the company's Soundblaster Live card. The Mac OS X OpenAL library for developers available from Creative Labs requires at least Mac OS 10.2.8, along with the Core Audio enhancements available with Quicktime 6.4, although Apple now include OpenAL v1.2 with Tiger, and you'll notice an OpenAL Framework if you go lurking in the System/Library/Frameworks folder.

For more information about OpenAL, visit www.openal.org, and for more about OpenAL in Mac OS X, take a look at Apple's developer FAQ at http://developer.apple.com/audio/openal.html.

Underneath the pop-up menu where you select a Stream are two pop-up menus to configure the sampling rate and bit depth for that Stream; however, despite the notional ability for different Streams to have different Formats, changing the format for one Stream will change other Streams to the same Format in most current Core Audio drivers. As already mentioned, the best example of different Streams having different Formats is where you need to select dual-wire operation for ADAT ports, which really shouldn't affect any other I/O ports.

Below the Stream parameters in the System Settings is a list of the total input or output channels available with the device, and you'll notice in the screenshot overleaf that the channels that belong to the currently selected Stream are highlighted with a blue background. Depending on the functionality offered by the Core Audio driver, it's possible to change the gain of channels, mute and unmute channels, as well as setting the through option to automatically pass input channels to the corresponding output channels on the audio hardware. These various options are greyed out when unsupported.

Part of what makes it easy for Aggregate devices to be supported in Core Audio is the ability for a single Device to have multiple Streams. For example, if you have two audio

Compatibility

So far it seems that Tiger has broken fewer music and audio applications and drivers than previous releases; many third-party developers were ready at the release of Tiger to supply the necessary patches and driver updates. Generally speaking, Core MIDI drivers seem unaffected by the move to Tiger, but here's a brief rundown on the current state of Tiger compatibility from various manufacturers at the time of writing (mid-May 2005).

• APPLE

As one would expect (or at least hope), *Logic* v7.0 and v7.01 seem to work fine under Tiger; sadly, I didn't have chance to try 7.1 in time to comment. On the hardware side, there has been no mention of driver updates or incompatibilities for Emagic's previous interfaces, but using an MT4 MIDI interface with a laptop running Tiger didn't seem to be a problem.

W www.apple.com

• BIAS

Both the current shipping versions of *Sound Soap 2* and *Sound Soap Pro* are Tiger-compatible, while *Peak* and *Deck* will require 4.14 and 3.5.4 updates respectively that should be available by the time you read this. Users of *Peak* 4.13 and *Deck* 3.5.3 can apparently experience problems when recording via a USB audio device in Tiger, although it's possible to work around this issue by creating an Aggregate Device (as described elsewhere in this article) containing just the USB audio device with which you're trying to record.

W www.bias-inc.com

• DIGIDESIGN

At the time of writing, Pro Tools, the Digidesign Core Audio driver, and the Digidesign Audio Engine (DAE) used by other applications such *Logic Pro* and *Digital Performer* are not yet qualified for 10.4, although hopefully this situation will have changed (or be about to change) by the time you read this. On the plus side, I did successfully install the 10.3 version of Digidesign's Core Audio driver on 10.4 and had audio output to an Mbox from *iTunes*.

W www.digidesign.com

• EDIROL

While Edirol's previous Mac OS X MIDI drivers remain compatible with Tiger, and some of the company's audio devices use the default Core Audio driver included with Tiger (FA101, FA66, UA1X, UA1D and UA3D), Edirol have posted Tiger-compatible versions for all other audio and MIDI + Audio devices.

W www.edirol.com

• M AUDIO

At the time of writing, M Audio were verifying compatibility of the company's MIDI and audio devices with Tiger, saying that Tiger-compatible drivers would, where necessary, be available shortly.

W www.maudio.co.uk

• MOTU

Users of MOTU's Firewire-based audio interfaces will need to download v1.2.5 of the Firewire audio driver and console package, while those with either a PCI324 or PCI424 audio card will need v1.08 of the PCI driver and console package, which offers support for devices going back to the original 2408 audio interface. MOTU's current v1.31 MIDI interface driver is already Tiger-compatible, and so is the current v4.52 shipping version of *Digital Performer*, although MOTU recommend removing and reinstalling this version for users upgrading a system to Tiger, and it's worth mentioning that version 4.52 is the first version of *DP* to be fully compatible with Tiger, so those who haven't downloaded the update will need to do so.

A public beta of MOTU's *Mach Five* sampler v1.22 can be downloaded from the company's web site and offers Tiger's compatibility for the MAS, VST and Audio Units versions. The only incompatibility with this version is when running with *Logic* 7.0.1 under Tiger as an Audio Unit, although MOTU are hoping to resolve this issue fairly quickly. *MX4* v2 is compatible with Tiger for the Audio Units and MAS formats, while a v2 RTAS-compatible version is expected to ship when *Pro Tools* becomes available for Tiger.

Of MOTU's remaining applications, *Unisyn* v2.11 is already Tiger-compatible and users should make sure they have the latest version to ensure compatibility. *Audiodesk* users can download a Tiger-compatible v2.04 public beta and, as with *DP* v4.52, MOTU recommend removing the current version of *Audiodesk* before installing the new version if you've chosen to upgrade to Tiger from a previous version of Mac OS X.

As a side note, all Tiger-compatible version of MOTU's applications, plug-ins and drivers are backwardly compatible with previous versions of Mac OS X, including Jaguar.

W www.motu.com

• NATIVE INSTRUMENTS

Most products from Native Instruments are already Tiger-compatible, with *Traktor DJ Studio* 2.6 and *Traktor FS 2* requiring updates that can be downloaded from Native Instruments' Update Manager on the company's web site. The company advise that users of *Final Scratch* v1.x should note that the Scratch Amp drivers are not approved for Tiger — or Panther for that matter — and that they may experience the odd hardware initialisation error before they can start using the application. Nice!

A small update is also required for users wishing to perform a clean install of *Komplete 2* on Tiger (rather than those upgrading to Tiger on a machine that already has *Komplete 2* installed) and fixes for Audio Units validation errors are apparently on the way for *Battery 2* users and those with products based on *Kontakt Player*, such as *Garritan Personal Orchestra*.

W www.native-instruments.com

• SIBELIUS

Sibelius claim that all of the company's products have been tested with Tiger and that no serious compatibility problems have been found, with the exception of Sibelius *Starclass*, which apparently reports problems playing sounds with Quicktime when Adobe's *Acrobat Reader* v7 is installed. The solution is to remove version 7 and download and install the older version 6 from www.adobe.com/products/acrobat/alternate.html instead.

W www.sibelius.com

• STEINBERG

While Steinberg have yet to comment on testing with the final versions of Tiger, they've indicated in their support forum that *Cubase*, *Nuendo* and other products have been tested with pre-release versions of Tiger and seem to be fine. Products that showed problems with the pre-release version of Tiger are *Halion Player*, the *Nuendo* Dolby Digital Encoder and the driver for the MI4 audio hardware that's part of the Cubase System 4 bundle. Full compatibility information will be available from Steinberg's web site in due course, and the company has also indicated that future *Cubase* and *Nuendo* releases will support Quartz 2D to improve graphics performance, which should offer a significant acceleration to the user interface.

W www.steinberg.net

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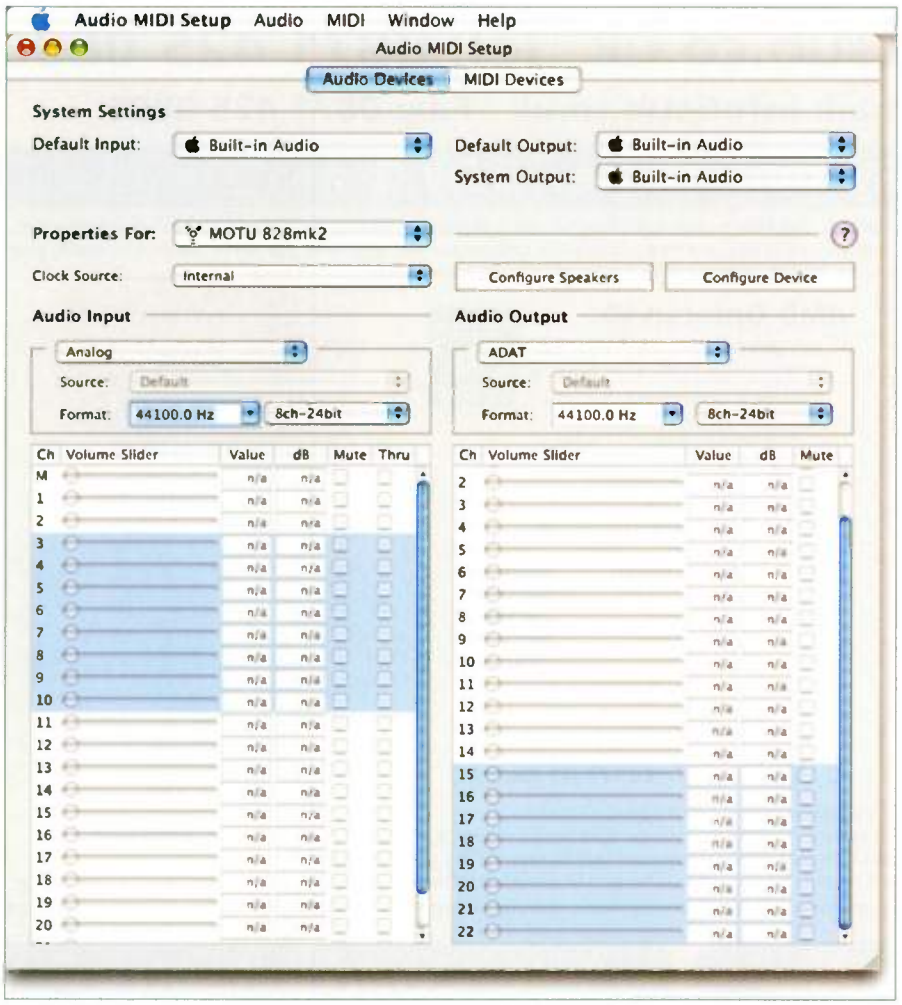


The Audio Input and Output properties for the Audio Device selected in the 'Properties For' pop-up menu are listed in the lower part of the Audio MIDI Setup application's Audio Devices page. Notice how the background for the channels contained in currently selected input and output Streams are highlighted with a blue background: using a MOTU 828 MkII, the Analogue stream is selected for the Input and the ADAT stream is selected for the Output.

▶ Devices each with single input and output Streams, the Aggregate Device will be presented as a single device with two Streams for both input and output: one for each Device. If you create an Aggregate Device with your Mac's built-in audio hardware and a MOTU 828, for example, you'll end up with a device consisting of six Streams for both input and output. The only thing to bear in mind is that not all Core Audio Drivers name Streams appropriately, notably those that only contain single streams: in these cases you end up with unhelpful names such as 'Stream n', where n is the number of the Stream in that Device.

Speaker Output Configuration

Panther introduced a way to configure which outputs on your audio devices are assigned to which speakers in audio applications with a single stereo or multi-channel audio output. This is the Configure Speakers sheet, which is opened from the Configure Speakers button for the currently selected audio device in the 'Properties For' pop-up menu. While this doesn't have too many uses in programs like *Logic* that deal with specific input and output audio channels on your hardware, it is useful to know about, since musicians and audio engineers are the ones most likely to need to manage multi-channel audio devices on a Mac.

One simple example where Configure Speakers can be useful is with an application like *iTunes*. Say you have an audio device with eight outputs: by default, *iTunes* will always play out of the first two outputs, but what if you want to hear to monitor via outputs seven and eight instead?

In the Configure Speakers sheet, if you're using a device with multiple Streams, you enable the Stream with the outputs you want to assign in the upper part of the sheet — in this example, you need to enable the Stream that encompasses outputs seven and eight on your audio device. Next, in the lower part of the sheet, you'll see a graphical representation of the speaker arrangement Mac OS X applications use when outputing audio, meaning that when an application like *iTunes* outputs stereo audio, it's this model that's used for the audio output.

The speakers are labelled with their configuration (left front and right front in the case of simple stereo) and are positioned in relation to the listener, who is illustrated with a blue dot (see the screenshot on the

Tiger's Built-In Audio Units

Apple include many Audio Units with Tiger, most of which are self-descriptively named, as detailed in the following list. You'll notice many Audio Units that don't usually get presented in your Audio Units host applications. Audio Units included with Panther are indicated with an asterisk.

OUTPUT
- *HALOutput.**
- *Default Output.**
- *System Output.**
- *Generic Output.**

MUSIC DEVICE
- *DSLSynth* (plays back a Downloadable Sound file containing sample-based instruments, such as the Quicktime Music Synthesizer bank.*

FORMAT CONVERTER
- *AUConverter.**
- *Varispeed.**
- *DeferredRenderer.*
- *TimePitch.*
- *Splitter* (takes an input and splits in into multiple outputs, such as a mono input to a stereo output).
- *Merger* (the opposite of Splitter: takes a multiple inputs and merges them into one output, such as a stereo input to a mono output).

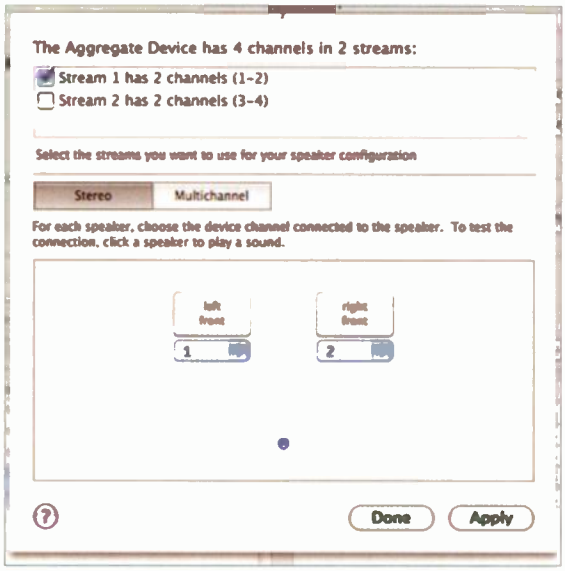
EFFECT
- *AUBandpass.**
- *AUDelay.**
- *AUDynamicsProcessor.**
- *AUFilter.*
- *AUGraphicEQ.**
- *AUHighShelfFilter.**
- *AUHipass.**
- *AULowpass.**
- *AULowShelfFilter.**
- *AUMatrixReverb.**
- *AUMultibandCompressor.**
- *AUNetSend.*
- *AUParametricEQ.**
- *AUPeakLimiter.**
- *AUPitch.*
- *AUSampleDelay.*

MIXER
- *StereoMixer.**
- *3DMixer.**
- *MatrixMixer.**

GENERATOR
- *AUAudioFilePlayer.*
- *AUNetReceive.*
- *AUScheduledSoundPlayer.*

right). Clicking on the speaker button sends white noise to that speaker until you click it again, and you can set which output on your audio device is used for this speaker in the pop-up menu below that speaker. In this example, you'd select '7' in the pop-up menu for the left speaker and '8' for the right speaker, and click Apply. All stereo output from basic audio applications that don't specify audio outputs themselves (*iTunes*, *Quicktime Player*, *DVD Player* and so on) will now take place via outputs seven and eight on your audio hardware. Programs that address specific outputs on Core Audio devices, like *Logic*, will ignore these settings.

The process of setting the assignments for applications that output basic multi-channel audio (such as *DVD Player* and the new version 7 *Quicktime Player*) is the same as for stereo configurations. In the Configure Speakers tab, click the 'Multi-channel' button and select a multi-channel configuration from the pop-up menu that now appears beside the button. You'll only be able to select multi-channel configurations based on the number of total streams in your audio device, so four speakers will only allow you to set stereo and quadraphonic configurations, for example. As before, getting it all to work is a question of enabling the required Streams at the top of the sheet, selecting the multi-channel configuration from the pop-up menu, and then assigning the outputs on the speakers in the lower part of the sheet.



The Configure Speakers sheet enables you to specify what outputs on your Audio Device are used by applications that output audio to Mac OS X's stereo or multi-channel speaker arrangement. Notice how multiple Streams can be selected in the upper part of the sheet if the Audio Device has multiple Streams, as you can see here for an Aggregate Device.

Audio Units

Audio Units, as the OS X audio plug-in standard, has had a somewhat tumultuous journey compared with other plug-in formats. A great deal of development was carried out during the early 10.0 and 10.1 releases of OS X, which, coupled with third-party developer feedback, culminated in a v2 revision of Audio Units with the release of Mac OS 10.2. Since few v1 Audio Units plug-ins existed, this didn't create too many problems for developers, and the specification settled down during 10.2 and most of 10.3, until Apple coerced developers into making their Audio Units plug-ins conform to Apple's validation tool after including this as part of *Logic 7*'s start-up procedure. Plug-ins that failed were set to one side, requiring manual user activation to bring them back into the application again. Although this created a few problems for users in the interim, overall it was a good move, and encouraged the development of 'fully legal' Audio Units plug-ins to improve overall system stability.

While many audio plug-in formats were created for specific purposes, such as to process incoming audio to create an effect, the Audio Units format was created to be broad container for a variety of different audio tools. There were actually seven different types of Audio Units in the specification released with Panther, and there are nine in Tiger. The original seven types are: Effect (one of the most common types, this is a standard process that takes an incoming audio signal and creates an outgoing audio signal), Music Device (the other common type, which is used to implement software instruments), Music Effect (which is similar to Effect, but allows a MIDI input for controlling the effect's parameters), Output (which can send an incoming audio signal to an output stream on a Core Audio Device or to a file), Format Converter (to implement a utility that converts audio in one format into another, such as a sample-rate converter), and the Mixer and Panner types, which are fairly self-explanatory.

A full list of the new Audio Units plug-ins that ship with Tiger can be found in the box opposite, and Tiger also adds two new Audio Units types. There's Offline Effect, for creating effects that work on an off-line audio stream, such as when processing files, and there's Generator, which generates an audio output, but doesn't require an audio or MIDI input to do so, (like a test-tone signal generator). Tiger ships with two examples of the new Generator class of AU plug-ins you can use in most applications, *AUAudioFilePlayer* and *AUNetReceive*, which I'll discuss in the next section. In order to use these Audio Units, applications need to be written to support these new types. However, as you might expect, Apple's own applications, *Garage Band* and *Logic*, in their latest 2.01 and 7.1 versions, both support AU Generators.

Potentially the most intriguing Audio ▶

Core Audio Format Files

Tiger introduces a new file format for storing audio data known as CAF (Core Audio Format), which is a 64-bit file format capable of storing 'a thousand channels of audio for a thousand years in a single file' according to Apple, in both uncompressed and compressed formats such as Apple Lossless and AAC. Quicktime 7 offers support for CAF files, although there no support in any other application, including Apple's own offerings, at the time of writing.

While little information is available yet as to the specifics of this new audio file format, CAF is pretty similar to other audio file formats, such as the Broadcast Wave file format, and consists of a series of data chunks, including one chunk that stores the actual audio data, and another that describes the format of the audio, such as the sample rate, bit depth, number of channels, and other settings associated with streaming the file across a network. Other chunks specify other characteristics concerning the audio stored in the file, such as an overview, so that the data for displaying the audio on screen is stored with the audio rather than it having to be created from scratch when the file is opened in multiple applications.

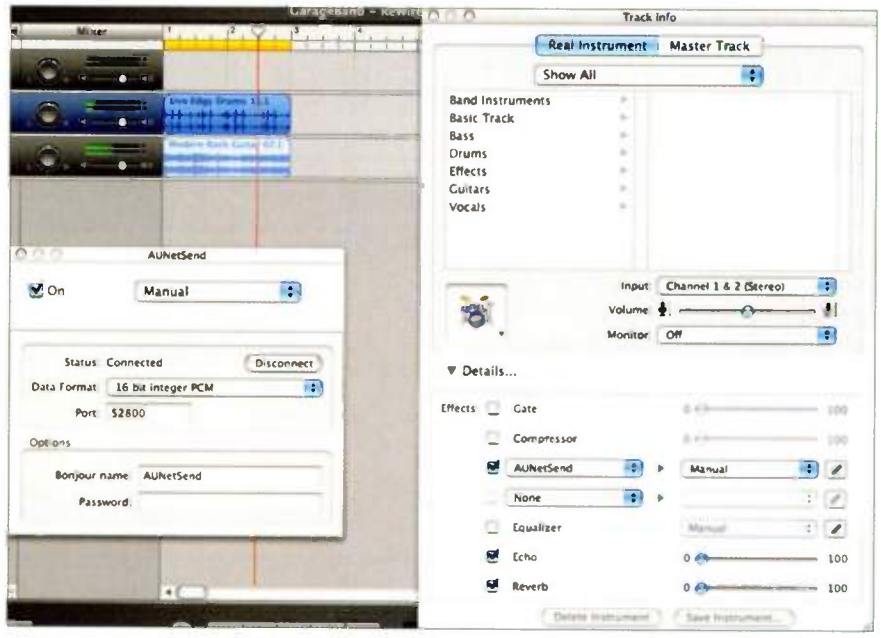
There's also an Instrument chunk to store data such as MIDI note values, velocities, gain adjustments and so on, if the file is to be used as part of a sampled instrument, and further chunks define a list of regions with the file or marker locations for storing loop points, program start and end points, marker start and end points, and so on. In addition to being able to store marker points as positions in terms of the number of samples from the start of the file, CAF also allows for SMPTE times to be recorded with sample-level sub-frame offsets (if required) and the original frame rate. This is an improvement over Broadcast Wave, where the time stamp is usually only represented in samples and the original frame rate is rarely stored, leaving it up to the programmer to decipher the original SMPTE time based on a guess of the correct frame rate.

It will be interesting to see how this new file format develops as it gains support from other Mac applications in the audio, music and video markets.

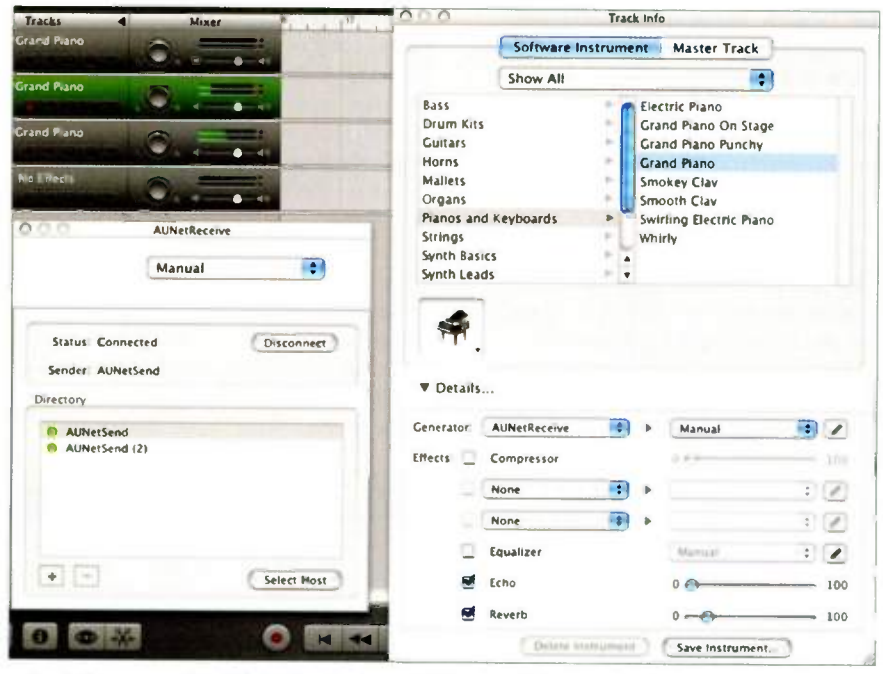
▶ Units plug-ins included in Tiger are *AUNetSend* and *AUNetReceive*, which, as their names imply, can be used to send and receive audio streams across a network. Basically, audio passes through the *AUNetSend* plug-in, which can be used as an insert effect, for example, and while this plug-in carries out no processing on the actual audio signal, it does pass any incoming audio to a connected instance of *AUNetReceive* running within any Audio Units-compatible application on the network. However, you don't have to have a network of Macs for these Audio Units to be useful, as you can also send audio from *AUNetSend* to *AUNetReceive* with both plug-ins running under the same application on the same computer.

To set up *AUNetSend*, you simply add it as an insert effect to an audio channel you want to transmit over the network. You can set a data format for the audio being transmitted, and although it defaults to 16-bit integer PCM, you can also choose from higher bit-depth PCM formats, 16- or 24-bit Apple Lossless format, µ-Law, IMA 4:1, or varying data rates of AAC compression from 32 to 129 kilobits-per-second. The Bonjour Name, as with MIDI networking in Core MIDI, is the name that will identify this audio stream to *AUNetReceive*, and *AUNetSend* won't actually start sending audio until it's connected to an instance of *AUNetReceive*.

All you need to do now is open an instance of *AUNetReceive* on another computer on the network, or the same computer — but remember that you need a host application compatible with Audio Units Generator plug-ins to do this. The Directory will list all available *AUNetSend* streams by their Bonjour names, and you can join a stream by selecting it and clicking Select Host. As with MIDI networking, you can also add computers and streams to the Directory manually by clicking the plus '+' button, which also means that it's possible to specify the address of a computer that's not connected to your LAN.



Here you can see *AUNetSend* in *Garage Band* where it's used as an insert effect on the Drum Kit Track. The Status indicates 'Connected' when the plug-in is connected to a corresponding *AUNetReceive* plug-in.



Here's the corresponding *AUNetReceive* plug-in running as a Generator in *Garage Band*, but on a different Mac.

Summary

As this article hopefully demonstrates, Mac OS X is the most feature-rich operating system for music and audio purposes. It's not that other operating systems are less suitable or perform less well for music and audio purposes — it's just that Mac OS X includes more features *specifically* designed for professional audio and MIDI users, leaving developers free to use the OS-based features provided for them, rather than having to take time to create their own, application-specific ones. You might ask why this matters to end users, but it means that under Mac OS X, there is a more consistent approach to addressing matters concerning audio and MIDI hardware, along with plug-ins. Or rather there *should* be — unfortunately major applications like *Cubase* still don't support Audio Units under Mac OS X, meaning that if you use *Cubase* for your music production and *Final Cut Pro* for video, you need a set of VST plug-ins for *Cubase* and a set of Audio Units for *Final Cut Pro*, whether wrappers are involved or not.

While no MIDI or audio applications are becoming Tiger-dependant at this point, Tiger is still a must-have upgrade for musicians and audio engineers. The general OS X improvements are nice, but the improved 64-bit support is going to help samplers and other memory-intensive applications running on G5-based Macs, and you can expect to see your applications' interfaces redrawing a little quicker if you have a graphics card that can take advantage of Quartz 2D Extreme. More specifically, I expect a great many people are going to be taking advantage of Core MIDI Networking and Aggregate Devices in Core Audio. It's nice to see Apple designing their OS with the professional audio market in mind. SOS

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East West/ Quantum Leap Colossus

32GB *Kompakt* Instrument For Mac & PC

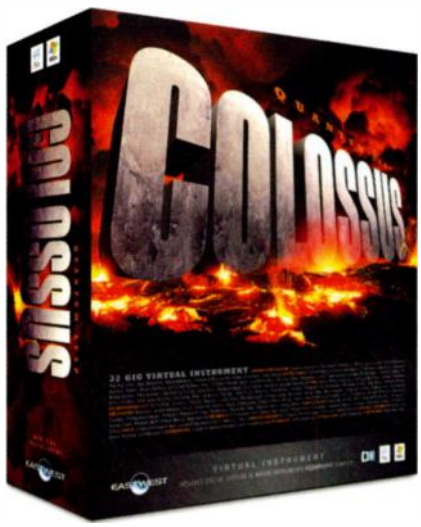
Like Ronseal products, Quantum Leap's *Colossus* is pretty much as it's described on its container, offering the user a vast 32GB sample collection supplied on eight DVD-ROMs. Size, however, isn't everything — or is it?

John Walden

As shown by reviews of recent products from both East West and Zero G, custom versions of NI's *Intakt* and *Kompakt* are becoming popular choices for developers as the virtual-instrument 'front end' for their sample libraries. East West/Quantum Leap's *Colossus* is supplied with *Kompakt* as its playback engine, which is identical to the version of *Kompakt* included with East West's *Vapor*, reviewed in February's *Sound On Sound* (see www.soundonsound.com/sos/feb05/articles/eastwest.htm). While 'Colossus' might have a number of meanings, it's a pretty safe bet that East West are referring to size as much as sound, given that the samples arrive on a total of eight DVDs and require approximately 32GB of hard drive space for full installation!

While a fixed front-end has both pros and cons for the user, one key advantage for the developer is that it offers some degree of copy protection — the samples can only be accessed via the bundled *Kompakt* (or via the full versions of NI's software-sampler applications) and on-line registration is required via the NI web site, preventing more unscrupulous users from passing the library around their local recording community.

In advertising *Colossus*, East West make comparisons with the way a hardware keyboard workstation attempts to span all common musical styles by providing a wide range of Instrument types. The manual also suggests that Colossus might be considered a 'Swiss Army Knife' for composition, given the breadth of its coverage. In essence, with *Colossus*, East West seem to be trying to create a one-stop sample shop — a single library that, for some musicians, might provide the larger part of their bread-and-butter sounds. The manual also suggests that the library might appeal to live musicians. And if you are not brave enough to depend upon your laptop at gigs, then there is a hardware rackmounted version of *Colossus* in development, based on Muse's Receptor hardware. Having cleared out enough hard drive space for installation and laid in sufficient provisions to explore a 32GB sample library, it was time to find out whether *Colossus* could deliver the goods...



Epic Installation

Colossus runs on both Macs and PCs, and has a surprisingly undemanding minimum spec for such a vast library. East West claim that it will run on Pentium III or Athlon processors faster than 700MHz, and on G4 Macs faster than 733MHz. Windows XP or Mac OS X (from version 10.2.6 onwards) are required, as is 512MB of RAM on both platforms.

As already mentioned, *Colossus* is supplied on eight DVDs. Installation is, however, very straightforward — if a little time-consuming, simply because of the volume of data involved. You can specify the drive/folder location of the sample files, and which formats of the *Kompakt* plug-in you require; a stand-alone version is available, in addition to VST (Mac and PC), RTAS (Mac and PC) and DXi (PC) formats. *Colossus* is supplied with a slim printed manual covering the operation of *Kompakt*, but all other documentation, including a full list of the sampled instruments, is supplied in electronic format. The final stage of the

SOUND ON SOUND

East West/Quantum Leap
Colossus **£650**

pros
- A huge library that gives coverage to almost every musical genre.
- Some excellent drum and piano sounds.
- All available via the very functional *Kompakt* front-end.

cons
- May not appeal to users who already have libraries covering some of the *Colossus* instrument groups.
- Orchestral group wouldn't provide enough performance options for serious MIDI orchestration.
- Supplied version of *Kompakt* does not allow MIDI controllers to be assigned for real-time control of filters, effects, and the like.

summary
Colossus certainly lives up to its name and ought to appeal to anyone who needs to establish a broad sample library from scratch. Given the quality of many of the instruments, it represents good value for money for these potential purchasers.

Kompakt's user interface maintains its East West cool blue colour scheme.

installation process requires authorisation of the library based upon the combination of a supplied serial number and a system-specific ID number generated by the installer. This can be completed on line within a minute or two (and worked without a hitch on my test system) but authorisation can also be completed from another computer or by post.

To briefly recap, *Kompakt* is a slimmed-down version of NI's flagship sampler instrument, *Kontakt* (for more on this application, check out the review of version 2 on page 82 of this month's issue). As you can see from the screenshots accompanying this article, East West have retained the cool blue *Kompakt* colour scheme seen in *Vapor*. The screen layout is divided into five main elements. The top portion of the interface is split into two of these; the Multi section and the Instrument section. The Multi section allows up to eight sample sets to be loaded (each termed an 'Instrument') from the library. Highlighting any one of these in the Multi list then allows its tuning, filter and amp controls to be adjusted within the Instrument section. While no Multis are provided with *Colossus*, users can save their own Multis for later recall once they've loaded a particular set of individual Instruments into the eight slots. This is particularly useful for groups of orchestral sounds, for example, where several different string or brass sample sets might often be used together.

Beneath the Multi/Instrument elements are the Modulation, Effects and Keyboard sections of the user interface and, again, these are Instrument-specific with the values shown for the instrument currently selected in the Multi list. The Reverb, Chorus, Delay and Master Filter in the Effects section are basic but effective, while the Modulation section provides three envelopes and four filters. These additional processing options are obviously useful to have, although they are probably going to see less action with some of the 'real' instruments available in *Colossus* (such as the orchestral sounds) than with the more synthetic instruments (such as the pads or synth lead/bass sounds).

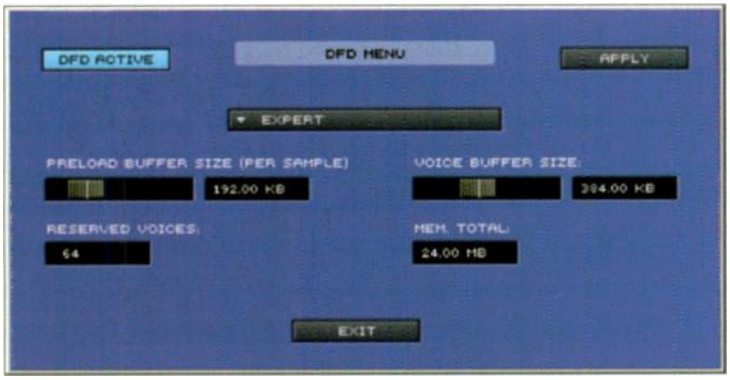
Given the size of some of the *Colossus* instruments, East West recommend downloading the DFD (Direct From Disc) extension for *Kompakt* from NI's web site (see overleaf). This allows samples to be streamed from your hard drive rather than fully loaded into memory. Once installed, settings for the DFD function can be made via the Options menu (within the Multi section of the user interface), although during testing, I had no problems using the default values for the DFD streaming.

Before turning to the sounds themselves, three observations about the *Kompakt* playback engine are worthy of a reminder. First, as I observed when reviewing *Vapor*, it is not possible to assign hardware MIDI controllers to any of the other on-screen parameters when using this bundled version of *Kompakt*, aside from volume, pitch-bend, pan and modulation. Write-enabling the *Kompakt* automation track within *Cubase SX* (my plug-in host of choice) does allow real-time mouse twiddling of the on-screen controls to be transmitted to *Cubase* for recording, although this is obviously not quite as musician-friendly as using a proper hardware controller. Second, while the supplied version of *Kompakt* does offer considerable playback and processing capabilities, it is not able to import samples from outside the *Colossus* library. Thirdly, the sounds in *Colossus*, rather like those in a Reason Refill which can only be accessed from Propellerhead's software studio, can only be accessed via NI products — either the supplied version of *Kompakt*, or one of the full versions of NI's software samplers. Of course, you can deal with all three of these issues by purchasing a full version of NI's *Kontakt*, for example, but committed users of samplers such as *Halion*, *Gigastudio* or *EXS24* need not apply!

All Basses Covered (& Guitars, Pianos, Strings...)

As mentioned above, East West's intention with *Colossus* is to provide musicians and composers with a single library that can meet all their basic sampled instrument needs. As a consequence, the samples in *Colossus* are organised into 19 Instrument groups (listed in the box on the last page of this article), amongst which nearly 600 *Kompakt* instrument patches are spread — although this number of individual Instruments is both an over- *and* an underestimate. Some Instruments appear twice, as there is a GM-compatible group (see the 'GM Crop' box for details) that contains a collection of sounds taken from other groups. On the other hand, a good number of Instruments (particularly amongst the synth sounds) feature sample layers containing very different sounds, with mod wheel-controlled morphing between them.

Of the 32GB of sample data, some 15GB represents new 24-bit recordings made at Ocean Way Studio B, while a further 2GB is taken up by new samples of a Fazioli F308 piano recorded in a well-known European



Given the size of some of the sampled instruments, the DFD extension for *Kompakt* is essential when using *Colossus*.

hall environment. However, given East West's wide ranging catalogue of existing sampled instruments, it would be surprising if some existing material did not also make an appearance in something as extensive as *Colossus* — and that is indeed the case. Some 15GB has been extracted from other Quantum Leap/East West libraries, including EW/QL's *Symphonic Orchestra*, East West's *Steinway B Piano* (apparently the full version of this Giga-format library is duplicated here) and there are contributions from the Quantum Leap titles *Stormdrum*, *Guitar and Bass*, *56 Strat*, *Hardcore Bass*, *RA* (the collection of ethnic/world instruments), *Brass* and *Voices Of The Apocalypse*. All of these existing samples have apparently been reprogrammed to take the best advantage of the various features of the bundled *Kompakt* front end.

For the purposes of this review, it makes most sense to consider the 19 Instrument groups in a smaller number of associated types (for example, all the drums and percussion together) so, without further ado, let's dip into the sounds themselves.

Drums

Some 38 drum kits are included in *Colossus*, split between two groups; Acoustic Drumkits and Electric Drumkits. The Acoustic sets are pretty much what you would expect and provide a varied selection of kits suitable for everything from pop, funk, jazz and rock. In contrast, the Electric sets are based around heavily processed acoustic sounds with plenty of options for more dance-orientated sounds. For most of the kits, the sounds consist of kick, snare, rim-shot, hi-hat, toms and other cymbals, with the occasional clap, cow-bell and tambourine included. Usefully, these sounds are mapped to the keyboard in a standard GM fashion.

The Acoustic Kits are uniformly very useable. While the manual gives very little away in terms of the detailed sample structure of any of the *Colossus* instrument groups, these kits seems to feature a sufficient number of velocity layers to provide a performance with convincing dynamics. This is particularly true of the main snare in most of the kits, which seems to feature not only velocity-sensitive layers (with suitable extra sizzle from the snares themselves as the drum is played harder) but also automatically alternating left/right-hand samples when the snare is played repeatedly. This is great for drum rolls, as it avoids the same sample being repeated over and over again in rapid succession (the 'machine-gun' effect). The cymbals are also very good, with plenty of splash and sizzle, and the samples are long, so the tails to the crash cymbals don't feel truncated in any way — the DFD LED keeps flashing for some time after the crash cymbals are triggered. All the acoustic kits seem to have been recorded either fairly dry or with just a touch of room ambience and, for my taste at least, this is spot on — just enough 'air' to give the sounds a little life, but plenty of scope to process further with reverb or delay without the ambience of the sample getting in the way.

The kits' names reflect the style of the individual sounds and these vary from the fairly dry and clinical 'Studio' and 'Pro' kits through to the big and bold 'Stage' or 'Metal' kits. However, my particular favourites were the '60's Vintage' and 'Old School' kits, both of which featured nice tight snare sounds that would work in a variety of styles from pop through to punk. Other useful additions include two funk kits, jazz kits with both sticks and brushes and the wonderfully named 'Sushi' kit. While you could undoubtedly buy better individual sampled drum kits than this collection with *Colossus*, East West seem to have all the key musical options covered here in a very playable format.

The Electronic Kits group includes the '508' and '908' options, targeted very obviously at particular classic drum machines. However, the names of the majority of the other kits don't give much away but titles such as 'S&M', 'Alley-G' and 'Bush Is A Fairy' are at least intriguing enough to make you want to load them up to audition! As indicated earlier, the majority of these kits are based upon heavily processed acoustic drum sounds but there are also some more off-the-wall sounds to be found. There is plenty to suit all contemporary dance styles — but R&B and hip-hop would work particularly well with some of the kits given the sometimes quirky nature of the sounds.

Plucked & Strummed

Colossus includes three Instrument groups that are dominated by plucking and strumming, helpfully titled Acoustic Guitar Family, Electric Guitar and the Electric Bass & Upright groups. Like many musicians whose weapon of choice is the guitar, while I'll occasionally turn to samples for solo guitars or basses, I almost always find it easier to record a real instrument for chord work. That said, amongst these three groups, there are both solo and chord instruments that are capable of some good results.

The Acoustic Guitar group contains 10 instruments. Three different versions of a Washburn acoustic are included — fingered, picked and strummed (which, oddly considering its name, doesn't contain any strummed chords) as well as a nice classical guitar. However, for me, the best of the bunch were the banjo, mandolin and ukelele and for fast picking parts (think

Usefully, to save screen real estate, *Kompakt*'s Modulation, Effects and keyboard sections can be minimised.

Things That Make You Go 'Oooh'

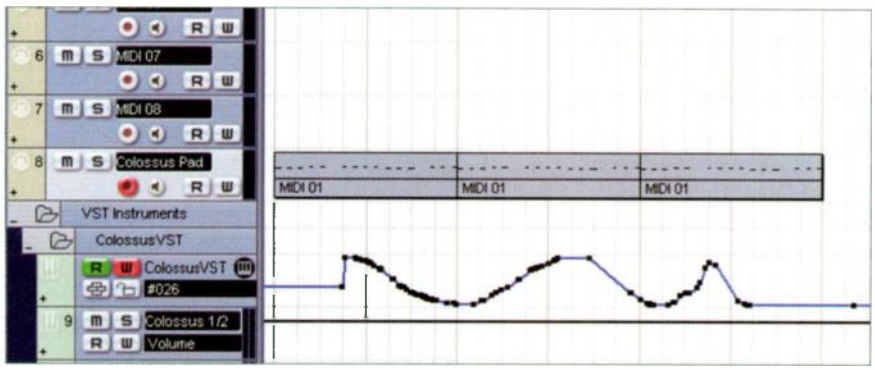
Given the sheer size of the *Colossus* library, it would be almost unbelievable if a few gremlins were not to be found within the samples or their editing. During the review period, I have to say that these were very few and far between. However, on a very few occasions, I did stop and go 'ooohhh'...

For example, the marimba instrument from the Keyboard/Mallet group had a noticeable noise on the low/medium velocity layer for notes C3 and D3. Another instance was the harpsichord from the same group. While the sound of the instrument itself is very good, several notes contain an audible sound at the end of the sample as the note is released. This sounds like a mechanical noise related to the original recording, and while you might argue that it adds a 'realistic' element to the sound, it is somewhat distracting, and could perhaps have been addressed with some suitable editing. Some notes within the piccolo instrument also contained rather too much breath for my taste — again, this was a little distracting when heard as a solo instrument. My only other minor criticism would be with the occasional instrument where the transitions between velocity layers were a little sudden. These comments aside, from a technical perspective, East West and their programmers ought to be pretty satisfied with a job well done.

bluegrass styles), these all worked particularly well. One obvious omission here is a 12-string acoustic — either picked or strummed — which is surprising given the overall size of the library. All these acoustic instruments are supplied with a number of velocity-sensitive layers. These include performance features in some instruments; for example, the 'Acoustic God' instrument includes both stopped notes and slides into notes at higher velocities. These performance features obviously take a little practice to use but can produce some very effective performances.

Of the 45 instruments within the Electric Guitar group, about one third have been taken from Quantum Leap's *56 Strat* library. These provide a mixture of performance types (for example, lead, mute, 'chug' and 'power' chords) with bridge and neck pickup choices. There is also a nice 'Effects' instrument that contains all sorts of slides, hammer-ons and various plectrum noises — these could make nice embellishments to a lead line constructed from one of the associated *56 Strat* instruments. From this group, 'Surf Spy' can be used to knock out a decent James Bond theme while some Hank Marvin-esque lines can be coaxed from 'Cloudwalk Lead'.

The remainder cover a range of clean, blues and rock-oriented sounds with a mixture of lead and chord-based instruments. Some of these more easily lend themselves to the creation of a convincing performance (as opposed to something that is supposed to sound like a sampled guitar). For example, 'PRS Chords' includes clean major, minor and seventh chords mapped across different sections of the keyboard and, used as part of a backing track, a simple chord progression can easily be created. 'Heavy Gtr Chords' also works well. This instrument features nu-metal-style damped fifth chords as a low velocity layer but with undamped fifths at higher velocities. This combination makes it fairly easy to create some crunching Metallica- or Linkin-Park-style riffing. For me, another highlight was the simple, but very effective 'Lapsteel' instrument. While it won't put Al Perkins out of work, used with a combination of a volume pedal and the Mod Wheel to control brightness, it is possible to create effective chord or lead lines.



Automation of *Kompakt*'s on-screen controls can be recorded and edited within its host sequencer. This is what the process looks like in *Cubase SX*.

The Electric Bass & Upright group contains various electric and acoustic basses, including both fingered and picked options and featuring two or three velocity layers to enhance the performance options. The electric sounds are solid without being overly exciting — although *Kompakt*'s effects options can add a little more movement when required. The Upright Bass is a more inspiring. The basic 'Upright Bass' patch sounds really nice with a high velocity layer adding some fingerboard noise for interest. The other instruments add extra expression, vibrato and various effects (up and down slides) and combining these allows some very convincing acoustic bass lines to be constructed — ideal if you like to add the occasional touch of jazz to your tracks.

Pianos

While the Pianos and Electric Pianos group has a number of special-effect style instruments (for example 'Creepy Piano' and 'Psychedellic Rhodes'), the highlights are the more conventional instruments. The two main acoustic pianos — the Steinway B and Fazioli F308 — both sound excellent, with very transparent transitions between the various velocity layers. The Steinway B is somewhat brighter sounding than the Fazioli and it presented fairly dry. It would quite happily suit rock & roll as well as classical styles of playing. The Fazioli is provided in two versions; a full 2GB instrument and a slightly brighter 1GB version. Both have a certain amount of ambience from the hall in which they were recorded but this is not overdone, and the result is a convincing and playable instrument which gets slightly brighter as the keys are struck harder.

Of the electric pianos, the '80s E-Piano' and 'Rhodes 88 Suitcase' are the clear standouts. Both of these get brighter at higher velocities. The former starts fairly warm but quickly changes to much brighter tones with a nice ring to them when pushed harder. The Rhodes is also warm at low velocities and, while it does brighten up a little when played harder, the sound never gets too top-heavy.

Amongst the other instruments within this group is a nice Clavinet, various other electric pianos (including several patches based upon the Yamaha GS1 — the first FM keyboard ever produced), a Honky Tonk piano and a number of 'piano + strings' sounds. Most of these are perfectly useable, although I'd rather layer my own versions of the latter within *Kompakt* as the decay settings on the strings seemed very abrupt in the various presets supplied.

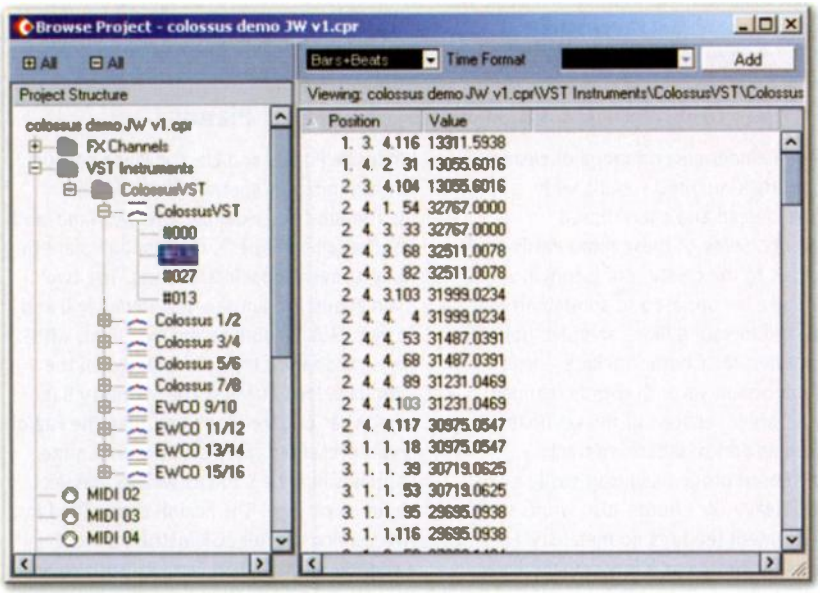
Organs, Keyboards & Mallets

The Vintage Organ group consists of a number of *Kompakt* instruments derived from sampled Hammond B3, Farfisa and Vox organs. Some 12 B3 patches are provided ▶

aimed at blues, jazz, rock and soul and each has a slightly different tone. For all these instruments, the Mod Wheel controls the speed of the Leslie Speaker and this effect works very well. While the B3 Instruments have been sampled very much 'as is', it might have been nice to have at least one instrument with a little bit of overdrive added for those Jon Lord/Deep Purple moments — although given the multiple outputs available from quibbles). Other goodies include the 'Tango Accordian' (which made me think of sea shanties) and the very nice vibraphone, where higher velocities produce a lovely bright, ringing tone.

Orchestra & Choir

All the necessary instrument types are represented within the Orchestral group. As well as solo instruments, a small number of sections/ensembles are



Automation data can also be edited via *Cubase SX*'s Project Browser.

within *Kompakt*, this could always be added via a suitable plug-in in your host sequencer.

The various Farfisa organ patches are nicely done — although the sounds of this instrument are probably only going to have some niche applications — and a small number of splits are included where one sound is available to the left hand and another to the right. The Vox Combo and Continental instruments are equally well reproduced.

The Keyboard and Mallet group contains the expected assemblage of accordian, celeste, church organ, harpsichord, marimba and vibraphone instruments, amongst a few others. For me, the highlights amongst these are the church organ and the harpsichord, both of which have a very satisfying, full sound (although see the 'Things That Make You Go Oooh' box for some minor

Test Spec

- 3.2GHz Pentium 4 PC with 2GB of RAM running Windows XP Pro (Service Pack 2).
- Steinberg *Cubase SX* v3.0.1.

included for the brass and strings. The 'Brass Section' instrument has velocity layering that produces a warm, soft sound at low velocities and then launches into very effective, bright, fanfare territory at high velocities — although it has to be said that there is not much between the two. Similar velocity layers are present in the three string ensemble instruments. All of these section/ensemble instruments also feature mod wheel control, providing a further opportunity to adjust the brightness.

Of the solo strings, the cello, viola and violin all sound convincing and feature velocity layering that changes the character of the sound. These would all suit slow or medium tempo phrases quite well and, when sustained, a nice vibrato is gradually introduced (quite strong on the cello). However, the attack of each instrument is probably not suitable for faster passages, even after adjusting the Volume Envelope settings in *Kompakt*. The 'Tremelo Strings' instrument [*sic*] is capable of being suitably spooky, although it is pretty intense. The only real oddity was the

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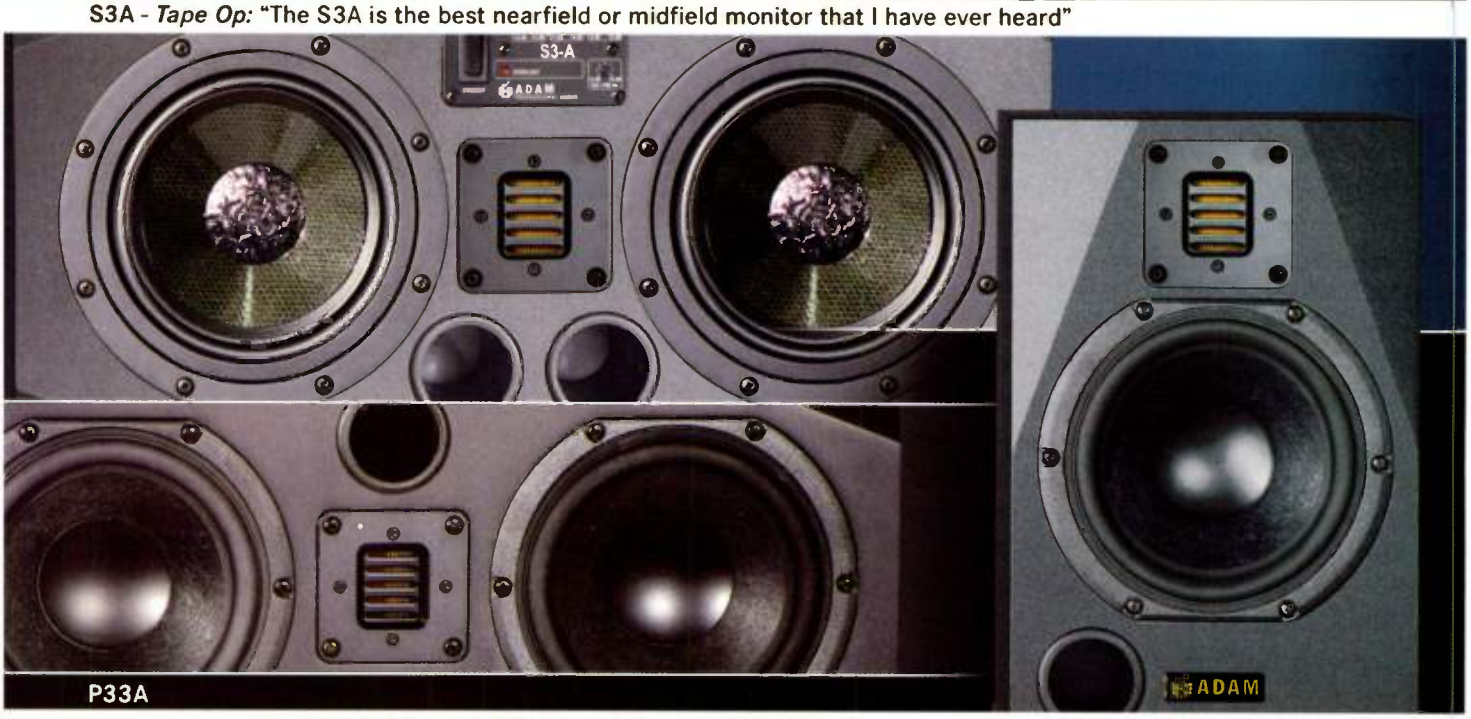

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'Pizzicato Strings' sound — while the strings themselves sound fine, the samples include a large dollop of hall ambience which is almost an echo. This patch would have perhaps been more versatile if presented a little drier.

The solo English horn (with a slight vibrato that appears on sustained notes), trombone, trumpet, tuba and French horn all capture the mellow tones required at lower velocities, while springing more fully to life at higher velocities. However, as with the strings, an extra velocity layer between the two might have made the instruments a little easier to play. In the wind instruments, the solo flute has just the right amount of breathiness and I also liked the oboe and clarinet instruments.

The Orchestral group also contains a powerful 'Orchestral Hit' patch and an excellent concert harp — this latter instrument has a beautiful, very soothing quality to it. Other instruments include a timpani patch (which usefully provides two keys for each pitch to make playing rolls somewhat easier) and a nice tubular bells instrument. Somewhat surprisingly, the Orchestral group does *not* include a general orchestral percussion instrument for cymbals, snares, timps and gongs.

A total of 11 instruments appear in the Choir group — five male and six female. In the main, these are sustained vowel sounds based on 'ah', 'mm' 'oh' and 'ee' sounds. Usefully, most of the patches feature mod-wheel crossfading between a non-vibrato and a vibrato version. With a little reverb added, these are all very effective for choral pads.

While the overall size of the *Colossus* library is huge and the quality of many of the Orchestral and Choir instruments is very good, there are probably not enough basic articulations of the various instruments for anyone attempting to construct a full orchestral arrangement. For example, there are no staccato performances of the string or brass instruments. In that context, *Colossus* should not really be seen as a replacement for something like East West's own *Symphonic Orchestra Silver Edition* or *Garritan Personal Orchestra*, both of which offer a considerably larger choice of performance styles to the budding orchestral composer on a budget.

Pop Brass

In contrast to my comments above about the relatively small number of performance styles included within the Orchestral group, the Pop Brass group has an abundance of these. For example, the trumpets include falls, staccato, short sustains, vibrato and cup mutes amongst a few others. The same is true of the tenor, alto and baritone saxes — a range of performance options and special effects are provided for each, although my favourite was the 'B Sax PPanther' instrument which was suitably deep and honky.

The Trombone options are also plentiful within this group and include some excellent falls, slides and wah performances, with the latter being great for those *Tom and Jerry*-style cues. There is also a very respectable 'Tuba God' instrument whose beefy staccato sounds would also work well for cartoon comedy cues. Another neat inclusion is the Salsa Trumpet, with both long and short fall options for when you need to add a little Latin element to a tune. If required, one or two of the staccato instruments from within the Pop Brass group would work quite happily in an orchestral setting.

Ethnic & New Age Ensembles

The collection of instruments in the Ethic Pitched group includes all the usual suspects; agogo bells, bagpipes, didjeridoo, duduk, fiddle, koto, pan flute and shakuhachi are all present and correct. Where appropriate, a number of these include a vibrato layer that can be added via the mod wheel. For a touch of Outback drone, the didjeridoo has plenty of flatulent bottom end and the tone can be changed via the mod wheel to produce a quite convincing movement in sustained notes. The bagpipe sounds like a Scottish set — although, as with all sampled pipes, it does give itself away a little by staying in tune! Other useful inclusions are the low Irish whistle and Uilleann pipes, which do a decent job of adding something of a Celtic vibe.

The five Instruments in the Ethnic Percussion group include useful tablas and taiko drum instruments. The other three *Kompakt* patches are collections of percussion instruments, with each sound mapped to a different key. The best of this bunch is 'Ethnic Drums 88Key' which does pretty much what it says on the tin. There is also a 'GM Percussion' patch that contains all the percussion sounds typical of a GM drum collection but minus the standard drum kit sounds such as snare, kick, and hi-hat. Given these three collections of percussion sounds, the omission of an orchestral percussion set mentioned earlier is a little puzzling.

The New Age Ensemble group provides a series of layered sounds, combining one of the ethnic pitched instruments with a string or synth pad sound of some sort. Some of these are more effective than others but the titles (for example, 'Chi and Chang', 'Sri Lanka' and 'Weeping Dragon') give an impression of what is on offer. As with the

GM Crop

One interesting feature of *Colossus* is what must be the largest ever GM-compatible sound bank. This features 128 instruments that follow the GM program number convention (from program 1, 'Acoustic Piano', through to program 128, the ever-handy 'Gun Shots'). In the main, these are all based on instruments that appear elsewhere within *Colossus* but, in total, the samples in this group contain 14GB of data — so it is safe to say that these sounds will have somewhat more depth than the GM sound sets built into your average consumer soundcard!

Given the potential users that East West are targeting with *Colossus*, this GM sound set is a very neat idea. The only minor inconvenience is that there is no simple way to load the instruments within *Kompakt* based upon standard program-change numbers — this process has to be done manually. This said, in testing with some commercial MIDI files using these sounds, the results were impressive and well worth the effort.

The GM instrument group is sensibly organised according to the GM program number convention.

N-n-n-Nineteen

***Colossus*'s many Instruments are organised into 19 basic types in *Kompakt*. These are as shown in the selection menu below.**

'Piano + Strings' Instruments in the Piano group, it is actually relatively easy to construct these types of sounds for yourself by layering two of the individual instruments from elsewhere within the library.

Synth Basses, Leads & Pads

The Synth Bass and Synth Lead groups contain about 25 instruments between them. However, in the majority of cases, the mod wheel crossfades between two different sounds. There are some nice analogue-style sounds amongst this collection and for most types of synth-based pop or dance styles, there is plenty to get started. It is in this section of the library that *Kompakt*'s additional processing options come to the fore and can be used to radically transform any of these preset sounds.

A somewhat larger collection of instruments is included in the Synth Pads section but, on the whole, these are a rather conservative bunch, although the 'Collossus Pad' [*sic*] is quite stirring. Thankfully, things get a little more interesting — and a little more abstract — within the Stormdrone group. These sounds are based on ethnic, orchestral and sound-effects samples and are intended more for creating atmosphere or sound design rather than music. The majority of them feature four-way crossfades using the mod wheel. The Instruments are split into three sub-categories; high morphs, low morphs and high-low morphs. A small number of drum loops are also thrown in for good measure. These would be just the thing for anyone who composes for the occasional horror film or who is in need of a suitably dark atmosphere. Patches such as 'Butcher's Blade', 'Apollo' and 'Preying Machine' are typical — wonderfully scary and not to be played to small children in a dark room!

Conclusions

Phew! There is no doubt that *Colossus* is aptly named — simply browsing through the presets is a major undertaking. As indicated earlier, East West are marketing *Colossus* as the software equivalent of a keyboard workstation, containing sounds that cover all musical genres and, on the whole, I think they have achieved this aim. It is also true, that with a very few exceptions, the quality of the sounds, both from an audio perspective and the technical details of the sample programming, is very good.

So, that's a tick in the 'Jack of All Trades' box then — but is *Colossus* a 'master' of any? There are certainly some extremely good groups of instruments. For me, the highlights include the range of acoustic and electronic drum kits and there is enough variety here to meet almost any musical need. The other exceptional group is the pianos — Colossus features two excellent acoustic pianos and a couple of electric pianos that just ooze class. However, there are also groups that are less strong. For example, while there is nothing to criticise in the quality of the majority of the orchestral instruments, for anyone interested in serious orchestral composition, *Colossus* simply does not feature enough different performance articulations. Of the other groups, the guitars and the synth pads, while containing some good individual instruments, are perhaps not the strongest suits in the *Colossus* pack.

Given these comments, to whom might *Colossus* appeal? Well, it would certainly be an efficient option for anyone establishing a software-based sampled instrument collection from scratch, perhaps as an alternative to a traditional hardware keyboard workstation — whether in a studio or via a laptop for live use. To have the majority of your sound sources available through a single user interface — the very functional *Kompakt* — would keep things simple and efficient. I'm less convinced that *Colossus* would be as appealing to those who already have an existing library of sampled instruments; buying it would probably result in some duplication, although the 'keep it simple' argument, where all sounds are available via *Kompakt*, still has some attractions. The library's size is certainly impressive, justifying its name. However, as with so many things in life, size is not everything and whether *Colossus* is the right tool for you may depend upon the existing contents of your sample toolbox. SOS

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Joe Barresi

Recording Queens Of The Stone Age

Photos Nigel Copp

Paul Tingen

Queens Of The Stone Age's fourth album *Lullabies To Paralyze* has cemented their position as the biggest and most exciting rock band in the world. Engineer and co-producer Joe Barresi describes the combination of old-school technique and far-out experiment that went into its making.

Back in the 1960s, Phil Spector's approach to production was described by the now legendary term 'wall of sound'. Forty years later, Californian producer and engineer Joe Barresi is attempting to inch ahead of Spector with a sound that's so massive, hard-hitting, and in-your-face that it can perhaps best be described as a 'wall of rock'.

An audio fanatic, who sleeps, breathes, and walks music in an effort to perfect his engineering and production skills, Barresi started out playing guitar at age seven. He went on to play in local bands and study classical guitar and music theory at the University of South Florida. After graduation he moved to Los Angeles where he eventually gained prominence as an engineer, mixer, and producer. You're likely to have heard Barresi's work at some stage or another, as he's engineered, mixed and/or produced tracks for Skunk Anansie, Hole, Monster Magnet, Anthrax, Bauhaus, Fu Manchu, The Melvins, Bad Religion, L7, The Jesus Lizard, and many others.

However, the best-known example of Barresi's sonic barrage is Queens Of The Stone Age: he engineered, mixed and co-produced the band's eponymous 1998 debut album, as well as their recently released fourth offering, *Lullabies To Paralyze*. Co-producer on both was bandleader, guitarist, singer and songwriter Josh Homme. "Josh and I have been friends for a long time," explains Barresi. "I had worked on three Kyuss albums [*the rock band on whose foundations QOTSA was built*], and after they broke up, Josh moved to Seattle and pursued some other interests. He sent me some demos of an album he was working on, and they blew me away. So he put up the money to make the record, and we went out to the desert and recorded it in under three weeks. It was purely a labour of love. That became the first Queens album. Josh later asked me to do *Songs For The Deaf* [*2002, the band's third album*], but Interscope wanted a 'name' producer. That situation soured, and by the time *Lullabies* came around, it was obvious that Josh knew his music better than anyone else, so that's when he called me in."

So, with full creative control and a much larger budget to work with than for the first QOTSA album, Homme and Barresi set out to experiment more than ever before and, says the latter, "create something unique".

"The band had gone out to Rancho de la Luna studios [*in Joshua Tree National Park*] to rehearse the songs," explains Barresi. "When they came back to LA they knew the songs and arrangements fairly well. I sat in on a couple of rehearsals in LA, and it was mainly a matter of me learning the music and seeing what worked, sonically, guitar- and tempo-wise, and so on. Then we loaded all the gear into Sound City studios and

spent the first day sorting through it, plugging things in and deciding what would sound good for what parts. We had a massive array of amplifiers and guitars and drums, including some of my own stuff."

When Barresi talks about "some of his own stuff", he shows mastery of the art of understatement, for he's the proud owner of a rather extravagant collection of assorted boxes, guitars and amplifiers. "I have 250 guitar pedals, probably close to 45 guitars, 75 guitar amps (35 combos and 40 heads), and countless pieces of outboard gear. Altogether enough to fill a garage."

Barresi's gear also includes over 30 microphones from the likes of Royer, Neumann, Shure and Sennheiser, almost 40 compressors from Tube-tech, Focusrite, EMI, Neve, Trident, Urei and more, 30 mic preamps bearing names such as Studer, Sontec, Pultec, API, Urei, Joe Meek and Quad Eight, and some more esoteric stuff he's reluctant to talk about. The sheer number as well as the nature of these boxes reveals much about Barresi's approach to engineering: many affect the front end of recording, and most are analogue, valve, and/or vintage.

"I like to focus on things like how a part is played, what guitar is played, where you position amplifiers, the drums, and the vocalist, what console you track on, the kind of mics and mic pres you use, and so on," stresses Barresi. "A few nights ago I spent hours AB-ing Neve and Quad Eight mic preamps. Stuff like that matters to me. Personality is mandatory. Every little bit helps. Analogue gear allows me to experiment, and it doesn't sound like everybody else. If I was lazy, I'd just put a plug-in on something, but instead I prefer to pick the right compressor or microphone, or mic placement. All this is about the art of making records, which is getting lost at the moment."

A Recording Dream

As a keen student of the art of recording, Barresi is an avid reader of recording books and magazines, and enjoys watching any kind of making-of documentary. He explains his emphasis on the front end of the recording process: "What really blew my mind was watching this documentary about the making of [*The Who's*] *Who's Next* and seeing Glyn Johns push up just four faders and hearing what I've been listening to for three quarters of my life. Now, everything is aimed at being totally perfect, at optimum level, with complete isolation on each microphone, and so on. It's just ridiculous. But I like recording without a click track and straight to analogue tape and without listening to whether this particular beat is ahead or behind. And that's what we did with *Lullabies To Paralyze*."

Further prodding for details of the recording of the latest QOTSA album runs into the occasional bit of resistance on Barresi's part, apparently out of respect for Homme, who likes to shroud the recording process in secrecy. For this reason exact details of the guitars, amps, and effects pedals used on various songs will have to be scanned from the impressionistic session documentary on the DVD that comes with the *Special Edition* version of *Lullabies*. Luckily, though, Barresi is happy to spill the beans on the tricks and working methods that were his own territory.

"In having so much equipment, I try not to use the same thing twice. If I used an Echoplex on the first Queens record, I wouldn't bring that the second time round. The making of *Lullabies* was also experimental in the sense that we tried to get a different sound for each song, and even for sections of songs, and would try different microphones that I would not normally use. It was like a recording dream, because not only were the songs good and the guys amazing players and was it a fun record to make, it was also like going back to recording school."

For each track the group and Barresi would experiment until they were happy with a combination of certain instruments, amplifiers, pedals, microphones, and their placements. Then, says Barresi, "We went for it and tracked the song. We cut drums, bass, and two guitars completely live on all the songs. 'Medication', 'Little Sister', 'Long Slow Goodbye' and 'Tangled Up In Plaid' were all done in one take. On other songs we did some very minimal editing of different takes. Then we'd punch in anything that needed to be fixed. The beauty of that was that at the end we basically had the bed tracks done, and I don't think we did too many overdubs."

Kitchen Sink Drama

To capture Queens Of The Stone Age, Barresi used a combination of his more standard approach to recording guitars, bass and drums (see the 'Joe Barresi's Mic Guide' box), and some wild variations. He elaborates on some of the specifics, beginning with the album's deceptively gentle opening, 'This Lullaby', which features only Homme on guitar and Mark Lanegan on vocals.

"We tried a million times to capture the right moment, and we finally got it while I was already mixing the album. Josh and Mark were in the studio lounge, sitting in the couch, chilling out, and I had a mic in front of Mark, while I recorded

For *Lullabies To Paralyze*, Joe Barresi deliberately chose different miking setups for different tracks. Here, QOTSA main man Josh Homme is miked up to capture both his vocal and the strings of his hollow-bodied electric guitar.

Joe Barresi, guitarist Troy Van Leeuwen and Alain Johannes in Sound City Studio A during the recording of *Lullabies To Paralyze*.

Josh's hollow-body electric guitar acoustically and the guitar amp in the bathroom. Josh also did some whispery background vocals, which was him singing through a mic with an analogue guitar pedal reverb on it. Actually, 90 percent of the guitars on the album were hollow-body, so a lot of jokes were made about 'F' holes."

Following 'This Lullaby' is the full-on 'Medication', a shift which is a bit like being whacked by a 2x4 while dozing in your rocking chair. According to Barresi, "The song was intentionally made to sound like the first album, it was like 'welcome back' to the listener. After this there was a lot of experimentation in sections of songs. We'd experiment with maybe changing the drum kit around so the texture is different, and have everyone in a circle looking at each other and putting a couple of guitar amps in this circle. We might put a mic up in the middle and cut a whole song like that, with a lot of bleed."

One song that saw a lot of experimentation was the album's lengthy centrepiece, 'Someone's In The Wolf'. With its long, impressionistic middle section, it almost comes across as a slice of '70s prog rock. "The band laid the song down live with the middle section in there," revealed Barresi, "and we then overdubbed all sorts of studio experiments to it. Josh had been reading a lot of the Grimm Brothers' fairy tales, and wanted it to be something like a fairy tale, with two children locked up, like Hansel and Gretel, and the big bad wolf is outside.

"So we had Chris Goss come in and he made all kinds of kitchen noises, like a tea kettle whistling and the chopping of a knife and the rustling of the pages of a recipe book. There's a snippet of him doing that on the DVD. These things were recorded on individual tracks and then bussed to one track. So the middle bit of the song has that as a whole montage of sounds, and multiple guitar parts, and also Alain Johannes played Marxophone, a weird, small instrument that you pluck and that vibrates multiple times. It makes this kind of very metallic, fluttery sound. That's the little melody going on in the background, along with some guitar swirling. There's also some slide guitar going on. All the slide lap-steel stuff went through a little Rivera amp, with some kind of weird tape echo."

Rock & Roll Circus

While Homme is adamant that Queens Of The Stone Age aren't a heavy metal band, much of the music on *Lullabies To Paralyze* is of the eardrum-assaulting variety. It's a perfect foil for Barresi's wall-of-rock approach to recording. But as ever with QOTSA, there are surprising leftfield turns, such as the opening to 'The Blood Is Love', which, being in three time, with clean guitars, weird sound effects and cheesy drums, sounds like it comes from a different musical universe.

"We wanted a circus feel," states Barresi, "and you can't have a big rock circus feel. So

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Joe Barresi's Mic Guide

• VOCALS

"I never go in knowing what vocal mic I'm going to use. While cutting tracks I'll put a couple of mics out and see what the singer sounds like. On vocal days I'll then put up a couple of mics again and listen and do a shoot-out. Sometimes you have the same microphone for the whole record, but on the Queens album we used different mics on different songs. I rented a Brauner VM1, and that worked really well on pristine vocals. It's a beautiful, very clear-sounding mic. I also used the [*Neumann*] M49 on a couple of tracks, the [*Shure*] SM57 on some others, tried the [*BLUE*] Ball, and used the Shure KSM44, which is really good.

"I tend to compress when I go to tape. The 1176 is my favourite on vocals, but sometimes the LA2A works really well. If you're looking for more dirt you can turn a tube compressor up a little more. I'm not opposed to dirtying the signal up and blending that in with the original. I'm not a transparent compressor guy. I may send one compressor into the other as well. That works well if you need a very up-front vocal. When I'm mixing I'll compress the vocal further, perhaps using an 1176 again or something that's a little cleaner and more accurate, like a Distressor or the SSL console compressor."

• GUITARS

"I'll split the guitar signal, using the PCP Instrument Distro or more often my Systematic Systems guitar splitter, which can split the signal to six amps. I don't tend to use them all at the same time — sometimes it's just three or four outputs, and one may go to a tuner and another to a DI box. Using six amplifiers is excessive, really! In choosing the amplifiers and speakers, it's important to remember that larger speakers give a more compact, tighter sound. A tiny amp turned all the way up will give a more blown-out sound. This volume war obviously also applies to bass amps and cabinets.

"The two microphones I use most for recording electric guitars are the Shure SM57 and the Sennheiser MD421, often both, close up, placed at the edge of the speaker, where the speaker centre meets the cone, or, if I'm looking for a more bright sound, dead centre. When I want more low end, I may have an AKG 414 on there, and when I'm after a little more personality, a Neumann 87, backed up a foot, or a ribbon mic — like the Royer 122, or an RCA BK5 or 77. I'll often take the microphones through some Neve 1272 preamps into the desk, and then via an API 550 or Quad Eight EQ to the multitrack."

• BASS

"I'll record basses via a DI and an amp, sometimes two amps blended into one track. I won't normally use a splitter, but just go through the DI into the amp. The microphones on a bass cabinet could be an SM57 or SM7, or Neumann 47FET. The guys in the Queens turned me on to the BLUE mikes. The BLUE Mouse, Blue Ball or Red Ball can all be great on bass. If I'm looking for a very full sound, I may back the mic up five to six feet, where it will almost become a room mic. You always use your ears and go from there. Sometimes I'll re-amp the DI bass track when I'm mixing and add a slightly distorted signal back in."

• DRUMS

"On kick drum I always love a mic in and out. Inside I prefer the Sennheiser MD421 — I'm not a huge D112 fan. If the 421 doesn't work, the next choice would be a [*Shure*] Beta 52. Outside could be anything, an NS10 speaker, a 47 FET, or a Beyer 160, about three feet away. Snare drum would be an SM57 on the top and a 57 or [*Sennheiser*] 441 on the bottom. I may also use a [*Neumann*] KM86 or a [*AKG*] 452 taped to a 57, or a 414 at the top. Toms could be 421, or 87 if I'm looking for a little more low end.

"Overheads depend on the studio I'm working in. Sound City has a really good pair of [*Neumann*] U67s. It could also be a 414, or a Sony C37 or a 47FET. Hi-hat and ride are usually something more condenser-like when I'm looking for a crisp sound, or SM57 or SM7 when I'm looking for something a little more sloppy. I'll usually compress the drums to some degree, and blend all the kick mics to one track and all the snare mics to one track. I like the kick to be under one fader, and the same with the snare."

• ROOMS

"I love to use a combination of a stereo and a mono room mic. So nine out of 10 times I'll have three tracks of ambience. That could be a pair of 87s or PZM or a 414 or a Coles ribbon mic. I love to put a room mic like a 441 close to the kit and highly compress it, *à la* Tchad Blake. And I'm a fan of M-S and Blumlein microphone configurations. For instance, when you're not getting a very even kick drum on both sides, I might end up putting a Blumlein array in the middle of the room, and that can work really well.

"Nine out of 10 times the room sound will be compressed to some extent. Sometimes it may be severely compressed, on what I call 'Full Canadian' setting, with all buttons pressed in and to the right. I like the EMI compressor for its fast attack. I often use the room mics for reverb, rather than adding reverb from a digital box. I may put an amplifier or the singer in the bathroom, or use reflective surfaces. At Sound City they have an echo chamber that doesn't have its speakers any more, so a lot of the time when we were looking for something echo-y or chamber-like, we stuck a cabinet or the drum kit in there, or did hand claps or vocals in there. It doesn't get more analogue than that!"

For 'pristine' vocals, a Brauner VM1 was often the mic of choice; elsewhere, a Shure SM57 was sometimes used.

we made it like merry-go-round type music, with a swirling feeling. The 'circus guitar' is a hollow-body guitar through a weird little combo amp and a bizarre microphone. There was also a mic in the middle of the group playing. I think that intro had only three or four mics. We cut the whole song with the sound of the intro, but decided that this didn't fit, and went back to a big rock approach. The shift from the intro to the big rock section was an analogue tape edit, a hard cut. There were a lot of intentional contrasts in the record in general: soft versus hard, very dry sections versus very wet sections, dry lead vocals and wet background vocals and *vice versa*."

Another striking contrast is offered by the bonus track 'Like A Drug' (only included on the album's special edition CD/DVD version), which sounds like a psychedelic '60s number, all hazy, wistful vocals, jangly guitars, laid-back rhythm section, and very gentle, open production. Even stranger is that it is one of the tracks on the album featuring guitarist Billy Gibbons of ZZ Top, himself no stranger to the hard-hitting, wall-of-rock approach to music.

"It's kind of crazy," says Barresi. "The four guys and Billy are all playing together, with Josh singing into an amplifier, and every mic in the room wide open. That's where all the space comes from. I did two different mixes in analogue on the fly, and loaded them into Pro Tools to line them up to see if I wanted to cut sections from one mix to the other. I then started nudging one of the mixes slightly ahead or behind, getting a phase going when I played the mixes together. It totally tripped it out, and was the effect we were looking for. So I ended up putting the two mixes on top of each other like this. It's got a vibe."

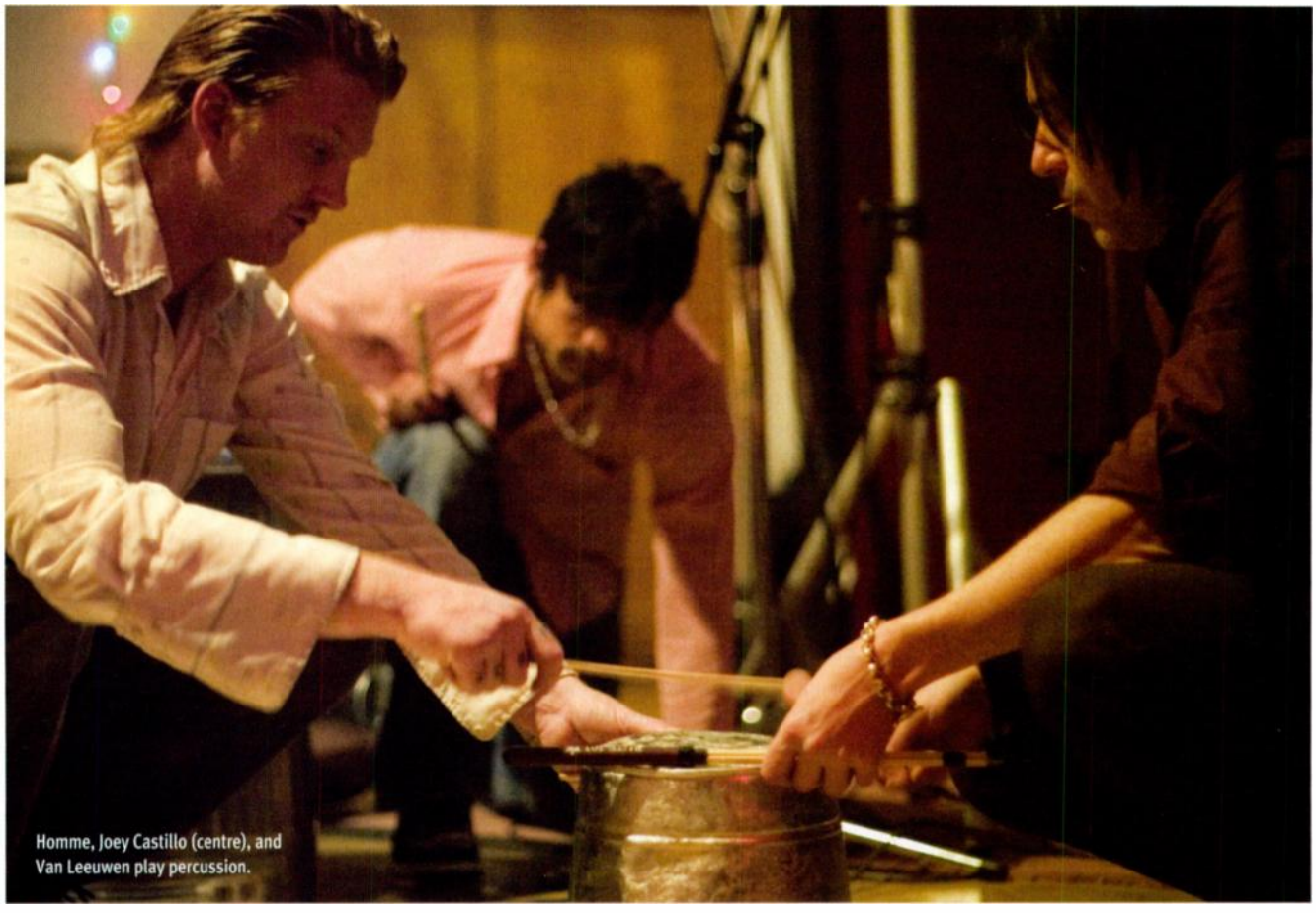
Commitment Is Good

Almost the entirety of *Lullabies To Paralyze* was recorded through Sound City's Neve 8028 desk, often in conjunction with Barresi's own mic preamps, and to Studer 24-track tape as well as Pro Tools HD. "I brought in some Helios and Telefunken V76 preamps," explains Barresi. "Just fat-sounding boxes. There's nothing on the album that didn't touch the Neve at some stage. Also, everything went to tape, but in cases where I'd filled up all 24 tracks I'd record the rest into Pro Tools. The brass went to Pro Tools, any of the crazy stuff.

"A lot of the vocals went right into Tools, through several preamps. Some of the vocal sounds were pretty complex: sometimes they were treated, or I'd use an additional mic that was slightly overdriven, or they were sung through an amplifier or a Leslie cabinet, things like that. I might use two or three microphones on a vocal, and a lot of times I would print the components separately, so I could re-balance later if needed for sections of the song. Of course this would eat up a lot of tracks."

When queried on the respective advantages and disadvantages of analogue and digital, Barresi has a lot to say on why he prefers analogue and why he thinks digital is in part to blame for the art of recording being at "a standstill". "I love the sound of the analogue tape machine," he says, "and I don't use Dolby. Never. For the kind of music I work on it's hardly necessary. I'm not doing super-hi-fi recording. I also think that noise is a good thing. The hiss is like reality for me.

"Another thing I love about analogue tape is that it forces you to commit early. Like, here's the guitar sound on one track, as opposed to using 15 microphones on a cabinet and putting them all on separate tracks. I don't think you can build an idea of how the song is going to sound in that way. To me recording a song is like building a house. There's a floor and there are walls and there's a ceiling and roof. How can you figure out what your roof is going to be like when you don't know what your walls are



Homme, Joey Castillo (centre), and Van Leeuwen play percussion.

According to Joe Barresi, most of the guitars played on *Lullabies To Paralyze* were of the hollow-bodied variety.

▶ going to be?

"HD sounds really good, but I'm not of the opinion that you need things to be at 96k, because in the end CD is only 16/44.1 anyway. If it's properly used, digital is fine, though many people don't spend enough time looking at how things are clocked. The simplest issue is whether digital is your master or your slave. If your Pro Tools session is the master and the tape the slave it sounds fine, but if you're slaving Pro Tools to the tape, Tools will move back and forth and it sounds less clear to me. Analogue is a little more forgiving when it's speeding up and down.

"A further complication with Pro Tools is that many people delay their decisions indefinitely. They'll mic the kick drum inside and out and print them separately. But at some stage you have to make a decision: here's the drum sound. Whether you have 20 or four tracks of drums, you have to commit at some point. And the sound of the drums affects the way the guitars and bass will sound. But people buy a computer rig nowadays and they never have to make a decision, because they have *Mic Modeler* and *Sound Replacer* and unlimited tracks. When I mix I get a lot of projects in that have been recorded on Pro Tools and where I spend ages trying to work out what the actual guitar or drum sound is. It bums me out."

Looks Aren't Everything

According to Barresi, another issue with recording on computers is that the focus shifts from the ears to the eyes. "You're not supposed to look at music! A friend of mine, engineer Mark Dearnley, an amazing engineer and avid Pro Tools fan, did four albums for AC/DC. He once held his hands 30 inches apart and said 'Imagine this is a piece of tape and here's the kick drum in the middle. The bass is going to be a little bit behind, over here, and the guitar player will be a bit ahead, over to the right of the down beat, and essentially your entire downbeat will sound huge!' The moment you start looking at music you start lining things up and your down beat is small again. There's none of that push and pull that makes music come alive.

"The whole idea of perfect music is just ridiculous to me, unless you're making dance music and you want that hypnotic effect. Playing with a click and then gridding things is insane. You find yourself fixing things as opposed to listening to the music. Playing the song a little bit faster next time may make the whole difference. We never used a click track with the Queens.

"Doubling music with *Vocalign*, or *Auto-Tune*ing a vocal, is equally ridiculous. The whole idea is to use your ears and double things until they sound good. Listen to old records. I think that some people these days decide that when they hand in a project that's perfectly in tune and time, they've done their job as a producer. But at the same time they've taken the life out of it and made things perfectly unmusical. What's the point?"

However, Barresi is no Luddite. At the time of writing, he has just bought a Pro Tools HD2 system, to complement his M Box, laptop and Firewire drive, which he's been using for several years in the back of the control room, "doing edits, moving things around, or whatever".

"The M Box is amazing value," reckons Barresi, "because you can do so much with it, and it's so small. I got the new HD2 system because recording budgets are getting smaller, and a lot of projects come to me that have already partly been done on computer. And as an engineer you now need to be a Pro Tools operator as well. All the material on the new Queens album lived in Pro Tools at some point. Some songs had some intricate stuff on them that I needed Pro Tools for. And if I had more than 24 tracks of material, and the extra tracks were in Pro Tools, then it was often easier to load everything into Pro Tools and mix from there. Although in some cases I combined tracks in Pro Tools until I had less than 24

tracks, and we went back to analogue multitrack tape for the mix."

Future-proof

Mixdown for *Lullabies* was to half-inch analogue, Pro Tools, DAT and CD, with the half-inch tape used as the master. The multitude of formats reflects Barresi's concerns over the uncertain longevity of digital media. "I worry that in five years from now you won't be able to open a Firewire 400 drive on a G5. I've already had issues opening a 9GB drive from a couple of years ago. Whereas I know that years from now, everything will still exist on tape. The tape may have to be baked, and someone may have to fix a mechanical part on a tape machine, but it will play. So I also backed all the unmixed material up to 24-track tape, to two reels in case a song had more than 24 tracks."

It's at the mixing stage that a number of important secrets of Barresi's volume-to-11 trade come to the fore. Analogue outboard gear and guitar pedals play crucial roles here too, explaining why he opted to mix via an analogue desk. "I mixed the whole record at Bay 7 Studios in Los Angeles," Barresi explains, "because of their G-plus-series SSL. They also have a lot of vintage outboard gear and two great Studer 24-track tape machines. I needed automation for multiple signal passes or to mult some things out or to change sounds in different sections. Also, I use this thing called a PCP Instrument Distro, made by Jonathan Little of Little Labs, which allows me to take three XLR signals off tape and convert them to quarter-inch. It allows me to set up three pedals in a chain, and have them as three mono outboard boxes.

"The Pro Tools rig that we had didn't have a lot of plug-ins on it, which was perfect. There are a couple of plug-ins that I like, but in general I'm not a fan. They don't sound good. I don't need Bomb Factory's emulation of an 1176 when I'm surrounded by real 1176s. If I use any kind of plug-in, nine out of 10 times it will be a de-esser, because it works quickly and is very controllable. I have to say that I do love *Altiverb*. It sounds good. But in general I don't think there are enough unique-sounding plug-ins out there.

"Everybody who has Waves will have *Meta Flanger*, and they will all sound the same. The *Sansamp* plug-in isn't bad, but there are four or five different Sansamp pedals that all sound different, plus there are two rackmounted versions. My rackmounted Sansamp has been modified for more bottom end, and you can't really modify plug-ins. I have three Boss overdrive pedals, and they all sound different. So analogue effects have much more character. Also, it's easier to manipulate buttons with your hands, than looking under a menu and loading fucking factory presets and trying to alter them. I think a lot of people use presets. It's simply too easy to plug and play now."

When nagged further about the ins and outs of his wall-of-rock sound, Barresi soon lands on a not-so-secret ingredient. "I use a lot of compression, obviously, for example the EMI TG12413, Focusrite Red 3, Tube-tech LCA 2B, Dbx 160, Neve 33609 or 2254, things like that. I also spend a lot time riding the faders when I'm mixing, so I can retain some dynamics and separation and the individual sounds are still recognisable and hard. When you compress too hard you lose all your dynamics. I'm a big fan of parallel compression, so I'll often mix in non-compressed sound with compressed sound to maintain the transients. Or I may use the console compressor on the SSL on an individual channel and buss my whole drum kit to a Tube-tech compressor or something. Also, in general I try not to over-EQ stuff, unless it's to get a particular sound. I'd rather get the sound I want out of the microphone. It does start there. It all starts at the source." SOS

Barresi with Billy Gibbons of ZZ Top.

Presonus Firebox

Firewire Interface For Windows & Mac OS X

Derek Johnson

Providing six audio inputs and eight outputs for £350, with the bonus of high-quality mic preamps, Presonus's Firebox sounds almost too good to be true. Is it?

Firewire audio interfaces are now becoming available at prices that might tempt the more aspirational desktop audio enthusiast away from USB-based devices. Potential users have a decent choice, and finding the words 'affordable' and 'Firewire' in close proximity is now unremarkable in terms of desktop music. I'll quickly jump in and say that there's not anything wrong with well-designed USB audio interfaces — there are any number of options that perform really well, and I regularly use one myself. But there's something about the much greater bandwidth of a Firewire connection that's both attractive and reassuring for audio applications.

What Have We Here?

Presonus have already shown what they can do with Firewire, not only with the rackmounting Firepod, reviewed in February of this year, but with the now-discontinued Fire Station. The latter interface, reviewed in February 2003, was an early adopter of Yamaha's Firewire-based mLAN standard, but the company's latest interfaces use a proprietary driver instead.

The Firepod is quite a well-equipped device, with 10 ins and 10 outs altogether, eight top-notch mic preamps, insert points, digital I/O and MIDI I/O. Carve a chunk out of that spec and bung it into a little package a third of a rack unit wide, and you have the Firebox. But smaller doesn't necessarily mean lacking in features: the interface still manages a total of six audio inputs (with 24-bit 96kHz converters on the four analogue ins) and eight audio outs, alongside a single MIDI In/Out pair. Such a specification doesn't really push the Firewire protocol all that much, but any USB 1.1 interface would have difficulty matching this performance.

Presonus have also ensured that you can get recording as soon as the interface is out of its box: Steinberg's *Cubase LE*, offering 48 tracks of audio recording alongside MIDI sequencing, is included in the overall bundle. Also in the Firebox packaging is a full paper manual — it's small, but it tells you pretty much everything you need to know.

The Box Itself

A lot has been packed into the solidly built little brick that is the Firebox — it weighs a lot for its size — yet some clever design means it doesn't feel cramped. There are no compromises with components, either. For example, the first two inputs are on the front panel, in the shape of a pair of Neutrik combo jacks offering balanced XLR and instrument or line-level jack inputs in one handy connector. Some choice Presonus

SOUND ON SOUND

Presonus Firebox £325

pros
- Very compact.
- Excellent feature set for the price.
- Brilliant zero-latency monitoring, via included software.
- You can start recording instantly with bundled *Cubase LE*.
- High headphone output level.

cons
- Breakout cable is a little inconvenient.
- No rubber feet supplied.

summary
Great sound, surprising mixing power under the hood, and excellent build quality. The list price is more than fair, yet shop around and the Firebox becomes a bargain. So shop around!

Rack It Up

Presonus produce a number of competitively priced third-rack-width processors, including the Tube Pre tube-equipped preamp, Comp 16 compressor, EQ3B parametric EQ and HP4 headphone distribution amp. All these devices, and the Firebox, are designed to fit in Presonus's Max Rac compact vertical racking system. Up to six units can be mounted in the Max Rac, allowing them to all be easily patched into your digital recording system.

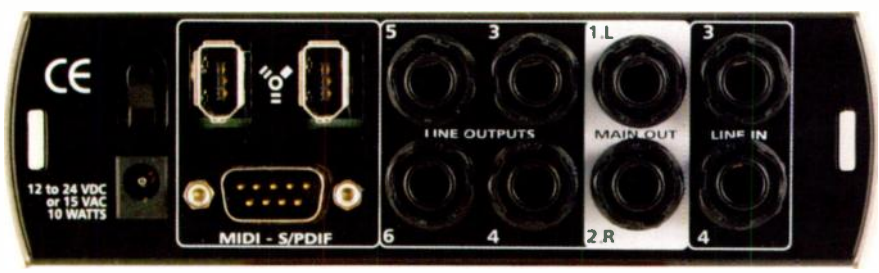
low-noise high-headroom preamp circuitry lurks behind the sockets, and phantom power for mics that need it is switched in via a front-panel button. Input level gain, which is wide enough to accommodate line, instrument and mic signals, is controlled by a pair of chromed blue knobs — you'll spot them on other Presonus products, and they're finely stepped in their travel to allow accurate setting of levels. Metering is minimal, but apart from your ears (and whatever your host audio application has to offer), all you really need are the built-in clip LEDs.

A further two stepped knobs at the front independently control headphone and monitor output levels. And be warned that the gain range of these two controls is rather wide: I can't remember when I heard a headphone mix go this loud! All that's left on the front is the headphone socket and a Firewire lock LED: it's blue when all's well, red when it's not, and flashes between the two when there might some uncertainty.

The Firebox Mixer application, as it appears on the Mac — the PC version is graphically identical. Looks great, and easy to understand. With input monitoring disabled on your host audio application, this is how the Mixer would look for zero-latency monitoring.

The rest of the action is, or starts, around the back. Two more, balanced, line inputs can be found here, alongside the main stereo output and four further line outputs, all of which are also balanced. Though arranged as stereo pairs, these outs are freely configurable as individual mono feeds, and (software allowing) could be configured as part of a 5.1 surround monitoring setup. The two Firewire sockets are also rear-mounted, and under most circumstances, the Firebox can be powered via this connection. If, however, your computer has a four-pin Firewire socket — the type usually found on PC laptops, which doesn't carry power — you'll need to deploy the supplied 16V wall wart. Interestingly, if you were to lose this PSU, finding a replacement won't be as much of a problem as it might be in similar situations with other products: the power socket can accommodate supplies providing 12-24V DC or 15V AC.

Last of all, there's a nine-pin connector back here. Plug the supplied breakout cable into this socket and the Firebox gains access to digital I/O (as two coaxial S/PDIF connectors) and MIDI I/O. This is not the most elegant solution to the problem of providing this extra connectivity — the cable flops around, offering a target for potential accidental damage, and becomes inconvenient to access when the Firebox is stacked with other units (as might be the case with the 'Max Rac' described in the box, opposite). But it was perhaps the only way Presonus could provide the extra facilities considering this unit's size. I'd certainly rather have them than not. All in all, that's pretty good going for a piece of hardware this compact.



The Firebox's digital and MIDI I/O are available on a separate breakout cable.

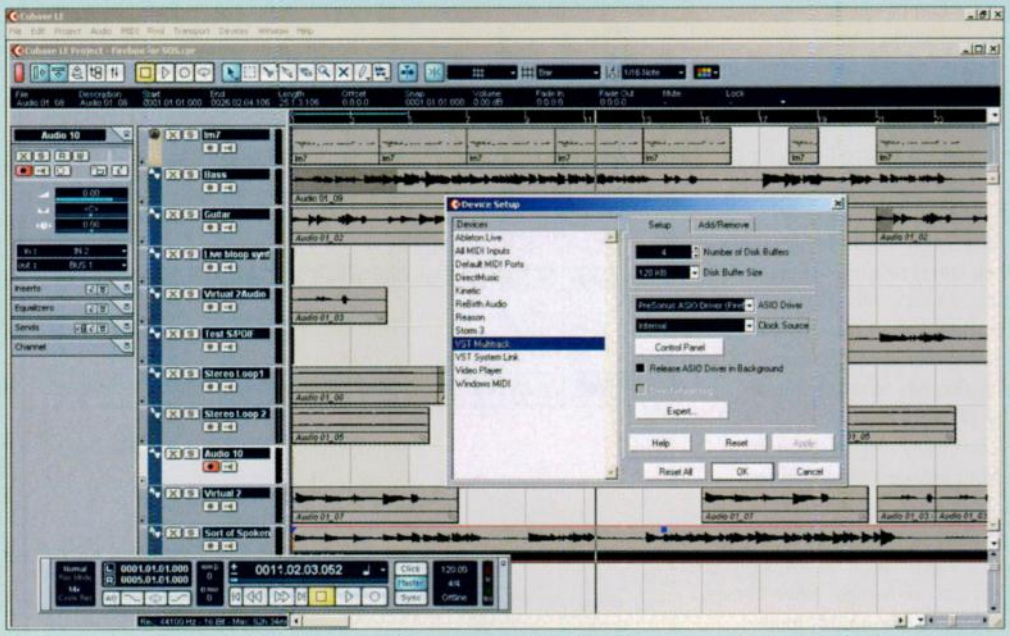
There's More

In common with many such computer audio interfaces, the Firebox is equipped with an internal DSP-based mixer. This can be accessed only via the supplied Firebox Mixer application, but doing so provides the user with quite detailed control over the signal path. The software is loaded onto your PC automatically as part of the standard driver installation routine, along with the Firebox Control panel. Mac OS X doesn't require drivers, since the Firebox integrates immediately with Core Audio, for both MIDI and audio: the interface is truly plug and play. Mac users have to go to the effort of manually dragging the Mixer and Control apps off the installer CD! Incidentally, the Firebox is only compatible with Mac OS 10.3.7 or over, and it's Windows XP only for PC users. However, although Presonus quote an Apple G4 running at 800MHz as the minimum supported spec, I obtained satisfactory results on my older 450MHz machine.

The Firebox Mixer is quite a comprehensive level-control and routing tool, allowing you to configure the inputs before they're routed to your host audio software, and decide how the audio coming back from the software will be handled by the interface. If you use this handy application for one thing only, it will be to remove all latency issues from recording and overdubbing. There is no 'zero latency monitoring' switch on the box itself, but by setting up the internal mixer correctly, and disabling input monitoring in your audio software, such latency as you might experience when recording and overdubbing audio is removed.

Graphically, the mixer shows a lot more sophistication than you'd expect: the six input channels and the stereo return from ▶

Touching *Cubase*



Cubase LE, here running on a PC, showing how the Firebox appears in the VST Multitrack window of the Device Setup box.

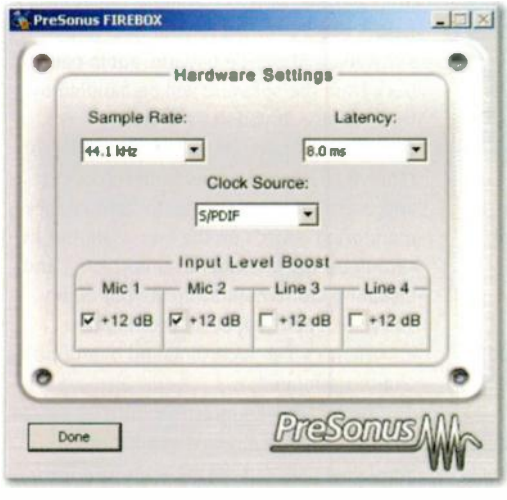
As noted in the main body of this review, the Firebox comes supplied with a copy of Steinberg's *Cubase LE*, for both Mac and PC. This is a superb freebie: it might lag a version or two behind the flagship *Cubase SX*, but still offers everything you'll need to work with MIDI, audio and plug-ins. The software is capable of handling up to 48 mono tracks of audio, at the Firebox's top sampling and bit rates if desired, plus virtually unlimited MIDI tracks. The number that you can use will depend on the sophistication of your MIDI interface (not very in the case of the single I/O of the Firebox) or how many virtual instruments you'd like to run.

A small but useful collection of plug-ins is provided, including the *Universal Sound Module*, *LM7* drum module and *VB1* bass guitar/synth instruments bass sound module and a basic complement of effects plug-ins. The good news is that any other VST effect or instrument plug-ins that you might want to use — and don't forget that the Internet is host to dozens of freebies for both Mac and PC — can be hosted in this package. You really can buy the Firebox and not have to spend any more money, at least in terms of software. But if you do get an itchy wallet, *LE* will of course host commercial plug-ins as well. If there's a down side here, it's that you're limited to eight virtual instruments, two insert effects per audio channel, four send/return effects and two mastering effects. But, given the price of the software, that's a pretty fair complement. You can always make the most of what's available by printing effected audio, or virtual instrument parts, to their own audio tracks. Likewise, think about bouncing tracks down if you find 48 is too restricting for you!

The facilities on offer are familiarly *Cubase*, with all most of the editing and organisational options you might expect. All the MIDI options, including the drum and score editors, are present, as are Steinberg's excellent audio manipulation tools. You can record stereo tracks, but one stereo track removes two tracks of audio from your total of 48. Mixing is well specified, with great automation and bussing options, too. Even if you have experience of other sequencing platforms, *LE* won't feel like cut-down software. But should you get an urge to upgrade to *Cubase SX* (with which the Firebox works splendidly), you'll be in completely familiar territory. There will also be an option to upgrade on preferential terms.

▶ the host each have a fader and a pan pot, mute and solo buttons. Each input pair also has a stereo link switch: enable this and the faders are instantly ganged and the pan pots jump hard left and right. Oddly, the mute and solo buttons still operate individually. It was strange to not see any metering in the on-screen mixer, too. Perhaps an update will fix this?

The master section offers a level fader, plus global solo and mute clear switches allowing you to unmute several muted channels with one switch. Finally, a bank of switches lets you route various audio streams to the mix or headphone output. Configurations can even be saved. Incidentally, though it can't be directly addressed from within the host software, the headphone socket is revealed as an independent audio stream from inside the mixer, making Firebox more of a six-in/10-out interface. In practice, being able to choose which stream can be monitored on 'phones will be very handy for on-stage musicians or DJs, allowing you to audition one track whilst another one is playing out — as well as for setting up an independent monitor mix during a recording session.

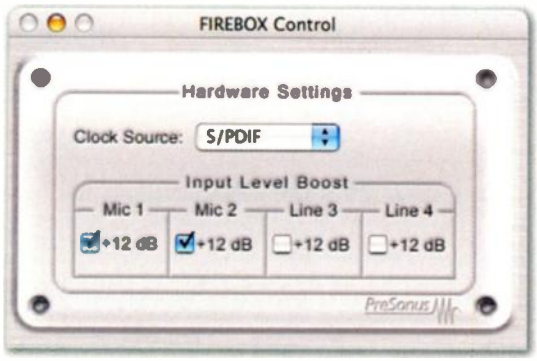


The Firebox Control utility, in its PC guise: note latency and sample-rate pop-ups.

Firebox Control is a strange tool in that it's not simply integrated into the mixer application. Basically, it provides a clock source switch (internal or S/PDIF) and 12dB boost switches for each of the analogue inputs. This makes up for the difference in level when you're connecting unbalanced devices with -10dBV outputs, and allows you to up the level while recording any quiet sources. The PC control panel also offers a sample rate switch and a comprehensive latency pop-up. The Mac panel lacks these two latter options, though the manual does mention 'right clicking' the control panel icon to choose between three computer optimisation settings. My main mouse doesn't have a right click, and all the button combinations I tried produced no result. In

Test Spec

- Presonus Firebox driver v1.2.
- Pentium 4 PC with 3.06GHz CPU and 1.25GB RAM, running Windows XP.
- Apple G4 450MHz PowerMac with 896MB RAM, running Mac OS 10.3.9.



The Mac version of the Firebox Control utility.

any case, latency/processor load and sample-rate settings were adequately dealt with from inside *Cubase SX* or the supplied *Cubase LE*.

In The Real World

As well as using the supplied *Cubase LE* software (check out the 'Touching *Cubase*' box for a little more on this excellent freebie), I had a go using the Firebox with my usual collection of familiar software — the full version of *Cubase SX* on both platforms, Cakewalk's *Sonar 4* on the PC, i3's *DSP Quattro*, my favourite audio editor on the Mac, and Propellerhead *Reason* 3.0 and Ableton *Live*, again on both platforms. The results were great across the board. Those applications that could record integrated well, and I appreciated the zero-latency monitoring options offered by the Mixer application. In all cases, I was able to record healthy numbers of audio tracks without clicks or dropouts.

The latency that becomes audible when playing virtual instruments from an external MIDI controller was more of an problem on my older Mac, where I found I had to adjust playback settings that resulted in unacceptable key-on to note sounding delays, but as I've already noted, this machine is well below Presonus's minimum recommended spec. The same problem also arose on my PC, but to a much lesser extent, and I found I was able to achieve a good result simply by playing with settings while recording MIDI-driven virtual instrument performances.

Moving past the issue of getting audio into and out of the computer, we come to the audio performance of the Firebox, and this is impeccable. In fact, *Reason* had more depth and 'oomph' than I've heard with my current audio hardware. The front-panel preamps are very forgiving, with great noise performance. It didn't matter whether it was my passive bass, a stereo out from a hardware synth or a mic: in each case the inputs extracted excellent, noise-free results. The sound coming back from software is also commendable, and I was impressed by the level that the monitor and headphone outputs are capable of. The 24-bit, 96kHz converters also have a clarity that's worth hearing; and as I just noted, the analogue circuitry really makes the most of the converters. Such excellent audio quality is a real bonus for a device that's so affordable.

Final Thoughts

All in all, the Firebox is good value for money and some street prices I've noticed make that great value. I can't think of much I'd fault here — the sound would be great on a much more expensive unit, and it operates at the high bit depths and sample rates many of us are working with. It offers plenty of input and output channels for home and portable applications.

I will note that the interface does run hot, even when powered from the Firewire buss. This needn't be a problem, though it might have an effect on where the unit is placed in a stack of gear (as might be the case with Presonus's Max Rac system mentioned earlier). The package I received also lacked rubber feet. Not a big issue, perhaps, but the Firebox's sturdy case does have some sharp edges that would play havoc with a varnished desktop! Still, a retailer such as Maplin should be able to sell you something useful for not much money.

You can see the lengths you need to go to in order to find fault with this unit. It's even an all-in-one recording system, with the inclusion of *Cubase LE* — just add your computer. Without even entering the USB vs Firewire debate, this is as fine a compact, portable audio interface as it's possible to find. Give the Firebox a listen — you won't be disappointed. SOS

information

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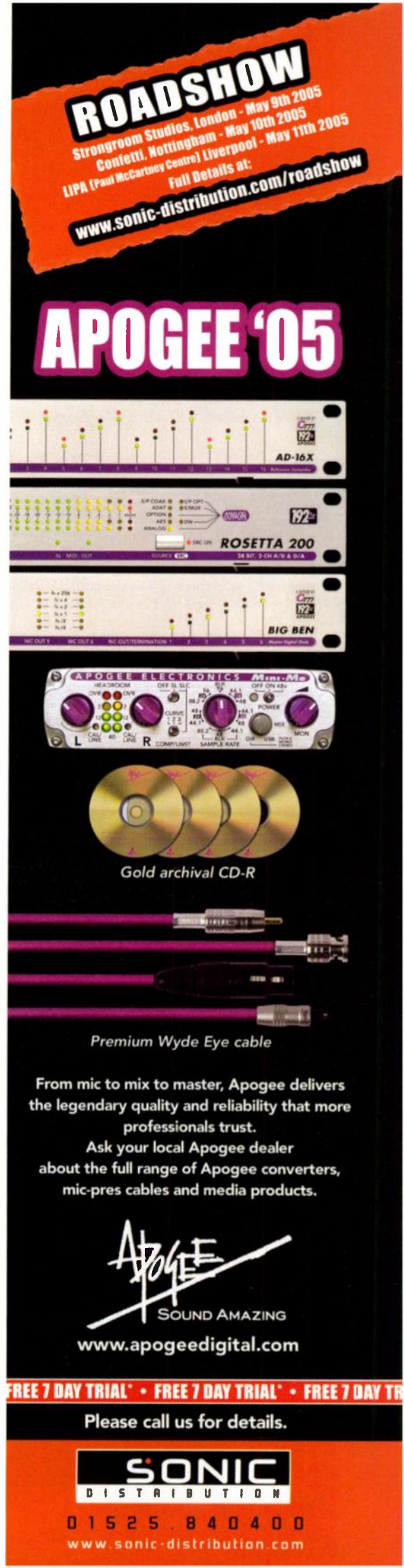
- F +44 (0)1579 326157.
- W www.presonus.com
- W www.handinhand.uk.net



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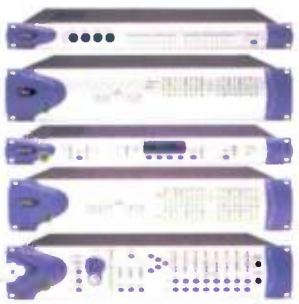

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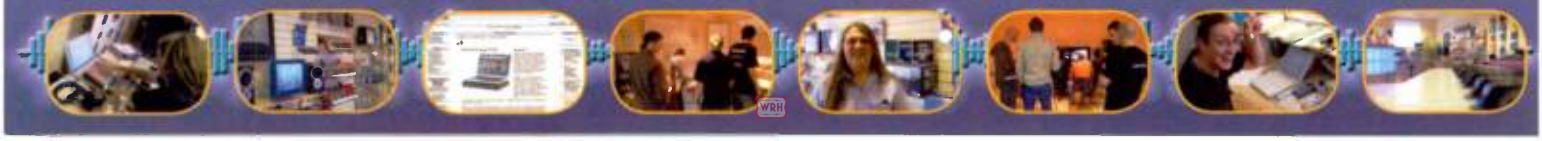

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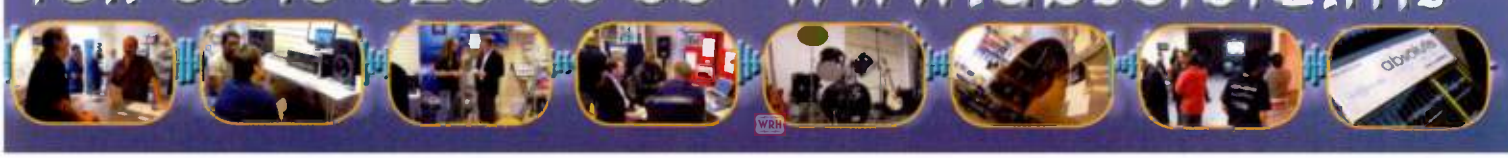

The Samson Rubicon 6A monitors.

Samson Rubicon 5A & 6A

Active Monitors

The performance of Samson's new project-studio speakers shifts up a gear courtesy of brand-new ribbon-tweeter technology.

Paul White

The vast majority of studio monitors use conventional driver technology, combining cone bass/mid-range drivers with dome tweeters or, in the case of some larger systems, compression drivers feeding horns. In theory, ribbon tweeters have a better transient response than conventional tweeters because they have no voice coil, making them lighter. The lighter the moving parts of a tweeter, the less its inertia and the faster it can respond to high-frequency information. However, ribbons have never really caught on in a big way because they've traditionally been expensive to build properly, they can be fragile, and they have a limited power handling. Furthermore, their very low impedance makes them quite difficult to drive, so special amplifiers are usually required. You may have seen our reviews on the ADAM range of monitors which use a unique 'concertina' folded ribbon to increase the amount of air that can be moved — folding the ribbon increases the impedance, which makes driving the ribbons easier.

Velocity Ribbon Tweeter

What Samson have done here shouldn't be in any way confused with ADAM's approach, as Samson's designers have stayed with a conventional planar (flat) ribbon. What they're done instead is use modern materials to try to overcome the limitations of traditional ribbon technology, while using mass-production techniques and offshore manufacturing to maintain an entry-level price. Their ribbon measures one inch by two inches, and is suspended in a magnetic field created by neodymium magnets. The

SOUND ON SOUND

Samson Rubicon 5A & 6A
£299/£379

pros

- Open, detailed sound with no obvious colorations.
- Inexpensive.

cons

- Less front-to-back perspective than some more sophisticated monitors.

summary

Given that these are relatively low-cost monitors, Samson have done a great job. Their new ribbon is a vast improvement over their old moving-coil tweeter. I'd be more than happy to mix on a pair of Rubicons in a typical project studio.

membrane itself is made from Kapton, a tough synthetic material that is used in other areas of driver manufacture for making coil formers, and this is coated with a fine layer of aluminium to make it electrically conductive. In a ribbon tweeter, the signal current is passed through the ribbon itself rather than an attached voice coil, forcing the ribbon to move within the magnetic field according to Fleming's rules of electromagnetic induction. The underlying electrical principle is essentially the same as that of an electric motor, or indeed a conventional magnetic driver. In some ways, you can think of a ribbon as being analogous to a capacitor mic, while a normal tweeter is more like a dynamic mic. The analogy isn't entirely accurate, as a ribbon tweeter is still driven by magnetism rather than electrostatic forces, but the use of a low-mass membrane that is less susceptible to resonances than a semi-rigid diaphragm has certain similarities.

There are two models making use of what Samson call their Velocity Ribbon tweeter, the Rubicon 5A and the Rubicon 6A. Both are two-way active monitors built into ported MDF cabinets, and the frequency range is remarkably similar on paper. The main difference between the two models is in the amount of sound level that can be generated, though the spec sheet manages to omit telling us what the maximum SPL actually is. Inside the cases are the necessary power amplifiers plus an electronic crossover, which includes a newly developed high-frequency control for matching the speakers to your room and sonic preferences.

"The Rubicons offer extraordinarily good value, without sacrificing any significant element of their audio performance that would get in the way of you doing a good mix."

The Rubicon 6A uses a six-inch inverted-cone bass/mid-range driver. This has a concave, rather than convex, dust cap and a butyl surround. A 75W amplifier powers the woofer, with a further 25W amplifier driving the tweeter. By contrast, the Rubicon 5A has a 50W power amp on the low end, and the cone driver is five inches in diameter. The 6A measures 9.25 x 15 x 10.75 inches (weighing 18lbs or 8.2kg), while the 5A is a more compact 8 x 13.25 x 9.25 inches (weighing 16lbs or 7.3kg). Both are similarly styled and feature a tough black painted finish with a red trim line on the front baffle. While the 6A manages a 57Hz-27kHz

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response (±3dB), the 5A fares almost as well with the same upper limit and a 58Hz lower limit. As stated earlier, the overall power, and hence maximum SPL, is the main difference between the two models as far as performance is concerned.

The cabinets, which have rounded corners, are 'shelf ported' via a slot at the bottom of the baffle, while the amplifier pack, controls and connections on the metal rear panel. There are both balanced quarter-inch jack and XLR input connections as well as an unbalanced RCA phono socket. Mains connection is via an IEC power socket with a power switch directly above it — a red LED on the front panel shows when the speakers are powered up. A continuously variable volume control allows for level setting, while the high-frequency EQ rotary switch operates on frequencies above 12kHz to provide the options of flat, -2dB, +2dB, or +4dB.

System Performance

I have to confess that I wasn't expecting great things from a ribbon tweeter monitor at this end of the UK price scale, but as it turned out both models performed rather well. The high end turned out to be open and very detailed without sounding strained, and the ribbon tweeter crosses over smoothly into the mid-range. Compared with earlier Samson monitors, the difference is huge.

The bass end is typical of a ported cabinet of this size and is perfectly adequate for a small to medium studio, though it is less solid than from my Mackie HR824s. There's also a little less of an impression of the front-to-back perspective that you get with more sophisticated (read 'expensive') monitors, but overall I was extremely impressed with the honest tonal balance, lack of obvious coloration, and ability to resolve detail. There's plenty of level to be had from both models, though the larger 6A seems more comfortable at very high monitoring levels. The 5A starts to sound just a hint 'tubby' when you push it really hard, but at sensible monitoring levels, and even slightly above, it sounds absolutely fine. My tests included a range of electronic and acoustic material as well as voice, and my feeling is that when the EQ switch is set to flat the speakers are just a hint forward sounding, but no more so than some big-name monitors. They're not fatiguing to work with for long periods and they seem quite tolerant of mounting position, with a wide sweet spot.

Despite my preconceptions, I have to concede that the Rubicons offer extraordinarily good value, without sacrificing any significant element of their audio performance that would get in the way of you doing a good mix. Corners have been cut to achieve the price, but it seems to me that they've been cut in the right places — the cabinet is simply painted MDF, while the baffle surrounds are moulded from plastic. Nevertheless, the speakers look great and seem to have been properly engineered. Whatever the traditional limitations of ribbons, this one sounds nicely transparent and seems happy at subjectively loud SPLs, and given that it is made from Kapton I can't see why it should be any less durable than a regular tweeter. Just as offshore manufacturing and a wider marketplace brought down the cost of capacitor mics, perhaps we're due to see the same thing happening with ribbon tweeters...

There are probably only four or five active monitors that I'd entertain for anything like serious studio use at under £400 per pair in the UK, but I'd have to add the Rubicons to this list. As they're so inexpensive, I'd go for the larger 6A if given a choice, but in the smaller studio the 5A certainly won't disappoint. SOS

The smaller Samson Rubicon 5A.

Information

£ Rubicon 5A, £299; Rubicon 6A, £379. Prices include VAT.
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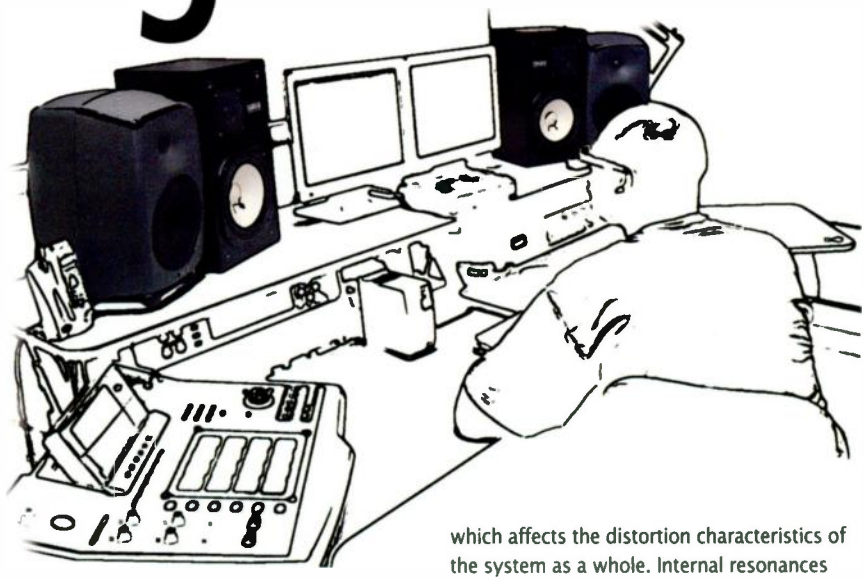
Choosing Monitors

There are many decisions to be made when choosing a monitoring system. Infinite baffle, reflex, or transmission line? Active, powered, or passive? Bi-wired or bi-amped? We help you find the answers you need.



Hugh Robjohns

Choosing a monitoring system can be a difficult and confusing task, not least because of the enormous number of models and designs on offer. For a start, there are three basic classes of monitoring loudspeaker: infinite baffle (sealed box), reflex (ported), and the less common transmission line. Some monitors use a single wide-band driver, but most are two-way or three-way, while others use four or more drivers. There are also systems which require a separate subwoofer. And finally, three different amplifier arrangements are widespread: passive, powered, and active, along with bi-wiring options. So let's have a look at the pros and cons of each of these designs.

Infinite-baffle Designs

The simplest kind of cabinet construction used in studio monitors is the infinite baffle, or sealed cabinet. Theoretically, an infinitely large baffle will divide the sound coming off the front of the loudspeaker driver from the opposite-polarity sound coming off the rear, but both sides of the loudspeaker cone are working into the same infinitely large volume of air and thus are loaded identically. Of course, such a concept is not workable in practice, and the closest we can come to the ideal is to build a large sealed box and place the loudspeaker in the front baffle, hoping that the sound coming off the rear of the speaker cone will be absorbed within the box.

Sadly, it's not quite that easy. Clearly, the rear of the cone is working against a much smaller volume of air than the front of the cone, and that volume of air is fixed. Consequently the loudspeaker cone feels a different degree of resistance when moving inwards than it does when moving outwards, which affects the distortion characteristics of the system as a whole. Internal resonances and standing waves can also be created within the cabinet, despite the use of lots of absorbent material, and this can produce various audible colorations in the sound.

Finally, the bass response of this kind of cabinet is relatively limited compared to that of other arrangements, for a given cabinet size, the low-frequency roll-off starting at a relatively high frequency. On the plus side, though, the phase response is very smooth, with relatively little phase shift, and the slope is also quite shallow, averaging 6dB/octave. Indeed, because of the shallow slope, even small infinite-baffle speakers can produce audible bass at surprisingly low frequencies.

For many, the infinite-baffle design is the most highly regarded and least compromised solution to loudspeaker monitoring. It is also interesting to note that the most widely used mixing references — the Auratone and the Yamaha NS10 — are both infinite-baffle designs. One of the most revered high-quality infinite-baffle designs was the infamous LS3/5A — a BBC in-house design dating back to the early '70s.

Ports are used in the majority of project studio monitors, primarily because they help boost the output level at low frequencies. In lower-cost monitors (such as the M Audio BX5, Samson Resolv 80A, Event TR5, and Behringer B2030A Truth shown below), the main side-effect of this design is a smearing of low-end transients which makes it difficult to judge the balance of bass instruments. However, the problems of ported cabinet design can be overcome, and more expensive models such as the Earthworks Sigma 6.2, Fujitsu Ten Eclipse TD512, Tannoy Ellipse 10 IDP, and ADAM S3A are able to achieve professional performance.

Photos: Mike Cameron & Mark Ewing

SOS Reviews: Infinite-baffle Monitors

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A couple of more modern and high-tech examples of the infinite-baffle loudspeaker are the K+H O 300D monitor, most AVI monitors, and the smaller ATC monitors. These speakers demonstrate the characteristically smooth, natural-sounding bottom end and associated mid-range clarity of the closed-box design very well. To many, what the infinite-baffle approach lacks in raw low-end volume, it more than makes up for in quality and transparency.

Reflex Cabinets

The most common cabinet design is the reflex or ported cabinet, which makes deliberate use of the resonance of the cabinet to take advantage of the sound coming off the rear of the loudspeaker cone. Instead of being completely sealed, the cabinet has a hole in it through which the internal sound can escape and contribute to the overall sound in the listening environment. The vent may be located on the front baffle, it may be on the rear, and it may take the form of one or more round holes or slots. Most usually, the vent is connected to a tube extending back into the cabinet, the diameter and length of which are carefully calculated to achieve the required frequency response. Across a specific frequency range determined by the various parameters of the port opening, the sound from the rear of the loudspeaker cone is allowed to resonate through this port, emerging in the same polarity as the frontal sound to bolster the low-frequency response of the system as a whole.

The advantage of this approach is that it allows a much greater acoustic output at lower frequencies than the infinite-baffle design — you get a far more impressive bass response and overall volume level for the size of the box. However, there are a few disadvantages, one being that any resonant system smears transient signals over time. This can most clearly be seen on the waterfall response charts beloved of hi-fi magazine reviews, where one or more long resonant tails can usually be seen at low frequencies.

In monitoring terms, this inherent time-smearing and resonant behaviour can obscure small dynamic changes in the signal being auditioned, and may also reduce the transparency of the mid-range. In practical terms, a poorly designed reflex system can make it extremely hard to judge the relative levels of bass instruments properly, because their energy is stretched over time.

Another issue is the frequency- and phase-response characteristics of the port resonance. While the low-frequency roll-off point can be extended to a significantly lower frequency using a reflex design than with an equivalently sized infinite-baffle cabinet, the slope is far steeper, and the phase shifts far greater. Thus the level of bass output is greater down to the roll-off point, but then falls away much quicker, and a reflex cabinet is likely to reproduce very low frequencies at a far lower level than an infinite-baffle speaker. The inherently large phase shifts of this design also reduce (or at least affect) the naturalness of the bass end — although not everyone appears to be sensitive to this aspect of sound reproduction.

The extent and impact of these inherent disadvantages depends enormously on the competence of the reflex cabinet's design and what the designer was trying to achieve. There are many excellent reflex designs around, including the larger ATC monitors, all the Genelec models, various Dynaudios, Mackies, and Tannoys, and many others. The Mackie monitors are an interesting sub-class of reflex design, though, because the port is covered by a passive radiator — in essence an unpowered speaker cone that reacts to the sound pressure inside the cabinet. This is a more complex arrangement again, sharing some characteristics with both infinite baffle and reflex designs — although it falls most comfortably into the latter camp.

Transmission-line Systems

The third type of cabinet is the transmission line, and at the present time there is only really one commercial monitoring manufacturer using this approach — PMC in the UK. Like the passive radiator approach, the transmission line in some ways presents a combination of both infinite baffle and reflex characteristics, arguably offering the best aspects of both worlds. Essentially, a transmission-line speaker places the driver cone near to or at the end of a long large-diameter tube which is very heavily damped with absorbent material. To make the cabinet practical, the tube is generally folded several times internally, allowing a line length of several metres to be enclosed within even fairly compact cabinets.

Across most of the low and middle frequency range the transmission line is so well damped that all of the sound energy from the rear of the driver cone is completely ▶

absorbed and none of it reaches the outside of the cabinet. In that regard, it operates like a true infinite-baffle design — none of the rear sound reaches the listener. At very low frequencies, though, the line absorption becomes less effective and some very low-frequency sound reaches the end of the transmission line, much like the sound leaving a ported speaker. This allows a near flat response which extends down to at least an octave below any similarly sized reflex cabinet. One other advantage is that the overall frequency response varies very little with monitoring volume — the balance stays more or less constant regardless of listening level — which I personally find very useful.

How Many Ways?

Single drivers can't really handle the entire audio spectrum at monitoring levels, so the vast majority of monitoring speakers employ two drivers — a low-frequency/mid-range woofer and a high-frequency tweeter. The former generally handles frequencies below about 2kHz and the latter everything above, the actual changeover point being called the crossover frequency.

Getting two drivers to match each other in terms of level, phase, and dispersion at the crossover point is far from trivial, and the

All of the monitors in Mackie's HR series, including the HR626 shown here, use a variation on the reflex design, where a kind of passive speaker cone is fixed over the end of the port. This design retains some of the advantages of the infinite baffle, even though a port it used.

on-axis frequency response of a loudspeaker is only one aspect of its performance that must be right. The relative phase through the crossover region is just as important, and the smoothness of the off-axis responses arguably more so — after all, most of the sound energy we hear in a room is reflected off-axis sound rather than direct sound. This is often what differentiates a really good monitor from a less good one.

Loudspeaker monitors have polar responses just like microphones or acoustic instruments. Some designers argue that a loudspeaker should have an omnidirectional polar response, and there are commercial designs built to do that — but in most typical studio situations a directional speaker works far better with typical acoustic treatment designs. At very low frequencies, speakers tend to radiate omnidirectionally because the wavelengths of low-frequency sound are generally far larger than the speaker cabinet. As the frequency rises, the cabinet starts to influence the dispersion of sound, and so the polar response starts to narrow into a more directional lobe. At higher frequencies still, the size of the driver itself starts to influence the dispersion, and the sound lobe reduces to something more like a beam.

Through the crossover region, the sound will be generated by both mid-range/woofer and tweeter, but given the relative size of the two drivers in relation to the wavelengths being produced, the woofer's polar response is likely to be very 'beamy', while the tweeter will have a much broader dispersion. Such a disparity in dispersion angles will cause a huge step in the off-axis frequency response, and consequently a very coloured off-axis sound. This is one reason why a speaker can sound very different when placed in a highly damped room than it does in

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a more lively, reflective room. It's only in the last twenty years or so that the importance of the off-axis sound and the careful matching of dispersion has been realised. So the width of the front baffle, the relative size of the drivers, and their crossover frequencies and filter responses are all chosen very carefully to optimise the response of the complete system.

Many systems these days employ waveguides around the tweeter to help control dispersion and sometimes to create different polar responses in the horizontal and vertical planes. This is usually to reduce early reflections from console and ceiling, and it's also one reason why turning a nearfield monitor on its side is not a good idea!

Designing a two-way speaker is hard enough, but most designers agree that a three-way system offers the best overall performance. Although there are two crossover regions to perfect, the disparity in size from woofer to mid-range driver to tweeter is much smaller, so the dispersion matching between adjacent drivers is easier. Each driver also has to operate over a much narrower frequency range, which enables each to deliver far better performance. Indeed, the improvement in the mid-range resolution and clarity of a good three-way system compared with a two-way system is very significant. Systems with additional drivers — four-way systems and systems with multiple tweeters, bass units, and so on — become a lot more complicated, and often the advantages are outweighed or at least balanced by the disadvantages.

Powered Models

The traditional way to build a loudspeaker is with a high-level crossover that accepts the full-bandwidth, high-power output of a power amplifier and splits that signal into two or more separate frequency bands to feed the appropriate drivers. However, the quality of such a 'passive crossover' can affect the sound dramatically, and there are limitations as to what can be achieved in terms of response shapes and phase alignment using passive filtering. Additionally, passive systems are inherently lossy in terms of power dissipation.

A passive loudspeaker is powered from a separate amplifier, typically installed some distance from the speaker and connected via a two-wire cable. Given the need to transfer power from the amp to the speaker and the relatively low impedance of the speaker itself, this cable has to have very low resistance and be able to carry large current pulses. Bell wire is not recommended, but any relatively substantial two-core cable will do. Two-core lawn-mower mains cable is ideal in most circumstances, and very cost-effective — far more so than the esoteric cables promoted in hi-fi shops.

Assuming good clean and tight connections and a competent amplifier, a passive speaker connected with respectable cable will perform very well. However, there are potential quality gains to made, if the speaker's innate resolution warrants it, by doing what is known as 'bi-wiring', where the tweeter and woofer are connected to the amplifier by separate cables. The passive crossover must be designed for bi-wired operation, and must provide separate pairs of terminals for each driver (normally linked with bars or brackets which must be removed for bi-wiring). This allows the amplifier to control the damping of each driver more effectively, as this bi-wiring separates the large sustained current flows to the bass driver from the smaller high-frequency signals. However, the crossover filter for each driver is still placed at the end of a long piece of connecting cable.

A related configuration is called 'bi-amping'. Here separate power amplifiers are used to drive the bass driver and tweeter. Each amp is fed with a 'Y'-cord so that it is amplifying the same signal through both channels, and is then connected to the relevant terminals of the speaker. The idea is to remove the interaction between bass and treble signals completely, but the practical disadvantages of this approach usually outweigh any performance gains.

Bolting the amplifier directly to the back of the speaker cabinet reduces the length of the speaker cable considerably, and thus also improves performance. The result of this approach is known as a 'powered speaker', but it is important to remember that the crossover circuitry is still passive.

Active Electronics

The final step is to remove the crossover function from the speaker and perform it at line level using active electronics. Speakers designed this way are known as active speakers, and potentially have a lot of advantages. Firstly, far more complex filter shapes and characteristics can be implemented with active electronics than with passive circuitry, and the need for large capacitors and inductors is removed. This facilitates better matching of drivers through the crossover region. Most active designs also incorporate room equalisation and tailored response facilities that can be very useful too.

By performing the crossover separation ahead of the amplification, it is necessary to power each driver with its own amplifier. This affords the second advantage, which is that the amplifiers' responses and power ratings can be tailored precisely to the speakers they are driving and driver protection systems can be easily built in. Most active systems intended for home studios are fully integrated solutions, so the cabling between the amplifier and driver is very short, although larger high-end active systems usually employ separate amplifiers with rackmounting active crossover units.

There are also some disadvantages with active designs, the most obvious one being that the number of amplifiers required has doubled or trebled compared to a passive design, and good amplifiers are inherently expensive. There are cost savings to be made in translating a passive crossover into an active one, but nothing like the amount needed to fund the kind of amplifier usually employed with good passive speakers.

In order to make active speakers for the budget end of the studio market, most manufacturers have to employ cost-effective 'chip amplifiers' — fully integrated designs — rather than traditional discrete circuits. Alternatively, many have chosen to use very efficient Class-D digital switching amplifiers, but in both cases the signal quality is often compromised in comparison with a good rackmounting amplifier. Whether these potential amplification losses are outweighed by the filtering and connection gains and careful system optimisation within any specific system is largely open to debate. However, overall I would say that, on pure resolution and transparency grounds, the losses generally outweigh the gains on most active speakers costing less than about £250 each in the UK, and true monitor resolution doesn't start to emerge until at least double that figure. SOS

SOS Reviews: Passive-radiator & Transmission-line Monitors

- Mackie HR624: May 2002
  W www.soundonsound.com/sos/May02/articles/mackiehr624.asp
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  W www.soundonsound.com/sos/May04/articles/mackiehr626.htm
- PMC DB1S: January 2003
  W www.soundonsound.com/sos/Jan03/articles/pmcdb1.asp
- PMC TB2SA & DB1SA: May 2005
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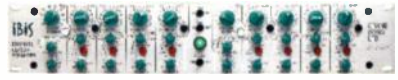

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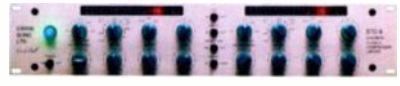

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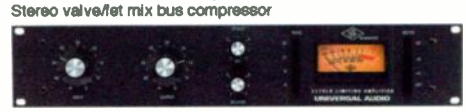

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Rock Steady

RME Designs • Matthias Carstens • Stephan Flock

From simple beginnings as an offshoot of an electronics project, RME have established themselves as soundcard and recording interface manufacturers whose products are almost always reliable, and usually offer that bit more than those of their competitors. We talk to their head of development about their recent innovations.

RME head of development Matthias Carstens.

Paul White

It would be too easy to dismiss RME as just another one of those worthy but unexceptional companies that produce soundcards or audio interfaces, but behind the company is a very dedicated team of audio engineers with a whole range of technical and artistic skills. For example, Stephan Flock, who is the company's main digital designer, is also a concert pianist and classical recording engineer with a Grammy award to his credit. RME regard themselves not as a manufacturing company but rather as a design and development team, and today, the equipment that bears their name is marketed by European distributor Synthax, with whom they enjoy a symbiotic relationship. RME's latest range of products makes a good showcase for the company's technical approach to product design and there are several 'under the hood' innovations that were explained to me when I interviewed Matthias Carstens, RME's head of development, and Stephan Flock, the company's digital design guru.

In The Beginning

I was curious to know what career path Matthias had taken that had ended up with him founding and running RME. He explained as follows. "I trained as an electronic engineer, played drums in bands and also developed an interest in recording. I later worked in a music store, where I gained a reputation as a good repair man, and eventually went on to become head product designer for Behringer, where I designed the Edison, the Supressor, the Ultramatch and my personal favourite, the Combinator, a four-way compressor/limiter with more than 2000 components inside. My last development for the company was a piece of tube circuitry which allowed harmonics to be added in a controlled way." Matthias has also worked as a journalist and editor for the former highly regarded German electronics magazine *ELRAD*, as well as contributing many articles to the country's top computer mag, so he has what you might call a well-rounded background.

So how did RME get started? "In 1996 a project was presented for publication in *ELRAD* by a young East German man who had developed a small pice of equipment called the DAM1 (Digital Audio Monitor). The design was published as a DIY project, but I thought we should built it in quantities and sell it". The author, Ralf Männel, agreed, and that was the start of RME. Ralf specialises in DSP code, and designed the DAM1, the ADI96 Pro, DIGICheck and the HDSP Meter Bridge.

"Also In 1996, two brothers named Kirst got in contact with *ELRAD* about a PCI recording card design. I contacted them and convinced them that they could earn some money if the products were improved and built in quantity. Martin Kirst studied electronics, plays organ in churches, and changed his name to Björnsen when he married. Martin developed the Hammerfall hardware and wrote all the Windows and Mac drivers for our products. Uwe Kirst has worked on most major projects together with his brother Martin. His latest contribution to RME is the Fireface hardware and parts of the Fireface Windows driver.

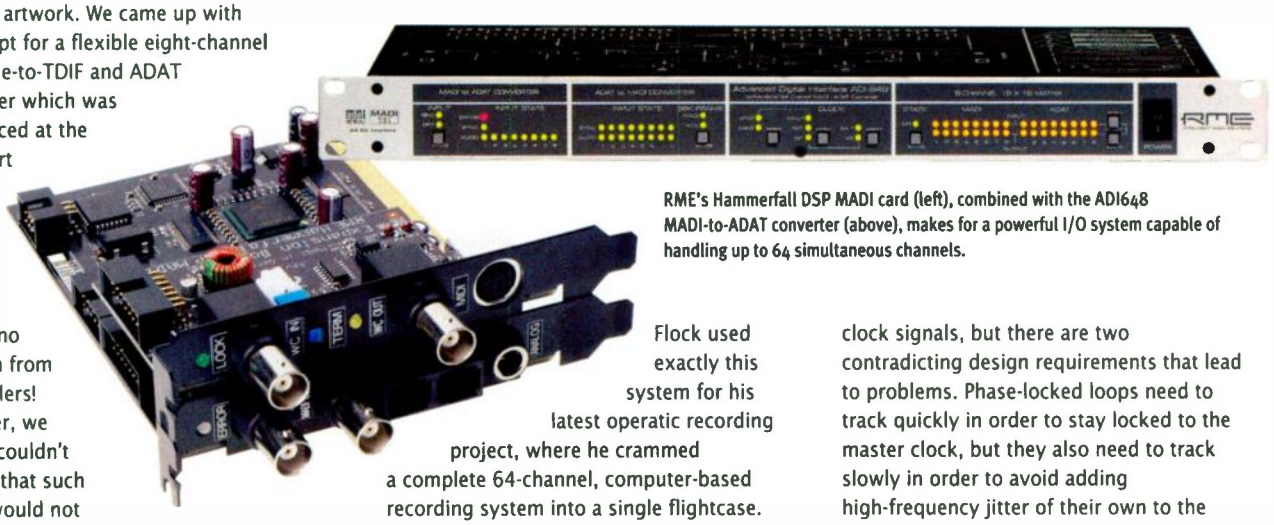
"I found a very small manufacturer, Ingenieurbüro Müller, located in Mittweida, who agreed to build the DAM1 and the PCI recording card in small quantities for a reasonable price. Today, IMM still build all our products, but their small company has now grown to more than 100 people. Then we needed a distributor in Germany, and Synthax's name came up — Hermann Savon, the MD, had a good reputation for being a serious business partner. Two months later, I was part of his booth at the Frankfurt Musikmesse!

"The DAM turned out to be a disaster, as nobody wanted it, but our recording card, the DIGI32, sold quite well and quickly gained a good reputation. Later, we added an analogue monitoring output to this card, and in February 1998 the DIGI32 Pro was launched as the world's first 96kHz audio card! At RME we were also first with 24-bit NT drivers, Interrupt sharing support, ASIO hardware, a multi-channel solution under Windows NT and Linux, and ASIO Direct Monitoring."

In 1997, Matthias asked Stephan Flock to join the RME team. "Stephan studied music, has a degree as a balance engineer, and works for the famous Emil Berliner Studios, formerly part of Deutsche Grammophon — now Universal — as a freelance engineer. He has made numerous classical recordings all over the world, and has been responsible for the RME ADI8 Pro and DS, the ADI4 DD, the ADI2, the ADI648 and the TDIF Expansion Board, as well as lots of forthcoming RME products!

"At the time Stephan joined us, we had

digital interface cards with ADAT ports, but we had no A-D or D-A converters, so I asked Stephan if he would be interested in designing the digital part of an eight-channel A-D/D-A converter with me doing all the analogue circuits, the layout and the artwork. We came up with a concept for a flexible eight-channel analogue-to-TDIF and ADAT converter which was announced at the Frankfurt Music fair in March 1998 — to almost no reaction from our dealers! However, we simply couldn't believe that such a unit would not sell, and at the end of 1998 we continued working on the ADI8 Pro. The unit began shipping in May 1999, shortly after the following Frankfurt Music fair, and proved to be a good example of how wrong dealers can be; it became a major success and a top seller for RME. Our Hammerfall DIGI9652 shipped in July 1999, and Steinberg were so impressed with our cards that they made OEM versions available via Steinberg distributors worldwide as part of the Nuendo series. However, we now sell our products only under the RME name."



RME's Hammerfall DSP MADI card (left), combined with the ADI648 MADI-to-ADAT converter (above), makes for a powerful I/O system capable of handling up to 64 simultaneous channels.

MADI

RME have also made use of the MADI (Multitrack Audio Digital Interface) protocol first developed as a high-end data pipeline between digital multitrack recorders and digital consoles. Matthias Carstens: "At the end of 2002, we made a decision to utilise the MADI digital interface in our products, and in early 2004, our Mac OS X drivers turned the Hammerfall DSP MADI into the world's only MADI solution for Macs" (see the *SOS* review from March this year, or check out www.soundonsound.com/sos/mar05/articles/rme.htm).

While other companies are trying to establish new protocols such as mLAN, MADI already exists, it is a standard and it works — and RME have designed a MADI interface that is both affordable and reliable. A single MADI PCI card can handle 64 channels of simultaneous 24-bit inputs and outputs at 'normal' sample rates and proportionally fewer at the more 'exotic' sample rates. The MADI data can travel long distances (two to three hundred metres) over a pair of optical or co-axial cables and RME also build the ADI648, a 64-channel ADAT-to-MADI converter unit that makes an ideal partner for up to eight of the company's eight-channel mic preamps (which have ADAT outs). Indeed, Stephan Flock used exactly this system for his latest operatic recording project, where he crammed a complete 64-channel, computer-based recording system into a single flightcase. Other customers have realised the benefits of MADI for replacing stage multicores, which means the RME design team now needs to think about remotely controlled mic preamps to add to its line.

Steady Clock

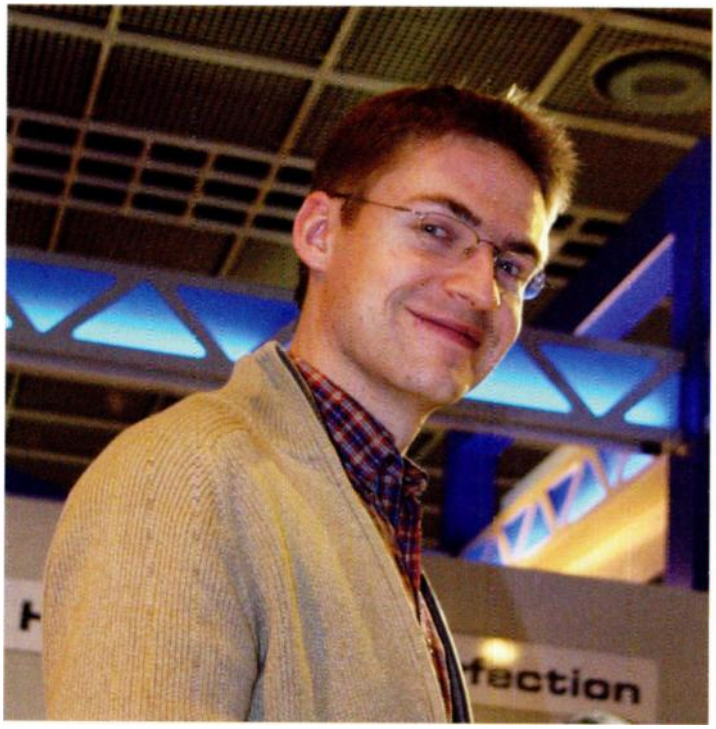
RME's Steady Clock system is another very interesting piece of RME technology, reducing jitter when an RME interface fitted with the technology is clocked from an external source. Jitter is the name for any modulation of or variation in the master clock frequency. It has the effect of modulating the audio in much the same way as FM synthesis (albeit to a much lesser degree), introducing artifacts such as noise, enharmonic distortions and a deterioration of the stereo image. Traditional studio equipment uses a piece of circuitry known as a phase-locked loop to follow external clock signals, but there are two contradicting design requirements that lead to problems. Phase-locked loops need to track quickly in order to stay locked to the master clock, but they also need to track slowly in order to avoid adding high-frequency jitter of their own to the clock signal! In other words, their final performance is a compromise between how well they track and how low their jitter is. In practice, a standard PLL effectively removes jitter noise in the range above 100kHz.

RME's approach is to use a direct digital clock or DDC. These circuits still use a highly stable crystal oscillator as a reference, but they derive their output frequency from this digitally. "Steady Clock was originally developed to recover a stable and clean clock from the inherently heavily jittery MADI data signal", says Matthias Carstens. "The embedded MADI clock suffers from about 80 nanoseconds of jitter, caused ▶

RME's digital designer and engineer Stephan Flock overseeing a choral recording in London. Unsurprisingly, you can see some RME hardware in the rack in the background!

by the time resolution of 125MHz within the format. Using the Steady Clock circuitry, the input jitter of 80 nanoseconds is reduced to less than two nanoseconds. Interface jitter values in real-world applications are usually below 10ns, so 2ns is a very good specification."

Of course, a DDS itself jitters, as it generates fixed step sizes between frequencies, so a DDS generator needs a filter on its output signal. Furthermore, the reference clock has to be measured with very high accuracy, or the errors of this measurement will contribute to the newly generated clock as additional jitter. RME's solution is simple but cost-efficient. Built around the Field-programmable Gate Array (FGPA) chip that lies at the heart of all RME's recent products, Steady Clock scans the input signal at 100MHz. This scanned frequency is then averaged over 1024 samples, which is equivalent to a digital jitter filter with a corner frequency of around 100Hz, reducing all jitter in the audio band. According to Stephan Flock, at 2.4kHz the jitter reduction is higher than 30dB and even an input jitter of 50 nanoseconds vanishes below the inherent jitter of the Steady Clock, which is below two nanoseconds. Additionally, Stephan claims that the averaging process improves the already precise scanning of the input frequency. Matthias Carstens: "Our DDS implementation operates at 200MHz, outperforming expensive, specialist DDS chips. A digital PLL then allows us to control the lock and sync behaviour completely, optimising it in a way that would not be possible with discrete solutions. The Steady Clock output signal has only a small amount of jitter, and can be easily filtered by a simple analogue high-performance PLL.



Martin Björnsen, developer of the renowned Hammerfall hardware.

"The practical outcome is that we lock faster to any input signal than all our competitors do, we stay locked even when fiddling around with the pitch of an ADAT recorder — none of our competitors can do this — and we have no transition during the complete lock and sync process. Steady Clock is also the only system that operates steplessly over the whole sample rate range of 28kHz to 55kHz, without missing any frequencies or switching between several 'ranges'." Sure enough, measurement plots of RME's jitter compared with that of other high-end products shows it to be significantly less when externally clocked (only in such cases do the benefits of Steady Clock apply). What's more, as Stephan Flock explained, if the input clock drops out for any reason, Steady Clock will continue to generate a clock at the last valid frequency until the clock is detected again. Matthias Carstens sums the technology up thus: "In short, Steady Clock guarantees low-jitter performance in all clock modes as its highly efficient jitter suppression cleans up any clock signal, and provides it as reference clock at the word clock output. This allows the best A-D and D-A conversion to be achieved, no matter what the reference clock source." For more information on Steady Clock, check out www.rme-audio.com/english/techinfo/steadyclock.htm.

Same Difference?

Today, RME has more products than ever, but the core team of designers remains the same, with Ingenieurbüro Müller manufacturing and Synthax distributing worldwide, and Matthias Carstens thinks this stability is a decisive factor in their success. "RME always has been and still is a group of developers with me as head. The secret of the company is in the core team's qualifications. You can hire engineers who can do electronics. You can hire project guys who studied economics. You might even hire musicians. But you won't get the same result as you do when the core team has all these abilities already." SOS

Leaders In The Field

RME's Fireface 800, as its name suggests, can exploit the higher speed of Firewire 800 and this has been achieved by the use of a Field-programmable Gate Array (or FPGA) chip that has been programmed to function as a Firewire interface. According to Stephan Flock, RME took this approach partly because existing Firewire 800 chip sets were not entirely suitable for audio use, and also because the use of FPGAs allows the units in which they are installed, in effect, to be given a hardware update as improvements are made to the design.

So far, this approach has stood RME in good stead. Early iterations of the Fireface 800 had compatibility issues with some commercial Firewire equipment because of operational quirks in the chip sets used in these products. Subsequent updates have enabled them to iron out these problems, whereas if they'd used commercial Firewire chips, there would have been no way of updating the designs. The FPGA chip used by RME also has a powerful onboard DSP section enabling the designers to add the Total Mix feature. This allows you to set up multiple independent monitor mixes, and also means units fitted with the chip can function as a stand-alone mixer without depending on the computer.

The RME Fireface 800 has an updatable Field Programmable Gate Array (or FGPA) chip at its heart, like the recent MADI-enabled Hammerfall card.

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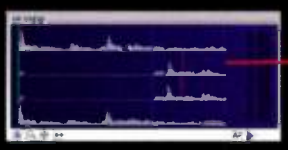

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M Audio Key Rig/ Drum & Bass Rig

Virtual Instruments For Mac & PC

Midiman/M Audio have come a long way since their days as a MIDI interface company. Now they sell everything from mics to laptop bags — and *Key Rig* and *Drum & Bass Rig* are their first foray into software instruments...

Nicholas Rowland

While M Audio is an established name in the world of MIDI and audio hardware, more recent times have seen the company developing a growing presence in music software. Up to now, though, this has been through marketing and distributing other companies' products, such as Ableton's *Live*.

However, at NAMM earlier this year, M Audio announced their first 'own label' packages, *Key Rig* and *Drum & Bass Rig* — two collections of cross-platform virtual instruments that can be used either as stand-alone programs or as plug-ins under the main sequencers. As the name might suggest, *Key Rig* is primarily intended for computer-based keyboard players, and offers a sampled piano module, a polyphonic, analogue-style synth, a virtual Hammond organ and a General MIDI module. The musical theme of *Drum & Bass Rig* is not to be confused with drum & bass, the frenetic breakbeat-driven musical style — we're talking real drum kits and bass instruments here! This plug-in is more eclectic in its purpose, being aimed at any computer musician in search of a rhythm section. This program consists of a preset rhythm loop 'creator', a TB303-style acid bass machine module, a sampled drum-playback unit and a virtual electric/acoustic bass player that can also do some bass synth sounds on the side as well. While each module can be played and edited independently — and all of them also have at least one programmable effects unit of their own — each *Rig* also offers a master effects section, plus programmable split, layer and mix settings so that you can create mega Performance patches using the sounds of the entire *Rig* as a single entity.

Opening either product box, you'll find a lot of air, a four-page Quick Start guide which, along with perfunctory installation instructions, bears the all-important registration serial number, plus a single, dual-platform CD-ROM. In fact, whichever of the two you buy, you'll discover it's the same CD containing the full set of data for both programs — the idea being that you get the chance to try the companion product as a 30-day demo.

The required operating system for both programs is Windows XP or Mac OS 10.3 or higher. As I've mentioned, both *Rigs* can be run in stand-alone mode or used as plug-ins with any sequencer that supports VST or RTAS (Mac and PC) or Audio Units (Mac-only) formats, which covers all the usual suspects. The installation procedure for Mac varies slightly according which flavour or flavours you intend to use, but basically it's a question of installing the program on your main applications drive, and copying the factory presets and sound data (in excess of 250MB in either case) to any available hard drive on your system. You then run a routine which tells the main program where all its source data is to be found. Installing under Windows XP is a similar process.

With software piracy on the increase, we're seeing manufacturers introducing increasingly complex registration routines. M Audio have adopted a two-stage approach: you first type in the serial number you get with the product, then connect to the M Audio web site which, in return for your personal info, generates a 'product certificate' containing a further authorisation code to fully unlock the program. If the

Test Spec

- 1.8GHz Apple iMac G5 with 1GB of RAM running Mac OS v10.3.7.
- M Audio *Key Rig*/*Drum & Bass Rig* versions reviewed: v0.1 (for both packages).
- Digidesign *Pro Tools LE* v6.9.

Key Rig.

computer you're using for music isn't connected to the Internet, you will need to follow an 'off-line' procedure via another Internet-enabled machine. Basically, without this second code, the programs will only run in demo mode for a limited period, so you simply can't get away with not registering.

Turning The Key

First on the test bench was *Key Rig*, which I ran on a G5 iMac, both in stand-alone mode and then as an RTAS plug-in in *Pro Tools LE* (v6.9) with everything running under OS 10.3.7. All the functionality is exactly the same for Windows users, the only difference being that their version has some extra controls to configure the plug-ins to work with the particular soundcard they have installed on their PC.

As you can see from the screenshots accompanying this article, both plug-ins takes the form of a stack of four virtual rackmounted modules, in this case the SP1 Stage Piano, the MS2 Polyphonic Synthesizer, the MB3 'Electromagnetic Organ' and the GM4 General MIDI Module. All have nicely styled graphical interfaces with a logical control layout, so it's easy to jump in and start playing around. I'd still recommend a read through the business-like electronic documentation, a PDF manual which gives you the lowdown on the function of each knob and slider.

At the top of both *Rigs* are the master controls. Master Volume and Fine-tune are self explanatory. Tempo is used to set the speed of any tempo-dependent parameters — such as delays or the LFO on the MS2 synth. However, if the *Rigs* detect an incoming MIDI Clock signal from a host sequencer or an external MIDI instrument, then they will automatically sync to this instead.

The global effects section offers no less than 49 preset algorithms, covering the usual suspects like reverbs, delays, chorus, tremolo, flanging, EQ and compression, plus distortion (including amp simulations and bit-crushing), phasers, wah-wahs and pitch-shift. Each effect offers you programmability of its two most important parameters (for example, for reverbs it's reverb time and damping) plus an overall wet/dry mix control. Finally, we have Load and Save buttons for dealing with global *Rig* patches. These would include the information such as MIDI channel and MIDI continuous-controller assignments, volumes, panning, key range, transpose, master effects sends, on/off status and so on, plus specific settings for each of the separate instruments in the *Key Rig*, as well as the global effects settings. What's missing, though, is any ability to play any of *Key Rig's* modules from within the program itself.

Let's start by tickling the ivories of the SP1 Stage Piano module. This offers 11 different piano sound presets: specifically, seven sampled acoustic pianos (five flavours of grand, an upright and one called 'Honky Tonk'), two Rhodes-style electric pianos, an FM piano and a Wurlitzer. What strikes you immediately is the high quality of the sounds. Individually the acoustic piano sounds are really very classy; the 'Upright' and 'Honky Tonk' presets are particularly impressive in terms of exhibiting 'real-life' piano characteristics right through the keyboard range with appropriately plinky notes at the top end and deep, sustaining bass at the bottom. M Audio don't provide ▶

SOUND ON SOUND

M Audio *Key Rig*/ *Drum & Bass Rig* £89/£89

pros

- Excellent value for money.
- First-rate sounds in both packages.
- Creative global and individual effects.
- *Key Rig* is capable of some great layered sounds, and it's easy to get creative with the MS2 synth.
- *Drum & Bass Rig* offers super-squelchy TB303-style bass lines, realistic acoustic drums, and a very tweakable virtual bass player.

cons

- *Key Rig's* CPU-hungriness ultimately compromises playability and usability.
- No multiple outs within the *Rigs* themselves.
- No ability to change patches via MIDI in either plug-in.
- Electronic documentation could be more detailed.
- You can't import your own loops into *Drum & Bass Rig's* loop player.

summary

A good balance between the immediacy of presets and the potency of user programmability. *Key Rig* is really worth checking out, although *Drum & Bass Rig* is probably more of an acquired taste.

▶ much detail on how the sounds have been created, but the fact that the SP1 sound presets add up to about 110MB points to fairly extensive multisampling.

Two preset selector wheels enable you to dial up two sounds simultaneously. The second wheel offers three extra synth-string pads if you fancy a soupy lounge sound. The two sounds can be layered (with a Mix control determining their relative volumes) or split, although the split point is limited to a choice of seven predetermined positions: C2, F#2, C3, F#3, C4, F#4, and C5. Both preset selectors have a simple Tone control to change the brilliance of the sound. In the case of the first preset, this is accompanied by a Velocity control, which adjusts the amount of dynamic range between hard and soft notes. The second preset features an Octave control enabling you to transpose the assigned sound by one or two octaves. Finally, a detune function enables you to adjust the relative tuning of the two presets.

Drum & Bass Rig.

These controls in themselves enable you to create a huge range of hybrid piano tones. But for good measure the SP1 is also equipped with a twin effects section. This can be routed either in series or parallel and each effect draws on the same 49 algorithms and offers the same programmability as the master effects section I've already mentioned.

Unfortunately, once you get into creating more complex layered patches using twin-barrelled presets and effects, it soon becomes apparent just how hungry the SP1 is for CPU power. In stand-alone mode, I found that I couldn't really afford to have any other programs running on my G5 iMac, and even then it didn't take too much in the way of polyphonic keyboard work before sounds started to glitch or drop out. The issue becomes more serious when using *Key Rig* as a plug-in, because the host sequencer needs its own share of the CPU, regardless of whether you have any other plug-ins running.

It's an issue which I will return to later. In the meantime, we'll progress to the MS2. This is a natty polyphonic virtual synthesizer capable of producing a wide range of timbres and synthy textures — lush pads, pokey leads, tight basses and (my particular favourites) some excellent ethereal bell-type sounds and spooky tuned percussion pads. It's difficult to describe, but the MS2 presets seem to have the ingredients of all the great synths you ever knew and loved, without appearing to directly mimic or model any of them. Looking more closely at the specs reveals how the MS2 manages to be such a chameleon. Although the synthesis involved is rather loosely described as 'generally analogue', the MS2 also throws in FM synthesis and wavetables. Down in the synth boiler room, you'll find 85 'oscillator presets' each of which can include any combination of up to three analogue oscillators plus two wavetables, a sub-oscillator (a square wave) and white noise. This gives you pretty complex source material, which is then further shaped through a conventional filter, amp and modulation setup, plus an effects section.

All that makes for a very rich basic fuel mixture, but M Audio have taken the complexity out of trying to drive the MS2 by providing presets for all main programming sections. So along with the oscillator presets there are 47 filter, 27 amp and 28 modulation presets, all of which are called up from drop-down menus associated with each section. So programming is simply a matter of mixing and matching different preset types. And as they are given real-world names, it's pretty easy to pick the right kind of combinations to get the kind of sound you want.

For those who want to get into more detailed tonal shapery, there's a fair degree of control via the on-screen knobs, although M Audio have generally kept it simple and accessible. For example, the filter and amp envelopes are easily manipulated just by pulling the 'handles' on the graphic curves. And for the oscillator presets you are just given a single 'Wave' control which is mapped to the element of the preset that is likely to have the most effect on changing the sound. Basically it's a question of using your ears and seeing what the knob does, although to make things more interesting, the wave parameter can also be modulated through the modulation presets.

Overall, it's a neatly designed and very approachable piece of virtual kit. For those who just want to get on and play, the 99 patch presets offer a very wide range of instantly useable and often quite inspiring synth sounds, while the modular preset-based approach makes it very easy to program.

Next up is the MB3 'Electromagnetic Organ', and as you might suspect from the on-screen wood-effect finish and chunky virtual rocker switches, this attempts an emulation of the classic Hammond sound. Indeed, all the authentic bells and whistles — or should that be clicks and tones? — are present. There are virtual drawbars, three chorus/vibrato effects and a rotary speaker emulation offering adjustable speed and ▶

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'tube' overdrive. Fifty presets provide a journey through the use of the organ down the ages of popular (and not-so-popular) music. Gospel, soul, blues, jazz, reggae, prog rock, experimental incisions with kitchen utensils and... er, the 'Bagpipe Solo' patch — it's all there for the taking. In short, MB3 is great fun and like the piano and synth modules, the fundamental quality of the sound is first rate. Even the rotary speaker, a piece of hardware which is notoriously difficult to emulate, is pretty convincing, especially as its speed can be controlled by the pitch wheel.

The drawbars, which follow the layout of a classic tonewheel organ, can be altered in real-time via MIDI continuous controllers and in factory-fresh mode, the MB3 is already pre-mapped to the controllers on M Audio USB MIDI hardware, although this can be easily changed to work with gear from other manufacturers (more on this in the box over the page).

Last in the list we have a General MIDI module — a 16-channel, multitimbral module with 128 GM patches and a GM standard drum and percussion kit at that. After the other three, the GM4 probably doesn't sound like it's going to be the most fun kid on the block, but of course if you work with standard MIDI files or need to generate a backing over which to play the other modules, then it's pretty damn useful. On this score, its first three channels are, by default, muted to free the channel for the first three *Key Rig* instruments.

The patches are arranged in the usual GM categories, with selections via a drop-down list. The number and type of programmable controls follows the GM spec, and each channel has Volume, Pan, Tone, Chorus, Mute and Solo buttons, plus a send to the global effect. Again, the sounds themselves are good and do justice to any decently programmed Standard MIDI file.

Selecting Effects in *Drum & Bass Rig*.

One area I haven't yet mentioned is the Instrument Control section on the right-hand side of each module. From here you load and save a module's individual presets, control volume, pan and send level to the master effects section, and set the MIDI receive channel. There's also a Transpose control (±24 semitones), a master On/Off switch, and, via the Hi and Lo parameters, the ability to set a key range for each module with programmable highest and lowest notes. This means you can create complex multi-patches (what in hardware synth terms would probably be called 'Performances') by stacking and/or splitting the sounds from all four modules across a keyboard in a wide variety of combinations. To show off what can be achieved, there are a number of factory global patches that are very impressive indeed.

The only problem is that the more you have going on, the more powerful your computer needs to be to handle it. Particularly when you are running the piano module, you find that polyphony very quickly becomes limited, even in stand-alone mode. And when running *Key Rig* as a plug-in within *Pro Tools LE* with no other effects running, the CPU meter was regularly running hot, leading to dropped notes and glitching. In fact, the experience left my iMac gasping for air — its internal heat-management controls decided that, as the CPU was consistently running at above 75-percent capacity, it was time to declare a Code Red emergency and set the internal cooling fans to Warp Factor 9! To free up CPU power, you may find yourself having to turn off effects within the program, deactivating modules that you are not using at that time, or looking at ways to bounce down or 'freeze' *Key Rig*'s audio output, depending on what your sequencer offers. It's a shame really, because when you've got all guns blazing, *Key Rig* sounds great.

System Requirements

WINDOWS

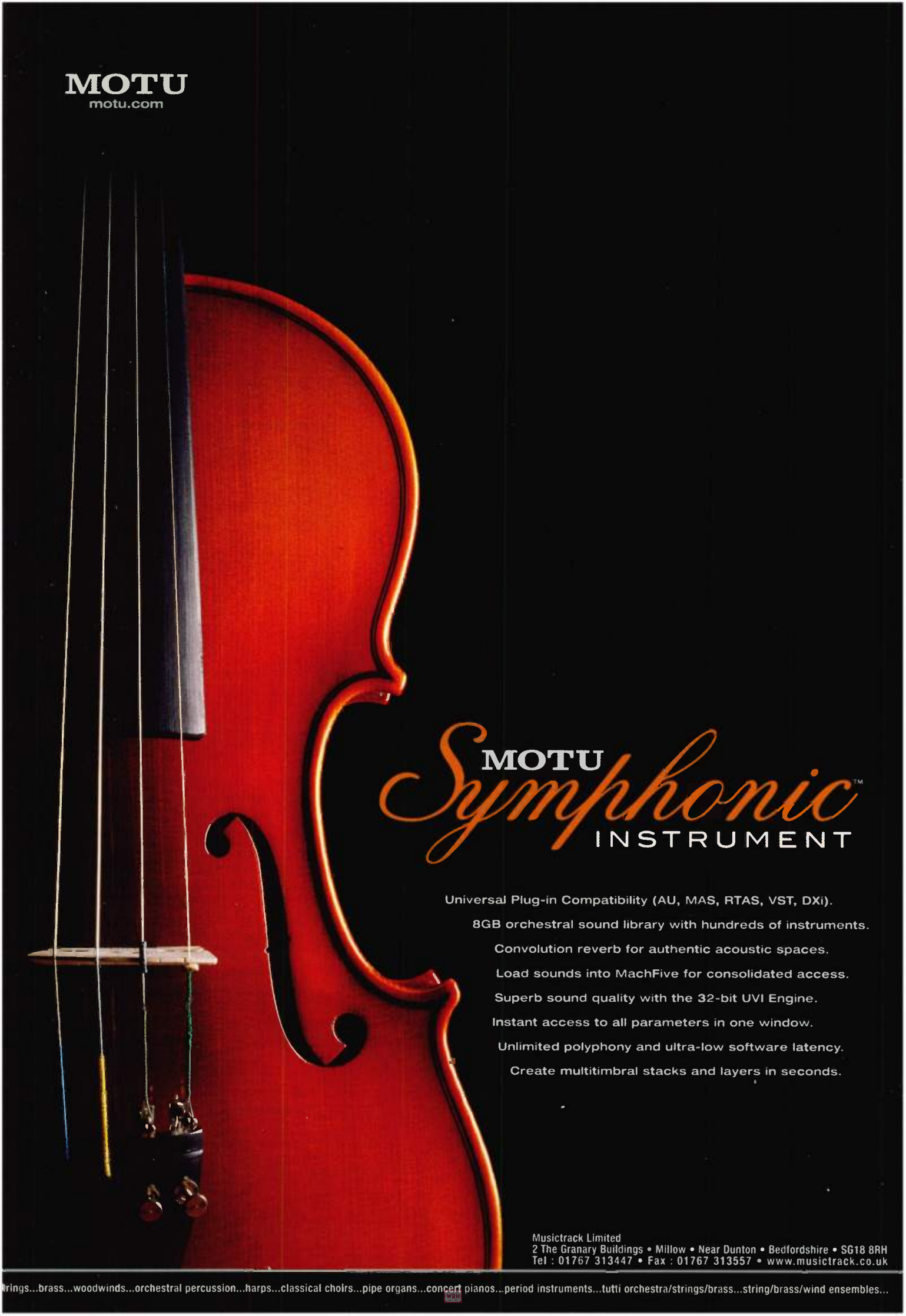
- 500MHz Pentium III or AMD7 (Pentium 4/Athlon 1GHz or faster recommended).
- 256MB of RAM.
- 600MB of free hard disk space.
- Windows XP.
- VST 2.0-compatible host software.
- MIDI interface.
- CD-ROM drive for installation.
- Internet connection (on any computer) for software authentication.

MACINTOSH

- 500MHz Power Macintosh G3 (G4 or faster recommended).
- 256MB of RAM.
- 600MB of free hard disk space.
- OS X Version 10.3 or higher.
- VST 2.0-, AU- or RTAS-compatible host software.
- MIDI interface.
- CD-ROM drive for installation.
- Internet connection (on any computer) for software authentication.

Drum & Bass Rig

I'm glad to report straight away that the same CPU issues are not present with *Drum & Bass Rig*. As you can see from the screenshot on the previous page, it follows the same layout as its sister program, the four modules in this case being the LC5 Loop Creator, the BL6 Bassline, the RD7 Real Drums module and and EB8 Electric Bass. As with *Key Rig*, there's a master section, this time augmented by a 'Swing control', specifically to give the playback of the LC5 and BL6 a jazzier, dotted-note feel. Also as with *Key Rig*, all modules have an instrument control section on the right-hand side, with preset Save/Load menus and controls for Volume, Pan, Hi and Lo notes for setting up the operational range,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▶ a Transpose control, MIDI channel assign and an On/Off switch.

As a keen drummer, I admit that I started off by skipping LC5 and BC6 and heading straight for the RD7 Real Drum module. This is a drum-orientated sample-playback device and editor which offers 28 different preset kits. Between them, they use over 100 individual drum and percussion samples (you can't load your own, sadly). Each drum kit consists of a collection of 26 sounds and these are permanently mapped to the standard GM drum assignments; in other words, you can only assign bass drums to C1, snares to D1, toms to F1 through to D2 and so on. Drums can be triggered by clicking on the pad-like circles of the stylised keyboard arrangement within the plug-in itself, or via MIDI.

The emphasis here is very much on 'natural-sounding' acoustic drums. On this score, the samples themselves prove to be quality products, particularly the range of snares, which accounts for nearly half the samples on offer. Tone, Decay, Pan and Level controls allow you to individually tweak each sound within a kit. The RD7 also has a Master section which allows you to alter the setup of your virtual drum room, with knobs to control the Overhead Mics, the Room Mics and the size of the room. This works really well, and proved excellent at helping to sit the drums in a mix, particularly if you are trying to achieve an overall live feel to your track. In addition, each drum kit preset also has an associated non-editable effect — for most kits, this is some type of reverb, but a few have been roughed up with distortion. As with all the modules, the entire kit can also be run through the master effect if you want further processing.

Virtual reality is also the name of the game with the EB8 Electric Bass player, which offers acoustic and electric bass presets and a degree of tweakability to make them your own. There are 55 presets in all, grouped around samples of fingered, picked, fretless and slapped electric bass guitars as well as acoustic bass, and each set is presented in self-explanatory flavours such as DI, Amp, Dirty, Chorus, Punch and so on. They sound great, particularly the amped-up models, which really cut through a mix. There are also some stonking synth and sub-bass sounds, which are definitely worth shaking a guitar pick at.

Basic sound modifiers include Bass, Treble, Decay and Tone controls and if you want to crank it up a little, you've got a virtual tube amp to overdrive, and a very in-your-face bass-specific compression algorithm to apply. To allow you to inject more realism into the playing, there are also independently switchable Vibrato and Harmonics controls, both driven by the mod wheel. Very cool!

If you prefer your bass player to take the form of a virtual machine, rather than a virtual human, then you can step out with the BL6 Bassline, a superb software rendition of a classic squelchy analogue monosynth complete with a programmable 16-step sequencer. With four waveforms — Sawtooth, Square, Triangle and Unison Saw — plus a feisty filter and a wicked overdrive, the BL6 is able to belt out a wide range of floor-shaking tones, a fact which is amply demonstrated by the 52 preset patches. While the module can be played simply as a monophonic synth, the step sequencer/arpeggiator is really where the fun is at. Each preset offers 12 patterns which can be assigned to a note on a keyboard or triggered via the mouse from the module's own virtual keys. A Scale control forces the pattern, if necessary, to conform to specific musical scales. Modifying these patterns is very simple, thanks to an interface reminiscent of Glaresoft's *iDrum* whereby values for Note, Accent, Glide (portamento), Depth, Cutoff, and Resonance are programmed via bar-graph meters in the step windows. The number of steps can be set anywhere between 1 and 16, while a Grid control toggles the playback rate between eighth notes, 16th notes or triplets.

Overall, this is a great little unit — possibly the highlight of both of the *Rigs*. it also works brilliantly when teamed up with the LC5 Loop Creator, which is actually something of a misnomer in that you don't actually 'create' loops in the sense of loading and manipulating your own samples. In fact, this application has really been designed for people who find this kind of thing bewildering, difficult, tedious or all six. What the LC5 offers is a library of pre-sliced loops that can be played back at any tempo without affecting their tuning (although you can also manipulate the tuning of the individual slices as well). Various other controls allow you to swap slices around or to play slices only on selected beats — for example, just the ones on the eighth or quarter notes. The general idea is that while M Audio have taken the hard work out of creating the loops in the first place, the program offers enough editability for you to customise them for your own purposes if you want to.

There are 23 patches in all, each of which contains 12 loops. In terms of styles, we

MIDI Control

All the main parameters in all the instruments on either plug-in are pre-programmed with the MIDI CCs (continuous controllers) used by the current range of M Audio keyboards, which obviously makes for a very 'plug and play' experience for those users. For owners of other equipment, it's possible to reprogram the settings simply by right-clicking (Windows) or Control-clicking (Mac) on any parameter. This opens a menu where you can select a new CC from a pop-up list. Usefully, this menu also offers a Learn function whereby you simply move the control on your hardware MIDI controller to assign it to the parameter automatically. Yet more usefully, there's also a 'Forget' control, which removes any such assignments.

What's missing, though, is any ability to call up presets via MIDI. Considering that *Key Rig*, in particular, is aimed at musicians who are likely to be using a controller keyboard with their computer hosting the sound source, this seems a curious omission.

Assigning MIDI controller numbers in *Drum & Bass Rig*.

have rock, hip-hop, R&B, techno and house, but there are a few welcome oddities in there too, such as 'Arabic', jazz and a couple of Latin presets. Typically each set of loops within a preset would give you several drum and percussion loops, a bassline or two, a melodic rhythm instrument and some kind of top line. When you have them all going at once, you've got a pretty full-on sound!

The 12 loops from within each preset can be individually assigned to any key within a three-octave range (C2-B4). This can be done from within the application itself, via a stylised representation of a keyboard (this time in a kind of graphical sawtooth/shark's fin arrangement). You trigger loops (either for one-shot or latched playback) by clicking on the 'fins' and these are also the means by which you select a key to change and/or edit the assigned pattern. Initially, the 12 loops are assigned chromatically up the keyboard with the first octave (C2-B2) generally having the standard version of each loop and the other two octaves offering variations created via the various editing functions.

There are many ways of manipulating each loop. Low, Mid and High 'kill switches' allow you to mute slices belonging to the corresponding frequency range. Each loop has associated Level, Pan, Pitch (plus or minus one octave), Decay and Filter controls, and the loop's speed can also be doubled or halved. Globally, you have a Punch compression algorithm similar to the one on the electric bass module, while Loose/Tight changes the microtiming to give more 'groove' to the loop.

Impressively, the waveform display reflects the effect of your edits, with waveforms shrinking, growing and generally shuffling about according to what you do. To be honest, though, being able to see the slices and waveforms actually proves to be of limited value, because you can't audition each slice individually to see what the sound is. Similarly, it would help if the loops had proper names to help you remember what each one was ('Bassline' and 'Percussion', say, rather than 'Loop 1', 'Loop 2', and so on).

That said, in practice the Loop Creator works best as an interactive 'suck it and see' experience — basically, you press combinations of keys until you come up with something interesting! This approach works particularly when you layer it with the BL6 Bassline; together, the two modules are great for coming up with inspirational grooves and riffs.

Verdict

And that really is the strength of both packages. They are not necessarily super-innovative, but they are fun to use, they sound great and also there's an immediacy about the way they work which means that, although they are based around a relatively small number of presets, it's very easy to bend the sounds to your own will without having to get involved in any deep programming.

The combination of modules in each *Rig* also makes them quite versatile and whatever type of music you make, they both would have something to offer. It's a pity, though, that M Audio haven't adopted a slightly more open-ended approach to the overall design. If you bought both packages, it would be great if you could put together various modules in different *Rigs* for specific purposes. It would certainly make things more efficient in terms of managing the CPU load. As it stands, running the two packages simultaneously as plug-ins, especially if you're trying to produce some big stacked sounds within *Key Rig*, means you've really got to keep an eye on the CPU meter. This observation also applies if you want to run multiple instances of one package as a plug-in — which you would have to do if you wanted to assign different modules to different physical outputs from within your sequencer, as there are no individual outputs.

Balancing out all this 'grumpy old man' chuntering, we have the price. At £89 each (or 22-and-a-bit quid per module) both packages offer really good value for money, particularly as the individual sound quality of each module is so good — the SP1 piano and MS2 synth are particularly strong. Ultimately though, if you're using a computer towards the bottom end of the minimum spec, I would strongly recommend a trial run with the demo packages, not only to appreciate the quality of what's on offer, but also to double-check how your CPU copes. SOS

information

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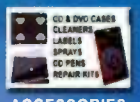
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Benchmark DAC1

Stereo Digital-to-Analogue Converter

If you place importance on the spec of your recording system's analogue-to-digital converters, then you shouldn't overlook the quality of your D-As either. We check out a surprisingly affordable high-quality example from the States...

Hugh Robjohns

The ultimate sonic quality of any digital audio system is defined by the quality and resolution of the analogue-to-digital conversion used — any loss of signal resolution at this early point in the signal chain cannot be recovered later. This simple truth is widely understood by the majority of serious amateurs and professionals who have embraced digital audio recording, and most allocate a significant part of their equipment budgets to purchasing the best A-D converters they can afford.

However, the other end of the same argument is that you won't be able to hear the limitations of a sub-optimal A-D if the digital-to-analogue converter is incapable of resolving the detail encoded within the digital signal. In short, you require a superb D-A if you wish to assess and appreciate the quality of the best A-Ds! Sadly, as we all know, the very best converters — and I'm thinking of the likes of DCS and Prism — always cost a great deal of money, putting them outside the reach of most of us. Even the next best offerings from the likes of Apogee, RME, Audio Design and so on, usually cost well over £1000 in the UK.

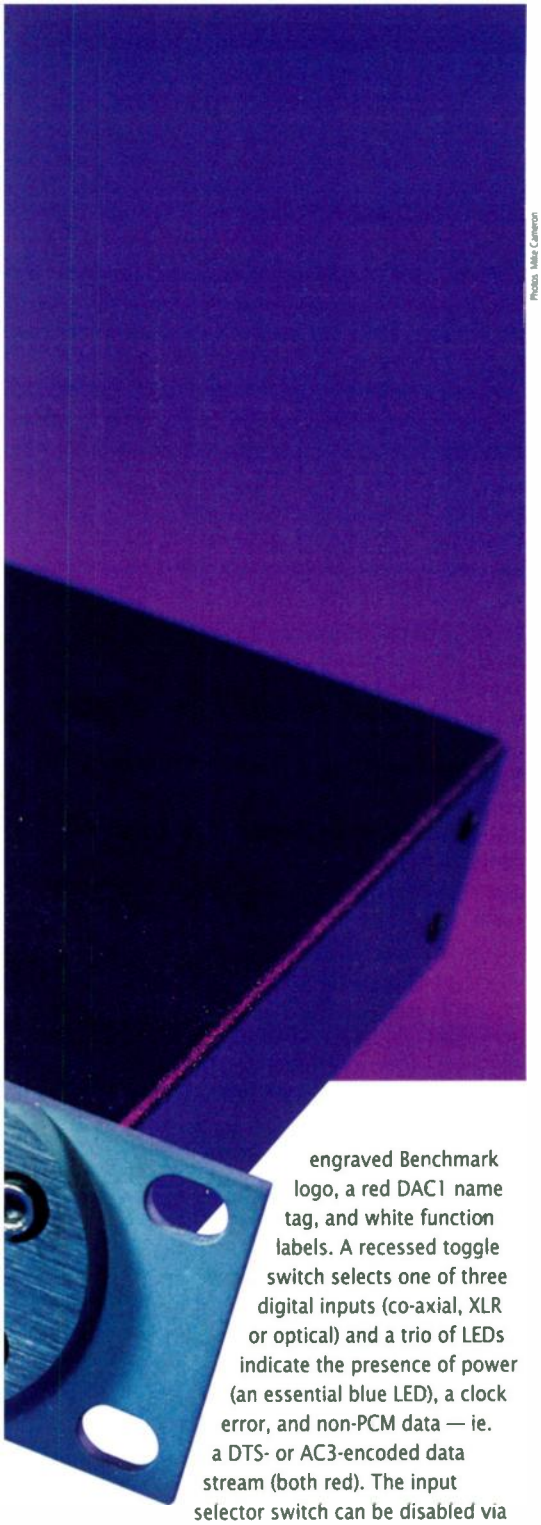
An American company has a product that has forced me to re-evaluate these ideas, though. Benchmark Media Systems are based in the state of New York and manufacture a range of professional digital and analogue audio products, many incorporating rather intriguing technology. The DAC1 is one such device — a stereo, 24-bit, 192kHz D-A converter that costs less than £1000 in the UK, but performs at a level that eclipses more familiar devices costing two or even three times as much.

The fundamental reason for such a high standard of performance is the DAC1's almost perfect rejection of interface and conversion clock jitter, which causes unstable stereo images and varying anharmonic distortion in D-As, colouring and clouding low-level audio detail (see the box overleaf for more on this). The DAC1 avoids this with a novel approach which eschews the use of phase-locked loops (PLLs), the conventional means of dealing with jitter, as these can themselves cause problems.

Enter The DAC1

The DAC1 is a compact self-contained stereo D-A, housed in a sturdy half-rack-width, 1U case that extends a modest 8.5 inches (216mm) behind the rack ears. The substantial sculpted aluminium front panel contains standard rack ears on both sides, so one side can be bolted into a rack frame in the usual way, and the other side is attached using an optional 'coupler' either to another DAC1 or a bespoke blanking panel to fill the void to the other side of the rack (a matching stereo A-D is currently under development, and would make an ideal rackmount partner for the DAC1).

The black painted front panel carries an



Photos: Mike Cameron

engraved Benchmark logo, a red DAC1 name tag, and white function labels. A recessed toggle switch selects one of three digital inputs (co-axial, XLR or optical) and a trio of LEDs indicate the presence of power (an essential blue LED), a clock error, and non-PCM data — ie. a DTS- or AC3-encoded data stream (both red). The input selector switch can be disabled via an internal jumper link and one specific source selected permanently. There's also a pair of full-sized headphone sockets (wired in parallel) and a large knurled and detented volume control. The latter always controls the volume of the headphone outputs, but can be switched to control the analogue line output level if required — making this D-A converter an ideal front end for active monitors.

Moving around to the rear panel (shown overleaf), the analogue outputs are provided on a pair of isolated unbalanced phono sockets as well as a pair of electronically balanced XLRs. Another three-position toggle switch configures the analogue outputs to operate at a fixed 'calibrated' level, or to be varied according to the front-panel level control. Alternatively, the outputs may be muted if the switch is placed in its unmarked central position.

The XLR outputs are aligned at the factory to provide +24dBu for a 0dBFS input (+4dBu at -20dBFS), although this can be adjusted in three ways. Most obviously, switching the front-panel level control into service allows the output levels to be continuously varied. The factory-calibrated level can also be adjusted via a pair of multi-turn trimmers on the rear panel, allowing a range of +5 to -15dB from the factory setting. Furthermore, if the DAC1 is to be used to drive sensitive inputs (or active monitors), internal links can be used to provide a further 10, 20, or 30dB of attenuation.

The unbalanced outputs are designed to provide a level of -10dBV when the XLRs are aligned for +4dBu (with a -20dBFS input), and are affected by any trimmer adjustment when switched to 'calibrated' mode, but not by the XLR attenuator link settings.

The digital input options comprise a TOSlink port for optical S/PDIF signals, an XLR for AES-EBU signals, and a BNC connector. The last of these will accept either the unbalanced form of AES (AES3-id) or, using a supplied BNC-phono adaptor, a standard S/PDIF signal. In both cases, the interface provides the required 75Ω impedance, although an internal link can be removed to provide a high-impedance 'bridge' mode, which is useful if a signal needs to be daisy-chained between several devices.

The DAC1 incorporates a mains power supply (no tacky wall-warts here!) and is fitted with an IEC mains socket with integral voltage selector and fuse holder for 115 or 230V operation. There is no mains power switch on either the front or rear panels — the DAC1 is intended to operate continuously to maintain a constant internal temperature for optimal results. For more on just how much the operating temperature can affect the unit's performance, see the box overleaf.

Technology

Internally, the unit is built to high standards using mainly surfacemount components on a single PCB covering the majority of the case floor. The linear power supply employs a relatively large torroidal transformer and large reservoir capacitors, with the analogue audio running on ±18V rails and separate regulation for the 5V and 3.3V digital rails. All of the analogue signal handling is done with industry-standard NE5532 dual op-amps, of which there are three per channel.

The headphone amplifier employs Benchmark's HPA2 design (which retails for $150 as a stand-alone unit). This is based around another NE5532 op-amp per channel augmented with a BUF634 high-speed buffer chip to provide higher current handling capability and fast slew rates. Since the two headphone sockets are wired in parallel, it is important to use identical models of headphone if both outlets are used at the same time (or at least models with the same rated impedance) to avoid significantly different volumes.

The digital signal path is quite unusual — but this is the reason for this D-A's remarkable jitter-suppression qualities. The input source selection is made with an AKM AK4114 transceiver chip which not only selects the input, but also decodes the various AES and S/PDIF data formats, applying automatic digital de-emphasis when required, and controlling the front-panel warnings for non-PCM data and incoming clock problems. The input clock is recovered from the selected digital input signal using a very wide-bandwidth PLL that allows it to lock to very poor digital signal sources with large amounts of jitter. This allows the DAC1 to recover good audio even when connected to poor-quality sources at the ends of long cables.

Although wide-bandwidth PLLs are generally bad for conversion clock recovery (because they won't remove the jitter), in this case the clock recovered by the AK4114 is only used to feed the input side of a sample-rate converter. The recovered input clock is not related to the final conversion clock at all, and to make sure it has no ▶

SOUND ON SOUND

Benchmark DAC1 £939

pros

- Superb low-level resolution and spatial imaging.
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- Good dynamic range with fast transient response.
- Powerful headphone amplifier.
- Configurable fixed and variable analogue output levels.
- Balanced and unbalanced outputs, with switchable volume control.

cons

- None to speak of at this price.

summary

A neat stereo D-A with three flavours of stereo digital input, and both balanced and unbalanced analogue outputs with variable or calibrated levels. Built-in high-quality headphone monitoring is provided, and the innovative digital circuitry provides extreme immunity from interface jitter, bestowing a remarkable degree of clarity and resolution for this price.

influence at all, the circuit board layout has been carefully designed to keep the jittery input clock well shielded and away from the crystal-referenced output clock circuits.

The bitstream is then passed to an Analog Devices AD1896 stereo asynchronous sample-rate converter (SRC) with a 142dB dynamic range, which is used to oversample the incoming digital signal, accepting any input rate from 32 to 192kHz. This particular SRC chip was chosen for its sonic transparency along with its ability to reject jitter from the input signal — in fact Benchmark claim the jitter rejection is 'nearly perfect.' This is because the chip's input PLL has a bandwidth of only 3Hz, giving jitter attenuation of 100dB at 1kHz, and over 200dB at 100kHz.

Conceptually, the SRC chip oversamples the input signal by a ratio of 1,048,576:1 — so a 48kHz input signal is effectively oversampled to a new sample rate of 50.3GHz. It is then downsampled again to a fixed-output sample rate derived from a stable crystal clock reference at the rather peculiar sample rate of 110.6kHz. As well as allowing the D-A conversion clock to be completely isolated from the input signal's jittery clock, this approach also has the advantage of providing excellent alias rejection.

It is this asynchronous sample-rate conversion that provides the isolation between the fixed, stable, crystal-controlled and jitter-free internal D-A clock, and the inherently jittery incoming data — a technology Benchmark refer to as 'Ultralock'. The fixed clock reference is derived from a 28.322MHz crystal mounted right next to the SRC and D-A chips, operating at 256 times the required rate of 110.6kHz.

The DAC1's front panel has few features, although more than many D-A converters! The main one, on the right, is the large output level control. The recess in the centre contains a switch that determines the connector used on the rear panel for incoming digital audio, whether co-axial, XLR or optical. To the left of this are three status LEDs. The main two jacks are headphone outs driven by the dedicated internal Benchmark headphone amplifier.

The output from the SRC is passed to an Analog Devices AD1853 multibit sigma-delta stereo D-A converter chip. This is Analog's first D-A to support all sample rates from 32 to 192kHz, and it has been designed specifically for high-end DVD-A players, mixing consoles and digital effects processors. The D-A converter is driven directly from the crystal oscillator, and its clock signal is delivered using a shielded controlled-impedance transmission line arrangement on the PCB. Again, lots of careful attention has been paid to the PCB design to isolate this reference clock from the input clocks, the audio signals, the power supply, and internal RF fields. The circuit board in current DAC1 units is a 'Revision C' design, highlighting just how critical the board layout is to the overall performance.

The choice of a 110.6kHz sample rate for the D-A conversion may seem odd, but there are some very specific reasons for it. Firstly, this places the DAC's reconstruction filter transition band above the bandwidth of a 96kHz digital signal. Secondly, the AD1853 chip actually provides its best performance specifications when operating between 100 and 120kHz sample rates, providing a 20dB improvement in the performance of its digital reconstruction filter to remove aliases. Thirdly, all current D-A converters (including the AD1853) operate relatively poorly at quad sample rates (176.4 and 192kHz) because to accommodate such high rates they have to use reduced internal oversampling ratios for the digital filters. Often this ratio is as low as 2, resulting in much poorer reconstruction filter characteristics, and thus poor alias rejection.

The use of the 110kHz D-A sample rate means, of course, that 176.4 and 192kHz sources have to be downsampled, reducing the audio bandwidth from roughly 96kHz to about 55kHz... but Benchmark claim that the improved filter performance more than compensates for the reduced ultrasonic bandwidth. For the more practical standard and double sample rate sources, there is no downside at all, and the approach provides a completely jitter-free D-A conversion.

The aspect that initially troubled me with this unusual approach to D-A conversion was the fact that the input is always passing through an SRC using complex non-integer ratios. The received wisdom is that non-integer SRC processes produce potentially audible artefacts, but Benchmark claim that the design of the AD1896 SRC

All About Jitter

Jitter is an inherent part of any digital interface. Whenever data with an embedded clock signal is passed from one device to another, the cable will act to blur the clocking edges and produce a degree of uncertainty over the precise position in time of each clock edge. Provided the data is being passed between digital processors this is of no relevance whatsoever (assuming the jitter is not so excessive that the interface breaks down completely!). However, where the digital data is converted to analogue (or *vice versa*), the clock timing is absolutely critical to the performance of the sampling and reconstruction processes. Timing errors translate into anharmonic sidebands in the signal — not entirely dissimilar to intermodulation distortion — and these dramatically reduce the resolution of low-level detail and compromise the stability and clarity of the stereo image.

Whereas most A-Ds operate from an internal crystal, and thus potentially have very low conversion jitter, D-A converters have to derive their clock from the incoming data, which will inevitably suffer from some degree of jitter. The jitter on a 24-bit signal arriving at a simple D-A with no (or poor) jitter reduction can result in the converter performing at 16-bit resolution, or even less!

The usual way to remove jitter is to use a circuit called a phase-locked loop (PLL) which detects the incoming clock and essentially averages out any timing variations to produce a more stable reference clock. However, there is no such thing as a free lunch, and PLLs suffer from various technical trade-offs. For example, a narrow-bandwidth PLL which will give fairly good jitter reduction will take a very long time to synchronise to a new input, and varispeed sources may not be handled well at all. Also, PLLs don't provide equal jitter rejection at all frequencies, so some jitter components almost always get through. There are of course ways to improve jitter performance — multi-stage PLLs are a common approach, but the problems mentioned are very hard to overcome completely.

Benchmark's approach is to use a very high-quality sample-rate converter to isolate the incoming jittery clock completely, and instead refer the D-A conversion clock to a stable local crystal reference — a technology they refer to as 'UltraLock.' The same technique can be used in reverse to derive a totally stable A-D conversion even when the output is referenced to an external jittery clock — and Benchmark use exactly this approach in their A-D converters.

chip is such that it does not require (or benefit from) integer ratios between input and output, and its performance exceeds that of the D-A converter, so it is not a quality bottleneck. With this in mind, I put it to a listening test.

Hearing Is Believing

I rigged up the DAC1 alongside my trusty Apogee PSX100, each feeding through a simple changeover switch to my reference Bryston 4B amplifier and PMC IB1 three-way monitors. Using a Meridian CD player as the source and a Neutrik Minilyser as the measurement tool, I calibrated the output level of the DAC1 to match that of the Apogee, and then sat back to listen. I started by familiarising myself with the Apogee, playing a selection of commercial CDs as well as some of my own recordings. Then I switched to the DAC1 and played through the same selection of material... and I was seriously impressed.

The PSX100 is, as converters go, a pretty good mid-range device. It's not in the same league as the high-end converters, but it resolves low-level detail and imaging information pretty well, and is certainly a lot better than most of the built-in converters in recorders, desks and soundcards. However, it was immediately apparent that the DAC1 was superior — most notably in a small but recognisable improvement in resolution, especially through the mid range. It provides a fantastically transparent conversion, completely free from any hint of digital 'graininess,' with a smooth, detailed high end and a really solid, full bass. The stereo image is truly three-dimensional, with not only impressive width but realistic depth cues too, and the dynamic and transient response is phenomenal!

Full of enthusiasm, I then hooked up the DAC1 to the output of my Yamaha DM1000 mixer, and remixed some eight-track 24/96 concert material from a Genex hard disk recorder. Compared with the both the Yamaha's internal converters and the Apogee, the DAC1 had a noticeable advantage, allowing minor EQ changes and subtle mix level tweaks to be heard just a little more clearly. I felt I could hear further into the mix — especially through the critical mid range.

I also tried the headphone output, and this proved equally impressive. Driving a pair of low-impedance Sony MDR7509s, the DAC1 had masses of level and drive capability, producing crisp transients with no hint of compression or clipping, even when pushing out ridiculous sound pressure levels.

Finally, I tried running the DAC1 as a monitoring preamp, using the front-panel volume control to adjust the listening level of a pair of powered monitors (a review pair of PMC TB2As). The relatively high output level of the DAC1 (+24dBu as standard) proved way too much for comfortable listening with the volume anything more than about a quarter of the way around. Not only was it difficult to adjust listening levels accurately, but this also revealed the only flaw I was able to find in the DAC1: some audible mistracking between channels, causing slight but detectable image shifts.

However, after removing the lid of the unit and changing some internal jumpers to attenuate the output by 20dB, I was able to operate the volume control over a more practical range, giving greater precision and much better tracking between channels. A quick meter check suggested that when using the volume knob around the 12 to 3 o'clock positions, channel matching is better than ±0.25dB, but it deteriorated with errors over ±1dB when nearing the bottom end of rotation. That is not unusual, and not really a criticism either, and the provision of output attenuators negates the issue in a very practical way.

The rear panel houses the main connections, including the unbalanced phono jacks and the balanced XLR analogue outs. Trim pots for the Left and Right output channels are located between the phonos and XLRs. On the right-hand side are the digital inputs in co-axial, optical, and XLR (AES-EBU) formats. The final connector on the right is the IEC to the switchable internal power supply — a welcome inclusion.

Conclusions

So, my overall impression of the DAC1 is extremely good. Its performance is quite extraordinary for the UK retail price, and it competes favourably against units costing considerably more. It is a very neat, well-designed package with an excellent feature set, including an internal mains PSU, usefully clean and powerful headphone monitoring, and the provision to configure the analogue outputs for fixed or variable levels. It can accommodate the roughest input signals with ease, extracting whatever sonic beauty is hidden within.

If you are looking to improve your monitoring, or to hear what your A-D converters are actually providing, you really must audition the DAC1. I must warn you, though, that this will be hazardous to your wallet — because you'll have to buy it once you hear it. I did! SOS

A Warm Feeling

After I had finished the review of the Benchmark DAC1, I had an opportunity to compare two identical units side by side. Both were fed with identical optical S/PDIF signals from a commercial signal splitter, and both were feeding identical active monitors, set up side by side. The only difference between the two DACs was that one had been running for about 90 minutes while the other had spent the previous two hours in a cold car travelling across the country before being plugged in.

The difference in sound quality between the two units was stunning. The unit which had been running a while sounded smooth, detailed and worth every penny while by comparison, the cold unit sounded thin, harsh, granular, and lacking in depth and resolution. The difference was so pronounced that we all became concerned that it might actually be broken in some way! However, over the space of about 20 or 30 minutes, the cold unit warmed up and the sound evolved to provide all the fine qualities and attributes already described, finally matching that of the first model.

The sonic benefits of allowing electronic equipment to 'warm up' are well known, but I have never experienced such a dramatic example as this before. This issue doesn't arise during testing for *SOS*, because I always plug review units in and have them running long before I start to make any aural assessments, but I thought it worthwhile bringing this to your attention as an important quality when you are auditioning equipment.

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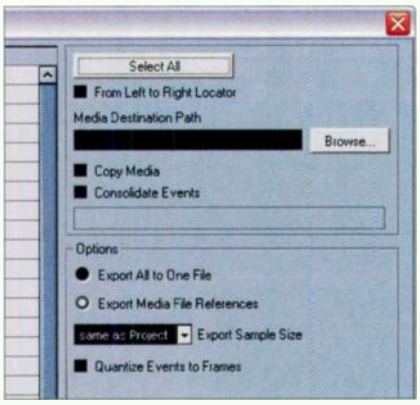


Nuendo now supports both the importing and exporting of AAF files. Here you can see the options available when exporting a *Nuendo* Project as an AAF file — similar options are also now available with exporting OMF files.

▶ proprietary file format, interoperability between different systems has become increasingly important. Avid originally set out to solve this problem with the OMF (Open Media Framework) Interchange format (sometimes referred to as OMFI) in the mid-'90s, and while this format has been widely adopted, with Avid publishing a developer kit for third parties, it wasn't an open standard, because Avid were the sole company in charge of OMF development. In the long term, this arguably impeded the success of OMF beyond Avid products and it became clear that another, more open solution was needed.

AAF (Advanced Authoring Format) was devised by a group of companies including Avid, Microsoft and the BBC as a file format designed to aid the workflow of users who need to transfer both data and metadata between different systems. Like OMF, AAF can either embed or link to audio and video files, and stores information about how those files are used in a project, as well as other project data such as start times, frame rates, automation and much more. For more information about the format, visit the AAF Association's web site at www.aafassociation.com.

Given the dominance of Pro Tools in the world of audio workstations, I was especially curious to see if I could export an AAF file from *Pro Tools* and import it into *Nuendo*. Initially, using *Nuendo* 3.0, I didn't have much luck. I created some simple test files in *Pro Tools* 6.9 containing eight mono audio tracks and a few short audio files recorded on tracks one, two and eight, with the start time set to 02:00:00:00 and the frame rate to 24fps. When importing this into *Nuendo* I got an error message box reporting that *Nuendo* "Failed to read AAF tracks. [Err 801201D1]" followed by a completely empty Import Options window offering no tracks available for import.

I repeated the test with both *Pro Tools TDM* and *LE* (even though there should be no difference, as both use the same Digitranslator tool for working with AAF and OMF files) and tried with both the Avid Compatibility toggle enabled and disabled in *Pro Tools's* export options, but there was no difference.

Fortunately, though, after trying the same experiment in the beta version of 3.1, I'm pleased to say that the same AAF file I exported from *Pro Tools* will now import into *Nuendo*, with the audio files time-stamped to the correct locations. The AAF functionality in *Nuendo* 3.1 has been built with the 1.1 SDK (Software Development Kit) and, along with some other improvements, this means that AAF compatibility with *Pro Tools* 6.7 (and later) and *Avid* is now possible.

Going the other way, when exporting an AAF file from *Nuendo* (both version 3.0 and 3.1) to *Pro Tools*, *Pro Tools* would read the AAF file and import the audio so long as I chose the linked media option in *Pro Tools* (*Pro Tools* doesn't support audio files embedded into the AAF file).

Non-Avid AAF

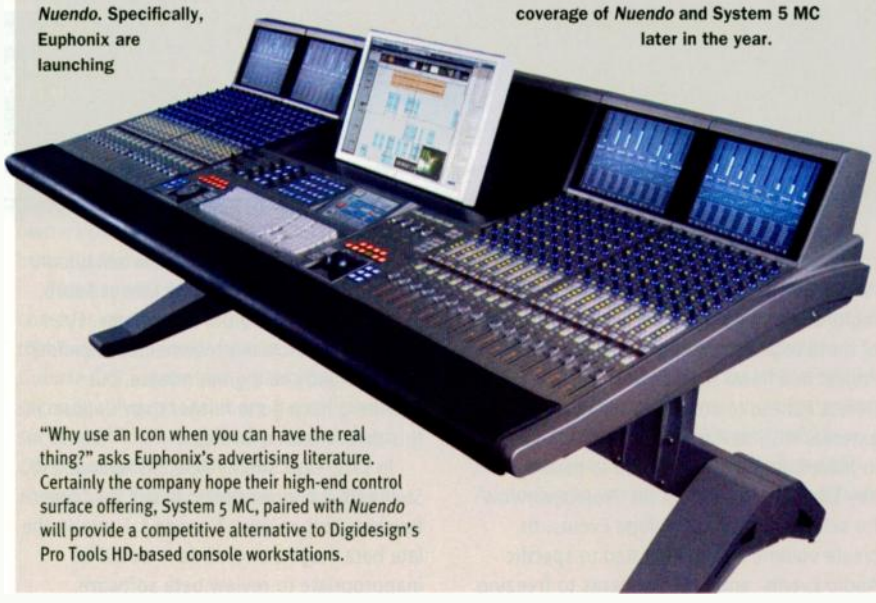
The point of AAF isn't just limited to transferring data to and from *Pro Tools*, of course, and Steinberg's *Nuendo* forum at www.nuendo.com has plenty of examples where people are reporting successful transfers from video applications such as Apple's *Final Cut Pro* and Adobe's *Premiere*. ▶

System 5 MC

Steinberg first announced a strategic alliance with Euphonix, a high-end, large-format console designer who have products popular in the post-production and broadcast markets, back at the 2002 AES show in Los Angeles. Euphonix's flagship digital console, System 5, is a highly modular system that combines DSP cores with a router, A-D/D-A and digital format converters, and a control surface. While MADI is used to distribute audio throughout the various parts of the console, a protocol called Eucon operates over Ethernet to send control messages, such as when a user moves a fader on the control surface. At the 2002 LA AES show, Steinberg and Euphonix showed a preliminary version of *Nuendo* 1.x that offered some support for Eucon with one of Euphonix's smaller Maxair consoles, although it's taken a while for this technology to be taken further, and in the mean time Steinberg collaborated with a German broadcast developer to create the ID controller, which has never really been a success.

Following on from *Nuendo 3* later this will be another release dubbed *Nuendo Eucon*, which will bring true Eucon support to *Nuendo* so that a Euphonix control surface can be used with *Nuendo*. Specifically, Euphonix are launching a product called MC, which is new control surface designed for use with desktop audio and video applications like *Nuendo*, featuring a keyboard, touchscreen, faders, programmable buttons, and a proper audio monitoring section. The monitoring section features an application called Studio Monitor Pro, where Euphonix came up with the idea to create a layer of software that sits in between the audio application, say *Nuendo*, and the ASIO (or WDM) driver that controls your audio hardware. Studio Monitor Pro then interacts with MC and is controllable from the MC's monitoring section and is set up via the MC's touchscreen.

Euphonix have also announced the System 5 MC, which is basically a competitor to Digidesign's D-Control/Command-based systems like the Icon. The System 5 MC combines the MC itself with eight-fader modules that are almost identical to those used on Euphonix's System 5 console (hence the name) to create a truly professional control surface with a large-format console feel for *Nuendo* users. Whether or not the *Nuendo* customer base is ready to embrace such a product remains to be seen, but it's good to see development towards high-end customers using the *Nuendo* platform. We'll bring you more coverage of *Nuendo* and System 5 MC later in the year.



"Why use an Icon when you can have the real thing?" asks Euphonix's advertising literature. Certainly the company hope their high-end control surface offering, System 5 MC, paired with *Nuendo* will provide a competitive alternative to Digidesign's Pro Tools HD-based console workstations.

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While other audio workstations such as SADiE and Pyramix also include AAF support, I wasn't able to test this, although I did try exporting an AAF from Apple's *Logic Pro* 7.0.1 into *Nuendo*. The audio tracks imported successfully along with the frame rate and the basic start times of the Audio Events other than the offset from the start time. The start time of the Project was imported as 00:00:00:00 rather than 02:00:00:00 (although this could be a problem with *Logic*'s export), and the other clear problem was that the tracks were imported with read automation enabled, while automation was switched off on those tracks in *Logic*.

As a side note, I tried importing my AAF files created in *Pro Tools* into *Logic* as a comparison, whereupon the *Logic* window disappeared and the Mac reported "The application Logic Pro has unexpectedly quit." At least *Nuendo* 3.0 was more graceful in the way it dealt with a file it couldn't read before 3.1's improved AAF functionality.

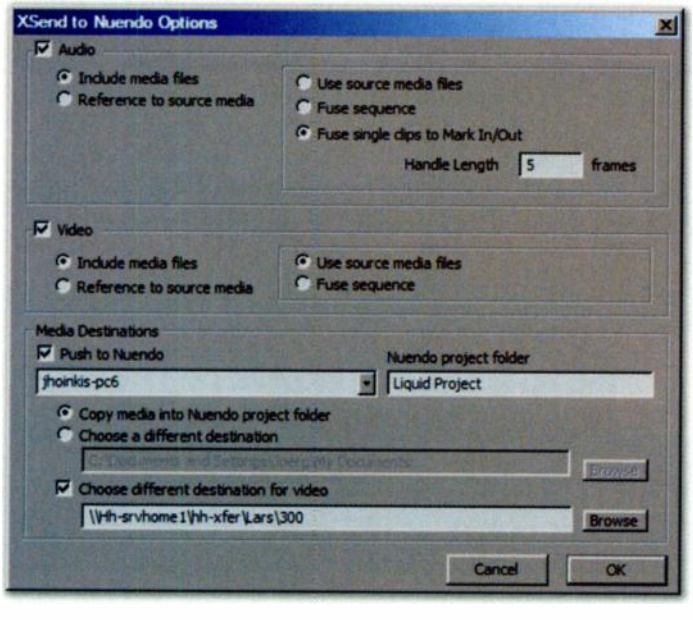
Evaluating AAF support is somewhat tricky, because even if *Nuendo*'s implementation of AAF was completely flawless, you would still have problems if the application you were importing from or exporting to had a poor implementation. Therefore, it's impossible to know exactly where to point the finger of blame right now, especially as most applications have only just started offering AAF support. In conclusion, it's great that AAF support has been added to *Nuendo*, and Steinberg have done tremendous work already in improving this since the 3.0 release. However, I'd definitely advise prospective users to try experimenting with AAF transfers between the applications they need to communicate with before committing to *Nuendo* to avoid disappointment.

Other than AAF, Steinberg have also improved the import and export features introduced in *Nuendo 2* for AES31, OpenTL and OMF files, most notably with the ability to import and export specific tracks rather than simply every track. In *Pro Tools*, I exported the same Session I used to create an AAF file as an OMF file, and this imported into *Nuendo* with the audio tracks, Events, start time and frame rate correct.

As a side note, it's worth mentioning here that the price of *Nuendo 3* has now risen to an RRP of £1450, but consider that Pro Tools TDM and LE users must spend an extra £285 to purchase Digitranslator for full OMF and AAF support, while LE customers must pay £575 for DV Toolkit to have timecode in *Pro Tools* before they can buy the full version of Digitranslator. So all in all, £1450 for a full version of *Nuendo 3* isn't that bad and I feel Steinberg are justified in increasing the price.

Working With Picture

As mentioned at the start of this review, *Nuendo 3* includes a large number of new features and improvements for those working in film post-production, and perhaps the headline feature in this area is called 'Warp to Picture'. Like many features in *Nuendo 3*, Warp to Picture is actually incredibly simple, and incredibly useful. *Cubase SX2* and *Nuendo* 2.1 introduced the Time Warp tool, which allows you to drag a musical beat or bar to a timecode position, while *Cubase SX3* and *Nuendo 3* offer the Warp Samples tool, which enables you to pick a point in time in an Audio Event, drag that point elsewhere in the time line and have *SX/Nuendo* automatically (non-destructively in real time) time-stretch the audio so that the point in the Audio Event now plays correctly to its new position.



Nuendo supports Pinnacle's X-Send Protocol to make it easy to work on projects started in one of Pinnacle's *Liquid* video editing systems.

Nuendo's Edit Mode enables the picture to follow the edits you make; moving an object on the Project window, for example, makes the picture track the start position to which you're moving the object, allowing you to easily move an object to start at a specific frame of action. Warp to Picture basically means that when Edit Mode is enabled, dragging with either the Time Warp or Warp Samples tool will cause the picture to track the position as you're dragging the mouse, enabling you to effectively 'warp to picture'. This is pretty useful since it allows you to see exactly where you're dragging bar 14, for example.

The video playback features have been significantly improved in *Nuendo 3*, and a new Direct X video playback engine has been added alongside the older Direct Show engine and the standard Quicktime engine, which has also been improved in version 3. The Direct X and Quicktime engines no longer feature the three size options for the built-in Video Player window, since this window can now simply be resized like any other window, with *Nuendo* scaling the video accordingly. These two engines also feature a new option for Video Playback Speed where you can select one of three speeds for the video playback: Normal Speed, for regular playback, and 0.1 percent pull-up and pull-down. These latter options are to compensate for the speed change that would have occurred in the video during the process of transferring the film to video (telecine) or back again compared to the audio, and are very welcome additions to *Nuendo*.

Originally, my conclusion about these new video playback speed option was that "hopefully the next version will include 4 percent pull-up and pull-down, along with the option to change the audio speed as well as the video speed". So I was really pleased to see that while the video playback speeds don't offer 4 percent pull-up and pull-down in the 3.1 beta (although this could change in the release version), Steinberg have added both 0.1 and 4 percent pull-up and pull-down options to the Project Setup window, which affects the audio playback speed when you need to match the playback speed of the video you've been provided.

While Steinberg are no longer owned by Pinnacle, *Nuendo 3* was developed during Pinnacle's ownership, and clearly shows areas where collaboration took place between the two companies. *Nuendo* now support video playback through two of Pinnacle's video cards via its Quicktime engine: Targa 3000 for Windows users and Cinewave for Mac users. If you want to use a non-Pinnacle video card, *Nuendo 3* also offers support for the full range of Decklink cards from Blackmagic (www.blackmagic-design.net), also via Quicktime.

Another Pinnacle-related feature is

Test Spec

- *Nuendo* 3.02 build 623.
- *Nuendo* 3.1 (beta).
- Workstation with two Intel 3.6GHz Xeon processors, Intel SE7525GP2 motherboard, 4GB registered ECC DDR266 RAM, one ATI Radeon 3200 PCI Express graphics card, 3ware RAID controller, 7200rpm HGST SATA drives, RME HDSP 9652 audio card, one Emagic Unitor 8 and seven AMT8 MIDI interfaces, running Windows XP Professional.
- IBM X40 laptop with 1GB PC2700 RAM, Intel Extreme Graphics 2 onboard video, 40GB 4200rpm hard drive, Echo Indigo I/O audio card, Edirol PCR1 USB keyboard, running Windows XP Professional.

Nuendo 3's support of Pinnacle's X Send Protocol (which is also supported in Steinberg's *Wavelab 5*) for better integration with the company's *Liquid* video editing applications. In *Liquid* you can select X Send to / Nuendo and export one video track and up to 16 audio tracks into *Nuendo* (via the Import / X Send command) for further fine-tuning of the soundtrack.

Nuendo 3 also offers support for Gallery's *ADR Studio* (www.gallery.co.uk), a software application that makes carrying out ADR (Additional Dialogue Recording) sessions much easier. *ADR Studio* has been used with *Pro Tools* for many years for films including *Lord Of The Rings* and the recent *Star Wars* trilogy, but is now *Nuendo*-compatible as well, with *ADR Studio* running on a separate computer and connecting to your *Nuendo* system via MIDI ports. In *Nuendo*'s Device Setup window you can add Gallery Software ADR Studio as a new Device, configure the MIDI In and Out ports accordingly, and assign *Nuendo* commands to *ADR Studio*'s Audition and Window/Alt buttons. *ADR Studio* basically controls *Nuendo*, turning it into a glorified tape machine in many ways, and remotely takes care of recording, in and out times, track naming, and general management. According to Steinberg, this is the type of integration we can expect to see develop further in *Nuendo* in the future.

Among the smaller improvements for those working with picture, *Nuendo* now supports a 24-hour timeline and will quiz you if you change the start time of a Project, much as *Pro Tools* does: "You have modified the timecode offset. Do you want to keep the project content at its timecode positions?" Clicking Yes here will keep the start times the same in terms of timecode (but not bars and beats), while clicking No changes the start times for timecode, but keeps the bars and beats intact. There are also two neat commands to add a one-frame fade-in and -out to selected Audio Events, and improvements to 9-pin sync behaviour.

Media Management

The organisation of audio files has been improved in *Nuendo 3* and you can now add user-definable attributes to files, which can store data in one of three formats: as text, a number, or a check mark. As an example, you might want to add a Department attribute to specify whether an Audio File is Music, FX or Dialogue so that you can sort media in the Pool window or search for media by department, which is rather useful. One small problem, though, is that these user-definable attributes aren't saved with the audio file, meaning the attributes are only relevant for the files in the Project in which they're used. However, there is a workaround.

Using *Nuendo*'s Library function, which allows stand-alone Pools to be created, loaded and saved independently of a Project — you can't save a Project's Pool as a Library — you could add user-definable attributes to the Library and use this as your master Pool to make the attributes given to files accessible in all Projects. The only other thing that would be nice with regard to user-definable attributes is the ability to use presets in the window in which they're defined, rather than just being able to store and recall a single default set. Since most other areas of *Nuendo* now offer presets, it's surprising to find one window that doesn't offer this feature.

Renaming The Night Away

One of the most useful features in *Nuendo 3* is the Rename Objects window. Although it might seem fairly uninteresting on the surface, this simple addition has the potential to save hours of work over the course of a project. Rename Objects (Edit / Rename) allows you rename either a collection of multiple Parts and Events or multiple tracks in a single pass, based on a common naming scheme.

One common example of where this can be useful with audio files is where you have tracks named after instruments and so you end up with a collection of files called 'Cimbasso_01', 'Spoons_01', and so on. If you're working on a film, you might want to name these files with the name of the cue — '6m44', for example — at the start, followed by the instrument name from the track and the version number. With Rename Objects you can now rename the files to be '6m44 Cimbasso v1', '6m44 Spoons v1' and so on, in a single operation, which is a real blessing when you might have 50 cues, each with 50 audio tracks.

To use Rename Objects, select the objects you want to rename and select Edit / Rename. If no Events or Parts are selected, ▶

Colour Customisation

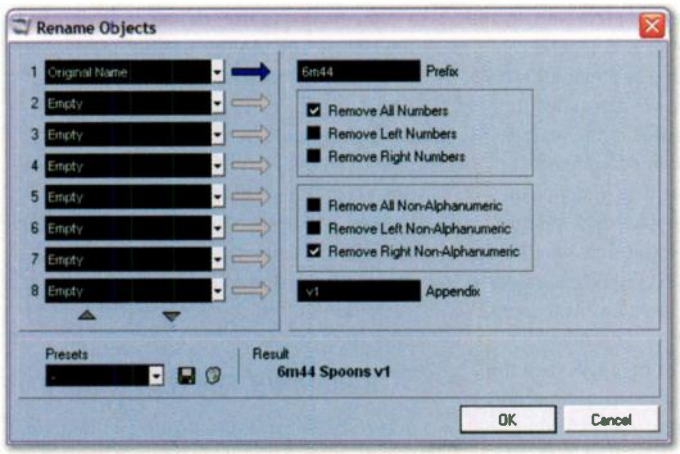
Since version 2, Steinberg have made it made it possible for users to customise *Nuendo* quite extensively, and in version 3 the appearance customisation features in particular have been extended to give you more control over the aesthetic of *Nuendo*. While *Nuendo 2* introduced the idea of appearance 'themes' to adjust the colour scheme of the user interface, version 3 replaces this with a new set of sliders in the Preferences window where you can adjust the saturation, contrast and brightness of the interface and see how this will look in a real-time preview area. Although you can't stray too far from *Nuendo*'s now very blue/grey stylings, many people will appreciate the ability to lighten or darken the appearance depending on the monitor they're using and the lighting conditions of the environment in which they're working.

Another colour-related enhancement is the ability to customise the start and end colours of the level meters in another new page found in the Preferences window — a feature that's also made its way into version 3.02 of *Cubase SX*. I'm not sure if this is particularly useful or not, but if you happen to hold a grudge with the colour of *Nuendo*'s meters (and I know a number of people who disliked the orange used in version 2!) at least it's now possible to adjust this according to taste.

While on the subject of colour, *Nuendo 3* of course incorporates the new colour-related features of *Cubase SX3*, where colours assigned to Tracks can be displayed in the Track List on the Project window and on the corresponding channels of the Mixer window, in a space just below the Channel Strip. However, unlike *SX3*, where a Track's colour is indicated on the right of the Track List as a background for the level meter, in *Nuendo 3* (as in *Logic* and *Pro Tools*) the colour is indicated to the left of the Track List. Existing users will remember that normally this space is used to show a colour that indicates the type of track used, whether it's audio, MIDI, and so on, and this is still the case when Show Track Colours is disabled. Once this option is enabled, however, the space to the right of the Track List now shows the colour for that track instead.

As with *SX* 3.0, *Nuendo* 3.0 didn't offer some kind of default colouring option for tracks, although this has been remedied in 3.1. Both *Nuendo* and *SX* will now offer a Preference option for newly created tracks to have either the default colour (as before), the same colour as the previous track, the next colour in the list of colours after the previous track, the last applied colour, or a random colour.

I think the user interface look for *Nuendo 3* is the most appealing of all *Cubase SX* and *Nuendo* versions to date, and it's good that the interface has been refined in such a way this time that doesn't alter the way users of previous versions of the application have become used to working.



The Rename Objects window allows you to batch rename tracks, Parts, Event Descriptions and file names based on certain conditions.

▶ the selected Tracks will be renamed; otherwise the selected Events or Parts will be renamed. One thing I initially found confusing about Rename Objects is that when you rename Events on the Project window, it's the Description flag of the Event that gets renamed; the name of Event — which is to say the filename — isn't affected by renaming process. However, it is possible to use the Rename Objects window to rename Audio Files: you just have to do this in the Pool rather than the Project window.

(Speaking of the Description field of Audio Events, while it's a small detail, I do think it would be useful if you could include this as the Description field in the metadata for the relevant Broadcast Wave file. Instead, the Description field in the resulting Broadcast Wave file is taken from the entry in the Record — Broadcast Wave Preferences page, along with the Author and Reference fields. One small improvement on the Broadcast Wave front, though, is that these properties in the Preferences window are now stored per Project, rather than being global as in version 2.)

Getting back to the germane issue, in the Rename Objects window you can choose eight different rename elements from top to bottom that affect the naming from left to right. If you use Rename Objects from the Project window, each element can be one of five options: Free Text, literally a field of text added to the name; Original Name, which adds the original object name and can remove numbers or non-alphanumeric characters; Number, to add a number that increments or decrements within a specified range with each object named; Project Time, which adds the start time of the object in a user-specified time format; and Date, which adds the current date in a format of your choice. All the options except Free Text include both Prefix and Appendix fields to add text before or after the text generated by the relevant option.

If you use Rename Objects from the Pool window, though, you get all the options you have in the Project window, plus attributes that concern information about the file, such as the file extension, bit depth, sample rate, and tempo (if musical mode is being used for real-time time-stretching). A nice touch is that you can also add any of the user-definable attributes you've created; so if you want to name all the files according to the Department they came from, to continue the example, this is also possible. In fact, it would be useful to have the User Attribute option available in the Project window as well.

In the land of *Pro Tools* (or even *Nuendo*), engineers usually find ways of providing the Rename Objects functionality by using additional applications such as *Quick Keys*, which is somewhat inflexible and basically requires the user to create scripts to improve their workflow. Having this kind of feature built right into the application, no matter how boring and simple it might seem, is a clear sign than Steinberg are listening to users and implementing features to help make repetitive tasks less tedious, which surely is the point of using computers in the first place!

Taking The Buss To The Audition

Nuendo 2 featured a brand new audio engine that brought with it the VST Connections window, a new, consolidated way of setting up Input, Output and Group channels. As in *Cubase SX3*, *Nuendo 3* has two new tabs added to this window: External FX, for incorporating external outboard hardware units as if they were plug-ins into the VST mixer, and Studio, which currently features a single buss known as the Audition buss. As in *SX3*, the internal audio click in *Nuendo* is now routed automatically to the Audition buss, so you can choose to what physical output on your audio card the click will be sent. However, in *Nuendo 3* there is one additional use for the Audition buss.

Each audio-based channel on the Mixer now features a Listen (L) button just below the conventional Mute and Solo buttons, which adds after- or pre-fader listening (AFL and PFL) functionality to *Nuendo*. There's a button on the Audition channel on the mixer (also, usefully, available as a Key Command) that, when active, selects AFL, and when not enabled sets PFL so that when Listen is enabled on a channel, that channel's audio is routed to the Audition channel (in addition to its standard Output buss) either before or after the fader has processed the audio on the given channel. It's worth pointing out as well that, although the Audition buss is stereo by default, you can right-click it and use the Change Bus command from the context menu to set it to a mono or multi-channel configuration.

While the new AFL/PFL functionality in *Nuendo* is welcome, there are a couple of points worth mentioning. The implementation of the Listen mode so that it operates separately to the Solo mode is potentially useful, compared with other implementations of AFL/PFL that work instead of the standard solo-in-place (SIP) mode: for example, in *Pro Tools* 6.9 (or even on high-end consoles such as System 5 from Euphonix) the Solo button is itself configurable between SIP, AFL and PFL modes. However, one obvious disadvantage in creating a new button for AFL/PFL is that existing control surfaces don't have a Listen button, and there doesn't appear to be a way of setting a control surface's Solo button to be either Listen or Solo, which

Minimum Requirements

As *Nuendo* relies completely on your computer's hardware, aside from any additional plug-ins you may have that use DSP accelerator cards, the performance you can expect from the system depends solely on your machine's specification. For Windows users Steinberg suggest a minimum of a 1.6GHz Pentium or Athlon processor, Windows XP Home or Professional (the latter is required for dual-processor systems), and MME or ASIO-compatible audio hardware, while Mac users should have at least a Power Mac with dual 1GHz G4 processors. All users should have at least 512MB RAM, a DVD-ROM drive (*Nuendo* now ships on a DVD), and a free USB port for the copy protection key.

For best results, a 2GHz processor is recommended for Windows users and a dual-2GHz Power Mac G5 for Mac users, along with 1GB RAM, and a dual-display system with each display having at least 1152 x 864 pixels. While Steinberg don't specify a minimum display resolution, you would absolutely not want to consider using *Nuendo* on anything less than 1024 x 768, and even at this resolution, things get a little cramped as I found when using my ultra-portable IBM X40 Thinkpad.

Here you can see Listen mode enabled on the two audio channels to the left: notice how the first send on the Default Output buss is routed to the Audition buss and how it's automatically disabled when any channels have Listen enabled.

might be a simple way of solving this issue. Even in *Nuendo* itself, you can't even access the Listen function on the track in the Project window, as you can with other Mixer functions like Mute, Solo and Read and Write Automation. The only way to access the Listen function within the Project window is to select a track and open the Channel Section in the Inspector.

The second issue to consider with AFL/PFL mode is what happens when you want to effectively mute all channels on the Mixer except those with Listen enabled. *Nuendo* achieves this by what the manual describes as a 'special relationship' with the Default buss. The Default buss is the Output buss to which, in general, newly created audio channels are assigned, and is indicated in the VST Connections window by an orange/red speaker next to the appropriate Output buss. You can make any Output buss the Default buss by right-clicking it and selecting Default Bus from the context menu.

In order to for all channels except those with Listen enabled to be heard, *Nuendo* automatically sets up a 0dB send on the Default Output buss channel on the Mixer to the Audition buss, so the idea is that you always monitor through the Audition buss. This does, of course, make the Default Output buss somewhat redundant and means you have to have double the number of outputs available for monitoring: four for stereo, 12 for 5.1, and so on. When you enable Listen on a channel, that channel's audio is routed either AFL or PFL to the Audition buss (in addition to its Output buss), as we've already discussed; but to cut the rest of the mix, *Nuendo* disables the send on the Default Output buss channel so only the audio-based channels being routed directly to the Audition buss can be heard.

While Steinberg advise against routing the Default Output and Audition busses to the same physical outputs, it is possible to do this in a way that doesn't give duplicate signals and allows you to use AFL/PFL in a way that mutes the channels not in Listen mode. If *Nuendo* detects that the Default Output and Audition busses are sent to the same physical outputs, the level on the send from the Default Output buss channel to the Audition buss is set at minus infinity rather than 0dB to avoid double-bussing. However, if you set this back to 0dB, enable the pre-fader button on that send and set the level fader of the Default Output buss channel to minus infinity, you will now hear only the output of the full mix being routed through the Audition buss. Since the send will still get disabled automatically by *Nuendo* when you enable Listen mode on a channel, you will now only hear the channels with Listen enabled through the Audition buss until you disable the Listen buttons again. And for this, the Mixer also has an extra Deactivate All Listen button, just like for Mute, Solo, and Read and Write Automation.

If you think all of this sounds a little

awkward, I'd agree with you. However, part of the problem here isn't actually *Nuendo*: if you look at the way *Pro Tools* 6.9 deals with AFL/PFL Solo without any extra hardware, it's a little bit easier than with *Nuendo*, but you still have to specify what outputs should become muted when channels are routed to the AFL/PFL channel. The extra hardware that would help this situation is an external monitoring box that could be controlled by *Nuendo*. *Pro Tools*'s AFL/PFL is designed for use with the D-Command and D-Control surfaces, which feature XMON, a hardware monitoring box that automatically mutes the main channels when AFL/PFL is active. Hopefully, products like the MC from Euphonix (see box) will be able to bring this elegance to *Nuendo* users as well.

One additional issue with the Audition buss brings us back to the beginning of this section where I mentioned that, as in *Cubase SX3*, *Nuendo 3* also sends the click to the Audition buss. This means it's impossible to not have the click on the same buss as your AFL/PFL solo, unless you disable the click. Having a separate click buss in the Studio page of the VST Connections window would be a better solution, and it would be great if Steinberg allowed the click channel to have auxiliary sends so it could be routed to multiple headphone mixes for those who use *Nuendo* for tracking in a recording studio context rather than for post-production. The workaround that solves both of these potential problems right now is to use a VST Instrument like *LM7* for your metronome click instead.

Fix It In The Mix

The fact the Default Output can use an auxiliary send to route audio to the Audition buss illustrates another important feature in *Nuendo 3* — the ability for Output busses to route audio to other Output busses to the right of them via sends. So if you have four Output busses labelled one to four, left to right, output one can send to outputs two, three and four, while output three can only send to output four. Despite the limitation, being able to route outputs still has many uses, and could be especially useful for creating headphone mixes within *Nuendo* or sending mixes to multiple speaker configurations.

Overall, though, *Nuendo*'s Mixer is still slightly less flexible than mixers found in competing digital audio workstations. For example, one feature I really miss in *Nuendo* is not being able route the outputs of Group channels as the Inputs of Audio channels, so you could bounce and create more complex mixers entirely in *Nuendo*. While not perfect, *Pro Tools*' internal busses (which are in many ways the equivalent of Group channels in *Nuendo*) do allow this and it would be great to have this functionality.

Nuendo 3 includes a new plug-in called *Mix Convert* to make it easy to downmix files, as shown here, to create a stereo mix from a 5.1 source.

On the subject of output routing, a feature that would be nice to see is support for different layouts of surround output channels. *Nuendo 3*'s surround output mapping conforms to the standard (and most commonly used) SMPTE/ITU layout, which is L R C LFE Ls Rs. Other common layouts include L C R Ls Rs LFE and L R Ls Rs C LFE, and while it's possible to adjust the surround routing in *Nuendo* by just changing the physical output assignments around, the onus for knowing how to re-patch everything is placed on the user. An extra option to re-patch the surround channel layout when you right-click a buss in the VST Connections window would be welcome.

One improvement to the Mixer in *Nuendo 3* is the use of the *Mix Convert* plug-in, which is a newly included plug-in that can convert incoming audio in one speaker format to outgoing audio in a different format: you could use this as an insert on a stereo channel to downmix to mono, for example. *Nuendo* automatically uses the *Mix Convert* plug-in in situations where you have a 5.1 channel routed to a stereo output: double-clicking the panner automatically opens a *Mix Convert* plug-in editor — you don't see it instantiated as an insert on the Mixer. *Mix Convert* offers quite a number of controls, such as the ability to adjust the phase of individual speaker channels (except the front centre channel, of course!), adjust the incoming gain and the level of the surrounds, centre channel and LFE that goes into the downmix.

Mix Convert is actually really useful for creating downmixes, especially since this is far more complex in *Pro Tools*: audio channels can only be routed to outputs with the same speaker layout — you can't route a 5.1 channel to a stereo channel without creating sub-paths, and creating a downmix requires some creative routing if you don't use a plug-in such as Waves' *M360° Surround Mixdown* plug-in from the *360° Surround Tools* bundle, which adds to the cost of the system.

Another improvement in *Nuendo 3* (also implemented in *Cubase SX3*) is the ability to quickly assign the Input and Output busses to audio channels. Holding down Alt/Option while selecting an Input or Output assigns all selected channels to that Input or Output, while holding Shift while selecting an Input or Output assigns Input or Output busses incrementally to the selected channels. Another real time-saver.

Post Production

Nuendo 3 is a significant step forward when compared with *Nuendo 2*, and without doubt the best overall release of *Nuendo* in the product's five-year history. In part, I think this is due to Steinberg finally embracing areas that really needed to be addressed to orientate *Nuendo* towards the post-production and high-end audio markets. And very publicly placing the company's Project Manager for Post-production, Martin Stahl, in LA with Euphonix to investigate the needs of the LA post-production market has clearly helped to build a better product. *Nuendo* isn't perfect, of course — there are still the odd bugs and issues that crop up — but overall, there are many improvements in *Nuendo 3* and features that finally make it possible to consider the system more seriously in the context of film, media and high-end audio work. SOS

information

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WRH

Behringer RX1602

Line Mixer

Paul White

This new mixer presents a compact and elegant solution to the problem of mixing multiple stereo line sources in the home studio.

There have been many occasions over the past few years when readers of the magazine have telephoned me and asked if I knew of a simple line mixer with lots of inputs that would be suitable for basic keyboard submixing. It seems reasonable enough to expect such a product to be available, but the reality is that most of the rack mixers on offer are unnecessarily complicated — for example, products like the Mackie LM3204 and the Studiomaster 162BP (reviewed in *SOS* March 1995 and July 2001 respectively) have full channel EQ and multiple auxiliary sends, as well as taking up lots of rack space.

Studio Problem-solver

The Rolls RM203X reviewed in *SOS* January 2003 provided one answer to this problem, but now our friends at Behringer have joined the fray by adding the RX1602 to their Eurorack Pro range. This 1U rackmount mixer is a simple but clean way to submix hardware synths to a single stereo feed that can be returned to a pair of inputs on a computer's audio interface.

Despite having the word 'Pro' in the title — which in the context of audio equipment is usually as good as an admission that it isn't (when did you last see a Neve preamp or SSL console with Pro written on the front panel?) — the RX1602 offers good-quality basic line-level mixing in a mains-powered unit.

The reason that a mixer can be reviewed in such a short space as this is that the Behringer RX1602 has very few features. All the connections are on the rear panel, where you'll find 16 balanced TRS jack line inputs arranged as eight stereo pairs, two main outs on TRS jacks (these are specified as being unbalanced, even though they are on TRS jacks), and a single aux send buss.

The aux send is normally configured as post-mute, pre-fader, but you can modify the circuit board very easily (at the expense of voiding the warranty) to change this to a post-fade send on a per-channel basis — the manual tells you exactly how to do this by cutting one link and adding another. A switch on each channel allows the input sensitivity to be switched from -10dBV to +4dBu.

On the front panel are eight identical sets of stereo channel controls comprising Level (up to 15dB of gain), Balance, and Mon/FX (the aux send), all on rotary pots. An illuminated channel Mute button also doubles as a clip warning LED. In the master section there's a headphone outlet with its own Level control, a pair of master Level controls for the left and right outputs, and a further Mon/FX master control with a button that enables you to monitor the send buss via the headphone output. Stereo eight-section LED meters monitor the output level, and a large square power button resides at the right-hand end of the panel.

Impressions

The RX1602 is a nice-looking and seemingly solid piece of equipment, even though it is very inexpensive, and the only flaw I can find is that the outputs are unbalanced, which means that you may need to make up a pair of unbalanced-to-balanced ground-lift cables to avoid ground-loop hum in some systems. The mixer is certainly very quiet, has plenty of headroom (with a maximum output capability of +22dB), and boasts a frequency response covering 20Hz-20kHz ±0.2dB, which is only 3dB down at 200kHz.

As a solution to my synth submixing problem, the RX1602 came close to being ideal, but it would also work well as an aux returns expander on a larger console, and could even be pressed into service as a live sound keyboard mixer, provided that you don't need EQ. It could also be used in a computer-based studio to provide multiple feeds to a monitor controller such as a Samson C•Control or Mackie Big Knob, allowing you to play keyboards, guitar preamps, CD players and so on through the monitor system at the same time without your computer having to be switched on.

Verdict

While the RX1602 has no effects returns, EQ, PFL buttons, or any of the other more advanced facilities available on a large console, it offers a compact and effective way to mix up to eight stereo line-level sources, and it does so very well. I now have one as part of my own studio system, and I'm sure many other musicians will find that it meets a need, both live and in the studio. SOS

SOUND ON SOUND

Behringer RX1602 £86

pros
- Inexpensive.
- Mixes up to eight stereo sources.
- Works with balanced or unbalanced inputs.

cons
- Unbalanced outputs.
- Modifying the sends to post-fader voids the warranty.

summary
A simple and compact line mixer that solves the problem of combining numerous stereo line sources.

information

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Bizune *Bizune VST*

Formats: PC VST

While there is no shortage of budget plug-ins to be found on the Internet, there can be few with such a unique user interface as *Bizune VST*. No virtual rack or virtual synth format here — this GUI is built into a virtual motor and, as described below, includes one of the most bizarre control features I've ever seen in a software synth. *Bizune VST* is the brainchild of Zeus Issariotis of the musical duo Bizune. The plug-in was written for their own use but is available to others as a free download. Web site clips from the duo's music give a good guide to what to expect from *Bizune VST* — weird soundscapes melded with dance beats.

The design features four oscillators. Two of these have selectable waveform options for building the basis of a patch. These oscillators include FM synthesis controls and overall ADSR envelope controls. The third oscillator is a phase distortion oscillator and provides a 'dirty' element to the sound. The Waveform knob for this oscillator provides a selection from Saw, Pulse, Dbl Sine, Saw-Pulse and three Reso types, while the fourth oscillator features a waveform display and small controls for Phase, Pitch and Drive. Two filters, with various band settings and ADSR envelope controls, are included, while simple flanger and reverb effects round off the basic feature set. As stated in the short text file documentation provided, ears and instincts are required, as many of the controls are not properly labelled (although labels do appear when you hover the mouse over them).

An excellent collection of 128 preset patches is also provided. While these include some fairly straight bass or lead sounds, the majority would be more suitable for creating textures or beds. However, do not think 'subtle pad' — while *Bizune VST* can do that, there is plenty of attention-grabbing, speaker-flapping fun to be had here. Patch names such as 'Bone Scrapper', 'Nuclear Breeze' and 'Conan' suggest what to expect.

Unfortunately, movements of the on-screen controllers are not output by the plug-in and so cannot be recorded in the host sequencer. This includes 'The Head' controller — yes, you grab the head of the character top-centre with the mouse and wobble it about for some instant sound mangling. As far as I could work out, this acts like an X-Y controller, but the documentation doesn't give much away! The Head Trip Button just below the head makes the effect of this controller more extreme. Thankfully, the individual controls do seem to respond to MIDI CCs, although no controller numbers are provided, so some experimentation is required by the user. Other than that, the plug-in performed flawlessly during testing within *Cubase SX3*. These idiosyncrasies are, of course, excusable in a free plug-in and, if you like your software and your synth sounds to have a quirky edge to them then *Bizune VST* will be right up your street. Great fun and highly recommended. *John Walden*

£ **Free.**

W **www.bizune.net**

Sonalksis *SV517*

Formats: Windows VST & Direct X, Mac OS X VST & AU, Mac OS 9 VST

Liverpool-based plug-in developers Sonalksis have been around for a little while now, and *SV517* has already established itself as one of the best-regarded EQ plug-ins out there. Nevertheless, there are probably SOS readers who haven't come across this little gem yet — and if you haven't, it's definitely worth a look.

Sonalksis claim to have developed a proprietary technology known as 'State-space' in order to model the behaviour of analogue equalisers on a component level, and their graphic design also recalls classy analogue units from the likes of Focusrite. As with many plug-in designs, though, the overall frequency response is displayed in a graphical window, and the easiest way to edit the EQ curve is simply to pick up the centre points of each band with the mouse and drag them around.

Like the analogue equalisers it's designed to emulate, *SV517* is intended mainly for 'broad brush' applications rather than as a surgical tool for notching out problem frequencies. Within its intended role, however, it's pretty versatile. You get low- and high-pass filters, with a range of slopes, plus four fully parametric bands, the outer two of which can be switched to shelving responses. You also get the option to switch between three different algorithms for the parametric bands, and two for the shelf EQs. These affect the overall shape of the response; the second parametric algorithm is particularly broad and smooth, whilst the third offers much steeper slopes, and the first is somewhere inbetween. Adjacent EQ bands can interact to produce resonant peaks and troughs in a similar fashion to Waves' *Renaissance EQ*.

The most important feature, though, is the sound. Running *SV517* as an RTAS plug-in via FXpansion's invaluable VST To RTAS Adapter, I substituted it for the basic *Pro Tools EQII* on several channels in a rough mix I'd been working on. The effect was instant and impressive: what had been a OK-sounding mix suddenly began to sound smoother, warmer and generally classier. The difference was especially apparent where boost was concerned — whereas previously I'd strained to apply

the required amount of gain without descending into harshess or phasiness, I could now achieve the desired result almost effortlessly. Like URS's impressive *Classic Console* EQ plug-ins, *SV517* gives clearly audible results from even a slight cut or boost, but instead of the aggressive bite of those equalisers, it offers a smooth, polished tone. It's like comparing a luxury saloon to a vintage sports car — it doesn't offer quite as many thrills, but it's a lot more comfortable to drive! At £150, *SV517* is well beyond the shareware price bracket, but in terms of quality, it's comparable to the best plug-in EQs around. *Sam Inglis*

£ **£149.99 including VAT.**
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Nusofting *Microrock Pro*

Formats: PC VST

New from Nusofting is *Microrock Pro*, a PC VST plug-in that provides a monophonic, physically modelled synthesizer with the emulation of string instruments very much its main target. Its combination of features is aimed at the kinds of lead lines, bass lines or riffs associated with electric guitars, and the built-in effects make it particularly suitable for the more experimental 'processed' sounds you might get out of a guitar once you apply a bunch of stompboxes to the sound.

Packed under the somewhat *Reason*-esque virtual hood of *Microrock* are two physically modelled oscillators. The Mode switch allows three options for their use; mode zero provides a single-note bass mode, mode two provides a single-note lead mode, while mode one provides two strings, separated by a fifth. In reference to the simple fifth chord on a guitar, this is called Power Chord mode. While the Mode controls the fundamental pitch of the patch, the String section contains the main controls for the oscillator. These feature the pick position and Pick Tone controls. The Exciter adjusts the amount of energy applied to the string, and the Velocity control also influences the velocity sensitivity. The Sub Osc adds additional bass frequencies, while the Modulation control adjusts the amount of noise modulation to pitch.

The Vibrato, Chorus, Overdrive, Wah (actually, an auto-wah with velocity sensitivity) and Distortion effects offer fairly limited control options but do the job pretty much as would be expected. The Delay effect is a little more sophisticated and includes tempo matching and a Damp control that progressively removes the high-frequency element of the repeats for a tape-like result, while the ADSR envelope includes a variable curvature control. The more unusually named Dynatone adjusts the filter's saturation and resonance and the Tonerama acts as a guitar pickup modeller.

The presets include some fairly straight bass guitar/synth sounds such as 'Soft Electric Bass' and guitar tones ('Sing Wah Pick'), but where *Microrock* really excels is the weird and wonderful. Presets such as 'Singer Guitar', 'Fired Lead' and 'Limp Lead' had even my limited keyboard skills trying out some ELP lead lines or going for a Suspiria-style soundtrack sound — very '70s. The various stompbox-style effects really add to the overall package and vintage vibe.

With a demo version available for download from the Nusofting web site and a price tag pretty much in the shareware range, *Microrock* is unlikely to do too much damage to anyone's piggy bank. On my 2.4GHz Pentium 4 test system, a single instance only caused a very modest dent in the *SX* CPU Performance meter. If you have a hankering for some weird lead and bass sounds with a hint of the '70s then the *Microrock* demo is certainly worth a download. While the plug-in is currently PC-only, Mac versions for VST and AU are due for release soon. *John Walden*

£ **36.90 Euros (approximately £26).**
W **http://nusofting.liqihsynth.com**

Universal Audio *Precision EQ*

Formats: Mac & PC UAD1

Given its current low price, the Universal Audio UAD1 DSP card is a very cost-effective way to upgrade your processing capabilities without straining your CPU, and it comes bundled with some exceptionally good plug-ins offering, amongst other things, emulation of respected vintage compressors and equalisers. The range of optional plug-ins is also growing all the time, and the latest to arrive on my desk is *Precision Equalizer*.

Rather than being an emulation of a specific piece of vintage gear, the stereo or dual-mono four-band *Precision Equalizer* seems to combine the attributes of several of the designer's favourite analogue equalisers and it is intended mainly for use with complete mixes, making it suitable for desktop mastering applications. According to Universal Audio, "The *Precision Equalizer* is modelled on the behaviour of real-world analogue mastering filters, and uses the classic parametric control arrangement." Audio processed by the *Precision Equalizer* plug-in is upsampled to 192kHz regardless of the project's sample rate so as to maintain optimum audio quality, with the aim of avoiding processing artifacts at very high frequencies.

Both channels offer four bands of filtering, arranged as two overlapping low-frequency pairs and two overlapping high-frequency pairs with frequency ranges where the overall frequency range is from 19Hz to 27kHz! In linked stereo mode, both channels respond to channel one's controls and a centrally located rotary switch allows several different 18dB per octave low-cut settings to be applied. The EQ range of ±8dB (shelving or peak/notch) may seem a little on the frugal side, but that's because *Precision Equalizer* responds more like an ▶

analogue equaliser, where you don't need to apply much cut or boost to hear a result. In any case, anything that needs more than 8dB of cut or boost at the mastering stage probably needs remixing first!

Each band offers 0.5dB stepped Frequency and Gain controls, but the Q value is stepped rather more coarsely, providing a choice of five preset Q settings or shelving operation. Each band also has its own bypass button, which saves on DSP power if that band isn't needed. Hardware mastering EQs often use switched settings for repeatability so Universal Audio seem to have tried to keep that same feel.

What first impressed me about *Precision Equalizer* was that when I applied heavy boost and then swept through the range in the usual way to find the 'bad spot' in the programme material that needed cutting, the equaliser still sounded sweet. Indeed, it was hard to make anything sound bad, whereas most equalisers seem to sound dreadful when used for heavy boost, no matter what the source sounds like. In normal use, only small amounts of cut or boost are needed to make a difference, usually no more than ±1.5dB, and the result sounded more analogue than I'd expected. You can warm up the bass end of a difficult track that would leave most digital EQs struggling or add a breath of air to the top of a congested mix.

The upsampling topography is probably part of the secret of this equaliser, but it's also clear that the frequency curves and phase responses of classic equalisers have been studied to come up with this musical-sounding hybrid. Whether you just want to sweeten your mix or add to your mastering armoury, the Universal Audio *Precision Equalizer* will do the job well and is a worthwhile addition for anyone with a UAD1 card. *Paul White*

£ $199.
W www.uaudio.com

Fabfilter *Volcano*

Formats: PC VST, Mac OS X VST & AU

Fabfilter's first product was the simple but effective *Fabfilter One* soft synth. As the name suggests, much of the appeal of this simple single-oscillator subtractive synth came from its distinctive filter algorithm, which offered a lot of the warmth and character beloved of analogue synth devotees, and Fabfilter have used the same algorithm as the basis of their new effects plug-in. *Volcano* is similar in concept to Sound Toys' *Filter Freak*, reviewed in *SOS* January 2004, featuring two independent filters which can be placed in parallel or serial configuration. The cutoff frequency, resonance and pan position of each filter can be modulated using two LFOs and an envelope follower.

As well as the *Fabfilter One* design, a selection of other filter algorithms is available, comprising Smooth, Raw, Hard and Hollow. The names provide pretty fair descriptions of the sounds in each case, and both filters can be switched between low-pass, high-pass and band-pass operation, with a choice of 12, 24 or 48 dB/octave slopes. Whatever settings you use, *Volcano*'s filters are laudably free of zipper noise, aliasing or other unwanted artifacts, and what's more, they will happily and authentically self-oscillate at high resonance settings.

The clear panel layout and simple modulation matrix makes creating new patches in *Volcano* a piece of cake. You can click and drag the virtual knobs, but it's even easier to set filter cutoff and resonance by moving the two orange circles around in the graphical display. However, I do wish plug-in designers would calibrate their parameters in meaningful units — such as kilohertz and seconds, in this case — rather than using arbitrary numbering systems.

Even though the review version was supplied without any presets, it quickly became apparent that *Volcano* is a very versatile effect. House-style filter sweeps are a piece of cake, and the modulation possibilities make it easy to create extreme burbles and squelches. *Volcano* also has more subtle applications: for example, I was able to add rescue a 'basketball-y' bass drum sound by tuning the resonant filters to bring out the 'thump' and 'click' and eliminate mid frequencies. The ability to pan the filters independently meant that I could also create a convincing stereo spread from a mono guitar part.

In some ways, *Volcano* is more flexible than *Filter Freak*, but I did miss the latter's awesome Analog Mode, which provides the best-sounding saturation I've ever heard in a plug-in. You can't achieve the same evil bass or lead sounds using *Volcano* alone, but if your tastes run to cleaner fare, or if you have your own favourite distortion plug-in to team it with, this is a slick and full-sounding effect which will keep you busy for weeks. You won't regret trying this one out for yourself... *Sam Inglis*

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W www.fabfilter.com

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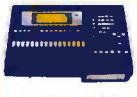

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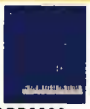

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competition win

Roland TD3KV V-Drum Kit

Electronic drum kits have come a long way in the last 20 years, but the association with a certain independent British manufacturer, who, without naming names, shall forever be remembered for hexagonal drum pads and the *Eastenders* theme tune, still holds strong. This is quite unfair, especially when you consider how much companies like Roland have done to push and develop the concept with their V-Drum range.

You can see why the electronic kit has always been a bit of a Holy Grail for electronic percussionists — the endless possibilities of synthesized and sampled sounds with the freedom of a non-sequenced instrument is a very appealing idea. There are other benefits though, and for traditional drummers as well as their electronic counterparts. A drum kit you can practise with whenever you like, for example, would be perfect for anyone with an unsympathetic neighbour, family, or local council noise-complaints department. It also has advantages in a small studio — most of us aren't lucky enough to have a separate drum recording booth (or often a dedicated live room for that matter) in our studios, so having a drum kit that can be DI'd and recorded in the control room could be unbelievably useful. It would also be ideal for recording with a live band — without the separation problems you'd get with a conventional drum kit.

This month we've teamed up with Roland to offer *Sound On Sound* readers the chance to win a set of Roland V-Drums. The prize on offer is a TD3KV kit and DAP3 accessory pack worth a total of £838.

The kit is centered around a TD3 percussion module which includes 114 separate drum sounds and is capable of dual triggering for snare, hi-hat and cymbal sounds. The TD3 is also equipped with MIDI In and Out, 15 onboard effects and has Roland's *Rhythm Coach* drum-tuition program built in. The rest of the kit is made up of four dual-trigger pads, two dual-trigger cymbal pads, a dual-trigger mesh pad, a kick pad, a hi-hat control pedal and an MDS3C drum stand. The accessory kit included with the prize consists of a drum stool, a pair of sticks and a kick drum pedal — basically everything you'll need to play your V-Drums straight out of the box.

If you would like a chance to win this fantastic prize, simply fill out the entry form at the bottom of this page and post it to the address on the coupon. Alternatively, you can enter via the electronic form on the *SOS* web site. Please make sure you answer all the questions and complete the tie-breaker. We also require your full address, including postcode and daytime telephone number. The closing date for entries is August 31st, 2005. SOS

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questions

Which popular TV programme's theme tune is characterised by terrible electronic drums?
- a. *Coronation Street* ☐
- b. *Eastenders* ☐
- c. *Emmerdale Farm* ☐
- d. *The Sooty & Sweep Show* ☐

What is Roland's *Rhythm Coach*?
- a. A man in a tracksuit with a tambourine ☐
- b. A really groovy bus ☐
- c. A drum tuition program ☐
- d. A figment of my imagination ☐

What is the name of the rhythm module included with the TD3KV?
- a. TD3 ☐
- b. 4TD ☐
- c. TD4 ☐
- d. Simon ☐

Roland V-Drum tie-breaker

Drummers are much maligned and misunderstood, and have habitually been the butt of many jokes. To redress the balance, we want you to send us your best non-drummer musician jokes. The funniest wins the V-Drums. Be warned, though, we already know all the obvious ones...

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Would you like to receive more information on Roland products? If yes, please tick or cross this box. ☐

Post your completed entry to: V-Drum Competition July 2005, *Sound On Sound*, Media House, Trafalgar Way, Bar Hill, Cambridge CB3 8SQ, England.

the small print

1. Only one entry per person is permitted. 2. Employees of SOS Publications Ltd, Roland UK Ltd and their immediate families are ineligible for entry. 3. No cash alternative is available in lieu of the stated prize. 4. The competition organisers reserve the right to change the specification of the prize offered. 5. The judges' decision is final and legally binding, and no correspondence will be entered into. 6. No other correspondence is to be included with competition entries. 7. Please ensure that you give your DAYTIME telephone number on your entry form. 8. Prize winners must be prepared to make themselves available in the event that the competition organisers wish to make a personal presentation.

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Getting great recorded vocals can seem like rocket science, especially with all the complicated editing and processing tools that *Logic* now provides. So this month we'll be giving you the advice you need to produce that big commercial sound.

Better Vocals In *Logic*

Paul White

Recording vocals, in a generic sense, has been covered in *Sound On Sound* on numerous occasions, but this time we're going to look at the process of recording and processing vocals using Apple's *Logic*. The process starts with getting a microphone signal into *Logic*, which usually means connecting a suitable mixer or mic preamp to the line input of your audio interface, or using an audio interface that has a mic preamp built in. Of course the choice and positioning of the microphone is just as crucial as in any other recording situation (see the 'Getting A Good Recording' box for some pointers). If you're using a capacitor mic, then the preamp or mixer must have phantom power — unless you're using a tube mic that is.

To Process Or Not To Process?

You may have a rack compressor that always sounds absolutely fantastic with your voice, but my inclination would usually be to avoid any form of processing while recording. In the bad old days, we needed to compress while recording to tape in order to maintain a high average recording level that would mask the tape noise, but with 24-bit recording you can easily leave 12dB or more recording headroom and not lose any quality at all. If you feel you must compress while recording, then at least make sure that you under-compress slightly rather than over-compress, as you can always add a bit more compression when you come to mix.

The same applies to EQ — it's much easier to add it than to undo the effect of inappropriate EQ, so it's safest to record everything flat and then EQ while mixing if you need to. If your mic preamp has a low-cut switch, it may be worth using that to exclude very low-frequency sounds, such as passing traffic, but try a test recording with and without the filter to ensure that it doesn't compromise the low end of the voice in an unacceptable way.

The next issue with any computer recording system is to see whether you can get the latency value low enough for the singer to feel comfortable when monitoring the output from your audio interface. Nobody can give their best performance when what's coming back through the headphones is delayed to a noticeable degree. Most reasonably modern computer audio systems are happy to work with buffer sizes of 128 samples or lower, *Logic* included, but you

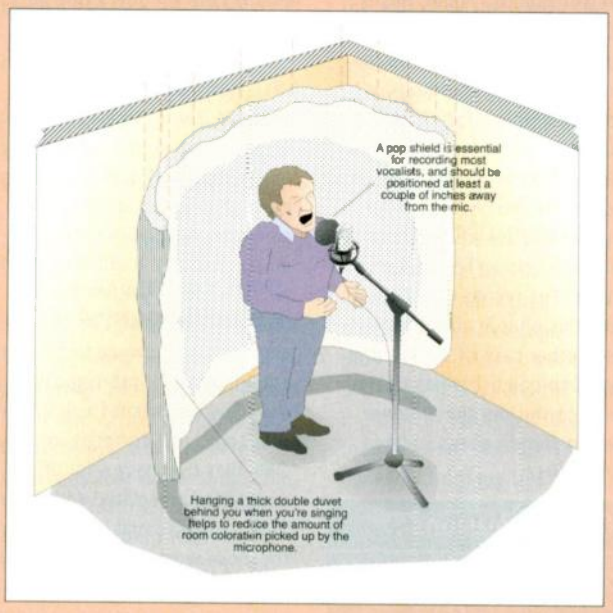
Getting A Good Recording

Most vocal parts are recorded using a cardioid-pattern condenser microphone, usually a large-diaphragm model. There are lots of these to choose from these days, and most will give good results if used carefully, even the relatively cheap ones. In most instances where users complain of a mic sounding boxy or coloured, what they're really hearing is the acoustic properties of their recording space affecting the recording. If you're working in a typical domestic room, you can make the best of the situation by following a few simple guidelines.

Firstly, hang up some acoustically absorbent material, such as a duvet or some heavy blankets, behind and to either side of the singer. This will help prevent sound bouncing from the room surfaces back into the microphone. Then set up the mic well away from walls, but avoid putting it exactly halfway between any two sets of walls, as this may exaggerate any room coloration — a couple of feet from the dead centre of a room is generally fine.

Always use a mesh pop screen between the singer and the mic, and leave at least a couple of inches between this and the mic — it won't work properly otherwise. As far as singer-to-mic distance is concerned, start with a gap of around six inches, as this is far enough away to avoid the worst of the proximity bass-boost effect, but close enough to give a good ratio of direct sound to room reflections.

Finally, provide the singer with a comfortable headphone mix, and don't record in the same room as your computer setup unless you really have to, otherwise you'll probably pick up some fan and drive noise. If you have no alternative, face the mic away from the computer and try to keep as large a distance as is practical between the mic and the computer.



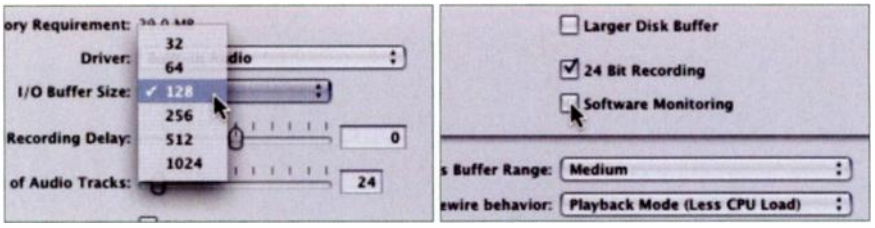
may need to increase the buffer size if the computer is being forced to work particularly hard. Software instruments place the greatest drain on CPU resources and *Logic*'s Freeze function can help you here by rendering these instrument tracks as temporary audio files to free up CPU power.

As a rule, I record with a buffer size of 128, which amounts to a latency of around four milliseconds (by the time you've added in the delay attributable to the A-D and D-A converters) at 44.1kHz and 48kHz sample rates — roughly the time it takes sound to travel four feet. Most singers don't perceive this delay, but please be aware that if you are using any DSP-assisted plug-ins such as those hosted by the Universal Audio UAD1 card or TC Electronic's Powercore, the latency will double and is then likely to be noticed. You'll also suffer greater monitoring latency if any of the tracks in your existing song use any plug-ins that themselves generate large delays, as *Logic*'s plug-in delay compensation will (if active) delay all the other tracks to match. Most of *Logic*'s processing plug-ins introduce only very short delays, but there are exceptions such as the new linear-phase equaliser. Note that plug-in delay compensation seems to be switched off when you first configure *Logic*, in which case you'll need to turn it on in *Logic*'s Audio Preferences.

Where high latencies can't be avoided, you can still get around the delayed monitoring problem by taking a second feed from your preamp. Many preamps now have both jack and XLR outputs so you can record from one and monitor from the other, but a splitter lead can do the job just as well. The extra preamp output can then be mixed with the output from your soundcard, either in a separate monitoring mixer or in a master monitor controller that offers the facility to mix two or more inputs. You'll need to turn off *Logic*'s software monitoring in the Preferences to avoid hearing both the direct and delayed sound, and you won't be able to add any plug-in reverb to make the singer more comfortable. However, if you have an old hardware reverb unit, you can patch this into the mixer you're using for monitoring and set up some 'comfort' reverb that way. You can feed the singer's phones directly from the monitor mixer's own headphone output or use the mixer to drive a separate headphone amplifier.

Vocal Editing

If all has gone well, you should now have a clean recording of what was hopefully a good vocal performance. To turn this good recording into a great one, you can use *Logic*'s *Expander* or *Gate* to remove



The I/O Buffer Size in the *Logic* Preferences (left) needs to be kept low in order to minimise latency, which can be distracting for the performer when recording vocals. If you can't get this setting down to 128 or less without problems, then it's probably best to switch Software Monitoring off (right) and use direct hardware monitoring.

low-level noise between phrases, you can use *Compressor* to add density and to even out the vocal level, and you can add EQ to fine-tune the tonality of the sound. The final touch is to add reverb, but if the vocal pitching needs a little work, there's always *Logic Pro 7*'s new *Pitch Correction* plug-in to help you out.

As a matter of course, I usually get the singer to do at least two complete takes of each part, as well as revisiting sections that might need patching up. The complete takes can be handled on separate tracks, muting the first before you record the second. If you're lucky, you'll be able to use the scissors tool to compile the best sections from each to produce a definitive take, but more often than not you'll need to retake specific sections. The easiest way to do this is to create a new track that has the same Track Instrument as the original vocal take (or compiled take) and then use the automatic punch-in/out function to handle the recording for you.

First drag (from left to right) in the upper part of the Time Ruler bar in the Arrange window to mark out the section you want to record, activate the punch-in/out transport button and enable the record switch on your new track. Pressing Record will then start the process, playing from the current cursor position. Logic will play what's on the existing track right up until the punch-in point whereupon it will monitor the new recording source (the voice) and record it. When the system punches out, you'll hear the original track again. If the new section was OK, you can snip a hole in the original vocal track and then slide the new take into its place, holding down the shift key to prevent the start time of the insert from being accidentally moved. Once in place, you can use the crossfade tool to avoid glitching if you've cut in the middle of a phrase, but most times it's best simply to arrange the edit (punch in and out) points in the pauses between phrases.

During this compiling and optimising process, you may also find that some chorus sections or other repeated phrases sound better than others, in which case you may wish to copy them and replace the less good ones. Using *Logic*'s new Marquee tool, you can identify your source section without having first to cut the sequence into pieces using the Scissors tool and then copy it ▶

Here is how the *Noise Gate* plug-in might typically be set up for vocal processing. Threshold control would have to be set up by ear for each individual track so that the gate only operated during gaps in the singing.

A useful general vocal compression setting is shown above, although again you'll need to adjust the Threshold to taste.

▶ using the usual Alt-drag procedure after first switching back to the normal Pointer tool.

Gating & Compression

Once you're happy with the quality of the vocal part, you can start to process it. *Logic*'s *Gate* is perfectly adequate for removing low-level noise between words and phrases, and its side-chain filters are useful if there's any other very low- or very high-frequency sound present that might otherwise trigger the gate and open it when it should be closed. The gate should be the first process used, so it's best to put it in the top Track object insert slot. If you set the side-chain filters to 150Hz and 6kHz respectively, the gate should trigger reliably on vocals while ignoring things like traffic rumble or fan whine. For vocals, it's usually best to set the gate to open as fast as possible, but to close over a period of around a quarter of a second, so that naturally decaying notes aren't cut off too abruptly. You can see if this can be improved upon by trying faster release times, as a lot depends on the performance and the level of noise present.

While gates can apply almost infinite attenuation when closed, you may get a more natural sound by setting the gate range to around 12dB, which should still be enough to hide any noise (unless your recording is really noisy). I've tried *Logic*'s own noise-reduction plug-in, but found it rather disappointing, and though an Expander will work just as well as a gate in this application, there's no real advantage under normal conditions.

Once you've gated the vocal track to clean it up, you can then compress it by inserting *Logic*'s compressor in the next available insert slot. For vocals, I tend to use the RMS compressor mode with the Knee slider over towards the Hard end of its range. The ratio can be somewhere between 4:1 and 8:1, depending on how assertive the compression needs to be. A fast attack followed by a 100-200ms release time usually works well, but if you like your compressors to audibly pump, then try a shorter release time. That leaves the Threshold control, the setting of which depends on the level and dynamics of the vocal recording. A good rule of thumb is to adjust it until you get around 6dB of gain reduction on the loudest peaks if you are being subtle, or up to 16dB or so if you're after an obviously compressed rock vocal sound. However, be aware that for every decibel of noise reduction applied, any background noise and room ambience on the recording will come up by exactly the same amount between phrases, which underlines the need to capture a clean recording in the first place. That's another good reason to gate the track, even though it may not appear noisy prior to adding compression.

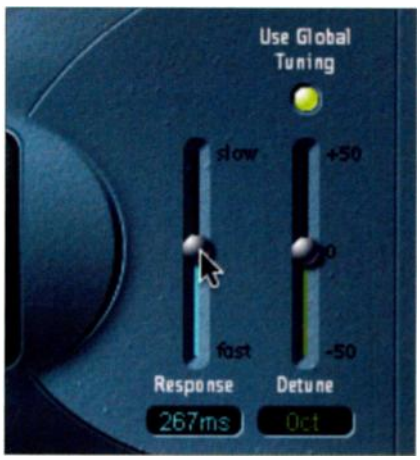
Pitch-correction

Logic's *Pitch Correction* plug-in can be placed before or after a compressor and, intuitively, I feel it has a better chance of working properly if it comes afterwards, as it will receive a more constant level. Having said that, this plug-in is so good that it copes with all normal vocals, compressed or not. Normally I only use pitch-correction where I really have to, and you can slow the rate of pitch-correction right down between the phrases that need treatment, using *Logic*'s automation, which has the effect of reducing the amount of processing applied — only long, sustained notes are then corrected. You can also automate the plug-in bypass button if you prefer to do it that way.

An alternative approach is to split the audio part over two tracks with identical plug-ins and track settings, then insert the *Pitch Correction* plug-in on one of them. By moving just the parts that need correcting onto the track with the *Pitch Correction* plug-ins, you can easily control where the processing is and isn't applied without having to use any automation. If you've yet to upgrade to Logic v7.1 then it'll be necessary to duplicate the track plug-ins (which can be copied over, complete with their settings, using the Audio Configuration window) rather than routing both audio tracks to a Buss object and putting the common plug-ins in its insert points — although this saves on processing power, the lack of plug-in delay compensation in *Logic*'s busses will cause the vocal part to be delayed slightly. You can fix this manually using a negative track delay if you're really short of processing power, but under normal circumstances, duplicating a gate, a compressor, and possibly an equaliser won't add significantly to the processing load.

As with most pitch-correction plug-ins, the most natural results are obtained by setting the response time as slow as possible commensurate with still controlling any obvious pitch wandering. If you set it too fast, natural inflections start to get ironed out, and the result becomes somewhat robotic. Although this misuse of pitch-correction has been successful as a special effect on a number of pop records, it's not the way to go if you want a natural-sounding vocal performance.

EQ is best applied after pitch-correction, and what you need to do, as always, is emphasise the positive aspects of the source sound while reducing any unpleasant characteristics. Often a sizzle is added to the high end by applying a broad boost (around two octaves wide) at anywhere from 8kHz to 12kHz using *Logic*'s *Channel EQ* (the standard version, not the new linear-phase option). It's also worth setting up a fairly narrow band (half an octave or



A common mistake when attempting vocal tuning fixes using the *Pitch Correction* plug-in is to set the response time too fast, which can remove the expressive inflections in the performance, making the voice seem lifeless and mechanical.

Another tactic for getting natural pitch-correction results is to process only the relevant sections of a vocal track, rather than the whole thing. You can do this by setting up an adjacent pair of tracks in the Arrange window, only one of which feeds the Pitch Correction plug-in. That way you can simply move regions between the two tracks to dictate which sections of the vocal performance are to be processed.

so) and then sweeping this through the mid-range to see if it picks out any nasal or boxy artefacts that need suppressing. More experienced users will be able to estimate the problem frequency and then try the cut without having to sweep first, which can help maintain a better sense of perspective. Which approach you prefer is up to you — I still tend to be a bit of a sweeper! EQ seems to be a very personal thing, where some people use hardly any and others pile it on. Different musical styles demand different approaches, but if the end result sounds right, then it is right. However, never judge the result of EQ in isolation — it's essential that you hear the part in the context of the complete mix.

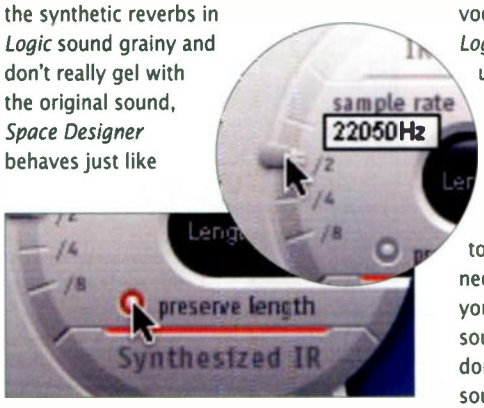
Reverb For Vocals

Until very recently, the majority of native-powered software reverbs have been, frankly, rather disappointing. *Logic*'s *Platinumverb* used to be top of the *Logic* reverb range, but it's really not that great. It is fine for demos, and it suits some instruments, but it's not a classy vocal reverb by any stretch of the imagination. As for the *Gold*, *Silver*, *Lead*, and *Cardboard* variants, just forget them. If you're using a version of *Logic* that only offers these, and you don't have any third-party alternatives, then the best option is to use a mid-price hardware reverb unit and feed it from one of *Logic*'s aux sends via a spare output on your soundcard. If you only have stereo digital and analogue I/O, then choose a reverb unit with a choice of digital I/O so you can feed it directly from the soundcard's S/PDIF output. Its output, analogue or digital (depending again on what your soundcard offers), can then go back into two soundcard channels routed to a stereo Input or Aux object within *Logic*, which will then act as an aux return.

Having said all that, anyone with *Logic Pro 7* also has *Space Designer*, a fantastic reverb, at their disposal. It is a bit processor-intensive, as it uses impulse responses and convolution techniques, but you can halve its appetite by choosing a halved Sample Rate setting at the left of the plug-in window and then clicking the Preserve Length box. This in effect halves the frequency response of the reverb, giving it an upper limit of around 10kHz, but that's still enough to emulate most classic reverb effects.

Normally *Space Designer* would be placed in a Buss object and fed from track sends — even if you don't have plug-in delay compensation, who cares if your reverb comes back a few milliseconds late? It's the same as increasing the pre-delay very slightly. Just remember to ensure the *Space Designer* mix controls are set so that the Direct signal is off and the Reverb signal is at maximum. You can then adjust the amount of added reverb using the send controls, and in most cases somewhere around 20 percent reverb sounds about right.

As to which reverb setting to use, you're spoilt for choice, especially if you have *Logic Pro 7* with all its extra reverb impulse responses. There are many vocal plates and vocal studio presets to try, but my advice would be also to try out some of the less likely-sounding presets such as the woods and forests, as some of these sound stunning on vocals. Even the Station Platform preset can sound great. Whereas the synthetic reverbs in *Logic* sound grainy and don't really gel with the original sound, *Space Designer* behaves just like a high-end studio reverb, becoming part of the sound itself rather than seeming to be layered on. For conventional pop music, the impulse responses based on other hardware reverbs rather than on real spaces often work best, as that's what we're used to hearing.



You can reduce the processing load placed on your computer by the *Space Designer* plug-in by halving the Sample Rate setting, and then activating the Preserve Length button. This will limit the high-frequency response of the reverberation to 10kHz, but that will be of little concern in most projects.

Some people find the need to de-ess vocals, and *Logic* has a plug-in for that too, though I don't think it works as well as a dedicated de-esser box, such as the one made by SPL. In most cases, changing the mic position or choosing a different mic works in all but the most extreme cases. In fact, I find that the most common requirement is to make the vocals sound more crisp, which can be done using 'air' EQ in the 12kHz range or by using *Logic*'s *Exciter* plug-in, which essentially resynthesizes the upper harmonics based on what's going on in the mid-range. It's important not to set the filter frequency too low (1.5-2kHz seems good for vocals) and not to over-process, but switching to bypass on a regular basis should ensure you're not overdoing things.

Use Your Ears!

Although there is a lot of esoteric hardware and software available for processing vocals, the plug-ins that come as part of *Logic Pro* are capable of doing a great job if used correctly. However, the most important thing is to start with a good, clean recording made in a well-damped or acoustically sympathetic space, as any boxiness caused by the room can't be fixed afterwards. After that you need to use your ears to judge what the sound needs, rather than processing just because you feel you have to. If you get the best sound without compression or EQ, then don't use it. Similarly, don't smother the sound in reverb just because you can. On many mixes, I find it's appropriate to use less compression and then compensate for more excessive level changes using *Logic*'s level automation. The less you have to do to a vocal to get it sounding right, the more natural the end result is likely to be. SOS

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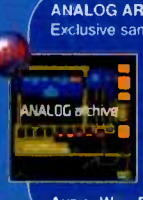

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- Control of PitchBend and Scoop
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Windows 95 or higher, 700 Mhz CPU, 256Mb RAM

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performer notes

Tiger, Apple's latest version of OS X, has some implications for *Digital Performer* users. Happily, they're nearly all good...

Robin Bigwood

There's always some uncertainty as to how a complex application such as *DP* will get along with a new operating system, so it's nice to be able to report that users of *DP* 4.52 upgrading to Mac OS 10.4 are having a fairly easy time of it.

If you're installing *DP* on a new Mac already loaded up with Tiger you'll have no problems at all — a normal installation of *DP* 4.52 should work right away. However, if you've upgraded a Mac running OS 10.3 or earlier that already has *DP* installed, you may experience some crashes when you try to play a *DP* project. The solution is easy: go to Applications / MOTU *DP 4.5* Folder and trash the *Digital Performer* 4.52 application file. Then run a *DP* 4.52 installer again, either from your installation CD or the *DP* 4.52 updater available from www.motu.com. Incidentally, this same application-trashing technique works for *Audiodesk* users too, except that they should reinstall from the new *Audiodesk* 2.04 public beta installer available from the MOTU web site.

Once you've got *DP* working in OS 10.4, you should notice some useful enhancements. Tiger's new device-aggregation capabilities will seem like no big deal, since *DP* has had a built-in equivalent for quite a while, but they could be useful if you (gasp!) use other audio applications as well as *DP*. Exposé now handles *DP*'s Consolidated Window and plug-in windows properly, and Apple's new AUNetSend plug-in could well end up fulfilling a similar role to Apulsoft's *Wormhole* in facilitating multi-channel audio connections between computers connected via Ethernet. Not quite distributed processing, but a step in the right direction. Similarly, Tiger's Network MIDI features should make Musiclab's *MIDI over LAN* redundant for some users.

The very American MOTU *MX4* v2, a superbly flexible synth with wavetable oscillators, mind-boggling modulation options and a surprising level of user-friendliness. It uses a bit of processor, though — gentlemen, start up your G5s!

More Tiger Developments

After you've got *DP* sorted out, there are more Tiger-related installations to do if your setup includes MOTU hardware. The updated USB MIDI driver, v1.31, that I mentioned last month is essential if you're using a MOTU MIDI interface with OS 10.4. But if you also use a MOTU audio interface, you'll need to download updated drivers for it. The MOTU Firewire Audio driver and console package v1.2.5 supports Tiger but is a recommended installation for all users, as it's backwards-compatible with OS 10.2 and works with every Firewire interface MOTU have ever made. The same goes for the PCI Audio driver and console package v1.08, which supports both the PCI324 and PCI424 cards and everything from the original 2408 interface to the HD192. Finally, there's a Tiger-compatible public beta version of *Mach Five* that should keep users of this software sampler happy — at least until *Mach Five* v2 comes along.

Universal Audio UAD1

Universal Audio's UAD1 powered plug-in card is a favourite with many *DP* users, as it properly supports the MAS plug-in format. Sadly, though, a few of them found out the hard way that the latest driver package as I write this (v3.8) isn't compatible with OS 10.4. Universal Audio may have released a fix by the time you read this, however.

It's also worth noting another issue that affects the UAD1 and TC Electronic's Powercore PCI and only emerges when you use one of these cards in conjunction with a Firewire audio interface and some Power Mac G5 models. It appears that a chip in the G5 that's responsible for controlling data flow between the Firewire and PCI busses can sometimes give rise to increased processor load and spikes when using the 'powered' plug-ins — exactly the situation they're supposed to prevent! This sort of behaviour has been identified in second-generation G5s with PCI-X slots (the 'old' Dual 2.0GHz and Dual 2.5GHz machines), but it's not clear yet whether the 'new' G5 line-up is affected. Watch this space for more details. In the meantime, if you're planning on spec-ing a system that will rely heavily on powered plug-ins and a MOTU Firewire interface or two, it may be worth digging around on Internet forums for the latest info, and possibly considering the non-PCI-X models over their higher-spec'd brethren. SOS

MX4 v2

MOTU's *MX4* 'multisynth' (see screen above) has been updated to version 2 and implements the new features I mentioned in April's *Performer* Notes column, as well as being compatible with OS 10.4. For *MX4* v1 owners the update is free. For everyone else this mega soft-synth costs £199. In a break with MOTU tradition, *MX4* v2 is available as a 14-day demo download, so you can try it before you buy. Nice one MOTU!

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Creative Shortcuts

In *Digital Performer*

An accomplished sequencer such as *Digital Performer* certainly allows its users to push the envelope when it comes to sophisticated music and sound production, but it should also act as a 'sketchpad', facilitating composition and musical experimentation. We take a look at what *DP* can offer in this area.

Robin Bigwood

The POLAR loop recorder offers remarkable flexibility for capturing multiple takes or layering multitrack textures and is just one of *Digital Performer*'s easy and time-saving ways to get creative.

When you're trying to come up with musical ideas, few things cripple creativity more than technical difficulties or convoluted working methods. Knowing how best to capture your ideas, and then how to use specific features to develop them, can prove incredibly useful skills, speeding up your work rate and perhaps even adding to the sophistication of the end result. In this article I'm going to look at those aspects of *DP* that can help with all aspects of writing music, and that are so useful regardless of whether you're predominantly a MIDI person or are more at home with recording audio.

Memory Cycle

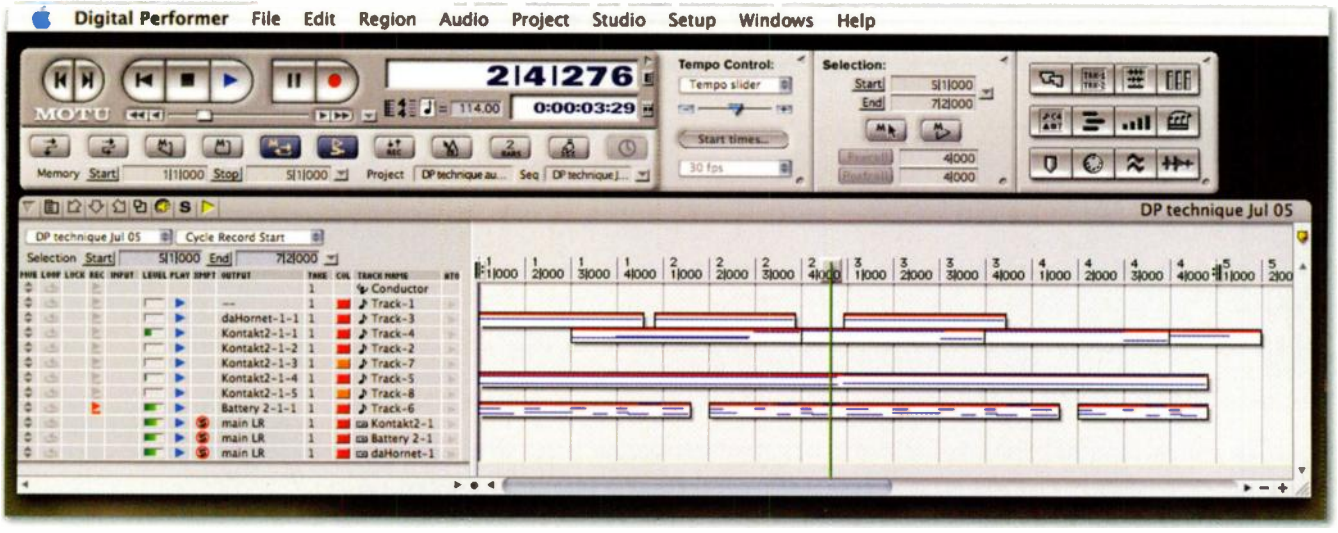
There can be few *DP* users, old or new, who haven't made use of the Memory Cycle function. Turned on with the rightmost 'M' button in the Control Panel, or with the keypad's '7' key, Memory Cycle causes a section of your sequence to loop during playback or recording. There are any number of reasons to use it, but it comes into its own for jamming and building up multi-layered textures from scratch. The idea is that for, say, a four-bar section, Memory Cycle lets you start off by laying down a bass line, then loops round and plays that bass line while you add another track, then continues to loop and play your recorded tracks while you add additional ones. All this can take place without the need to ever press the stop button or even come out of record.

Memory Cycle loop boundaries are indicated by a pair of forward- and backward-facing repeat marks in editing windows' time rulers. Their location can be changed by simply dragging, but there are other ways too:

- Locate to your desired loop-start point and hit F1, then go to your end point and hit F2.
- Make a time-range selection, perhaps by dragging in the time ruler, and then use the Memory Cycle pop-up menu just below the Memory Cycle button to choose 'Set to Selection Bounds'.

Quick Tips

- **When using Memory Cycle to build up multi-layered arrangements from scratch with software instruments, it's worth not getting too carried away with your own creativity, as occasionally patch or sample loading during playback can cause *DP* to lock up or crash. Frequent saves can help to preserve your work, and you can save during play, too — just drop *DP* out of record before hitting Apple-S.**
- **If you're getting good results with *DP*'s real-time MIDI plug-ins but you occasionally need manual control over the results they provide, it's possible to 'print' the plug-ins to your MIDI track. Just make a time-range selection in the appropriate MIDI tracks where you want the effects to be printed, then choose the 'Capture Realtime MIDI Effects...' option from the Region menu. This intelligent function converts the MIDI events produced in real time into actual MIDI events in your tracks, and it can even then automatically disable the real-time effect.**



A typical setup for jamming using Memory Cycle. Several MIDI tracks are already in place, Memory Cycle and Overdub are turned on in the Control Panel (buttons dark blue), and *DP* is in record.

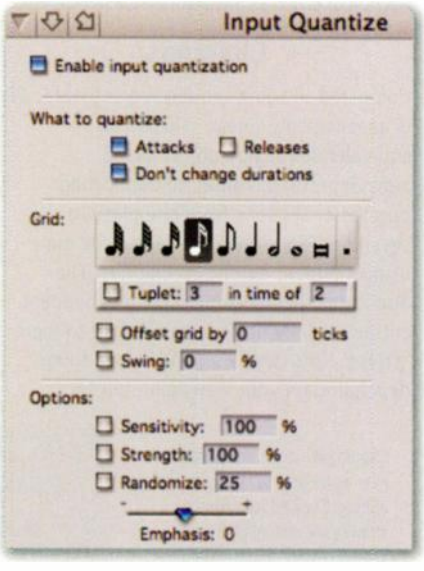
For the most part, Memory Cycle works best for recording when Overdub mode is turned on, using its Control Panel button just beneath the Record button. This causes *DP* to continue recording throughout multiple loops. Otherwise it drops out of record each time you reach the end of a loop.

If you're working with MIDI, try setting up a Memory Cycle loop, turn on Overdub (and the Metronome, if you'll need it), set up some tracks with working MIDI destinations and record-enable one of them. Hit record, and play in some notes. When *DP* reaches the end of the loop the playback wiper jumps back to the start and anything you recorded remains in place. You could layer more notes on top of what you just recorded, but if you need to experiment or practice a bit more first, hitting the keypad '3' key takes you temporarily out of record. You can also use the up and down arrow keys to switch record-enable status to adjacent tracks. Your first track continues to play, and you get to instantly record on a new one, perhaps with a different sound.

Working with Memory Cycle, you get to use a superb shortcut: 'Spot Erase', which is triggered by the 'reverse apostrophe' key (often found next to the 'Z' key). If you've played some bum notes, just hold down this key, together with the offending MIDI note (or notes) on your controller keyboard. As you do this, any instances of them are erased. This works great for drum parts. You might also try using Input Quantize, accessed from the Studio menu. This can help you achieve rhythmically precise results more quickly, by actually recording a quantised version of what you play, and does away with the need to subsequently select data and apply the standard Quantize command.

Memory Cycle is also useful for audio recording, but it works in a slightly different way. Again, you really need Overdub turned on, so that each time *DP* reaches the end of the loop it stays in record. Unlike with MIDI, though, audio recorded in a new loop is recorded into its own 'take'. *DP* doesn't have the ability to display multiple takes side by side, so sometimes it looks as though your efforts are instantly disappearing, but you can always audition takes by switching between them using the Take pop-up menus in the Tracks Overview and Sequence Editor (assuming they're visible, of course). If you've recorded multiple takes of the same phrase, you can 'comp' together the best bits by dragging several good takes to a new audio track for editing.

There's one final 'power user' shortcut



When you're programming MIDI drum parts using Memory Cycle, the Input Quantize function saves you the chore of selecting data and applying quantisation, and can allow you to achieve accurate and precise results quickly.

for when you're working with Memory Cycle: Ctrl, Alt and Apple plus the left or right arrow key 'jumps' the Memory Cycle region backwards or forwards the same number of bars as it is long. This gives you the possibility of, say, working on a 16-bar section of a song by splitting it into four-bar sections: when you've finished with the first four bars, you can 'jump' the Memory Cycle region forward to start working on the next four.

Pasting & Merging

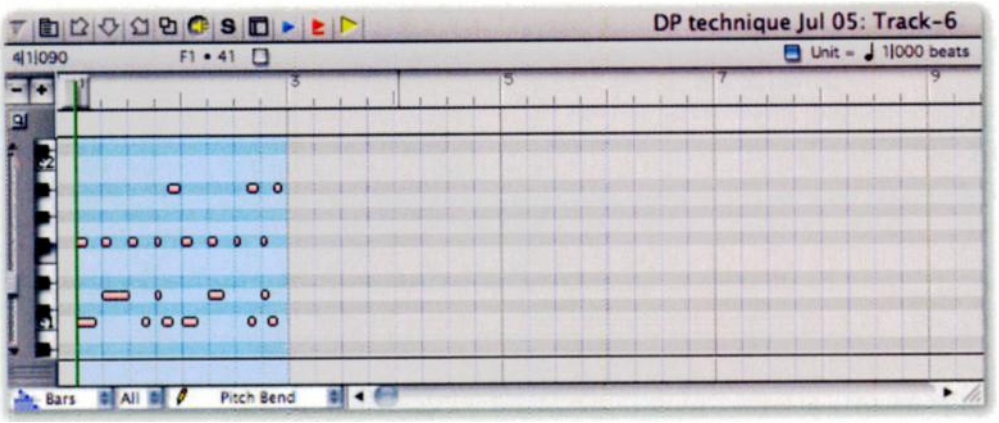
Knowing how to quickly copy material and paste or merge it elsewhere is very useful when you're writing, allowing you to outwardly expand detailed work you may have done on very short sections, and experiment with or re-order the large-scale structure of your sequence.

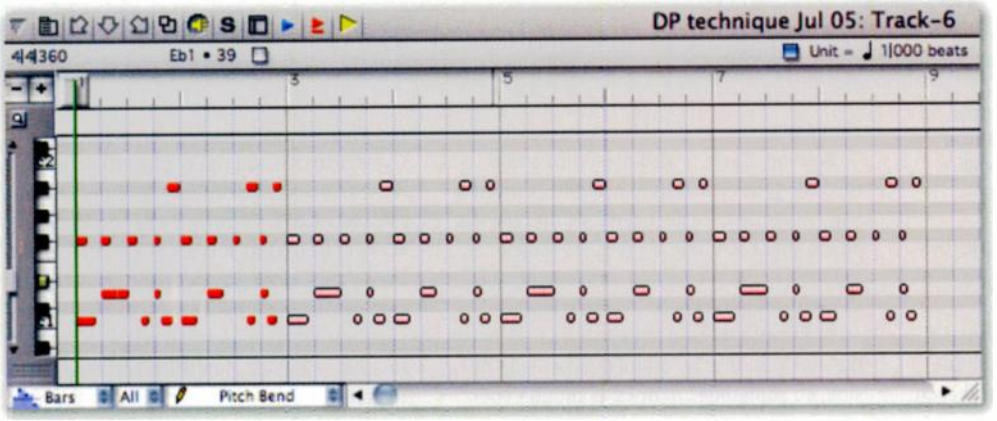
First, you need to copy your sequence data correctly, and this is best done with a time-range selection, which is easy to achieve in various ways:

- In the Tracks Overview, drag in the time ruler.
- In track lanes, drag using the cross-hair pointer. Individual tracks can be included in or excluded from a time-range selection by shift-clicking their names.
- Make time-range selections in the Sequence and Graphic editors by clicking and dragging in the time ruler or audio tracks, or using the I-Beam tool.
- Finally, don't forget to hit Apple-C to copy your data.

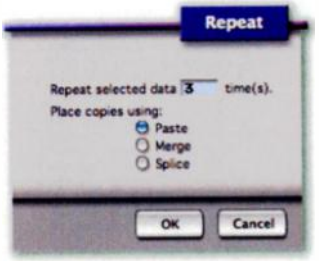
The next step, not surprisingly, is to place the data elsewhere in your sequence. In *DP* there are two main ways to do this.

- Position the playback wiper where you want the new material to go, hit Apple-D (deselect all) to make sure nothing is





DP's Repeat function is superb for building up recurring patterns and is very easy to use. First, make a time-range selection of the material you want to repeat, then hit Apple-R to configure the number of repeats and how they'll be integrated with your sequence (below). Finally, click 'Apply' to see the results.



selected elsewhere in your sequence, and finally hit Apple-V, -M or -K, to Paste, Merge or Splice in your copied data.

- Alternatively, make a new time-range selection before placing your data. This has the slight advantage that you can be selective about which tracks are copied into the new location.

Time-range selections are also the key to using *DP*'s Repeat functions. These make it easy and quick to build up repetitive structures such as riffs and drum patterns.

- One approach is to make your selection (it works equally well for MIDI or soundbites), hit Apple-R, choose the number of repeats you want in the dialogue box that appears, then click Apply.
- An alternative approach is to make your selection and then hit Apple-C to first copy it. Then you make a new time-range selection where you want your repeats to go and use use Paste Repeat (control-Apple-V) to fill it up with your copied material. This method takes a lot of the guesswork out of deciding how many repeats are necessary to fill up a longer section.

Both techniques can be used to create interesting syncopated or polyrhythmic effects if the initial time-range selections aren't a whole number of bars long.

For copying and pasting really large-scale parts of your sequence, using the mouse to make conventional time-range selections can be a drag (sorry). In these cases you could try placing Markers (using control-M) at the start and end of the section to be copied, and then clicking the first to select everything in between. After copying, just hit Apple-D to deselect all, place your playback wiper in the new location, and Paste or Merge as normal.

Clippings

Compared to some sequencing software, *DP* is unashamedly 'linear'. There's no equivalent of *Logic*'s object-based behaviour, for example, so duplicating phrases or sections from one place to several others generally needs to be done using standard editing techniques. The duplicates then become quite independent entities — they don't remain linked to their 'parent'. This can be a good or bad thing, depending on your viewpoint, but for building up songs and other compositions, some object-like behaviour can be useful, and this is where *DP*'s Clippings can help. They allow you to build up a store of constructional elements — riffs, chord sequences, soundbites, or even whole sections on multiple tracks — and to place these in a sequence simply by dragging and dropping.

Clipping Windows are about as near as *DP* gets to 'object-based' editing. They act as a sort of storage area for all kinds of sequence data, and the clippings they contain can be dragged and dropped into your sequence to quickly build up large-scale structures or compositional ideas.

To work with Clippings, you need a Clipping Window. Perhaps the most useful for editing work is a Project Clipping Window, created from the Clipping sub-menu of the Project menu. It appears as a little grey box that immediately prompts you to name it — something like 'sequence elements' might be appropriate. To get something into the Clipping Window, you first need to select some data: it could be anything from a two-bar MIDI bassline to a 16-bar, 32-track section containing MIDI, audio and automation data. Choose Copy to Clipping Window from the Edit menu, and then the name of the window you just created from the sub-menu. Your data is transferred to the Clipping Window, and it can be put back into your sequence, to relocate or copy it, by dragging and placing it in the Tracks Overview or Sequence Editor.

You can open multiple Clipping Windows, perhaps to organise different types of sequence data, and if you need to share data between Projects, a *Digital Performer* Clipping Window works in exactly the same way but is accessible from any Project you open.

Clearly, Clippings don't exactly replicate dynamic object-based editing, but they do go

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▶ a long way towards it. There's even more about Clippings in the August 2001 Performer Notes article, available online at www.soundonsound.com/sos/aug01/articles/motunotes0801.asp

Generating New Material

DP has a number of features you can use to generate new and sometimes surprising material from MIDI tracks, as well as from MIDI data played in real time.

The Transpose window (called up by choosing 'Transpose...' in the Region menu, or hitting Apple-9) can do more than just simple key changes: it can convert between different types of scale, such as from Major to Dorian. Some experimentation with this function, set up using the Diatonic or Key/Scale options in the Transpose window, can yield interesting results. Perhaps even more useful, though, is the Transpose window's Harmonize function. With the same range of choices available, from simple transposition to complex scale translation, Harmonize adds to existing MIDI notes rather than changing them, allowing very useful octave and fifth doubling, as well as other harmony lines, to be generated from existing MIDI notes in no time at all. Using Transpose or Harmonize is easy: just select some MIDI notes, open the Transpose window, dial in your settings and click 'Apply'.

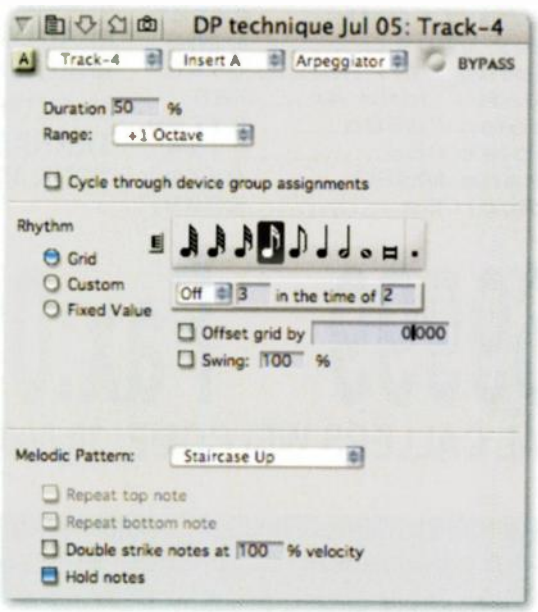
If you're not quite sure which Transposition settings might be appropriate, or you want to experiment with lots of different ones, you might try using *DP*'s real-time, non-destructive Transpose. This is available for individual MIDI tracks in the form of a MIDI plug-in via the Mixing Board, and it offers all the same choices as the Region menu command. Because it does its work 'on the fly', your original MIDI data is never changed, and you can go crazy, safe in the knowledge that order can be restored once more just by bypassing or deleting the plug-in!

Other real-time MIDI plug-ins that can prove handy for compositional experimentation include Echo and Arpeggiator. Echo is the MIDI equivalent of a digital delay and works by generating additional events from the MIDI data fed into it. Even if this plug-in could only generate simple MIDI echoes it would be useful, but it can be set up to produce complex rhythmic patterns and (with its Feedback Transpose function) to have echoes transposed by a user-definable amount — which is superb for creating 'peals' of notes that can sound great with harp, bell and many other sounds. Using the Echo plug-in is pretty much self-explanatory, but it's worth remembering that values for the decay parameter must be within the range 0-50, with higher values causing a more rapid decay in the volume of the repeated notes. The Arpeggiator plug-in also has the potential to produce some fantastic effects and, in more recent versions of *DP*, is more flexible than ever, offering 15 preset patterns as well as a user-definable option. Both Echo and Arpeggiator will work on a live MIDI input too, so you can hear their effects as you play.

If you're working with audio, your choices for 'generative' plug-ins are rather different. Delays, especially when synchronised to sequence tempo, can always be inspiring, and amongst the best are MOTU's own *Delay* plug-in, and PSP Audioware's *PSP84*. The latter, in particular, is capable of some astonishing effects, producing 'sheens' of notes around the simplest monophonic audio line.

It's not a huge conceptual leap from delays to granular synthesis plug-ins, and I find these have great potential for producing new, inspiring sounds from your existing sequenced audio. The daddy is undoubtedly *Riverrun* by Audioease, especially since it has sophisticated transposition facilities for the very flexible audio 'grains' it works with. In 'rhythmic' mode it's possible to achieve effects somewhat reminiscent of arpeggiators, while 'flowing' mode can produce walls of sound from the least promising input material. Different beasts entirely, but still very useful, are the freeware *KT Granulator* and *Transverb* plug-ins, both of which can conjure up strange rhythmic and harmonisation effects.

Although often only thought of as tools for treating drum loops, the likes of Native Instruments' *Intakt* and Glaresoft's *pHATmatik Pro* can actually work wonders on melodic or chordal material too. I find these extremely useful tools for giving rather stiff and straight-laced MIDI arrangements a much more up-to-date and glitchy feel. SOS



Digital Performer's real-time MIDI effect plug-ins can work on pre-recorded tracks or a live input. Several, including this highly configurable arpeggiator, are very inspiring to work with.

POLAR

If there's one feature in *DP* that never fails to inspire and delight, it's got to be POLAR, the Performance Oriented Loop Audio Recorder (see screen on page 238). It's a platform that allows an audio input to be recorded into RAM, rather than on to disk, so that it can immediately be played back as soon as the end of the loop is reached. Dozens of record 'passes' can be made in this way, without interruption, so it's great for building up audio-based multitrack arrangements such as vocal harmonies or multiple guitar parts. You're not forced to listen to the loop you've just recorded, though, so POLAR is also good for capturing multiple alternative takes of the same sequence section. It has all the tools to allow subsequent auditioning of your efforts before 'printing' the best of them to disk for more conventional inclusion in your sequence.

POLAR is called up from the Studio menu, or with the Shift-P shortcut, and its loop length and location is determined solely by enabling and configuring *DP*'s Memory Cycle function. POLAR then works almost like a separate application, with its own audio input and output. Clicking the big red record button starts off your POLAR session, with audio being recorded into the main, central waveform display. Individual record passes are triggered either manually (by clicking the 'new' button) or automatically via a gate with a configurable level threshold. Two radio buttons at the top left of the window choose between these modes. As you use POLAR, passes begin to appear in the bottom part of the window, and each has a play-enable, level and pan control. These, along with the Mute Previous Passes button, make it easy to control what passes you will and won't hear as you work.

When you've worked up an arrangement or bagged your killer take, you can actually save your efforts as a POLAR session file, or 'print' them to disk. How this is handled is governed by the choices you make in the 'options' window, and these are clear and easy to understand. For more on POLAR, have a look at the very first *Performer* Notes article I ever wrote, way back in April 2001. It's available at www.soundonsound.com/sos/apr01/articles/performernotes.htm

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reason notes

The new *Combinator* device can solve *Reason* problems you didn't even realise you had. We elaborate, as well as offering news and tips.

Derek Johnson

I've recently been having a play with *Obsession*, one of eLab's themed loop collections based around a nicely-specified eight-track REX-loop player plug-in. It offers a file-saving system lacking in *Reason*'s own *Dr:Rex*, and the way a user's own REX loops can be imported got me thinking how nice it would be to have a similar dedicated multitimbral REX device inside *Reason*. The thought quickly developed to: "But I can make one!"

The answer is, quite simply, v3's *Combinator*. This excellent device has had a lot of coverage, not least in last issue's *Reason* technique feature, which offered a great crash course in sound design in *Combinator* format. But it's worth being reminded of the simple jobs the *Combinator* can do that make our lives much easier. One of these is adding patch saving and loading abilities to devices that lack it.

Thus one *Dr:Rex* could be saved in its own Combi and be reloaded at any time with its loop and parameter settings intact. Add another seven instances of *Dr:Rex* to the Combi setup and you have a good approximation of what eLab's loop player has to offer. However many *Dr:Rex* devices you put in the Combi, you'll find it essential to include a mixer, either a *Remix* or a *Micromix*, to sub-mix the massed audio to one stereo output; a mixer will also allow you to save effects as part of the patch.

The great thing about the patch is that any front-panel changes made to any *Dr:Rex* included therein are saved with the selected REX loops. A *Combinator* could also be used more simply to collect a couple of *Dr:Rex* devices that each have a verse or chorus loop loaded, or two halves of one bit of music (I sometimes have to split REX loops into two when the contain more slices than *Dr:Rex* can accommodate).

One last thing: each *Dr:Rex* still needs a sequencer track from which to be triggered.

Six *Dr:Rex* devices in one *Combinator* — all loops and settings saved in a single patch.

Trigger Happy

If you use *Dr:Rex* a lot, try this: swap around sequencer tracks assigned to *Dr:Rex* devices so that one loop's triggers play another loop. Don't worry if the loops have different lengths or feels. Then try triggering loops in several instances of *Dr:Rex* from one track's triggers. You might think that you'll need to copy the triggers to multiple tracks — easy enough to do. But it may be quicker to load the target *Dr:Rex* devices into a *Combinator* and route one trigger track to that device: all the *Dr:Rex* devices in the *Combi* will be triggered and play back. However you do this, you could well find interesting textures, rhythms and tunes coming out of the existing material. Loading loops at random can be particularly fun!

Two Words: It Works

At the risk of repeating myself, I think it's worth adding a few comments to my report last month on Peter Tools' still-beta *Hammer* audio input add-on for *Reason*. To recap, this PC-only widget hijacks *Reason*'s *Rebirth Input Machine* to Rewire external audio into the *Reason* rack. Once there, audio can be mixed, effected, vocoded, and so on, alongside standard *Reason* sounds.

After playing with the beta for a little while, I'm still amazed that *Hammer* works. It was easy to set up, has been crash-free during my tests (amazing enough for some fully released software, let alone a beta), and provides a really useful tool to the creative *Reason* user. As I noted last month, this is essentially a live or real-time tool, since the host still lacks any way to record audio. But being able to patch my bass through *Scream 4* did confirm to me that I'd really like one of these available as a plug-in inside another host! I/O delay aside, it sounded great, and I'm looking forward to the final release of the software.

Incidentally, Peter Tools acknowledge the latency issues, which occur due to the convoluted signal path from input hardware, through software and back out again. They didn't seem quite as bad as I'd expected, though singing through *Hammer* would be a challenge! SOS

Peter Tools' *Hammer* may not be overdressed, but what an excellent little addition it makes to the *Reason* user's arsenal! Note the meter activity in the *Rebirth Input Machine* and *Remix* channel six: that's *external* audio!

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Building Combinator Effects

In Reason 3

Reason's Combinator device isn't all about creating new sound sources and storing live setups — it also provides the way to build new and imaginative effects units.

The *Combinator* acts as a container for other devices, like the effects devices shown here, which we'll explain how you can build into an off-the wall processor incorporating filtered, flanged, stereo ping-pong delays plus a dose of distortion — great for fattening analogue synth and guitar patches.

Simon Price

In last month's *SOS* we looked at how the new *Combinator* device works and walked through the steps needed to create a new instrument patch. Basic instrument patches in *Combinator* are typically layered sounds from *Reason*'s other synths and samplers, with dedicated effects, modulation routings and some useful or cunning front-panel control assignments. This month, we'll show that the *Combinator* can also be used to design your own new effects devices. Let's have a quick recap for those who missed last month: the *Combinator* is an (initially) empty shell in the rack that can house any number of other *Reason* devices. The unit has its own audio inputs and outputs that connect its internal workings to the main *Reason* environment, and it can receive and distribute MIDI data

Screen A: The *Combinator*'s rear-panel connections. Note the separate sockets for passing signal to and from the devices inside the *Combinator*.

to devices inside. Its front-panel knobs and buttons can be mapped to the controls of the 'combined' devices, so a *Combinator* can therefore be used to create a complicated multi-device configuration, with its own signal flow and CV patching, and collapse it all into a single 'black box'.

Special Effects

The key feature of the *Combinator* that allows the creation of new signal processors is the presence of audio inputs. Take a look at the device's back panel (Screen A, left) and you'll see that there's a pair of stereo audio inputs, then just below that another pair of jacks for passing on the incoming signal to a device inside. Let's get stuck into an example to show how this works:

1. Start by creating a new song, then add a *Remix* mixer, *Subtractor* synth and *Combinator* from the Create menu.
2. Click inside the empty box at the bottom of the *Combinator* and place a *DDL1* delay, again by choosing it from the Create menu. Screen B shows the rack you should now have produced.
3. Turn the rack around and you'll see that *Reason* has automatically cabled the Combi's 'To Devices' and 'From Devices' connections to the delay's audio inputs and outputs. However, it will not have connected anything to the *Combinator*'s inputs and will have patched the outputs to a mixer channel.
4. Re-cable the *Combinator*'s main inputs and outputs as you would when creating send-and-return connections (see 'Connection Conventions' box for more about this) to the mixer, as in Screen C. You can now send the *Subtractor* signal to the *Combinator* (and its internal delay) by adjusting the first send control on the mixer channel.

So what has this achieved? Well, apart from demonstrating how you can send a signal through the *Combinator* and its internal devices, not very much! This *Combinator* patch does nothing more than the delay unit can already do on its own. However, we can now add further devices to the patch, so that the signal is processed in more complex ways. For example, we could add a reverb, or a flanger. Again, this could be done without putting the effects units into a *Combinator* (although less tidily), so let's try something a little more adventurous. One thing you might not have noticed is that the *DDL1* delay unit is a mono device, despite having left and right audio connections. The left and right signals are summed and panned using the panner on the front of the unit. The *Combinator* provides an opportunity to parallel two *DDL1*s, creating a true stereo delay unit.

Screen B: The basic starting rack, featuring mixer, synth and *Combinator*. A *DDL1* has been placed inside the *Combinator*.

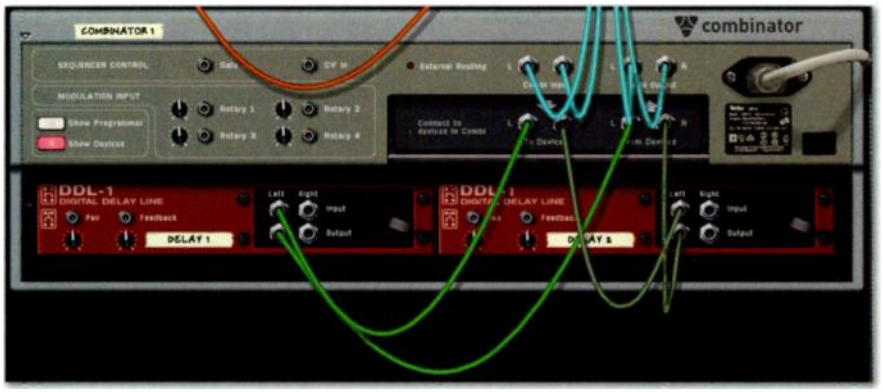
Screen C: Re-cabling the *Combinator*'s main ins and outs for send-and-return operation.

5. To add a second *DDL1*, click in the *Combinator*'s device area, just below the other delay. Now hold down Shift and choose the *DDL1* from the Create menu. (Holding Shift tells *Reason* not to create any automatic cable connections. Normally when you create a new effect unit in a *Combinator*, *Reason* will assume you want to chain it on to the last device, but in this ▶

instance we'll do something different.

6. The plan is to use just one channel from each device (the left one) for each side of the stereo input coming into the *Combinator*. This will mean that the left and right legs are being processed entirely separately, maintaining the stereo signal, and allowing for stereo effects such as ping-pong echoes or subtle spatial treatments. Check out Screen D to see how the cabling should look.

7. On the front panels of the *DDL* units, set the pan pots hard left, as we're only using the left outputs. Now try playing the *Subtractor* with some delay added at the mixer send. You can adjust the left and right delays independently, for some fun results, but even if you don't your delays will follow the panning of the mixer channel, an improvement over the normal *DDL1*. Also, if you put a stereo signal through your new unit, say from an *NNXT* sample patch, the delays will now maintain the original sound's stereo width, instead of collapsing into the middle.



Screen D: How the cabling should look after the second *DDL1* has been added.

Screen E: The rear-panel connections after the chorus/flanger, filter and distortion devices have been added.

Save this patch and you can pull it up any time in the future. Now, though, let's try to create something more interesting. By adding more devices, we'll make a filtered, flanging, ping-pong delay with some distortion that really fattens up analogue synth and guitar patches.

8. Add a *CF101* chorus/flanger, again holding down Shift to avoid messing up your cabling. Re-patch the cables so that the outputs from the two delays go into the flanger.

9. Select the flanger and add an *ECF1* filter device. The outputs from the flanger will be connected to the filter automatically.

10. Finally, add a *Scream* distortion device. The Filter will be connected to this so that all the devices are now chained together. Manually connect the *Scream*'s outputs to the *Combinator*'s 'From Devices' jack ports. The final cabling is shown in Screen E.

11. Now we can start playing with the front-panel controls to get the effect we're looking for. Try the settings in Screen F. I've set the first delay to half the step time of the second, creating the ping-pong effect. The feedback amount has to be reduced quite a bit on the second delay, as 'feedback' controls the number of repeats on these devices, so longer delay settings result in longer decay times for the effect. On the chorus device I've set a short delay, high negative feedback, and some modulation to create quite heavy flanging. The filter has a bit of resonance and quite a high cutoff, so it just smooths things out a bit. Finally, the *Scream* distortion is set to Overdrive, with the Damage Control pulled back, and the Master Output down to avoid a boost in overall level.

At this point you could just save the patch as it is, ready for recall at a later date. This is already a major advantage over building a chain of devices in previous versions of *Reason*. Before the *Combinator*, if you'd wanted to re-use a configuration like this

Screen F: Suggested front-panel settings for the effects device.

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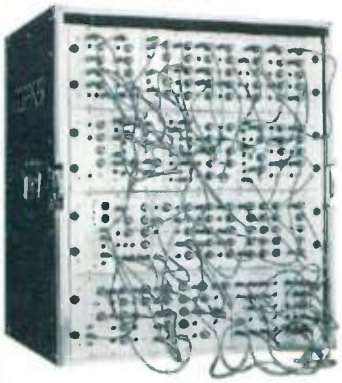

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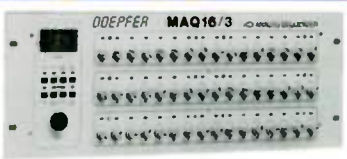

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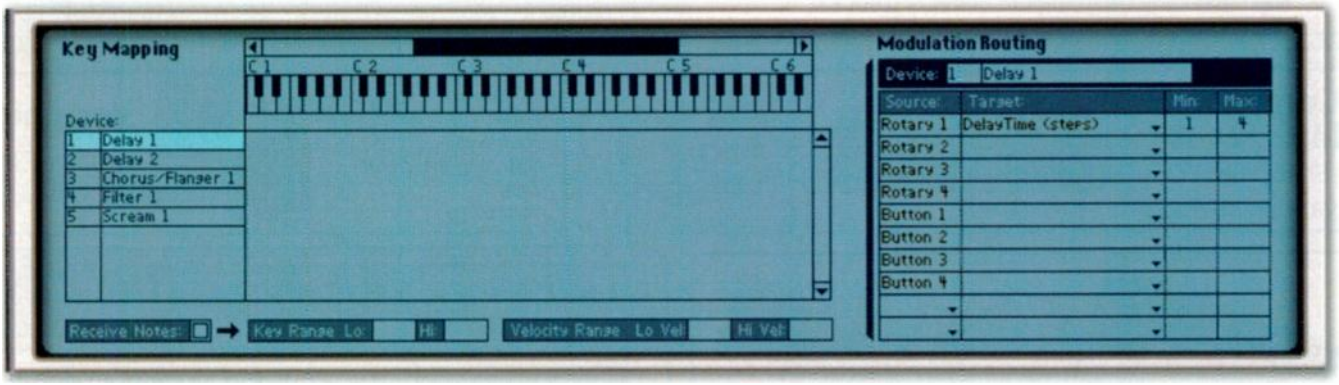
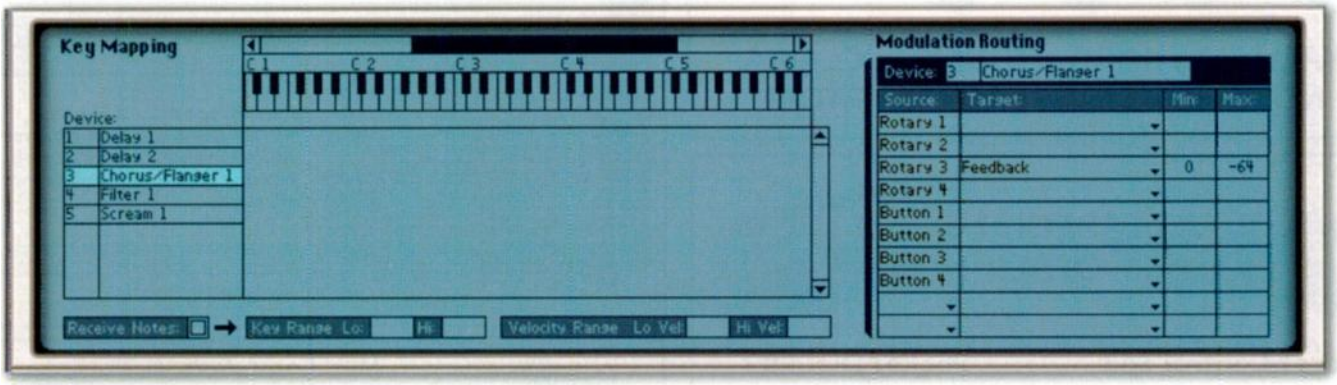


Screen G: Starting to assign parameters of the *DDL1* delay to the *Combinator*'s front-panel rotaries.



Screen H: Assigning the *CF101*'s Feedback control (governing flange amount) to Rotary 3 on the *Combinator*.

you'd have had to open the song it was in, copy all the devices, then paste them into your new song. You'd then have to try to cable it into your new song's rack. By building everything into a *Combinator*, you can just load it as a patch. However, the *Combinator* environment has a further advantage, in the shape of the front-panel control system. By mapping key controls from the various devices to *Combinator* knobs and buttons, you can quickly make variations of your effect, control several devices at once, and limit the parameters to ranges relevant to the type of effect.

"Our ping-pong flanger (or whatever it should be called) is only just scratching the surface when it comes to *Combinator* effects. A *Combinator* can contain any of the other devices available in *Reason*, and all CV cables, as well as audio connections, are saved as part of the patch, so you can be as complicated as you like."

12. First, we'll control delay time using the first knob on the Combi panel. Hit the 'Show Programmer' button, and select Delay 1 from the list on the left. Now, in the Modulation Routing section on the right, click on the Target slot next to Rotary 1. Select 'Delay Time (steps)' from the pop-up list. We'll limit the control to a useful range by adjusting the Max field to '4'. See Screen G, above.

13. Select Delay 2 in the device list, and again choose 'Delay Time (steps)' for Rotary 1. What we're doing here is doubling up the mapping for the first knob, so that it controls both delay units at once. Set the Max parameter to '8'. The knob will control the delay time, maintaining the ping-pong nature of the effect by increasing the second unit at a greater rate. Re-name Rotary 1 'Delay Time' by clicking its label on the panel and typing in the new name.

14. Now use the same technique to assign Rotary 2 to control the Feedback controls of both delays. Again, the ranges need to be set differently to maintain the relationship between the units. I've set the Max value for Delay 1 to 103, and Delay 2 to 41. Re-name Rotary 2 'Repeats'.

15. Rotary 3 will be used to control the amount of the flange effect. Select the *CF101* in the Programmer page and map its Feedback control to Rotary 3. We want zero feedback when the knob is fully left, then an increasing amount of negative feedback as the knob is turned clockwise. The default range for the chorus device's Feedback control is -64 (maximum negative feedback) to +63 (maximum positive feedback). Set Rotary 3's minimum and maximum to '0' and '-64' respectively, and you'll get the correct behaviour from the knob (see Screen H). Re-name Rotary 3 'Flange Amount'.

16. The final knob will become the filter frequency control. Select the *ECF1* and assign Rotary 4 to Frequency. Set the minimum to something above zero — say, 30 — to prevent this control from completely muting the effect when fully left. Re-name Rotary 4 'Filter Frequency'.

We're left with four buttons that I'll let you decide how to assign. I've used one to toggle the filter between Low Pass and Band Pass modes, and another to bypass the distortion. Don't forget to save the patch! You can see the final version on page 246.

Further Projects

Our Ping-Pong Flanger (or whatever it should be called) is only just scratching the surface

when it comes to *Combinator* effects. A *Combinator* can contain any of the other devices available in *Reason*, and all CV cables as well as audio connections are saved as part of the patch, so you can be as complicated as you like. A great enhancement to the patch we've created in the example would be to use an LFO to sweep the filter frequency. The filter device has a Filter Frequency CV input, so all you'd need is a device that has an LFO with a dedicated CV output. (The two options are *Subtractor* and Malström.) The LFO output would be patched into the filter, then the little trim pot next to the CV input would need adjusting to set the modulation depth.

Another area for experimentation is using *Matrix* step sequencers to create rhythmic effects. This is when you can start trying to emulate some of the cool stuff you might do with *Reaktor*. An easy-to-follow example of this is the patch 'Simple Pattern Filter', which can be found in the 'Pattern Based' folder of the *Combinator* Effects Devices collection in the Factory Sound Bank. In this patch there's a filter device, with one *Matrix* triggering its envelope in a rhythmic pattern, and another setting the filter frequency at each step. A much more complex pattern filter to study, '*Matrix* Filter', is in the same folder. This one uses more step sequencers and even a vocoder device.

Thinking up new ways of creating effects, and emulating old favourites is one of the most fun and satisfying parts of *Reason 3*, mixing head-scratching frustration with moments of inspiration. For example, one of the bright sparks at Propellerheads realised that you could stick the Gain Reduction CV output of the new *Masterworks* compressor device into a filter to create an envelope-following filter, like you'd find on a Mutator or Moogerfooger hardware processor. In other words, with a bit of imagination you can use *Combinator*s to create signal processes that none of the other devices could achieve on their own. SOS

Connection Conventions

The example in this article uses the classic 'send-and-return' cabling to allow signals going through the mixer to be blended with varying amounts of an effect. Normally, if you select the mixer and add any of the basic effect devices to the song, *Reason* automatically sets up this routing for you. With the *Combinator* you'll need to make these connections yourself, as shown in Screen C, page 247. This is an efficient way of using your new effect unit, as it allows all of the other instruments in the song to share the effect.

There are, of course, many instances (for example, distortion or filter effects) when you'll want to route an instrument straight through the effect (like having a plug-in on an audio track). In this case, just cable the instrument's outputs directly to the *Combinator* effect's inputs, then connect the *Combinator*'s outputs to a mixer channel. Many effects patches suit one of the two routing options better than the other, so a rough naming convention was adopted when compiling the Reason Factory Soundbank. If you look in the *Combinator* Effect Devices folder you'll see that some of the patches have '[ins]', or 'ins', or simply 'insert' in their name. These patches only really work well when you feed an instrument into them directly. The rest will probably work best in a send-and-return configuration, but there are no hard and fast rules (and the convention has not been followed strictly anyway).

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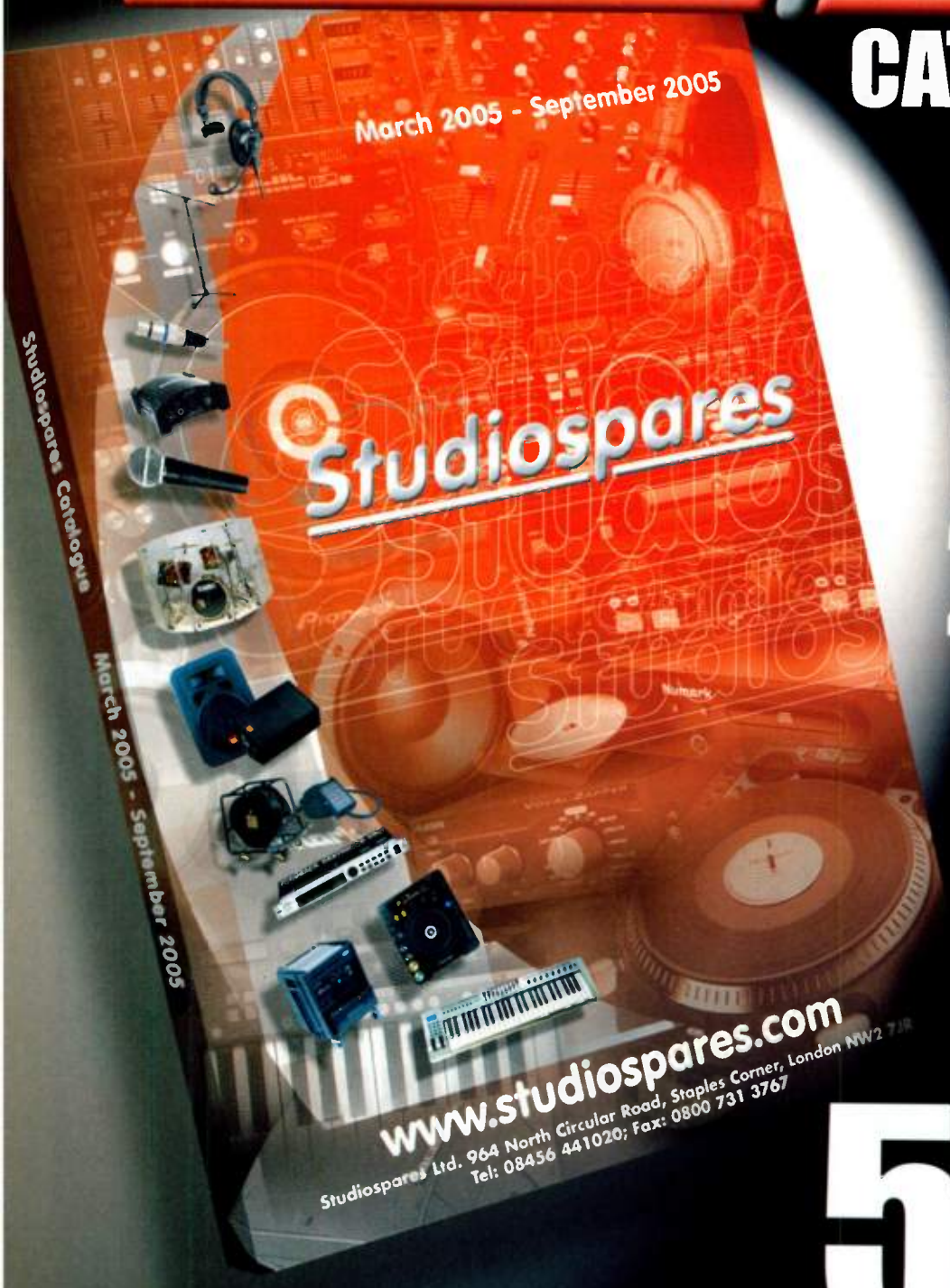

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Sonar LE appears, we find a utility that lets you zoom with a mouse wheel, and _Project 5_ slightly changes direction...

Craig Anderton

Although some Cakewalk programs have been based on previous versions of *Sonar*, and there are both *Producer* and *Studio* editions of *Sonar 4*, the recently-announced *Sonar LE* fills a remaining gap in Cakewalk's product line. *Sonar LE* is an OEM (Original Equipment Manufacturer) version of *Sonar 4 Producer Edition*, and is bundled with several of Edirol's hardware offerings, including the UA and UM series of audio and MIDI interfaces, SD sound modules and PCR keyboards.

Sonar LE is surprisingly capable. It offers 64 audio and 256 MIDI tracks, supports 24-bit recording up to 192kHz, implements Rewire 2 as a host and includes MIDI clock and MTC slave sync. *LE* has the familiar *Sonar* views: loop construction, dynamic console, piano roll, staff notation and drum-grid editor. Both VST/VSTi and DX/DXi plug-ins are supported, and *Dreamstation* and *Cyclone* DXi instruments are included, as are 14 real-time effects and six MIDI effects. Furthermore, according to Cakewalk, registered owners of *Sonar LE* will be able to upgrade to the full version at a special price. (More *Sonar* converts, mwa-ha-ha-ha...)

More About *Project 5*

In April's *Sonar* Notes, we covered the Winter NAMM news about *Project 5* v2. However, the new version has just started shipping, and there have been changes in its 'positioning' between NAMM and now, so it's worth a few more column inches.

The first version of *Project 5* was seen as Cakewalk's answer to *Reason* — basically, an all-in-one studio. I never really agreed with that assessment, as detailed in my SOS review (www.soundonsound.com/sos/jun03/articles/cakewalkproject5.asp), and v2 makes that comparison even less valid — although there is now some philosophical commonality with Ableton *Live*'s 'stage meets studio' vibe. Yet *Project 5*'s implementation is quite different. Rather than using separate 'live' and 'studio' screens, *Project 5* inserts a 'groove matrix' between the track view and the clips pane. This allows the switching between or combining of live and sequenced playing styles within a single environment.

The groove matrix is similar to *Live*'s session view, but operationally it can be used on its own or 'tied' to the clips pane, so that whatever you do in the groove matrix is recorded as audio data. You can even hide the clips pane entirely and just work with the matrix, or use the matrix as a kind of development system for tracks. It's a rather different interpretation of the venerable Akai MPC60 groovebox paradigm at the heart of so many groove-orientated programs.

Note the groove matrix located between the tracks pane and the clips pane (the MIDI Pattern view is just visible toward the bottom). The groove matrix gives *Project 5* more of a live performance feel and encourages improvisation.

Cakewalk's marketing angle is that *Project 5* blurs the line between stage and studio, which is OK as a short tag-line, but begs further explanation. To address the 'studio' part of the assertion, *Project 5* includes tools for greater spontaneity as you're recording — there's more emphasis on improvisation, composing on-the-fly, and trying to get inspiration recorded rapidly. From the live angle, *Project 5* brings some studio tools to the party, such as playing back *Acid*ised files, recording on the fly and weaving in pre-recorded backing tracks.

Some *Sonar* users might see the new freeze features, audio recording and so on as simply variations on *Sonar*, but while *Project 5* does indeed draw from *Sonar*'s technology base, the experience of using the two programs is different. Of course, you can always Rewire *Project 5* into *Sonar* if you want to combine the two methods of working (unlike the original version, *Project 5* v2 can also serve as a Rewire host). SOS

Scroll Control

Being able to use a mouse scroll-wheel for horizontal and vertical zooming is really useful, but *Sonar* doesn't allow you to assign one to key bindings. However, Randy from the *Sonar* forums (at www.cakewalk.com) recently mentioned a solution: a shareware utility called *Mouse Wheel Control* that can tie a mouse-wheel to *Sonar*'s horizontal and vertical zoom.

Go to www.ardamax.com/info_mwc.html and download setupwmc.exe. Once it's set up, specify the disk path to *Sonar*, so that the program knows *Sonar* is the target app. Then specify the control-key combinations for the wheel-up and wheel-down motion; for horizontal zooming, I chose Ctrl + Left Arrow and Ctrl + Right Arrow. You can also open up a second 'application' and choose what's to be controlled when you press down on the mouse wheel and move it. I chose vertical zoom (Ctrl + Up Arrow and Ctrl + Down Arrow).

***Mouse Wheel Control* installs an icon in the system tray, whereby you can redefine functions, enable or disable, get help, and so on. It seems to have no negative effects on *Sonar* or Windows, and given the time you'll save by being able to leave your hand on the mouse when you need to scroll, it's not hard to justify the $15 price tag.**

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Creating Easier Drum Parts In Sonar 4

Producing great drum parts can be quicker, easier and more fun with the dedicated facilities *Sonar 4* provides. We explain.

Craig Anderton

I've always enjoyed using programs such as *Reason*, *Fruity Loops*, *Hammerhead* and so on, to create beats. But that was before *Sonar* added a Drum Grid, which brings the program's full power to bear on beat-creation. The Drum Grid is also an efficient view for creating any kind of drum part, looped or not, and an ideal environment in which to use *Sonar*'s 'paintbrush' feature for painting patterns of individual drums, or even entire parts. Yet I've always had the impression that the Drum Grid is one of the program's least appreciated features — so let's take care of that right now.

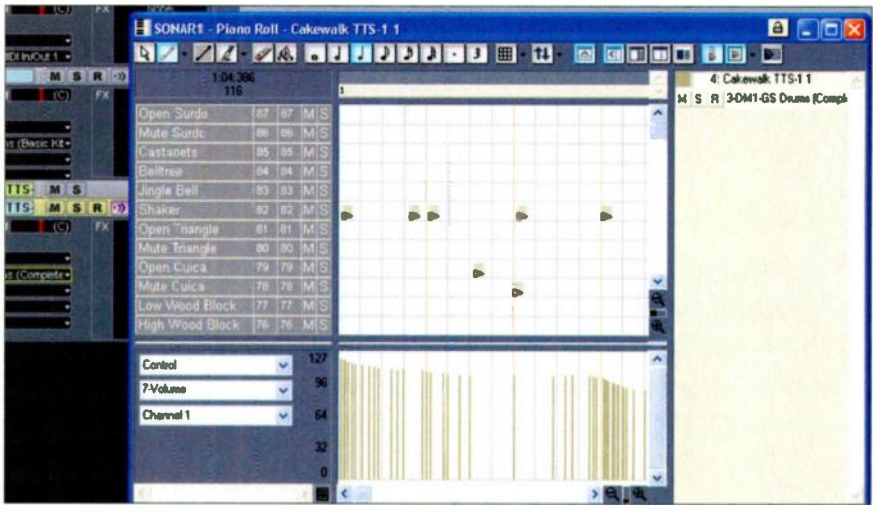
Sonar's drum-programming features, centred around the Drum Grid (top right) and the Drum Map Manager (bottom left) are well worth investigating.

Drum Grid Basics

There are two main ways of generating looped beats in any MIDI + Audio host. One is to drag samples of individual drum sounds into digital audio tracks, position them as desired in the timeline, then mix them together to create the final loop. The other is to drive a drum 'tone module' (anything from the *TTS1* included with *Sonar* to something like Native Instruments' *Battery 2*) with MIDI notes.

I prefer the latter method, for several reasons. It's easier to move MIDI notes around than digital audio, and many drum modules include processing (filtering, bit decimation and so on) that let you warp the drum sounds in interesting ways. On top of that, *Sonar*'s Drum Grid is optimised for this way of working.

The Drum Grid is a pane in the standard Piano Roll view (see screen on right). However, where you would normally see a key representing a note (on the virtual vertical keyboard off to the left), you see data about the drum played by that note. Each line shows the drum name, the 'In' note (the MIDI note value represented on the grid), the 'Out' note (the note to which the In note is mapped, which actually defaults to the same note as the In note), a mute button and a solo button. (Soloing and muting of individual drum notes is not possible with a standard Piano Roll view.)



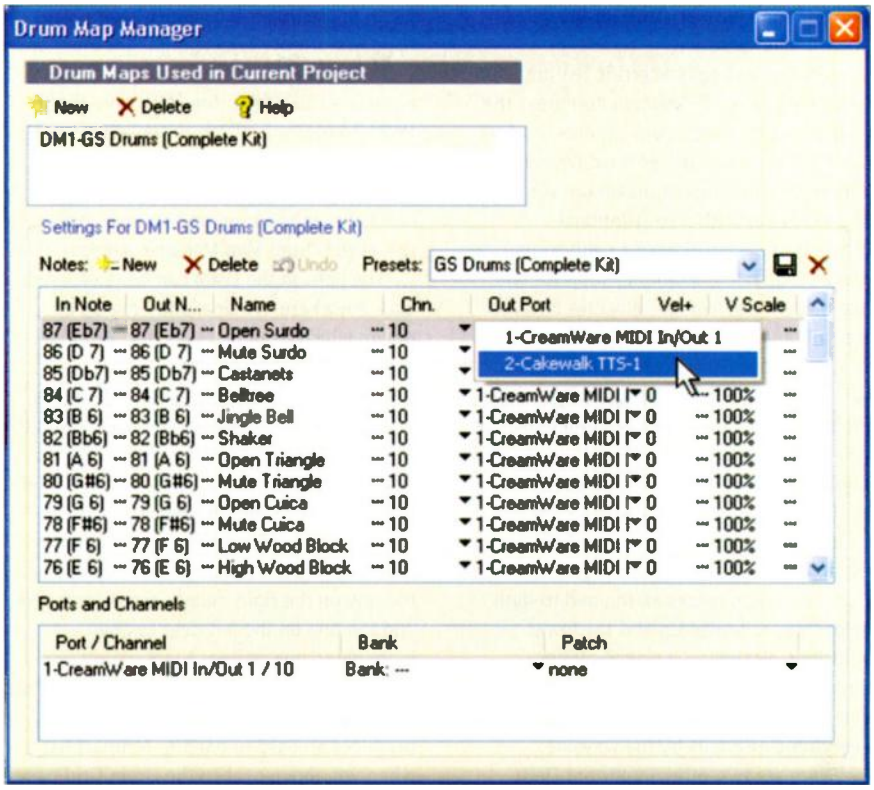
Where you'd normally see a key in the Piano Roll view, the Drum Grid shows a drum name and data about each drum. Note the controller strip below the main pane.

The reason for separate In and Out notes becomes clear if you've created a drum part for, say, a General MIDI drum machine, but then you decide to play it back with a different set of sounds that aren't GM compatible. The Out note allows you to simply map, for example, the original snare note to a different one that drives the new snare sound.

Drum Map Manager Basics

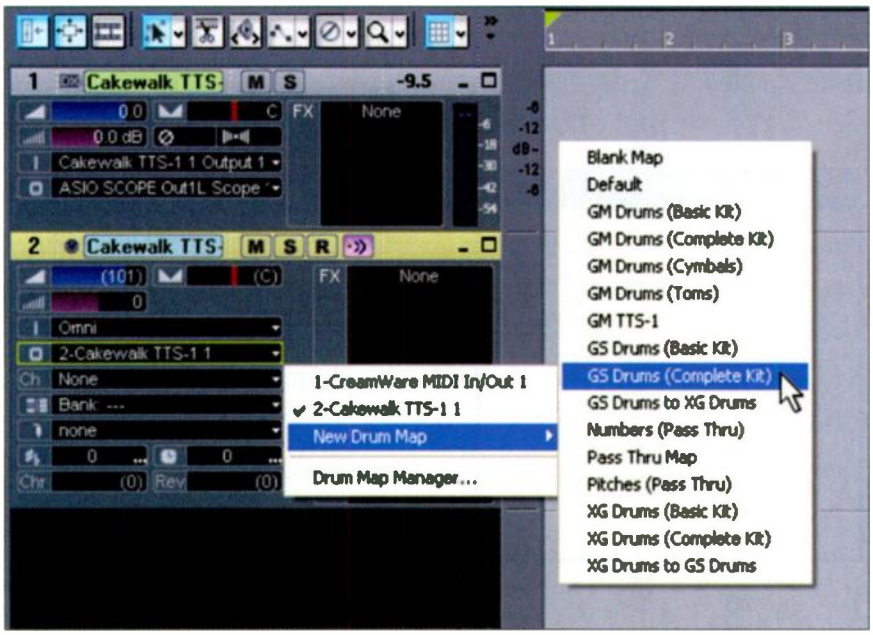
However, these In and Out notes, drum names and so on don't magically appear out of nowhere: you need to create a template in the Drum Map Manager (DMM for short), although *Sonar 4* provides several drum maps that may do the job for you with only minor tweaking. This map specifies the parameter values you see in the drum grid, as well as providing control over other drum-note characteristics — channels, output ports, and so on. As a result of this flexibility, a single drum map can trigger a variety of notes over a variety of channels, as well as driving both internal soft synths and external drum machines connected to a MIDI hardware port.

The Drum Map is truly a mapper. It accepts incoming notes ('in' notes) from the track, remaps them (thus creating 'out' notes), then sends them to an output. Because the Drum Map is providing an output signal to a track, it's perhaps not surprising that you select a Drum Map in a MIDI track's Output Field. For example, suppose you had inserted the Cakewalk *TTS1* DXi synth and were using one of its drum kits. Where the MIDI Out field would normally show 'Cakewalk *TTS1*', you would instead select a Drum Map. There's no need to worry about channel, bank or patch assignments: the Drum Map handles all those chores (see screen below).



The output is being set to the Cakewalk *TTS1* synth. If you hold down Ctrl and Shift while you make this selection, all Out Port fields will be set to the same output.

If you then put the focus on the MIDI track and play a few notes, odds are that you wouldn't hear anything. That's because the Drum Manager defaults to sending its outs to the MIDI device specified under Options / MIDI Devices, which will probably be a physical MIDI port. While this works OK if you're using a hardware drum machine connected to the physical MIDI out, in the case of a soft synth you'll need to change the output assignment so that it feeds the synth. This is easy to do with the DMM.



A complete GS Drum Map is being selected, which drives a GS drum kit within the *TTS1*. The other maps are provided with *Sonar 4*.

Working With The DMM

To edit DMM parameters, click on the track's MIDI Output field and select Drum Map Manager. It appears in its own window (see screen above).

You'll see lines with a variety of fields for each drum sound: In Note, Out Note, Name, Channel, Output Port, Velocity Offset and Velocity Scaling. You can change outputs one at a time, but that's tedious. A shortcut for changing output or MIDI channel is to hold down the Ctrl and Shift keys as you select the desired output or channel. This assigns all notes to your selection. All other parameters are set by double-clicking in the field and typing in the desired value, or using the +/- buttons or spinner bar for numericals (note that you cannot click and drag on the parameter to change values).

The Velocity Offset parameter can be given a positive or negative value and can be very handy, used with In and Out notes, for 'evening out' differences between different sound sources. For example, you might replace a snare drum with one that's more dynamically responsive, so the new

snare sounds weaker. Turn up the velocity offset to compensate.

Velocity Scaling is a terrific feature. Numbers below 100 percent compress the velocity curve. Like a conventional studio compressor, this reduces the difference between minimum and maximum velocities, and — also as with a conventional compressor — you'll need to add some make-up gain. For example, suppose you had a drum part whose velocities covered the full range from one to 127. You compress it by 50 percent so that the velocities range from one to 64. To bring the peaks back up to 127, you then use the velocity offset to add 63. Now the velocity range goes from 64 to 127. You've essentially compressed it with a ratio of 2:1.

Numbers above 100 percent add expansion. This is useful, too, because with high expansion values all the mid-to-high velocities are scaled up and the lower velocities disappear. It's almost like a noise-gate effect, where medium and high velocities come through at maximum and everything else falls by the wayside.

There are two other important DMM functions. You can save edited maps by entering a name in the Presets field, then clicking on the floppy disk (save) button. You can additionally choose a preset from this field and click on the delete (X) button if you want to delete a map permanently. It's also possible to remove the map from the MIDI output field without deleting the map itself. In the upper left, under 'Drum Maps Used in Current Project', highlight the map you want to remove, then click on the associated Delete button. Also note that the DMM 'centralises' all Drum Maps used in all tracks. It's not necessary to go to a track and specify 'Drum Map Manager' in the MIDI Out field: you can call up any map that's in use at the Drum Map Manager window itself.

The lines in the DMM can be re-ordered: click anywhere in a line, and drag up or down, which would let you, say, group all the toms together, or all the hi-hat parts. You can also delete lines: just click on the line you want to delete (Shift- or Ctrl-click to select multiple lines), then click on the 'Notes — Delete' button. (Yes, it is confusing to have three Delete buttons in the DMM that all use the 'X' symbol. Just remember: the top one deletes maps from your Project, the one on the right deletes maps from disk, and the one on the left deletes any highlighted line or lines.)

It's good practice to delete any notes that aren't being used for drums, as this produces an easy-to-handle, compact list when you move over to the Drum Grid pane.

Creating Drum Maps From Scratch

If you're not using a setup covered by one of the Drum Map Manager's presets, it can be tedious to create a new map, and unfortunately there's currently no way to import drum names into the DMM. However, it's unlikely that you'll use all the drums in a given kit, which can save some time. One option is to call up a blank map and click on the 'Notes – New' button for each drum you want to add. But I find it easier to call up the Pass Through map. This creates a list of all notes, expressed as MIDI Note Numbers and pitch. I then enter info for the drums that will be used. Eventually, after I'm sure I won't be adding any more drums, I delete the notes that don't have associated drums. Also note that you can do quick edits within the Drum Grid, which we'll come to shortly. Any changes you make in the Grid are reflected in the DMM.

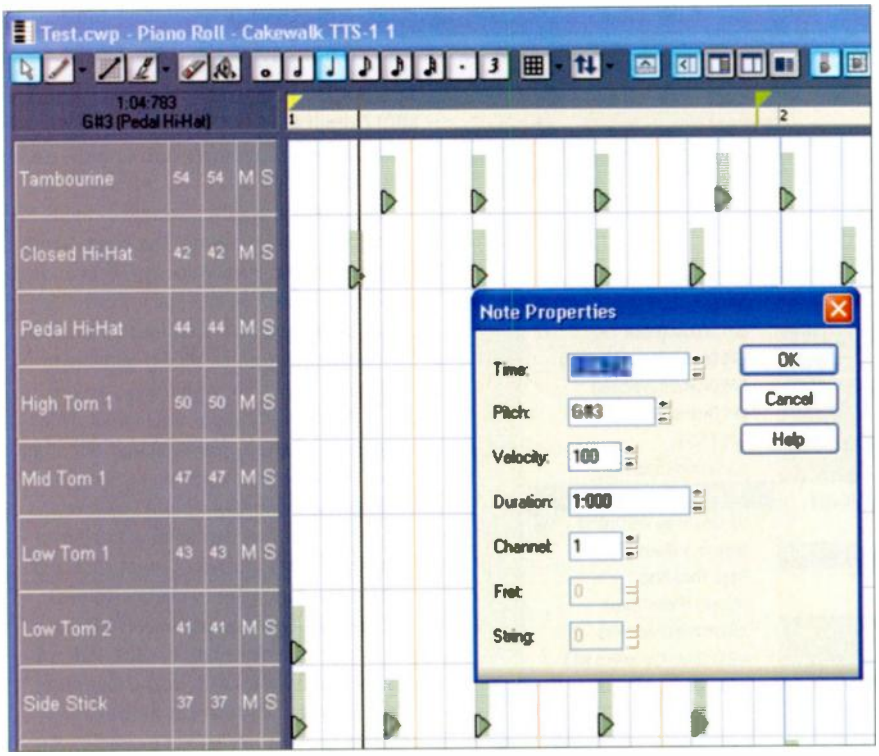
The Drum Grid

Newbie *Sonar* users often wonder how you call up the Drum Grid, because it's not represented in the View menu. Instead, you call up a track's Piano Roll view. If the track has a Drum Map selected for its MIDI output, the Drum Grid will show up (see screen below left).

The Drum Grid has much in common with the piano roll: the same horizontal and vertical zoom options, snap to grid, show grid lines, and so on. However, there are a few major differences, particularly with regard to how notes are displayed. One is that although you can show the Controller Strip, for velocity it's fairly useless because you'll often have several drum hits on the same beat. As a result, you can choose to show or hide 'velocity tails', whose height indicates velocity. If you point at one of these tails with the Draw tool, the cursor adds a series of lines that shows it's in velocity edit mode. Click on the tail and drag up to increase velocity, or down to decrease velocity. Zooming in vertically will show more resolution on the velocity tails. By the way, I do find the controller strip useful for setting velocity for multiple simultaneous drums — for example, to make the downbeat hit really hard. The controller strip is also invaluable for use with drum modules that allow you to affect sound parameter values with continuous controllers.

Another display option, Show Durations, lets you see notes either as individual hits or see their actual length. I generally switch over to actual length at some point and shorten the notes (most drum triggers are one-shots; you don't need to sustain a note to keep hearing the drum). Otherwise, I'll display hits, which are smaller and thus clean up the display. See the first screen on the next page.

As mentioned earlier, you can also edit the Drum Map from within the Drum Grid. Double-click on one of the lines that has a drum sound and a Map Properties window



This shows a typical use of the Drum Grid: developing a looped beat. Note the velocity tails on each note. Right-clicking on one of the notes has brought up the Note Properties menu, which allows 'micro editing' of the note's parameters.

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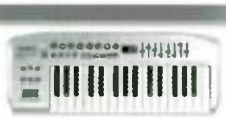

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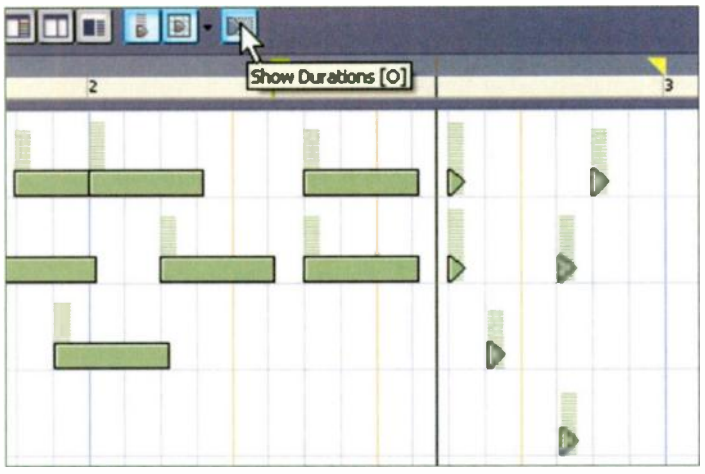
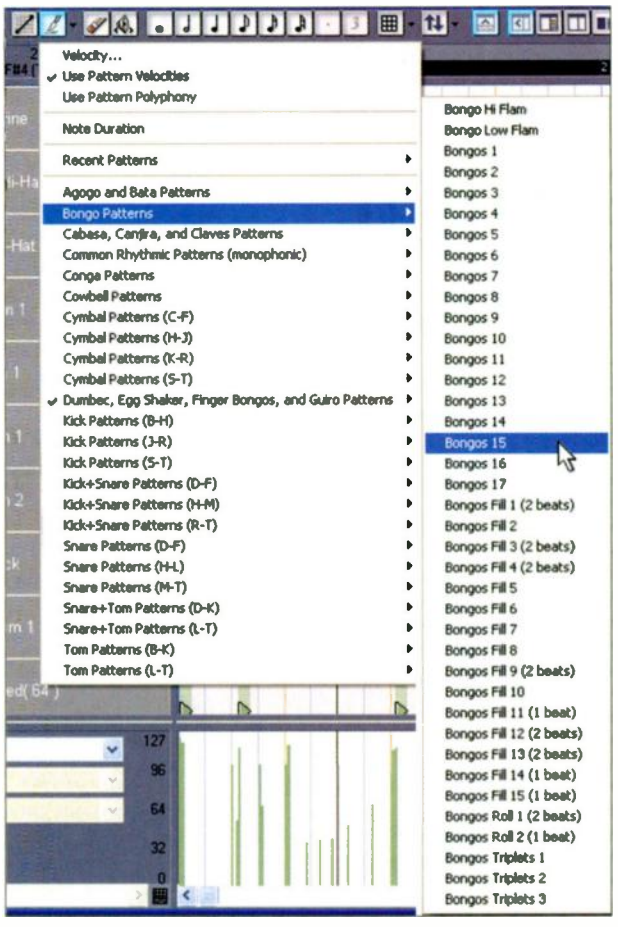


The Show Durations button affects all notes in the Drum Grid, so this screen is a collage: the drums on the left show durations, the ones on the right don't. The Show/Hide Velocity Tails button is two buttons over to the left.



Sonar ships with a large number of rhythms you can 'paint' into the Drum Grid. You can also create your own rhythms.

▶ appears. Here you can edit the drum name, In and Out notes, velocity settings, and so on — just as in the Drum Map Manager. You can also click on the Map Properties' 'Map Mgr' button and call up the full DMM.

Paint Time!

Another interesting grid feature is the ability to 'paint' rhythms. You can also paint notes in the standard Piano Roll view, but the technique really comes into its own when doing drum parts. Click on the Paint Brush button's downward-pointing arrow and you'll find a library of rhythmic patterns, as well as some setup options (see screen at top right). To paint a pattern, pick one from the library, click on the Drum Grid where you want the pattern to start, then drag for however long you want it to last.

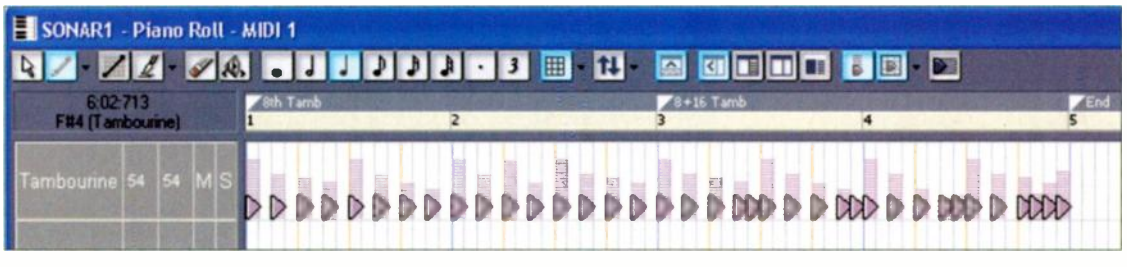
I strongly suggest ticking 'Use Pattern Velocities', as any dynamics built into the pattern will then be preserved. The alternative is to click on Velocity and select a specific velocity value, which means that all notes will be painted at that velocity. If you select Pattern Velocities, Note Duration must be unticked. For simple patterns (a single clave part, say), leave 'Use Pattern Polyphony' unticked. Otherwise, the note pitches used will be the ones stored with the pattern, not the notes created when you click the mouse in a line of the drum grid.

You can also create your own Patterns. The process is slightly involved, because you basically have to create a string of patterns, separated by markers, in a single MIDI track. For example, the first pattern might start with a marker that says '8th Tamb', while the second has a marker that says '8+16 Tamb.' You then save the string of patterns as a .MID file (Tambourines.mid, for example) in the 'Pattern Brush Patterns' folder inside the *Sonar 4* installation folder. The next time you open *Sonar*, there will be a 'Tambourines' entry in the Pattern Brush drop-down menu, with two side entries for 8th Tamb and 8+16 Tamb (see screen below).

The main use I've found for the Brush Patterns is when I need some 'placemarker' patterns fast, such as a kick or shaker part. In conjunction with the *Session Drummer* MIDI plug-in, it's possible to use Brush Patterns to create pretty decent drum parts in minutes. Once you have your song fleshed out you can edit them or replace them with something else.

You can also save complex patterns (for example, something with kick, snare, hats and so on) for later painting. The procedure for creating the pattern is the same, but when it's time for playback, tick 'Use Pattern Polyphony'. This will deposit all the notes into their original pitches and, assuming you're using the same Drum Map as the one you used to create the pattern, the pattern willl play back on the desired drum sounds. For this reason, it's probably best to make sure your 'polyphonic' patterns adhere to a standard Drum Map, such as GM. Otherwise, you never quite know what will play back when you paint in the pattern... although I suppose that could also lead to some happy accidents!

That concludes our tour into the world of *Sonar* Drum Maps and grids. If you like to put together beats, there's a lot of power waiting to be exploited, and once you become familiar with how the Drum Grid and Drum Map Manager work, I doubt you'll go back to using the Piano Roll view for entering and editing drum parts. SOS



Two patterns, separated by markers, have been created. Once this is saved as a Standard MIDI File into the Pattern Brush Patterns folder, you'll be able to paint the patterns into the Piano Roll or Drum Grid view.

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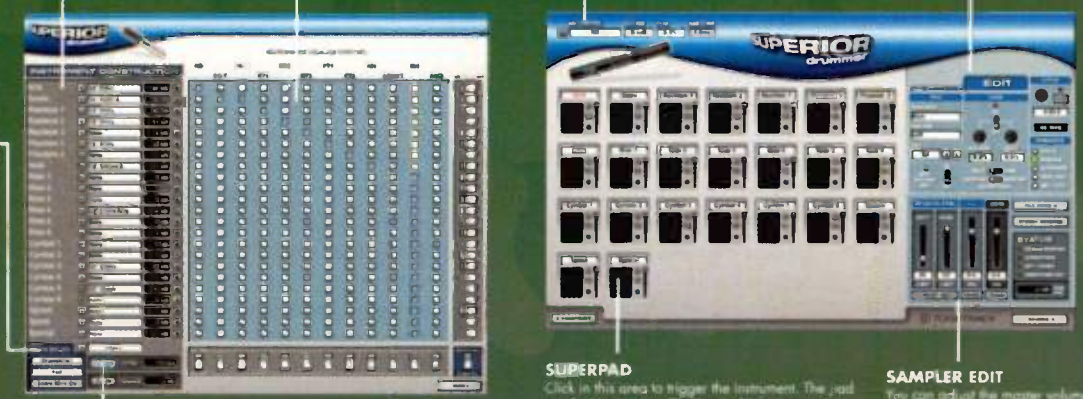
INSTRUMENT CONSTRUCTION
You can create a custom kit by selecting each drum individually. Each instrument has a RAM display and a preview button. You can also disable certain parts of an instrument if you don't need them and want to keep your RAM usage down.

MICROPHONE LEAKAGE CONTROL
In the Leakage Control matrix, rows represent instruments and columns represent microphones. If all buttons are set to ON in the Snare row, the snare will leak through all microphones. If all buttons are set to ON in the Ambience column, all instruments will be picked up by the ambience mics.

MICROPHONE CONTROL
In this menu you can select the mic you wish to edit, giving you total control of the leakage between different instruments. You can for example lower the hihat in the snare microphone.

INSTRUMENT EDIT
Adjust fade, pitch, humanize and use other functions such as MIDI-learn and re-mapping.



TOOLS SELECT
Select the handtools the drums are to be played with. Sticks, rods, brushes or felt mallets. Select the type of bassdrum beater you prefer. Felt, wood or plastic. You can also turn the bottom wire snare on or off.

CACHED
With caching enabled, samples are not loaded until triggered via MIDI. Useful for RAM economy and fast previewing of sounds - you can go straight to the main window without having to wait for the entire kit to load.

SUPERPAD
Click in this area to trigger the instrument. The pad is velocity sensitive. Clicking in the bottom region will trigger the sound at minimum velocity, and the sound gets progressively harder the further up you click it. You can also solo, mute and set the bleeding level of the instrument.

SAMPLER EDIT
You can adjust the master volume and set the threshold for hard hits, reverse stereo, save your own preset kits etc.

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cubase notes

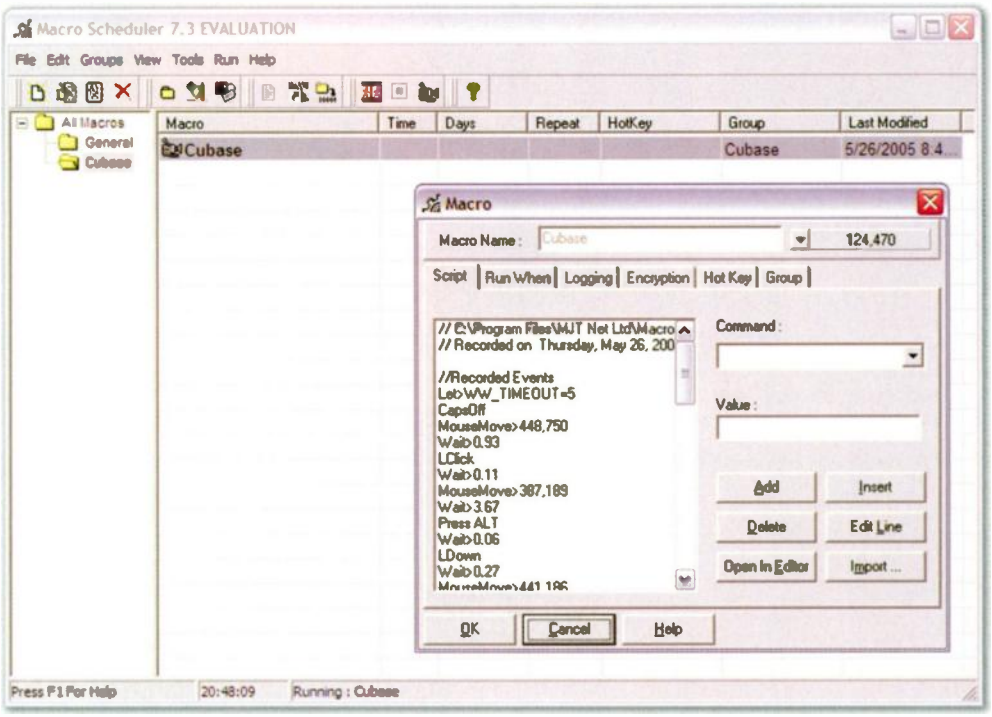
This month we investigate an interesting script for exporting audio and look at the various options for automating tedious tasks in *Cubase*.

Mark Wherry

While trawling through *Cubase*.net this month, I came across an interesting post (www.*Cubase*.net/phpbb2/viewtopic.php?t=15100) from a user who's created a stand-alone script that can automate the process of bouncing multiple tracks in *Cubase*. Say you have 10 tracks and you want to export each one as an individual audio file, with all the effects processing for that track. Normally, you'd have to solo the first track, export the audio file, wait, solo the next track, export the... you get the idea!

With the snappily-named *SX Unattended Audio Export Tool*, you set everything up as if you were going to export audio in the usual way. Indeed, the first track you'll still need to bounce manually. The reason for this is so that you can set up the export parameters that will be used for all the other files and the path to where the exported file will be stored, since the Export Audio window always defaults to the last-used settings. Once you've bounced the first file, select the track containing the next chunk of audio and run the tool.

After a couple of explanatory messages, you'll be prompted for the number of tracks to export and a base file-name: the tool will use this plus an automatically incremented number for the file-names. The script will then run by enabling solo on the selected Track, exporting the file, disabling solo, moving to the next track down and repeating this process the number of times required.



While it's a little more daunting than applications such as *Quickeys*, Windows users who like to dabble in writing their own scripts might find *Macro Scheduler* a useful tool for enhancing workflow in *Cubase*.

Tales From The Script

Although *Cubase* has a macro facility for creating Key Commands that are made up from a sequence of individual Key Commands, this feature is unfortunately too basic at the moment to allow something like the *Unattended Export Tool* to work: there's no option for user interaction, or the ability to wait for one process to finish before issuing the next command. However, by using a separate, more generic utility that can issue user-interface commands to applications running on your system, such as *Cubase*, and that provides a certain amount of programmable logic, you can create more elaborate macros than *Cubase* would otherwise allow.

This concept isn't new, of course. Users have been creating custom Key Commands and sequences of commands for many years with utilities such as *Quickeys*, which allow you to either record or program a sequence of events and play them back via a keyboard shortcut. Quickeys (www.quickeys.com) is now sold through Startly Technologies and is available for both Mac OS X (including a new, Tiger-compatible version) and Windows, priced at $99 for a single-user license that can be purchased online. A cheaper alternative Mac OS X users might like to check out is Script Software's *iKey* (www.scriptsoftware.com/ikey), and the application used to create the *SX Unattended Audio Export Tool* is MJT Net's Windows-only *Macro Scheduler* (www.mjtnet.com). The latter enables you to record and edit scripts using a scripting language, rather than graphical building-block elements like more user-friendly utilities such as *Quickeys* and *iKey*. However, while it takes a little more time and programming experience to learn, *Macro Scheduler* is a powerful way to automate workflows in *Cubase*.

Macro Scheduler is available in both a Standard and a Pro version, which you can purchase online from MJT Net's website for $75 and $175 respectively. The Pro version allows you to compile your script into a stand-alone application, which is great if you want to run scripts without *Macro Scheduler* installed and share your scripts with other users. SOS

Tiger & *Cubase*

You'll find information this month concerning *Cubase* and Tiger compatibility in both Apple Notes (starting page 278) and the 'Tiger for Musicians' article (starting page 136). Generally speaking, the latest version of *Cubase* seems to work fairly well with Tiger, but one *Cubase* and Tiger problem not mentioned in the other articles is an issue with the installer for *Cubase SE/LE* v1.0.7, which basically doesn't work. Steinberg are preparing an update and recommend that *SE* users contact their local Steinberg distributor, while *LE* users should contact the distributor of the hardware device they bought that had *Cubase LE* as part of the bundle. Otherwise, *SE/LE* 1.0.7 users should make sure to install their software before upgrading to Tiger, if possible. Interestingly, anyone who received *Cubase SE* v1.0.6 as part of Steinberg's *Studio Case* bundle should have no problem installing this software under Mac OS 10.4.

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Customising The Workspace In *Cubase SX*

John Walden

When you come over all creative or are facing a tight deadline, a lean, mean music-recording machine is a definite advantage. The tools for customising the *Cubase SX* work environment may not sound very sexy, but they can certainly help the workflow.

Way back in the September 2003 *Cubase* Notes column, when *Cubase SX* was still at v1, Mark Wherry provided an introduction to using Window Layouts in *SX*. As Mark acknowledged, this feature might not be the most significant consideration when you're parting with your hard-earned cash for a top-of-the-range MIDI + Audio sequencer. However, if you need to work efficiently with *Cubase*, getting to grips with the tools for customising the appearance of the program, with Window Layouts — or 'Workspaces', as they are referred to in *SX 3* — and with some of the other customisation options ought to be very near the top of your to-do list. So let's explore some of the features that can help keep the *SX* interface as streamlined as possible.

Cut The Clutter

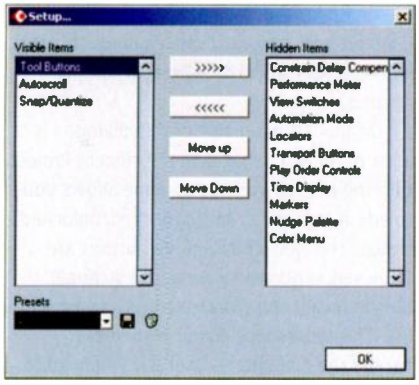
Whatever software you are using, be it a word-processor, photo editor or music application, the less clutter you have in the user interface, the more space there is for useful stuff, so it makes sense to spend a little time tweaking the interface. This is particularly true if you're using *SX* with a single-monitor system and screen space is at a premium.

The Project window is where most users will spend the greatest proportion of their time. There are a number of elements in this window that can be customised, and these include features that, while very useful in some circumstances, may not be required in routine operation. As an example of how a little tidy-up can both save space and make it easier to focus on the controls you use the most often, have a look at the 'Before' and 'After' screen shots of the Project window (see right).

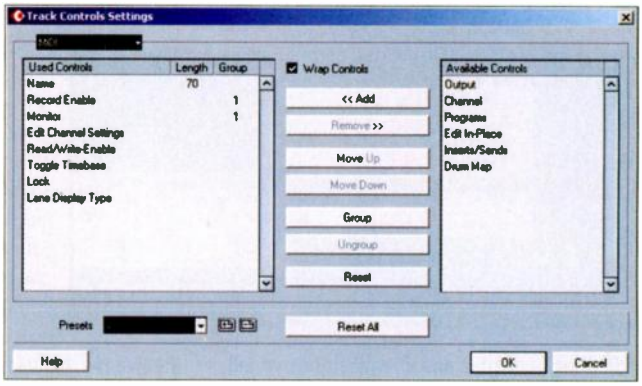
The differences are small but they do clean things up somewhat. First, some elements have been removed from the Project window toolbar. Right-clicking (PC) or Ctrl-clicking (Mac) anywhere within the Toolbar area opens a pop-up menu. From here, individual elements can be toggled on or off. For further control, the 'Setup' option from this pop-up opens a dialogue that not only allows elements to be switched on or off, but also allows their positions to be adjusted via the Move Up and Move Down buttons (see screen overleaf). As can be seen in the 'Before' and 'After' screens below, I've only left the View Switches, Tool Buttons, Autoscroll and Snap/Quantize buttons active, as these are the options I regularly use.

The second difference between the 'Before' and 'After' screen shots is the selection of buttons displayed for each track. Again, right-clicking (PC) or Ctrl-clicking (Mac) on an individual track opens a pop-up menu from which the Track Control Settings option can be selected (see screen overleaf). The dialogue that opens reflects the type of track currently selected, but the drop-down menu positioned at top left allows the settings for other track types to be edited too. In the

The Project window before a tidy-up (top screen), and after.



The Setup dialogue for the Project window Toolbar.



The Track Controls Settings dialogue.

example shown here, I've customised the MIDI and Audio track buttons to provide identical layouts, so whether I'm working with a MIDI track or an audio track, the controls are the same and appear in the same position. I've also removed one or two controls I don't use often (for example, the Insert/EQs/Sends buttons, as I tend to use the Inspector to access these for an individual track). Third, and most simply, I've switched off the Event Info line and the Overview line. While these are very useful on occasions, most of the time I'd rather have the extra space for other things.

Steamy Windows

As Mark Wherry described back in September 2003, one of the seemingly least exciting features of *SX* — the ability to define screen layouts for instant recall — is actually one that can bring some of the greatest improvements in workflow. An *SX* Workspace is simply a particular arrangement of windows. For many users, the two obvious candidates would be a full screen 'Project window' layout and a full-screen 'Mixer window' layout. Once fine-tuned to suit your needs and then stored as Workspaces, they can be recalled via a Key Command.

Depending upon how you work, a number of other preset Workspaces could also be useful. For example, Workspaces could be configured to access key VST instruments or effects more quickly, or to access MIDI or audio editors. A particular Workspace can be stored in a Project Template (so it would be available for any Project based on that Template) or saved globally. In the case of the latter, Workspaces can either be made automatically available to all new Projects or activated in a new project after the Project has been created.

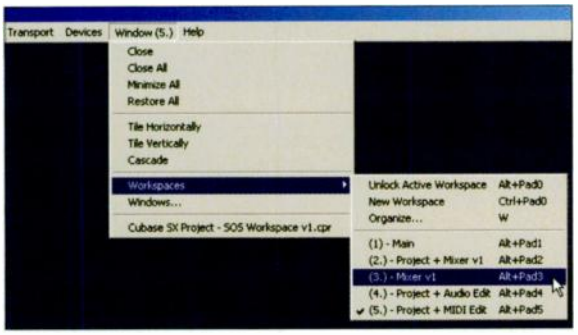
Before getting into these details, let's remind ourselves of the basics: how to create a series of Workspaces and then navigate between them.

- Even if you have not created any of your own Workspaces, by default a new *SX* Project contains a single Workspace named 'Main', so first open a new Project.
- Arrange whatever combination of windows you require on screen (see example below).
- Now go Window / Workspaces and choose the 'New Workspace' menu option (or use the Key Command: on the PC it's Ctrl+NumPad 0). A small dialogue then appears, allowing a suitable name to be entered for the Workspace.

Having spent a little time creating a screen layout that's ideal for a particular task (be it recording, editing, mixing or whatever), it would be a shame to accidentally disturb it. The 'Window / Workspaces / Lock Workspace' menu option (or Alt+NumPad 0) will lock the Workspace so that even if you do change an element of the layout or open a further window or two, when the preset Workspace is recalled again everything will be returned to its original place. However, locking does have a downside. For example, if you change the Project window track heights or the horizontal or vertical zoom from their original settings within a locked Workspace, when that same Workspace is recalled later, the original track heights/zoom are restored. In an unlocked Workspace, the ▶

This Workspace includes both Project and Sample Editor windows. If the 'Link Editors' option is ticked in the *SX* Preferences window, whenever this Workspace is recalled the currently selected audio event will automatically appear in the Sample Editor. A similar Workspace could be defined for MIDI editing.

CUSTOMISING THE WORKSPACE



Workspaces can be selected via the Windows menu.

▶ edited track heights and zoom settings would be retained.

Total Recall

Once you've created the necessary Workspaces and locked them, recalling them for use can be done in a number of ways. If you find it difficult to let go of your mouse, the 'Window / Workspaces' menu option will display a list of the available Workspaces to select from. (A small detail worth noting here: the Window menu at the top of the *SX* screen contains a number in brackets beside it. The number refers to the currently selected Workspace number — more on these in a moment — and if a full stop appears beside this number it indicates that the Workspace is locked.)

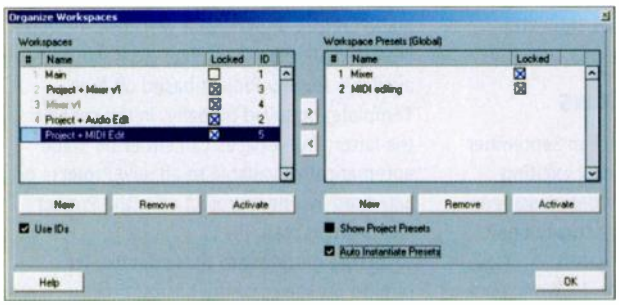
However, while a mouse is an excellent tool for some jobs, given that the main reason for creating and using Workspaces is to improve the speed with which the creative stuff can be done, perhaps the best way to move between the different Workspaces is via Key Commands. By default, the first nine Workspaces (which, for the majority of users, is likely to be plenty) are available via Alt+Num1-9 on the PC (and the equivalent on the Mac). This key combination does, of course, involve two hands (unless you have a very large span from thumb to pinky!) but the default key combination can be edited within the Key Commands window if you want something that's a bit less of a stretch.

Get Organised

If you regularly work on projects of a similar type, storing the required Workspaces in a Project Template or globally (so that they can be available to all Projects) offers considerable advantages. Selecting the 'Windows / Workspaces / Organize' menu option opens the Organize Workspaces dialogue and, amongst other things, this is where Global Workspace Presets can be created.

On the left-hand side of this dialogue is a list of the Workspaces in the current Project. Clicking on the Workspace name allows you to edit it, as well as setting locked/unlocked status. The New and Remove buttons are fairly self explanatory, while the Activate button recalls the Workspace selected in the list. This Workspace layout is then seen behind the dialogue — useful if you need to confirm what elements a particular Workspace contains. The Use IDs tickbox effectively allows the Workspaces to be re-numbered; a drop-down menu lets you specify a number for each.

If the Show Project Preset button is left unticked, the right-hand side of the dialogue displays a list of Global Workspace Presets. This is empty by default, but if you've created some suitable Workspaces in a Project and would like them to be available to all Projects, the arrow buttons between the two lists can be used to copy a current Workspace into the Global Preset list. If the Auto Instantiate Presets box is then ticked, all the Global Workspace Presets



The Organize Workspaces dialogue.

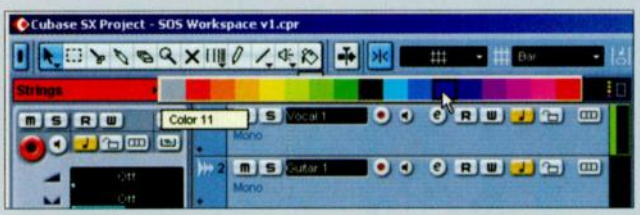
Colour Me Good

With complex *SX* projects, it can eventually become difficult to keep tabs on what's going on in the Project window and, in particular, which track or event contains which musical part. This can become a real problem if you return to a complex Project after some time away from it. *SX* offers all sorts of useful tools to alleviate confusion, with Folder Tracks, the Notepad associated with each track and the ability to name tracks and individual events all being helpful in keeping things organised.

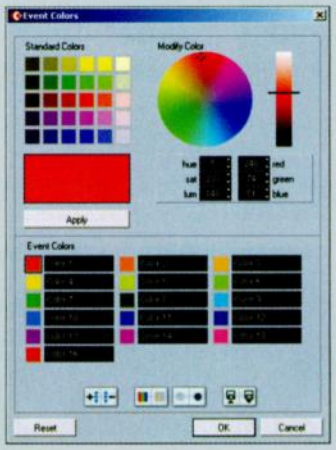
A further simple memory jog can be provided by colour-coding tracks and/or events using some sort of simple convention (for example, blue = bass, green = vocal, red = guitar). *SX* allows colour to be defined at both track level and event level. Track colour can be defined from the pop-up available in the Inspector that offers a choice of 16 default colours. Once a colour is selected it is automatically applied to any new events recorded on that track. Track colour is also displayed at the base of the Mixer Window.

Event colouring can be done via the Colour Tool in the Project Window Toolbar (that is, if you haven't removed it as part of your clutter-free work environment!). The same set of 16 default colours is offered as for tracks. If an event-level colour is applied, this takes precedence over any general colour selected for the track. If, like me, you find the *SX* default colours a little bland, the Colour Selector tool (also available via the Project Window Toolbar) can be used to select something a little more individual in place of default colours.

Track colours can be selected via the Inspector.



Event colours can be set via the Colour Tool.



If you want *SX* to match your décor, pick your own colour scheme.

will automatically be available when a new Project is created. If you would rather this wasn't the default behaviour, leave the box unticked. In a new Project, any selection of the Global Workspace Presets you do require can then be copied from the Global list to the current Project via the Organize Workspaces dialogue, by using the left arrow button between the two lists.

And Here's One I Made Earlier

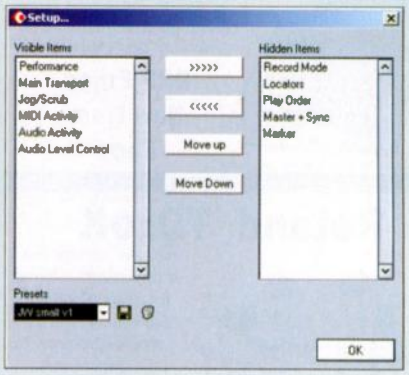
While Global Workspace Presets can be very useful, many *SX* users often find their Projects fall into a number of different types, each with its own way of working. For example, I might identify '*SX* audio + *Acid Pro* for drum loops' and '*SX* MIDI Orchestral' as a couple of my common Project formats. Users who find their Projects can be placed into such groups could create a dummy Project for each of their different musical tasks, with possible settings, track configurations and VST effects or instruments pre-loaded. The 'Save As Template' option can then be used to turn this pre-configured blank Project into an *SX* Project Template, cutting down start-up time for new Projects. Usefully, any Workspaces created in a Project are also included when the 'Save As Template' option is executed. This is particularly helpful if your Template includes specific VST plug-ins, as a Workspace can be defined that will provide instant access to its key controls.

While the operations I've covered involve a certain amount of up-front preparation, it's worth the effort, because when the creative impulse does strike you've got the best chance of being able to catch the moment if a fully-configured *SX* Project is up and running as quickly as possible. SOS

Restricted Transport

The Transport Panel in *SX* certainly has a lot of options on offer, but if you have a single-monitor system the full Transport panel takes up a lot of space — and how many of the options do you actually use on a routine basis? Fortunately, *SX* allows it to be customised: right-click (PC) or Ctrl-click (Mac) anywhere in the Panel to display a pop-up menu where certain elements can be toggled on/off or the Setup option can be selected for further control. I find I can generally manage with a fairly minimal set of Transport controls for most tasks.

Particular configurations of the Transport Panel can also be saved in a Workspace and this can be useful if, in some Workspaces, you simply need more space for other things and can configure a minimalist Transport Panel. That said, the Transport Panel's Setup dialogue also features its own preset system, located bottom right. These presets are global in nature: if you create a particular Transport Panel configuration and save it as a preset, it will be available to all Projects. Any such presets also appear as a list in the Transport Panel's pop-menu, so they can be quickly selected when required.



The Transport Panel Setup dialogue.

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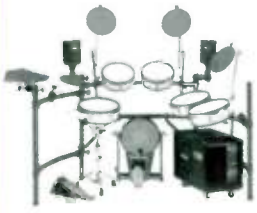

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pro tools notes

Version 6.9 of *Pro Tools* is here, bringing with it the usual slew of improvements and changes — and the odd pitfall for the unwary. Here's what you need to know if you're thinking of taking the plunge.

Mike Thornton

No sooner have Digidesign released *Pro Tools* 6.7 than out comes version 6.9! Thankfully, this gets all the versions in sync again, with the exception of the new *M-Powered* edition. Quite a few of the improvements are for audiovisual work, and include options that were only available in v6.6, improving on them and bringing them into one unified version. For instance, *Pro Tools* 6.9 now works with the Avid Mojo and Digidesign AV Option V10 video I/O peripherals on Windows platforms.

In this month's Pro Tools Notes, we're going to take a look at some of the most important new features in version 6.9.

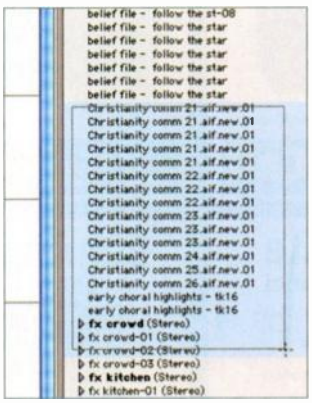
System Configuration

Perhaps the most basic improvement is that the number of busses has been increased to 128, and the maximum number of Aux tracks to 160, though in both cases, this applies to TDM systems only.

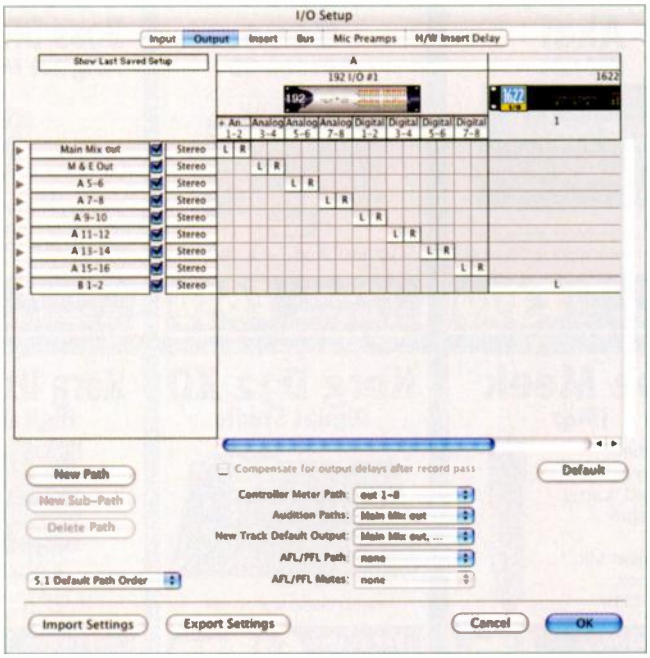
Session & Track Features

One of the biggest changes in version 6.9 concerns how to select multiple items in a list. Before v6.9, to select more than one item in the Region List you had to click on the first item you wanted and then Shift-click each additional item. Now, you still click on the first item, but if you then Shift-click on the last item in a list you want to select, all the items between are selected — just as the main Edit window has always behaved when you wanted to select a contiguous range of regions. If you want to deselect any item or add any non-contiguous items to the selection within a list, Command-click (Mac) or Ctrl-click (Windows) on them.

This works in the Region List, Show/Hide list, when selecting tracks in the Edit and Mix windows, and in the I/O Setup window. In addition, for these lists there is now a Marquee option: if you move the cursor to the left of the list of names you get a 'target' cursor which can be used to lasso a group of items. If you need to add to a group of selections, hold down the Command (Mac) or Ctrl (Windows) key: the cursor changes to a marquee with a small '+' symbol, allowing you to drag round and



add the extra regions you want to select. Again, simply clicking with the Command (Mac) or Ctrl (Windows) key held down also permits you to add or remove individual items.



The I/O Setup window now includes options to select a default output for any new tracks you create, and to choose the monitoring path that will be affected by the new TDM-only AFL and PFL solo options.

There are now keyboard shortcuts to enable you to change the track view (for instance between Waveform and Volume or Pan graphs) and it is possible to do this on a number of selected tracks simultaneously. Select the appropriate tracks, then hold down Ctrl+Command (Mac) or Ctrl+Start (Windows) and use the left and right arrow keys to toggle through the track view options. You can also use an extension of this shortcut to change all tracks at once, by adding in the Option (Mac) or Alt (Windows) key as well.

There are also some new solo features. In the Operations tab of the Preferences window you will see some new Solo Latch options. Latch is the way Solo has always worked before v6.9, where any subsequent Solo buttons you click will latch as well. With the new X-OR (Cancels Previous Solos) option selected, however, pressing another Solo button will deselect the previous one. You can deselect this option by pressing and holding a Solo button on the first soloed track, whereupon subsequent Solo buttons will latch.

On TDM systems you can also now have the Solo button work as a PFL (Pre Fade Listen), as an AFL (After Fade Listen), or Solo In Place (which is how *Pro Tools* worked before v6.9). You can select which option you want in the Operations menu. You will also find a new option in the I/O Setup window that allows you to set which hardware outputs the

Known Issues With *Pro Tools* 6.9

As ever, a few teething troubles have been brought to light in the latest release of *Pro Tools*:

• Clicks at the end of regions when recording with automatic delay compensation on are still a problem.

• When you double-click a *Pro Tools* stationery pad (template) ready to create a new Session based on it, you end up copying the template and creating audio files, fade files and Session backup folders where the template is residing. This is not a *Pro Tools* bug but an OS X 'feature', and workarounds include opening the template from within *Pro Tools*'s Open Session dialogue or the workspace, or dragging the template's icon onto the *Pro Tools* icon in the Dock. Why is this a problem in 6.9 when it didn't seem to happen in 6.7, I hear you ask? Well, actually it did happen with 6.7 for some users, and Digidesign are not sure how or why, but it is definitely an issue for all 6.9 users.

• In 6.9, the shortcut for the Replace Region command, which allows you replace multiple instances of an audio region in a playlist with another region, is now Command and Shift+drag (Mac) and Ctrl and Shift+drag (Windows) — previously, the Shift key wasn't required. Digidesign have promised to get this updated in the next revision of the manual.

Solid Gold?

Developed in collaboration with Sound Fuel, Digidesign's new *Solid* is a TDM synth plug-in for HD and HD Accel systems running *Pro Tools* 6.7. It's currently Mac-only, with Windows XP support due later in 2005. *Solid*'s two oscillators can reproduce analogue waveforms for subtractive synthesis or provide FM operators, allowing you to integrate classic analogue sounds with FM. There's also a wide range of effects at the end of the signal chain, from distortion to flanging.

With HD Accel cards, *Solid* operates as an eight-part multitimbral synth that can produce 32 voices per DSP chip, while HD cards enable *Solid* to produce four-part multitimbral sound with 16 voices per DSP. To download the *Solid* demo, got to www.digidesign.com/products/details.cfm?product_id=4508.

PFL or AFL signal path will use. This feature is really intended for users with Digidesign's Icon D-Control and D-Command control surfaces, which are designed to automatically route the PFL or AFL signal path to your monitors. You can use this feature without either of these control surfaces by routing the PFL/AFL signal to another pair of outputs and arranging for these to be added to your monitor path externally to Pro Tools, then going to the I/O Setup window to choose which output path (your normal monitor path) will be muted when you press a PFL or AFL button.

Note that this feature requires you to be using the Surround Mixer plug-in, and will not work if you are using the Stereo Mixer plug-in. (You will have selected this when you installed *Pro Tools*.) Be aware that the PFL/AFL option also uses significant DSP resources as it adds several more busses and signal paths to *Pro Tools*.

There have also been a number of small changes to the I/O Setup window, including the added feature of a New Track Default Output pop-up menu, which will allow you to select busses as well as output paths.

Improved Grouped Playlist Synchronisation

When you create a new Playlist, *Pro Tools* increments the suffixes by one. This is fine until you add a new track to a group — then suddenly the suffixes are no longer in sync. The new feature inserts blank Playlists in the added track, so that the suffixes are always in sync.

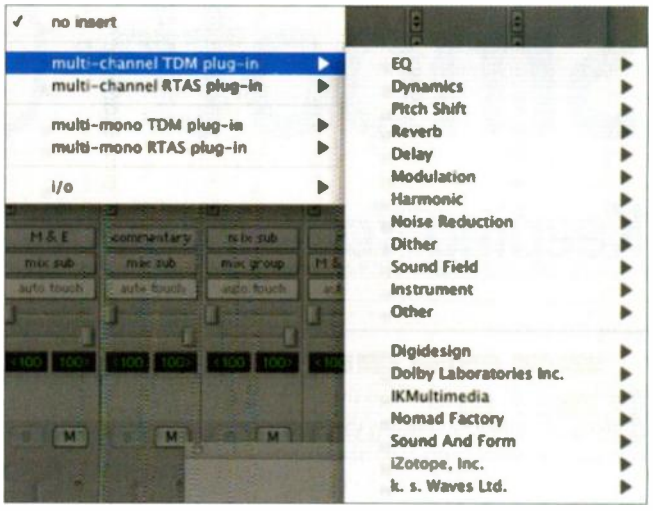
New Automation Features

A new feature in 6.9 called 'Constrain to next or previous' allows you to constrain an automation breakpoint to the next value or the previous value when you are using the grabber tool (not the smart tool). Hold down Command (Mac) or Ctrl (Windows) before you click to 'constrain to next', and hold down Command and Option (Mac) or Ctrl and Alt (Windows) before you click to get 'constrain to previous'. The 'fine adjust' feature is still there as normal: to get it, you simply hold down Command/Ctrl after you click just as before.

Plug-In Organisation

In the old days, when you went to select a plug-in you got a long list starting with the *Digirack* plug-ins and then all the third-party ones in alphabetical order. Then we got grouping by categories, which helped no end, and now we have the option to choose how to categorise the plug-ins using a drop-down menu in the Display tab of the *Pro Tools* Preferences window. You can choose between four options.

- Flat List lists the plug-ins in alphabetical order.
- Category is the system used in v6.7, where the list is organised by function into categories such as EQ and Dynamics.
- Manufacturer arranges your plug-in list according to who made the plug-in, so all your Waves or Digidesign plug-ins will appear in a group.
- Category & Manufacturer combines the two options above into one menu list, with the categories first and the manufacturers underneath.



New TDM Features

There are a whole raft more new features in *Pro Tools* 6.9 that I haven't mentioned here, most of which are specific to the TDM version. Digidesign have added support for the new Icon D-Command control surface and new capabilities for Icon D-Control systems such as inline console emulation, new automation features and more. The new *EQ III* plug-in is bundled as standard, while *Pro Tools* 6.9 improves integration with third-party sound library managers on Windows XP and incorporates a 'Send to DigiDelivery' command to facilitate collaboration through Digidesign's file delivery system.

Pro Tools v6.9 is available as a free update for Pro Tools HD system owners who have *Pro Tools* 6.4 software or later, and for *Pro Tools LE* system owners with *Pro Tools* 6.7. It is available for download from Digidesign's web site or on a CD from dealers or the Digi Store for a small charge. Take a day to go through the 84-page PDF document and see whether the new features will benefit you.

Pro Tools & Tiger

One thing for Mac users to be wary of is that not even version 6.9 of *Pro Tools* will work with Mac OS 10.4 'Tiger'. Digidesign make it very clear, but some folk have tried it nevertheless, and it definitely doesn't work. Digidesign have, however, announced that the OS 10.4 Tiger-compatible version of *Pro Tools TDM* will be available four to six weeks after Tiger's release, which should mean it's available in June. Compatible *Pro Tools LE* and *M-Powered* versions will be available eight to 10 weeks after the release of Tiger, hopefully in early July.

(Incidentally, one advance warning for early adopters of Tiger is that when you first fire up Spotlight, it will start to index all of your attached drives. While this is happening, you can't do anything like record or play back using these drives, and it can take several hours to fully index them so be warned — don't run Spotlight for the first time just before a session! Leave it to index them overnight.) SOS

Pro Tools M-Powered Extends Its Range

***Pro Tools M-Powered*, reviewed in last month's magazine, is now compatible with more M-Audio interfaces, supporting the Firewire Solo, Firewire Audiophile, Delta 1010, Delta 1010LT, Delta 44 and Delta 66 in addition to previously supported Firewire 1814, Firewire 410, Ozonic, Audiophile 2496 and Audiophile 192. This extension of support now means that M-Audio's complete range of Firewire audio interfaces and Delta PCI cards is now compatible with *PTMP*.**

Smooth Operation

Keeping Your Pro Tools Sessions On Track

Mike Thornton

In a busy recording studio, no-one wants to be hanging around while you duplicate individual tracks or try to locate take six. This month's Pro Tools workshop lifts the lid on some essential session-smoothing tips and techniques.

In this month's *Pro Tools* workshop, I'm going to introduce some tips that can be handy when you're really up against it. When you're in the middle of a complex, fast-moving session and the control room is full of 'helpful advice', the last thing you want to be doing is struggling to create multiple Playlists or tracks, and I've found these techniques invaluable in difficult situations.

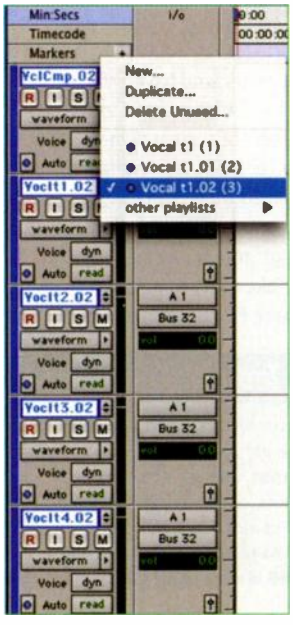
Take Management Using Playlists

Pro Tools's Playlists feature is invaluable when you're recording multiple takes, and if you're working on a complex session with multiple sources being recorded at once, it can provide a neat way of keeping track of all the takes. Before the studio recording session, create template Sessions with the appropriate number of tracks and set up the input and output routing, track names, grouping and so on. Group all of the tracks and create a new Playlist by selecting New Playlist in one of the track name pull-down menus in the Edit window. This automatically attaches a '.01' suffix to the end of each individual track name in the group, clearly indicating take one of the recording process.

When you record subsequent takes, click the pull-down menu in one of the group of tracks and choose New Playlist again. *Pro Tools* now advances all of the playlists in that group to '.02', which becomes your take two, and so on. This way, you always have a numerical ident associated with the Playlist and the audio for each take, because the track names together with their suffixes are transferred automatically to the audio files as you record. The 'helpful advice' in the control room will refer to performances by their take numbers, so you can very quickly tab through to the desired takes and assemble a composite track in the original Playlist (the one without a numerical suffix). As of v6.9, if you add a new track to a group, *Pro Tools* will add a set of blank Playlists so that the new track's Playlist suffix will be in sync with all the original tracks.

A chronological overview of the recording session would thus go something like this:

- First, create a master template Session, label all the tracks and group them.
- Immediately select New Playlist for grouped tracks to append a '.01' suffix to each of the tracks.
- Create a Session for each song based on the template. (If you're a Mac user, don't forget that in version 6.9 it's not a good idea to open a template Session by double-clicking on it in the Finder. Instead open it using the Open Session option from the File Menu or open it from the Workspace Browser, or drag it onto the *Pro Tools* icon in the Dock.)
- For each subsequent take, select New Playlist to create incremental suffix numbers on the subsequent Playlist and audio files. With all takes complete, scroll through the Playlists and select the best regions chosen by the production team (otherwise known as the 'helpful advice').
- Copy the desired regions from the various takes, and paste them into the original blank Playlist group until you have created a completed composite, then label the 'blank' Playlist group 'Comp'.



The New Playlist pop-up on a track creates new Playlists for all tracks in the same active group.

Speedy Overdub Track Management

I use this trick when I am working on a session where I need to record several passes to layer up a section. A typical example would be working with a small string section where I want to use two, three or even four passes to produce a thick, luscious string sound. This can mean recording 10 to 15 tracks for each pass, so creating a new set of tracks for a quick overdub on the fly can be a time-consuming challenge, but here is a way to do it very quickly.

- Select all tracks in the Session that are to be overdubbed. Go to the File menu and choose Duplicate Selected Tracks to immediately make an exact copy of each track. These duplicates will now be highlighted but will be interleaved with the original files.

Deleting Preferences

If you end up with problems for which the solution maybe 'trashing the Prefs' then make sure you delete *all* the preference files. They are in the Preferences folder in Library folder in your 'User' folder and are:

- com.digidesign.Pro Tools.plist
- DAE prefs (folder)
- DigiSetup.OSX
- Pro Tools x.x preferences

In addition, make sure you delete not only the Digidesign Databases on every drive or partition attached to the computer, but also the Volumes folder located in the Databases folder in the Digidesign folder in Application Support, in the Library folder on your startup drive. Make sure you don't delete the Catalogs folder as this contains your carefully arranged catalogue files of samples and sound effects.

Philip Rees

MODERN MUSIC TECHNOLOGY

The cutting edge in music PC systems

We've got some exciting new parts in for evaluation this month. We are putting them through their paces, checking for performance and compatibility with audio applications.

As soon as we are sure that we are happy with the new parts, they should appear on our website – where you can use them to configure your own music PC system. Alternatively, contact us by phone or email and discuss your requirements.

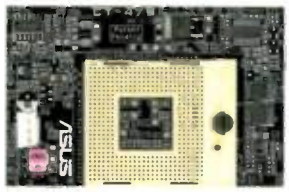
Dual-Core Pentium Studio PCs

For power users, the new *Asus P5WD3 Premium* motherboard has the latest *Intel 955X* chipset, supporting the new *Intel Pentium Processor Extreme Edition* with dual CPU core and 64-bit extensions.

Pentium M desktop systems

We love the *Intel Pentium M* family of processors. They are cool and quiet, and they benchmark extraordinarily well with music and audio applications.

Unfortunately, until now, these excellent chips have only been supported by notebook PCs and expensive, specialist, small form factor motherboards.



This situation has just changed. The newly launched *Asus CT-479* CPU adaptor brings the performance of the *Intel Pentium M* Socket 479 notebook processor onto *Asus'* Socket 478 desktop motherboards.

It's brilliant: this means that you get all the features of a proper top quality desktop motherboard, but in a system which can be wonderfully quiet!

Combine this technology with our acknowledged expertise in designing quiet machines. Potentially, this is now the best platform for ultra-quiet studio PCs.

New compact systems

We have updated the range we offer of small form factor PCs.

Quietest ever Shuttle XPC

The *SB86i* is a new addition to the popular *Shuttle XPC* range of small form factor system units.

The *SB86i* is based around the *Intel 915G* chipset. This has an LGA 775 *Pentium 4* processor socket and it supports a fast 800MHz FSB and PCI-Express.

This model introduces several new noise reduction technologies, including in-line airflow, superior venting and vibration damping.

AOpen Pentium M cube

The innovative *AOpen XC Cube EY855* supports the impressive cool, quiet *Intel Pentium M* processor.

The latest notebooks

For users who prefer full desktop replacement *Pentium 4* laptop PCs, we plan to offer the new *Clevo D900T*, which has the latest LGA775 processor socket. It uses the *Intel 915P* chipset, supporting 800MHz Front Side Bus, PCI-Express and DDR2 memory.

Its graphics adapter communicates via PCI-Express x16, and it uses the *nVIDIA GeForce Go 6800* high-performance graphic chip. It has a 17.1" TFT widescreen, with a superb resolution of 1680 x 1050.

We are massive fans of *Intel Centrino* technology, which includes the amazing *Pentium M* processor (great for making music).

We are looking at the new generation of *Centrino* machines. The new *Compal DL70* looks like a great machine. It has an *Intel 915PM* chipset with PCI-Express and support for the latest 533 FSB *Pentium M* processors.

The *ATi Mobility X600* (M24) PCI-E graphics adapter has 128 MB dedicated video RAM. It has a 15.4" TFT widescreen, with a superb resolution of 1680 x 1050.

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▶ • Create a new group of the newly duplicated tracks whilst they are highlighted.

• Still while they are highlighted, drag the top track in the new group (say Violin 1) to be adjacent to and underneath the last track in the original strings group (say Double Bass). Although the 'duplicate' tracks are interleaved, moving the top track down places all the highlighted tracks side-by-side below the previously recorded tracks.

• Select all regions of audio in the new group of duplicated tracks and hit Delete. Hey presto! You now have a matching set of empty tracks ready for the next pass.

Your new tracks will have the exact same input and output routing, insert and send configurations as the original tracks. If there is time, the only other thing I do before hitting Record is to remove the '.dup!' suffix that *Pro Tools* attaches to the end of each track name and replace it with a continuation of my 'take numbers'.

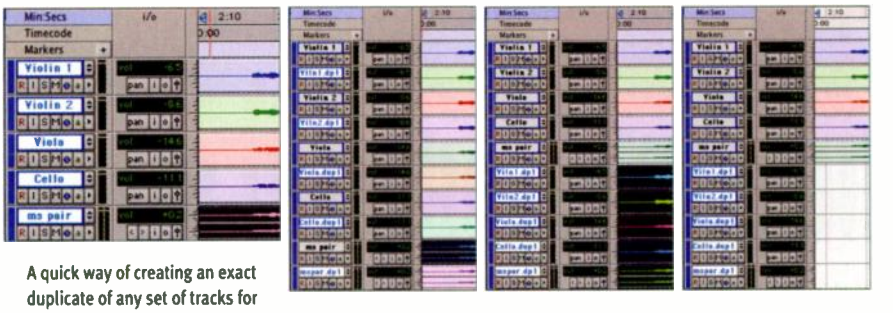
'Section Based Automation' For Plug-ins

Plug-in parameters can be individually automated in *Pro Tools*, but if you need to apply a large number of parameter changes all at once, things can get fiddly — unless you use the following plug-in automation trick.

Go to the point on a track where you want to change the plug-in settings, and turn off track automation by changing from Auto Read to Auto Off. Work on the track until you are happy with its overall plug-in settings, then click the Auto button in the plug-in's window. Select all the parameters required and click the Add button and then OK. Open the Automation Enable window and deactivate all the automation types except 'Plug-in' (this is very important, because if you leave the other types active, you will mess up all the other mix data). Highlight the track from where you want the new settings to start until the point at which you want them to revert to their previous settings.

More On Journaling (Mac OS X Only)

Digidesign now recommended turning Journaling off on all non-system drives with versions of *Pro Tools* up to 6.7. With v6.9, however, they recommend that Journaling should be turned on for all drives. Apparently the potential for better disk performance with Journaling on is not *Pro Tools*-dependent but OS-dependent and since OS 10.3.8 it should be on. To enable Journaling, you can use Disk Utility by selecting the drive from the list and clicking on the Enable Journaling button. Alternatively, a number of 'maintenance' applications have this option, my favourite of which is *Cocktail*.



A quick way of creating an exact duplicate of any set of tracks for overdubbing: from left, select all the tracks and Duplicate them. Moving the topmost duplicated track can then bring all the duplicates together. Delete the audio from the tracks and you're ready to go.

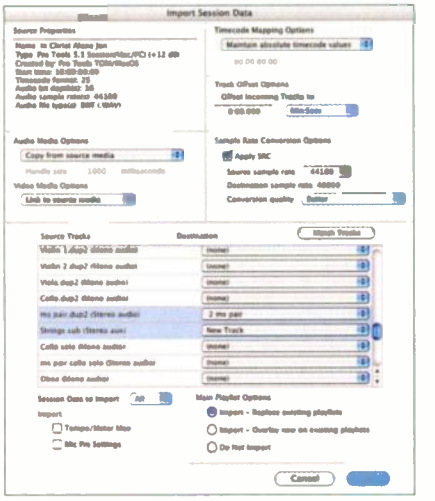
Here's the clever bit: press Command and Option and '/' (forward slash), or Ctrl and Alt and '/' on a Windows system, to write automation to all the plug-in parameters you just selected. Now turn the automation back on for the track. If you click before, during, and after the area you highlighted, you will see all the parameters jump to their new settings. You can also 'slope' the changes between these parameter settings by editing the automation points to ramp from one 'program change' into another.

Import Session Data (TDM Only)

This is another major time-saver in difficult circumstances. It's a very powerful and useful extension of Import Track, allowing you to import a track from another Session into your current Session, including the audio itself, plus edits, plug-in settings and routing. Import Track is still the only option for *LE* users, even though the Menu item is called Import Session Data, but TDM users can pick and choose which elements of a track's data they want to import into a Session. I use it a lot for bringing in a set of tracks that I have configured in a Session for one song into another one without bringing the audio or automation data across. Another way I use this trick is when bringing a group of tracks from a template Session into a working Session. I also use it to move multiple plug-ins and their settings from one Session to another, as I can do it in one go.

Go to the File menu and select Import Session Data, then navigate to the Session you want to get some track data from. Determine whether you require new tracks or want to add data to existing tracks, then use the pull-down menu list for each track to select New Track or to choose which track in the destination Session you would like to add some track data to from the source Session. From the drop-down menu at the bottom of the Import Session Data window, you can select which types of Session data will be imported. This will be the same for new tracks and existing modified tracks in the current import — if you want to import different combinations of Session data for different tracks, you need to revisit the Import Session Data option and configure it for each different combination of Session data types from this list. You can also determine if media will be referenced to the source Session, or copied. My advice is to copy, as there is always a risk with 'borrowed' material that the source Session might get deleted or moved, thus losing you the 'borrowed data' without warning.

Finally, click on the Done button and watch the data fly into your Session. The uses for this powerful option extend far beyond the examples I have given here so go ahead, experiment and enjoy. SOS



The Import Session Data dialogue provides a hugely powerful way to incorporate track data from one Session into another, provided you're using a TDM system.

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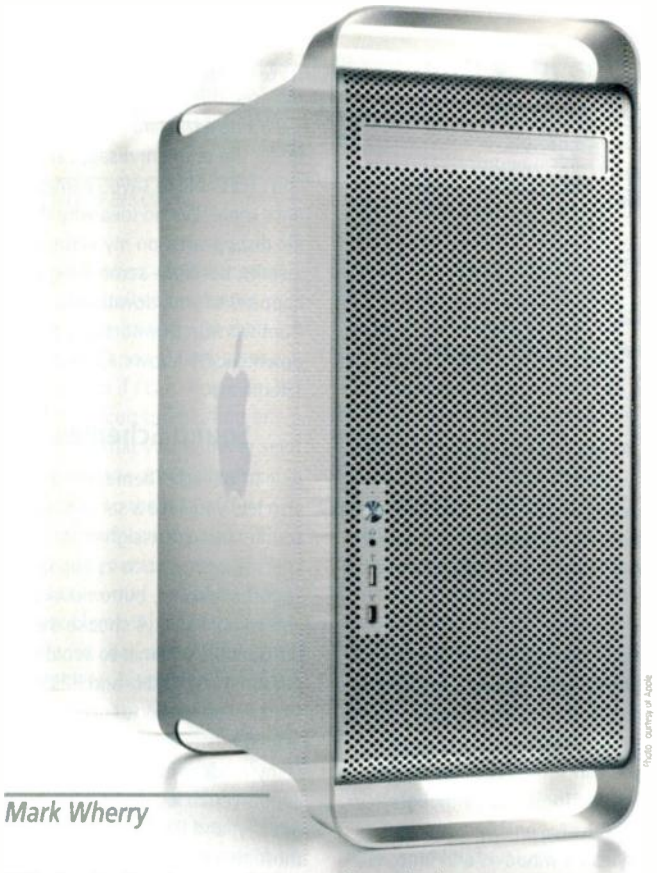

Photo courtesy of Apple

Mark Wherry

As Apple's Tiger finds its way around the jungle of Mac users, there's also some new hardware to consider this month, with faster G5 machines hitting the shelves.

Following its release on 29th April, Tiger has pretty much been the subject on every Mac user's lips and every Mac magazine's cover this month — and you'll notice an in-depth feature in the very magazine you're holding (starting page 136) that describes what Tiger means for musicians and audio engineers. Even since I finished that article, Apple have released the first minor 10.4.1 update, which you can download via Software Update or from Apple's web site, offering increased stability, along with improvements to many of the bundled applications, such as Mail and Address Book.

Another interesting Tiger-related point that's become a topic of discussion since its release is that Quartz Extreme 2D, the technology that offers hardware acceleration to applications that draw 2D graphics with Quartz (as opposed to Apple's 'classic' Quickdraw commands from OS 9), is actually disabled by default in Tiger. Although there are ways to activate this feature manually, it seems that Quartz Extreme 2D is not quite ready for prime-time yet and will become activated in a future release as more applications — such as Steinberg's forthcoming 3.1 updates for *Cubase* and *Nuendo* — use it for graphics.

The Fastest Mac — Ever!

It's funny how often I end up using the phrase "the fastest Mac system ever" in Apple Notes — every time Apple update their top-of-line model, of course — and it's time to use it again this month, with the coming of a revised line-up of Power Mac G5 models that features, well, the fastest Mac system ever. Retaining the entry-level 1.8GHz model (and its specification) that was added to the previous generation, Apple have speed-bumped their dual-processor Power Mac G5 models to offer either 2GHz, 2.3GHz or 2.7GHz G5 processors, which feature 1GHz, 1.15GHz and 1.35GHz front-side busses per processor respectively. Although these three models all come with 512MB DDR400 memory as standard, the dual-2GHz model can only be upgraded to 4GB, while the dual-2.3GHz and 2.7GHz models can be upgraded to the full 8GB.

For graphics, the 2GHz and 2.3GHz models offer ATI Radeon 9600 graphics cards with 128MB memory, featuring two single-link DVI ports, while the 2.7GHz model has an ATI Radeon 9650 card with 256MB memory, one dual-link DVI port and one single-link DVI port. This means that the dual-2.7GHz Power Mac G5 supports one 30-inch display out of the box, while an upgrade is required for the other Power Mac models to do this. You can choose the 9650 card as a built-to-order option for an extra £30, or an Nvdia GeForce 6800 Ultra DDL graphics card for an extra £330 if bought with a dual-2GHz or 2.3GHz model, or an extra £300 if bought with a 2.7GHz Power Mac. The advantage of the Nvidia card is that it offers two dual-link DVI ports for attaching two 30-inch displays (although the 9650 card is good if you only need one 30-inch display as, unlike the Nvidia card, it doesn't obscure one PCI-X slot).

While these graphics options range from competent (for the Radeon 9600 and slightly tweaked 9650 model) to pretty impressive (for the Nvidia card), it's perhaps disappointing that the interface used for the Power Mac's video cards is still AGP 8x Pro rather than PCI Express (as featured in the majority of Intel Xeon-based workstations, and even Pentium 4-based systems) to push the Power Mac's graphics abilities even further.

For storage, the 2GHz Power Mac includes a 160GB 7200RPM SATA drive, while the 2.3GHz and 2.7GHz models offer a 250GB drive instead; all models now include a fast 16x Super Drive, though, capable of writing dual-layer DVD discs able to store up to 8.5GB of data. In terms of expansion, the dual-2GHz model (like the single 1.8GHz) offers three full-length 33MHz/64-bit PCI slots, while the other models provide one 133MHz/64-bit and two 100MHz/64-bit PCI-X slots.

The new Power Macs retain the same pricing structure as before, with the entry-level single 1.8GHz model costing £999 and the three new models priced at

Pro Tools, Tiger & The New Power Macs

The issue of buying a new Mac for *Pro Tools* is a little thorny at the moment, since neither Apple's new dual-processor Power Mac G5 models or Tiger are qualified to run with Pro Tools. The issue of the computer is fairly straightforward, in that Digidesign just haven't tested it yet, so hopefully it will become qualified at some point in the future; the issue of the *Pro Tools* software isn't quite so easy, since the actual application won't work. The solution might be just to take your chances, buy a new Power Mac, install Panther and see what happens. However, a Tech Note on Apple's web site (http://docs.info.apple.com/article.html?artnum=25497) warns not to install an earlier version of Mac OS X than the one supplied with your system, and specifically "If, for example, you have a Power Mac G5 (early 2005) that came with Mac OS X 10.4 Tiger installed, you will not be able to start up to a Mac OS X 10.3 Panther disc or install from it." Hopefully this issue will be resolved fairly soon as, at the time of writing, it creates a really awkward situation for those wanting to purchase new Pro Tools rigs.

£1349, £1699 and £1999 for the dual-2GHz, 2.3GHz and 2.7GHz models respectively.

How Fast Is The Fastest?

I've been thinking about getting a new Mac for a while, and with the release of new Power Macs that will hopefully remain at the top of Apple's line-up for the next six months I gave into temptation and ordered a 2.7GHz machine. I opted for the basic model and bought an additional 2GB memory (giving me 2.5GB in total), because while I was tempted by the prospect of wireless options and the Nvidia graphics card, I decided that these were things that could be added later if I felt I really needed them. Even the Bluetooth module can be added later by an Apple-approved service centre these days, and, in all honesty, wireless peripherals irritate me because I don't want my keyboard and mouse running out of power, and having a spare USB port on the keyboard (after the mouse is plugged in) is useful for dongles and memory devices.

Here you can see the dual-2.7GHz Power Mac running *EXS24* in *Logic Pro* 7.1. Notice in Activity Monitor that the Dashboard Widgets, such as Calculator, aren't using any CPU resources.

Having tested the previous 'top of the line' Power Mac G5 models — the original dual-2GHz and the recent 2.5GHz model — I decided to see how the new 2.7GHz monster fared with the same tests, this time in *Logic Pro* 7.1 running on Mac OS 10.4.1. There's a slight caveat, since both the 2GHz and 2.5GHz models were tested on Panther as opposed to Tiger (which offers more bells and whistles, such as Dashboard), although I'm fairly happy that the varying versions of *Logic* I've used over this time have a fairly consistent processor footprint, as demonstrated when the 2.5GHz model was tested in February's Apple Notes.

One other factor worth bearing in mind when looking at processor usage is that while Mac OS X's Activity Monitor is useful for benchmarking, this utility itself requires some CPU resources to work. When I ran tests with *Logic*, I noted around 1.4 percent usage for the utility, where the maximum theoretical usage overall is 200 percent for a dual-processor system.

Testing Time

Starting, as usual, with *Platinumverb*, the dual-2.7GHz managed 160 instances, with the User CPU meter in Activity Monitor showing around 98 percent usage. While the audio was fine, the system eventually became sluggish to the point of being unusable. By comparison, the dual-2.5GHz managed 140 *Platinumverbs* and the dual-2GHz managed 120. I was able to run 34 instances of *Space Designer* (using the Large Hall 2.6-second preset) with around 80 percent User CPU usage, compared to 30-32 instances on the dual-2.5GHz model and 29 on the dual-2GHz G5.

Moving on to *EXS24*, I loaded the usual 'HA_ES' Harp patch from the *Vienna Symphonic Library* and disabled the Virtual Memory option for disk streaming, to concentrate the results on processor and memory performance. Using the sample's original 16-bit storage format with the filter disabled, I could play back 844 voices (13 instances playing 64 voices and one instance playing 12 voices) with 95 percent CPU usage, compared to 752 and 704 voices for the dual-2.5GHz and dual-2GHz models respectively. Enabling the filter brought these figures down to 384 voices (6 x 64) with around 85 percent User CPU usage, compared to 240 and 192 for the 2.5GHz and 2GHz models respectively.

Enabling 32-bit floating point storage for samples always gives a significant performance boost, in addition to increasing the memory footprint required for the samples, and here the dual-2.7GHz excelled, being capable of playing 4224 (66 x 64) voices with 93 percent User CPU usage, over the 3648 and 3264 voices attained by the 2.5GHz and 2GHz models. So, overall, while the new high-end PowerMac doesn't offer any significant features over the previous generation, the extra speed is definitely going to be welcomed by users requiring host-based processing. SOS

Say Hello To The New iMac G5 (Again)

Apple's new iMac G5 line-up again consists of two models with a 17-inch screen, featuring either a 1.8GHz or 2GHz G5 processor, and one model with a 20-inch screen and a 2GHz G5 processor. The buss speeds of these systems have also been increased, to 600MHz for the 1.8GHz and 667MHz for the 2GHz machine. Perhaps best of all, though, is that all iMac G5 systems now feature 512MB DDR400 SDRAM as standard (which is now a minimum requirement for running *Logic* 7.1, incidentally). While each system also includes built-in Bluetooth 2.0 and Airport Extreme, the wireless keyboard and mouse is still optional. On the subject of networking, another improvement is that the Ethernet port now supports Gigabit (1000Mb/s), which is great for those users wanting to get more from *Logic Pro 7*'s distributed audio functionality.

In terms of storage, the 17-inch iMac G5 models now offer 160GB 7200rpm internal SATA drives, while the 20-inch model has a 250GB drive (compared to 80 and 160GB respectively in the original models' specifications). The 2GHz iMac G5 models also now offer an 8x Super Drive (rather than a 4x model, as before) with dual-layer support, while the 1.8GHz model still has a Combo Drive. Last, but not least, in terms of graphics all iMac G5 models come with ATI Radeon 9600 AGP 8x graphics cards featuring 128MB of video memory, as offered in the new mid-range Power Mac G5 systems.

The new iMac G5 models hold the same pricing structure as the previous generation: the 1.8GHz 17-inch model costs £899, while the 2GHz 17- and 20-inch models cost £999 and £1199.

When I originally reviewed Apple's iMac G5 back in December 2004 (www.soundonsound.com/sos/dec04/articles/imacg5.htm), the timing of the review happened to coincide with the introduction of an entry-level Power Mac G5. While I thought the iMac G5 was a great entry-level system for musicians who wanted to take advantage of a system that had a G5 processor, it was hard to justify recommending this Mac wholeheartedly when, except for the cost of a monitor, you could get more features by buying the 1.8GHz Power Mac G5 for basically the same price as the 17-inch iMac G5 with the 1.8GHz processor. This situation has now changed, as the revamped iMac G5 range offers a significantly better feature set for the same money.

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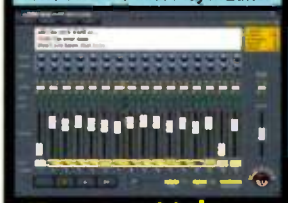

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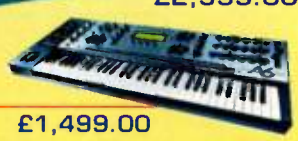

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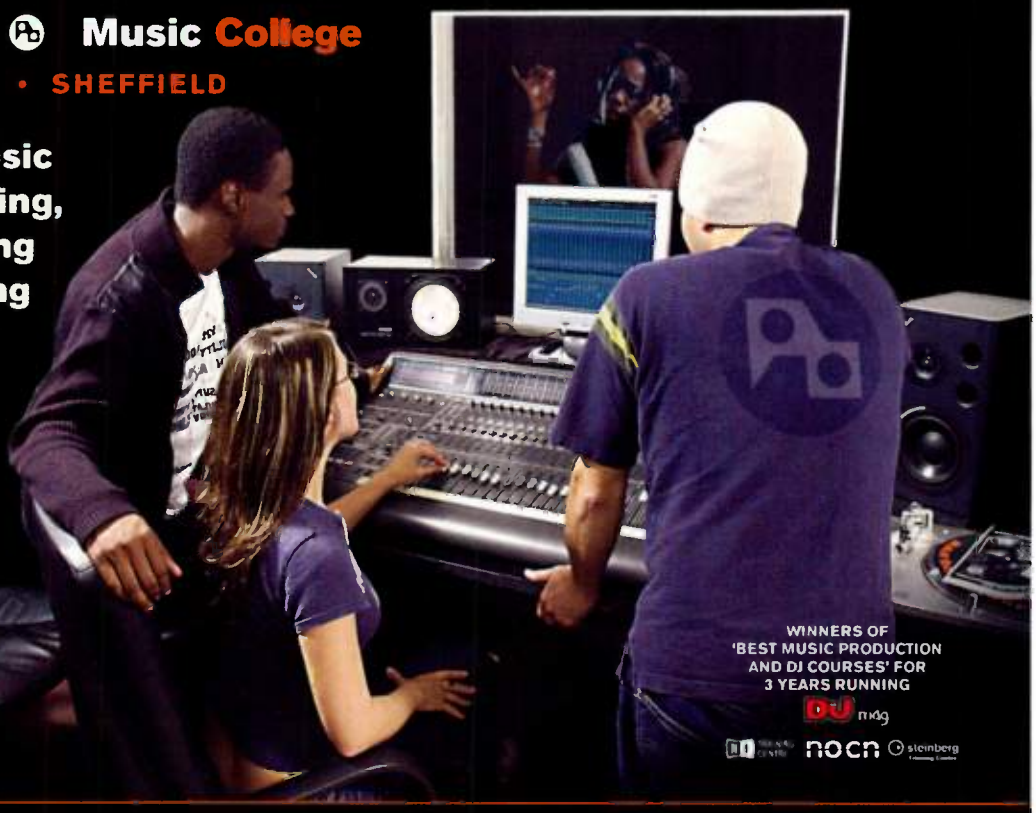

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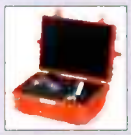

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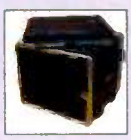

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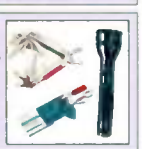

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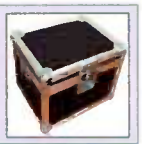

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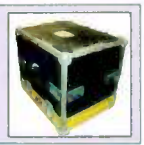

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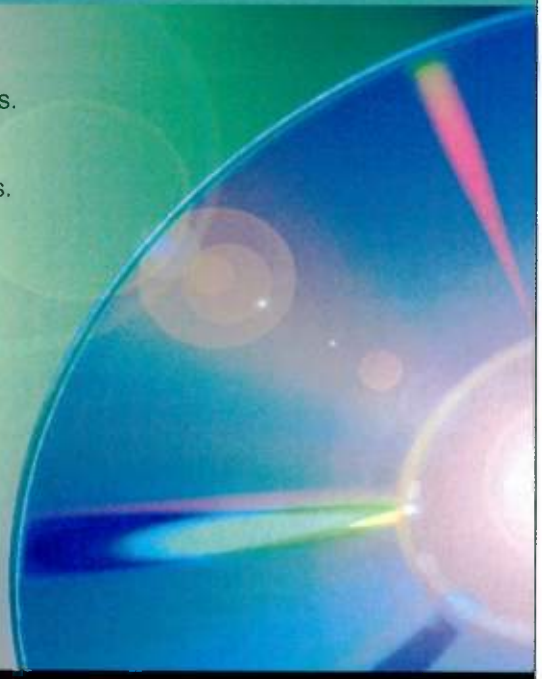

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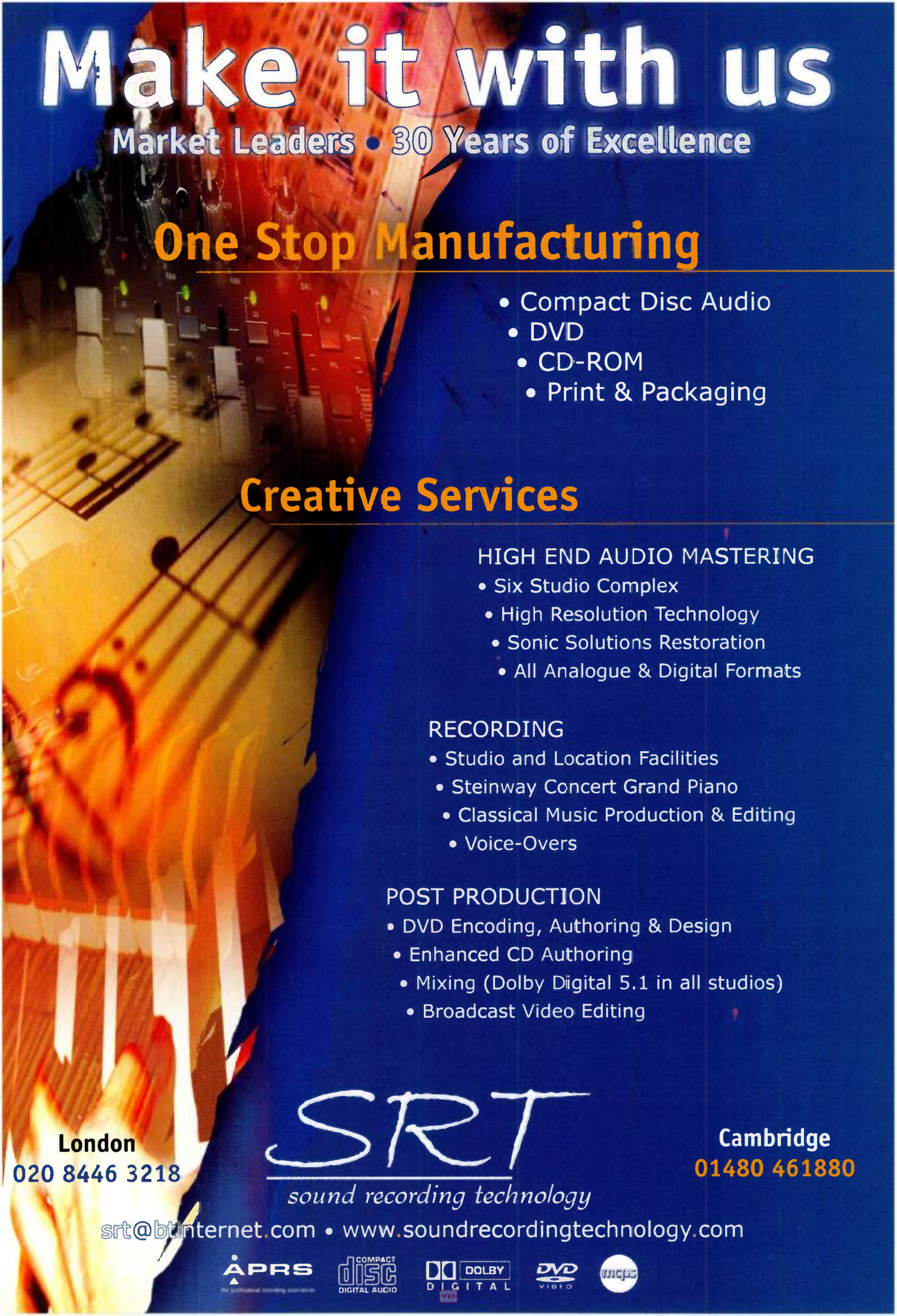
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HP LAPTOP, 3.4GHz, 512MB RAM, 60GB hard drive, includes software, as new, £650. Edirol PCR1 keyboard also available. ☎ Steve 01288 361947 or 07851 352156 (Marlow, Buckinghamshire).

TOSHIBA TECRA LAPTOP, 1.6GHz Pentium M centrino, 60GB HD, 1GB RAM, DVD-RW, Wi-Fi, Win XP, 56k modem, full spec, £550. ☎ 07951 542427 (Essex).

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GUITAR/KEYBOARD players into German electronica, Cluster, Eno, Budd, Tangerine Dream, etc, for jam sessions possibly gigs. Must be based in or around Central London. ☎ Tony 020 76255187 (London).

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One man is on a quest for the perfect all-in-one computer controller.

Alan Tubbs

Recording is going to the DAWs. So is synthesis. I'll leave arguments about the relative merits of this to others, simply noting that I'm not about to abandon my Minimoog at the doorstep of the local music shop.

Real and virtual synths each have their strengths but, unlike the Moog, programming ever more complex virtual synths can often be more frustrating than fun. The same goes for recording — a DAW gives one almost unlimited ability to micro-manage recording, but mousing rubber bands and numbers isn't the most instinctive route to getting a rough mix. There are plenty of fader/knob controllers out there, but that leads to another problem — space. I've got a bedroom studio, already as overstuffed as a cushy recliner with all the necessary paraphernalia for recording; the last thing I need is to try to find an empty spot within easy reach of my computer.

The solution? A keyboard from which one can control most, if not all aspects of recording. There are plenty of hardware controllers out there, but none that combine the most common recording needs. I have modestly called this idea the Ultimate Keyboard Controller (UKC). I imagine the first company to get this right will sell a lot of units — and I will guarantee at least one sale myself.

First off, the UKC needs a keyboard. My apologies to the guitarists, wind players and electric lute *aficionados*, but the keyboard is the standard for playing electronic sounds. While 25- and 37-key designs save space, 61 keys are needed for playing with both hands. Some may prefer 88 keys with piano action, but that too is more of a specialist instrument. What is needed is a generic synth keyboard that will fit on a desk.

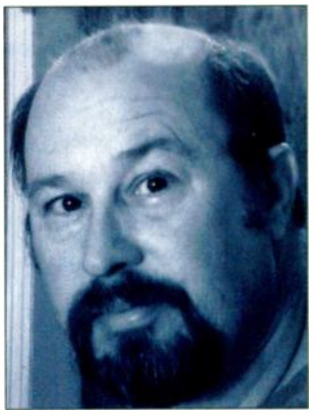
On the left side of the keys, the UKC would retain the standard two-wheel configuration; it works, and there is no point in reinventing the (controller) wheel. But that's just the start for controlling a virtual studio. Alongside the wheels I propose a touchpad. This could be used in lieu of a mouse, like the trackpad on a laptop. Such an arrangement would make the UKC singularly hands-on. Those nifty slide-out trays for computer keyboards all too often slide back during performance and mixing. Rather than having to drag the keyboard back out, it makes more ergonomic sense to use a trackpad. Of course, the trackpad could also be assigned as a music controller too.

Above the keyboard on the left-hand side would run eight continuous rotary controllers with an LCD strip. Each knob should have a ring of LEDs to show its rough value without you having to squint at the LCD and should be the push-button type to allow you to cycle though the knob's assignments. Programmable templates would allow control of different soft synths, as well as mixer functions traditionally handled by pots, like pan, sends and EQ. Above the middle of the keyboard there should be space for an LCD or touchscreen monitor. If we are trying to keep the focus on the keyboard itself, there is nothing better than having the program screen right there on the hardware.

On the right of the UKC would be the moving faders and other DAW controllers. Eight faders seems to be the convention in fader controllers, but we need nine — the last reserved for the master output. Above the master fader should be another rotary controller for pan, sends, and so on. The remaining DAW controllers are the standard transport buttons (play, record, and so on), along with a jog wheel and a joystick. Why a joystick? Not only is it good for doing surround sound mixing, it is also a lot of fun to assign different parameters to vectors and sweep them. One last thing: it needs a detachable hinged cover for the keys themselves. In mixing mode, it could be fitted over the keys as a hand rest.

Perhaps some of the hardware could be upgradeable — like the computer screen and basic flying faders. The same thing could be done with the processor: all the processing power to run the UKC as a controller could be done on a small microprocessor, but maybe it would be possible to have an option to add the latest CPU and motherboard into the UKC, turning it into a DAW in its own right. I don't know if that is feasible, but it should be. Damnit, Jim, I'm a musician, not an electrical engineer!

Whilst I have borrowed (stolen is such a harsh word) a lot of ideas — from the most modest keyboard controller to the Open Labs Neko, no existing product has everything on my wish list. What I, and many others, need is a keyboard that can control an entire virtual studio. SOS



About The Author

Alan Tubbs spends too much time thinking about efficiencies rather than just getting on with the job at hand. That includes his web site, www.bnoir-film.com.

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• Customizable keyboard mapping
• Audio scrubbing
• Sound Forge™ 8 comes with CD Architect 5.2 + Noise Reduction 2

take your imagination to the extreme

No doubt about it. This is the TRITON with attitude. The aggressive new TRITON Extreme is bursting at the seams with more of everything that has made the TRITON family the workstation of choice for thousands of performers, producers and musicians the world over.

Beneath its cool blue exterior lurks KORG's innovative new Valve Force circuitry that adds just the right amount of warmth or snarl to your sound, and what's more you can sample through it too. With a 160MB wave ROM that's packed with sizzling new and classic samples, the TRITON Extreme is a treasure trove, delivering an out-of-the-box palette of sounds that is second to none. Plus, not one but two USB connection ports open up a world of possibilities letting you connect to cost-effective external CD-R/RW drives and computers.

Add all this to sequencing, sampling, a massive collection of effects, a TouchView™ interface, 120-note polyphony, CompactFlash™ data storage and digital I/O, and you've got the most extreme wish list of features your imagination could desire.

Available with 61-note, 76-note or 88-note weighted keyboard.

The New Triton Extreme, it's everything TRITON - taken to the Extreme.

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