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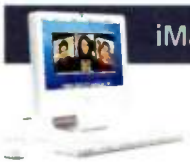

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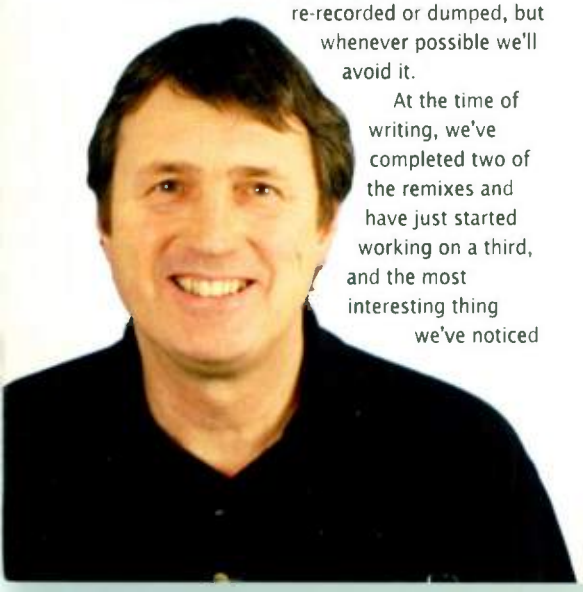
Mixing It Up

It was a great year for *Sound On Sound* in 2005 — we celebrated our 20th birthday and produced a couple of feature-packed commemorative DVDs. These turned out to be extremely popular, and consequently we'll be increasing the amount of audio content on our web site, as feedback suggests that this is very helpful, particularly in the case of reviews and our practical 'how to' articles. So if you didn't get broadband for Christmas, now is definitely the time to think about it — broadband is no longer a luxury for computer musicians, it is an absolute necessity.

Over the coming year we'll be doing our best to keep ahead of the game by introducing new ways of exploring recording and mixing principles, much as we did with our popular Studio SOS series. Studio SOS was a magazine first and we'll be continuing it for as long as the roads of the UK remain open to traffic, as it's not really possible to take six sheets of acoustic foam or a rack of sound processors on the bus or train, and acoustic treatment is unlikely to be replaced by plug-ins any time in the near future!

Christmas 2005 saw the launch of our new Mix Rescue series, which we hope will be equally popular. As you probably gathered from the first instalment, which ran in our last issue, the idea is that we take your multitrack files and a copy of your original mix, then try to improve on the mix. We don't want to create a 'remix' in the dance music sense, where everything is changed or added to, but rather retain the original intentions of the composer as far as is possible. That doesn't mean to say that the odd track won't get edited, re-recorded or dumped, but whenever possible we'll avoid it.



At the time of writing, we've completed two of the remixes and have just started working on a third, and the most interesting thing we've noticed so far is that, as you might expect, the source material ultimately determines how good a job you can do. Not only do the performances need to be in tune and in time, but also cleanly recorded and available to us without added effects or processing, so that we can give the job our best shot. I've found the work so far to be very rewarding, and even where projects can't be brought up to release standard, it's very informative to be able to explore the limits of what is possible.

I do get the impression that some musicians still put too many parts into their recording — why would you need six distorted guitars playing at the same time? If there's too much happening, your mix gets congested and loses its sense of space. It's also important to choose the right sounds so that they don't conflict with each other.

So far we've asked readers to send in their tracks as WAV or AIFF files so that we can process them, and I'm also keen to make sure that track numbers stay under control. This month's remix comprised a large number of tracks, but in an ideal world, a limit of around 24 would be more practical, as it helps save my sanity and stops my hard drive seizing up!

Our aim is to put the 'before and after' mixes on the *Sound On Sound* web site (or DVD when appropriate), as well as any individual tracks where the processing has been particularly important. These will augment the magazine article, which will explain the processes used and show the settings of any plug-ins or processors used in the remix. Personally I'm very excited about this series, not least because it means that I get to spend more time in the studio and perhaps a little less in front of a word-processor package!

So if you have a mix that's giving you problems, please get in touch. We only have the capacity to do one a month, so if you can email us an MP3 of at least part of your mix, it will help us decide what is most practical and most likely to be informative. Hopefully, homing in on common mix problems will mean that everyone can benefit from the experience.

Paul White *Editor In Chief*

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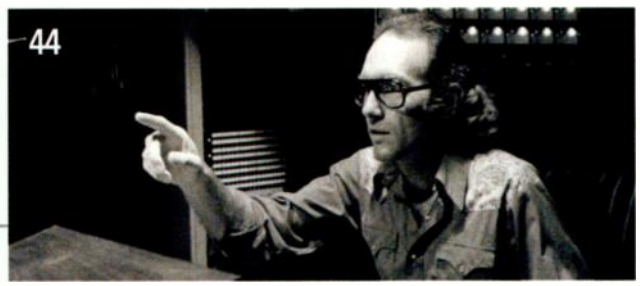

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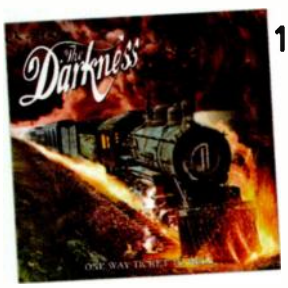

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Exclusive: new virtual instruments from Digidesign

Two new Wizoo-designed plug-ins are coming to Pro Tools

Just as this issue was going to press, Digidesign gave us a sneak preview of two new virtual instruments, which will be officially launched at January's NAMM show. Following the buyout of their company, Wizoo's Peter Gorges and his colleagues have become Digidesign's 'Advanced Instrument Research' team, and *Xpand!* and *Hybrid* are the first fruits of their work. Many of the new features in *Pro Tools 7* were aimed at making it a more attractive environment for sequencing and programming, and the new plug-ins are clearly another step along the same road.

From Digidesign's description, it sounds as though *Xpand!* (pictured right) will have a lot in common with *Hypersonic*, the virtual workstation synth Wizoo developed for Steinberg. The difference is that *Xpand!* is going to be free to all Pro Tools users, which is a nice bonus! Over 1000 factory patches are included, in 28 banks covering everything from acoustic pianos, drums, bass and strings to synth leads and pads. Each instance of *Xpand!* allows you to combine up to four patches to create monstrous layered sounds, and the presets on offer use no fewer than five synthesis methods: analogue-style subtractive synthesis, sample playback, wavetable synthesis, FM synthesis and tonewheel modelling.

Like *Hypersonic*, *Xpand!* is optimised for both ease of use and minimal computer resources. Six Smart Knobs are pre-assigned to key parameters for each sound, there are built-in arpeggiators and effects units, and, say Digidesign, *Xpand!* is 'fully integrated with Pro Tools for rock-solid reliability'. The installer CD-ROM, which includes 625MB of sample data, will be available free from Digidesign dealers, and can be ordered on-line from the Digistore for a nominal sum. Given that version 1 of *Hypersonic* had a smaller library and cost £280, this could well help to tempt some waverers to choose *Pro Tools*.

The other instrument, *Hybrid*, won't be free, although it will be included in a *Music Production Toolkit* bundle for *Pro Tools LE* and *M-Powered*. Pricing for the instrument itself has yet to be confirmed. The name is intended to establish the idea of *Hybrid* as a synth that combines the 'warm and powerful sound of legendary analogue synths' with digital technology. What this means in practice is that it will have a fairly conventional subtractive synthesis architecture, but will incorporate oscillators that are capable of reading wavetables as well as reproducing basic waveforms. Also on offer are a 'multisaw' waveform, plus oscillator sync and cross-modulation. Digidesign claim that their filter design is 'revolutionary', and it certainly sounds comprehensive, with no fewer than 23 filter modes. It is apparently capable of 'true saturation', modelled after the Memorymoog, and can be modulated at audio rates, for effects that will be familiar to owners of some analogue synths. Again, there are two effects processors, but this time they're joined by a pair of analogue-style step sequencers. And like *Xpand!*, *Hybrid* will integrate with *Pro Tools* 'at the application level', ensuring maximum stability and performance.

Digidesign UK +44 (0)1753 655999 www.digidesign.com

Focusrite Liquid Channel Competition winner

This happy chap is Richard Cranefield, the lucky winner of a brand-new Focusrite Liquid Channel from our competition way back in *SOS* November 2004. Richard, a broadcast engineer from Surrey, explains that he's been moving house and carrying out renovations, so he's only just got around to unwrapping his prize, which was generously donated by Focusrite (+44 (0)1494 462246/www.focusrite.com). When not at work designing post-production and broadcast installations for the television industry, Richard has a small home studio where he produces chillout tracks and remixes and remasters old vinyl. He says he had been hoping to buy a Focusrite Trakmaster to try and improve his recordings, so winning a Liquid Channel was a real bonus. Well done to him!

Before you get too jealous, we've not one but two competitions this month. On page 231, we've got two Waves Guitar Tool Rack (GTR) packages to give away, courtesy of Sonic Distribution (+44 (0)1582 470 260/ www.sonic-distribution.com), while in our Subscribe & Win competition on page 223, you could get your hands on Joemeek, Studio Projects and Toft Audio mics and processors worth a whopping £3600, courtesy of distributors PMI Audio (+44 (0)1803 215111/ www.pmiaudio.com).

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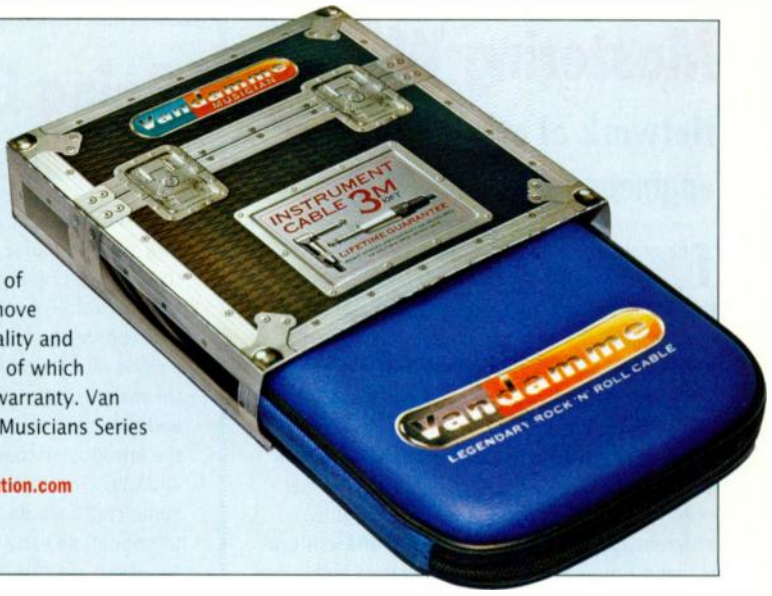
Van Damme

introduce Musicians Series cables



Cable and connector specialists Van Damme UK are launching a new range of instrument, speaker and microphone cables. Van Damme are a big name in the fields of pro audio and live sound, and this represents a significant move into the consumer market. Hopefully their reputation for quality and reliability will be represented in this new range of cables, all of which are made by hand in England and are covered by a lifetime warranty. Van Damme have appointed Westside Distribution to handle the Musicians Series range in the UK.

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For the birds High-flying new hardware from Thermionic Culture

Hot on the heels of the Culture Vulture Mastering Version, which was announced last month, Thermionic Culture have released details of a further two new products. The Earlybird 2.1 is a stereo valve preamp and EQ which uses a specially designed balanced push-pull double-triode circuit which, it's claimed, delivers a warm but clean sound, an extended frequency response and extremely low noise and distortion — the dynamic range is quoted as 115dB, which is pretty impressive by any standards, and especially so for a valve-based device. Each of the Earlybird 2.1's two channels has its own independent set of controls. The preamps have mic and line inputs, phantom power and phase invert switches, and input impedance can be set at 300Ω or 1.2kΩ. There are straightforward Top, Mid and Bass EQ controls with an Active Lift switch, and an unusual high-pass filter which can provide a mid-frequency cut at its most extreme settings when used in conjunction with some active bass boost. Finally, an Output Trim knob means that it's possible to overdrive the Earlybird by increasing the input gain and turning down the Trim control. A separate line input allows users to access the unit's valve EQ alone, bypassing the preamp. The Earlybird 2.1 is a high-end product with a high-end price — £2467.50 including VAT.

Continuing the avian theme, Thermionic Culture's second new product is the Pullet, a stereo passive EQ, and it's an unusual product to say the least. Each of the Pullet's two channels provides Mid Lift and Mid Cut controls with variable frequency and bandwidth, with a High Top knob providing high-frequency boost/cut. Though it can be used alongside any mic preamp, the Pullet was originally designed for use in conjunction with the Earlybird 2.1, the idea being that while the Earlybird's active EQ can be used for general broad-brush EQ duties, a passive EQ is more suitable for precise and radical boosting and cutting in the mid-range. It costs £998.75.

Unity Audio +44 (0)1440 785843 www.unityaudio.co.uk
www.thermionicculture.com

Line 6 Variax Challenge competition

From now until the 28th of February there's the chance to win a trip for two to LA in Line 6's Variax Challenge competition. As well as the top prize, which includes a visit to Line 6's head office, there will be separate prize draws in January and February, with Line 6 guitars, amps and effects up for grabs. In January you can win a Variax 600 guitar and in February you can win a Vetta II amp. Each month there will also be a draw for a second prize of a Line 6 Tonecore effects pedal of your choice. To enter, all you need to do is try out any of the Variax electric, acoustic or bass guitars at a participating dealer and fill in an entry form. Contact Line 6 to find a dealer near you.

Line 6 +44 (0)1327 302700 www.line6.com

Advanced *Logic* courses at London School Of Sound

London School of Sound are now offering the Apple authorised *Logic* 301 course. This advanced course covers everything from production, editing, and mixing to notation and scoring to picture within *Logic Pro*. On completing the course, students gain the status of *Logic Pro* User Level Two, currently the highest level of expertise recognised by Apple. The course is four days long and the first class will run from Thursday 16th to Sunday 19th of February 2005. The number of participants is limited to four, so booking early is recommended. The course costs £881.25 including VAT.

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

World Radio History

Mastering World

Network of mastering engineers established

The proliferation of on-line mastering services is a relatively recent phenomenon. It seems that many mastering studios and engineers have noticed both the untapped commercial potential in the many bedroom producers and semi-professional artists up and down the land, and the power of the web to deliver their services conveniently — tracks can be sent back and forth electronically and client and engineer need never meet face to face. What's slightly different about the new Mastering World venture is that it brings together three separate and independent mastering studios under the banner of www.masteringworld.com. This means that prospective customers are offered a range of rates and can choose where, and by who, their material will be mastered. Currently, the Mastering World network consists of Simon Heyworth's Super Audio Mastering in Devon (SACD pioneers), John Dent's LOUD Mastering in Somerset (Kasabian and PJ Harvey, amongst others) and Donal Whelan's Hafod Mastering in Wales (Goldie Lookin Chain, David Sylvian and Embrace). The plan is to recruit further mastering houses to join the network in the future. You can find up-to-date pricing and other information on the Mastering World web site. Don't miss the 'On-line Mastering Shoot-out' in next month's *SOS* — see the item below for more information.

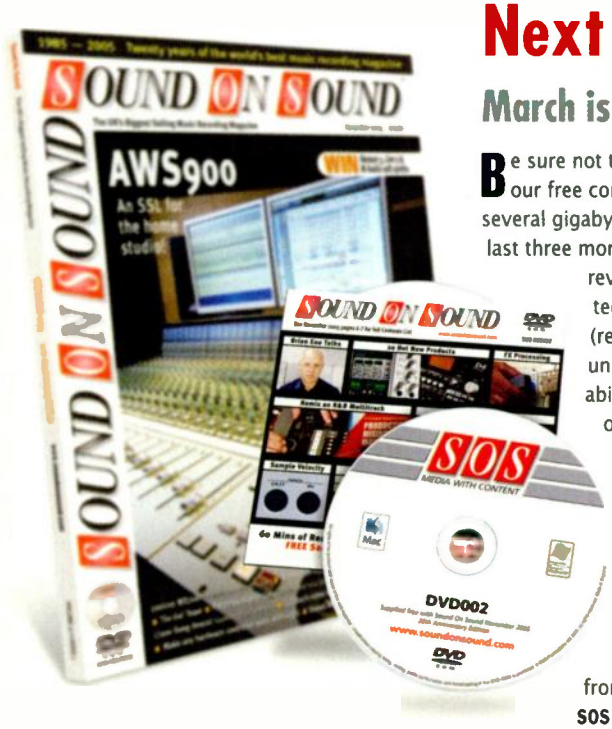
Mastering World +44 (0)1446 775512.
www.masteringworld.com

Going Live

Soundcraft live sound training course

Mixer makers Soundcraft have set a date for their next 'Going Live' live sound training course, held in conjunction with Adlib Audio and led by some of the UK's top touring engineers. The course will take place at Liverpool Community College from February the 20th to the 22nd. The first day of the course consists of an optional introduction to the basics of live sound engineering, designed for anyone new to the field. On the 21st and 22nd, the course proper will cover all the main aspects of live sound, from microphone and speaker placement to FOH and monitor mixing. The course costs £180 for the main two days, plus £30 for the introductory day, and all participants will also receive a copy of John Eargle and Chris Forman's book *Audio Engineering For Sound Reinforcement* and Soundcraft's *Guide To Mixing* DVD. Places are limited, and the course is expected to sell out, so early booking is recommended.

Soundcraft +44 (0)1707 665000 goinglive@soundcraft.com www.soundcraft.com



Next month... DVD003

March issue to feature third *SOS* DVD

Be sure not to miss next month's *Sound On Sound*, as the issue will be bagged with the third of our free commemorative DVD-ROMs, plus the next *SOS* live sound supplement. Featuring several gigabytes of video, pictures and audio, DVD003 will provide the perfect companion to the last three months of *SOS*, with sounds from and hi-res pictures of the best of the products we've reviewed recently. There's exclusive video footage of Editor In Chief Paul White talking technical with Marcus Ryle of Line 6 about the company's new Toneport technology (reviewed this month on page 126). We'll also be using the DVD to illustrate our unique shoot-out of on-line mastering services. Lots of mastering houses now offer the ability to upload tracks via the web, at a fixed price that looks very attractive. But is on-line mastering really the bargain of the century, or is it a false economy? We've put five engineers and their services to the test, sending them three tracks and asking them to master them to the best of their ability — and you can be the judge of the results. The original, unprocessed tracks and the five mastered versions of each will be supplied as CD-quality audio files on DVD003 so you can compare them side by side. We'll also report on the services themselves: which ones are easy to use, and which ones will take you to Internet hell? Find out next month.

Be sure not to miss the March issue of *SOS* and its free DVD — order your copy from your newsagent now, or subscribe at the web address below.

SOS Mail Order +44 (0)1954 789888 www.soundonsound.com/subscribe

World Radio History

FOR MOST FOLKS, ANY FIREWIRE INTERFACE WILL DO.

FOR THE OBSESSED, THERE'S ONYX.

Ordinary FireWire audio interfaces are fine for capturing your musical ideas on the go. But if you're the type of musician or engineer who won't compromise quality, then you need to audition the Onyx 400F Studio Recording Preamp with 192kHz FireWire I/O.

This professional 10-channel premium mic preamp and audio interface features four boutique-quality Onyx mic preamps, with superior headroom, sonic detail and clarity vs. the competition (123dB dynamic range and .0007% THD, measured in the real world). The Onyx 400F also offers TRS inserts for plugging your favorite outboard gear into your signal path before sending it to your Mac or PC. And an internal 10 x 10 DSP Matrix Mixer with 64-bit floating point processing and full recall—a feature not found on any other FireWire interface, at any price.

With mastering-grade 24-bit/192kHz AKM® audio converters, true 192kHz operation at full channel count, a powerful standalone operation mode, and robust aluminum-and-steel construction, the Onyx 400F boasts fanatical attention to every last detail. Not to mention exceptionally open, natural and revealing sound worthy of your finest projects. Visit www.mackie.com/onyx400f to feed your obsession.

MACKIE ONYX 400F: FOUR BOUTIQUE MIC PREAMPS W/ 192KHZ FIREWIRE I/O. PLUG IN TO ONYX.

www.mackie.com ☎ +44 (0) 1268 571212 ☎ +1 (425) 487 4333

MACKIE.

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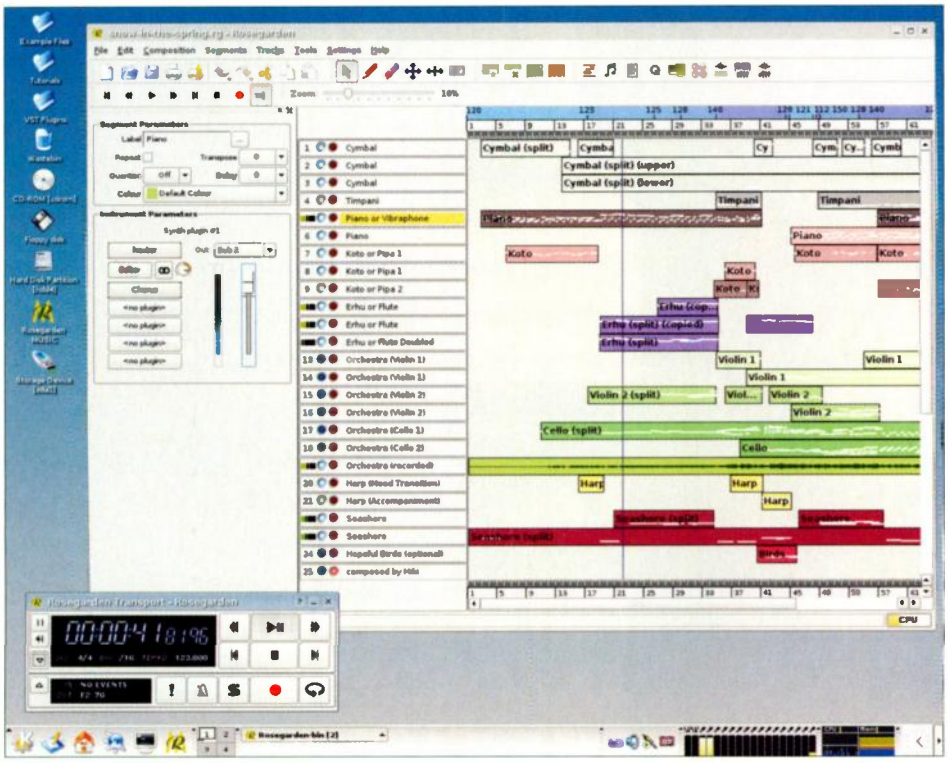
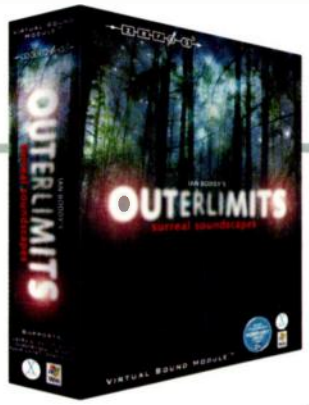
Studio To Go! Download edition released



Fervent Software's Linux-based music production suite *Studio To Go!* is now available as a download. *Studio To Go!* boots off a CD-ROM and allows users to compose, record and mix on any PC without having to install any software. Version 1.5 includes the latest versions of the *Rosegarden* sequencer, *Ardour* DAW and *Hydrogen* drum machine, as well as lots of other effects and instruments, notation software and more. *Studio To Go!* could previously only be purchased on a CD-ROM. The new download edition means that you can get hold of the software directly, though you'll need a broadband Internet connection, 1GB of hard disk space and CD burning capabilities. It costs £44.99.

www.ferventsoftware.com



Outer space

New atmospheric instrument from Ian Boddy and Zero G

The latest sample-based instrument from Zero G and Xfonic is *Outer Limits*, which features a 4GB core library yielding over 500 pads, atmospheres and evolving soundscapes. What's more, up to eight of these complex patches can be layered simultaneously. *Outer Limits* is designed by electronic musician and erstwhile *SOS* interviewee Ian Boddy. Like his previous Zero G instrument *Morphology*, which was reviewed in *SOS* August 2004 (www.soundonsound.com/sos/aug04/articles/zerog.htm), *Outer Limits* uses Native Instruments' *Kompakt* sampler as a front end. It's available now and costs £114.95.

Ian Boddy has also produced a signature soundset for Linplug's *Albino* soft synth. It contains 300 patches, ranging from monosynths and polysynths to atmospheres and effects to rhythmic loops. It's available to download from www.linplug.com and costs 59 Euros, roughly equivalent to £40 when we went to press.

Time + Space +44 (0)1837 55200 www.timespace.com www.zero-g.co.uk

MOTU launch USB 2.0 interface

The 828 MkII interface is now available in Firewire and USB 2.0 versions

In a surprise move, MOTU have unveiled a new version of their 828 MkII interface which uses the high-speed USB 2.0 connection protocol. The Mac- and PC-compatible 828 MkII USB, as it's called, is in every other way identical to the original 828 MkII Firewire in terms of features, and it carries exactly the same list price — £695. It provides 10 24-bit/96kHz analogue inputs and outputs, eight channels of ADAT digital I/O, stereo S/PDIF I/O and MIDI In and Out, together with two mic preamps, comprehensive metering and flexible onboard DSP mixing.

Until recently, audio interface manufacturers were cautious of the new protocol — for a long time, Edirol's UA1000 and UA101 were the only interfaces that supported it, until they were joined by Behringer's BCA2000. But now that the majority of today's new laptop and desktop computers — Macs and Windows PCs — are equipped with suitable ports, we may be about to see more of USB 2.0 in the studio.

Musictrack +44 (0)1767 313447.

www.musictrack.co.uk

www.motu.com

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Both offer uncompressed 24 bit recording and USB data transfer for tight integration with external computer systems.
With a peerless track record in digital mixing and recording, only Yamaha could have done this.
Visit www.yamahasynth.com to find out more.

YAMAHA
www.yamaha-music.co.uk

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Saffire software hits version 2

Focusrite have released a v2.0 software update for their Saffire interface, available as a free download from their web site. Reviewed in *SOS* September 2005 (www.soundonsound.com/sos/sep05/articles/saffire.htm), the Saffire is a compact Firewire audio and MIDI interface with on-board effects-processing capabilities. The big news is that the v2.0 update adds 192kHz audio support. In addition, Focusrite have overhauled the accompanying *Saffire Control* software's GUI, upping the brightness and contrast and making crucial buttons easier to see. They've also tried to make the software more user-friendly by adding Tool Tips — those little text boxes which pop up after you leave the mouse pointer over some graphical element for a few seconds, explaining its function — and fixed a few bugs. The update is available now — simply head to the Downloads section of the Focusrite web site.

Focusrite +44 (0)1494 462246 www.focusrite.com

KMR Audio to distribute API

Pro audio experts KMR Audio have been appointed exclusive distributors for API Audio equipment in the UK and Ireland. API have 40 years' experience in the design and manufacture of studio equipment. Their current catalogue ranges from large-format consoles, like the Vision, Legacy and Legacy Plus, to high-end outboard gear, like the 7600 channel strip.

KMR Audio +44 (0)20 8445 2446 www.kmraudio.com

X Electrical open store in Canterbury

New and used music equipment specialists X Electrical have opened a new store at 22 Burgate, Canterbury, adding to their existing branches in Hammersmith, Kingston and Croyden. They stock a wide range of studio gear, as well as hi-fi, AV and photographic equipment.

X Electrical (Canterbury) +44 (0)1227 785001 www.xelectrical.com

Allen & Heath upgrade Mix Wizard

New features added to stereo source mixer

Allen & Heath have upgraded the Mix Wizard WZ20S and renamed it the WZ³20S, bringing the mixer up to speed with the rest of the range (the WZ³16:2, WZ³12:2 and WZ³14:4:2). The WZ³20S is a compact 20:2 mixer with four mono channels and eight stereo channels, making it suitable for submixing multiple stereo sources, like keyboards and sound modules, on stage or in the studio.

It has six aux sends (switchable to pre- or post-fader), two stereo returns, 100mm faders, direct outs on the four mono channels and A and B inputs on all eight stereo channels. The user can switch between the A and B signals, mix the two together or send A to the main output while sending B through the channel. The 'WZ³' tag signifies that the 20S now features new and improved WZ³ mic preamps and four-band EQ with in/out switching on every channel. The EQ on the four mono channels also offers sweepable high- and low-mid bands.

In addition to the main stereo output and master fader, the WZ³20S has a separate mono output and dedicated fader which can either be used to control the summed mono output — for use as a monitor feed, for example — or Aux 6. And as if it wasn't flexible enough already, a range of internal routing options for the channel aux sends and direct outputs are configurable via pluggable jumpers. The WZ³20S costs £999.95.

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NATIVE INSTRUMENTS
SOFTWARE SYNTHESIS

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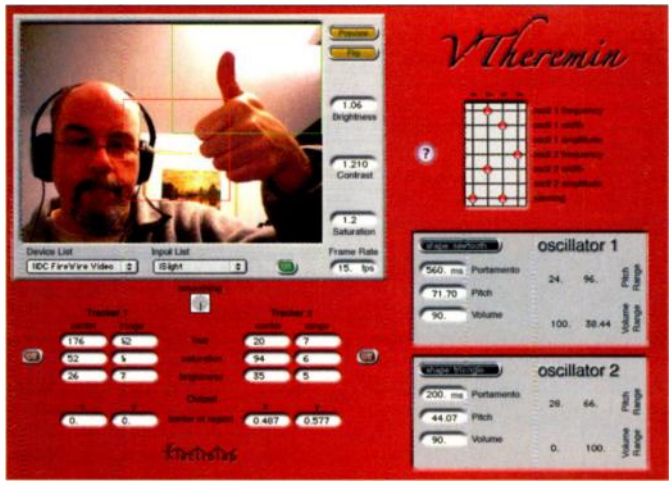
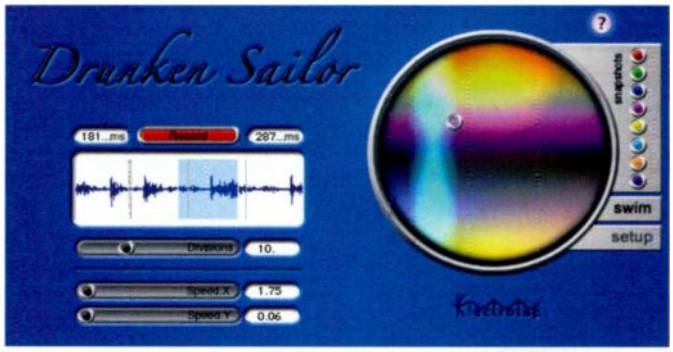
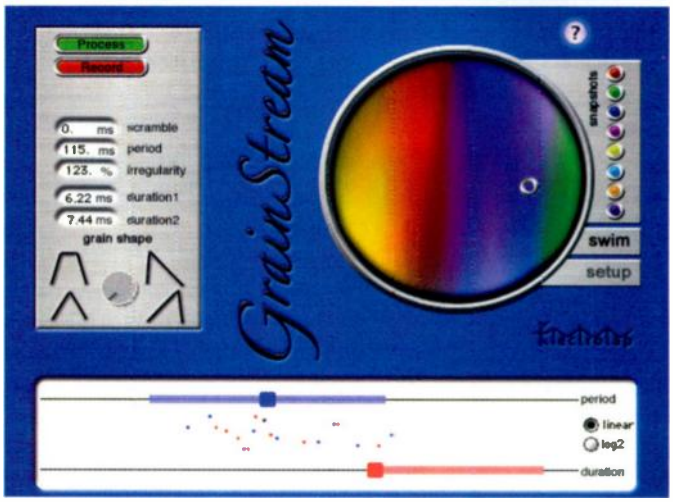
Hipno Weird and wonderful plug-ins from Cycling '74

The new *Hipno* plug-in bundle from Cycling '74 is a highly original collection of plug-ins and virtual instruments from the creators of *Pluggo* and *Max/MSP*. Designed by Electrotap (www.electrotap.com), the bundle contains over 40 granular-, spectral-, filter- and delay-based plug-ins and throws up more than a few surprises — when dealing with Cycling '74, it's best to expect the unexpected!

For example, *VTheremin* (pictured top right) is described as a virtual Theremin which, like a number of *Hipno*'s plug-ins, can be controlled by live video input — using an ordinary webcam, you can manipulate a pair of oscillators by moving coloured balls in the air! And, via the use of Modulators (plug-ins which control other plug-ins), the same colour-recognition and motion-tracking technology can be used to control any parameter of a *Hipno*, *Mode*, or *Pluggo* plug-in.







Colour also plays a part in the Hipnoscope, an unusual graphical device that features in many of the plug-ins and allows you to morph between up to eight presets. You take snapshots, assign them to a colour and then position that colour anywhere in the Hipnoscope — the multi-coloured circular pane you can see in the *Drunken Sailor* and *Grain Stream* plug-ins (pictured right). By moving the 'puck' (a small circular cursor) around the Hipnoscope, you can move between and mix the snapshots according to position. *Hipno*'s other plug-ins are far too numerous to mention here and, in many cases, rather difficult to explain — it's probably best if you download the demo from the Cycling '74 web site and have a look for yourself! The full bundle costs £147 including VAT.

MI7 UK +44 (0) 1446 754350. www.mi7.com www.cycling74.com

DB Audioware launch virtual guitar amp

The latest plug-in from the Scottish company DB Audioware is *Aura Pro*, a virtual guitar amp for Mac OS X and Windows. Costing just £49, *Aura Pro* has traditional guitar-amp controls — input gain, master volume and three-band EQ — as well as a noise gate and compressor. It provides reverb, echo, phaser, tremolo, chorus and auto-wah effects, all of which are available simultaneously. There are six different cabinet models and a mic-modelling section offering four different mic positions. *Aura Pro* operates as a VST plug-in under Windows 2000 and XP, and as a VST or Audio Units plug-in under Mac OS X v10.3 or higher. It's available to buy now from the DB Audioware web site, where you can also download a trial version and listen to some MP3 demos.

www.db-audioware.com

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MediaDesk:

Full Range Audio
And Deep Bass From Your Computer

MediaDesk. The first true 2.1 full-range professional monitoring system designed to produce a seamless spectral experience for computer audio recording and production, or listening to music without any compromises.

A powered system with a small footprint and a compact sub that fits under your workspace, MediaDesk uses 2-way satellite speakers with a dedicated 8 subwoofer. Blue Sky's Bass Management System puts the full, articulate bottom end exactly where it should be.

Easily expandable to a 5.1 Surround system, MediaDesk brings professional grade monitoring to a whole new world of applications in your home, studio, production suite, or broadcast studio.

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www.beyerdynamic.co.uk

t: 01444 258258

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Alesis update Fusion workstations

Brand-new keyboards get brand-new features

Alesis have released a version 1.2 update for their eagerly anticipated Fusion 6HD and Fusion 8HD. Details of the powerful workstation keyboards, which offer synthesis, sampling, sequencing and eight-track recording in one box, first emerged in January 2005. A year later, the 6HD and 8HD are finally on sale and Alesis are still adding new features! The v1.2 update includes a whole range of new sounds which can be downloaded to the Fusion's hard drive via USB 2.0, and adds three new formant filters and a low-pass filter derived from the Alesis Ion synth. The Fusion can also now handle up to four sample layers and four insert effects per program. Elsewhere, some new functions have been added to the sampler and arpeggiator, and the included *Fusion Converter* software allows users to convert sample libraries in WAV, AIFF, Akai and Soundfont formats into the Fusion's own format. *Fusion Converter* is currently only compatible with Windows PCs, though a Mac version is in development. The v1.2 update is free to download from the Alesis web site. Look out for our in-depth review of the Fusion 6HD in next month's *SOS*.

Numark-Alesis +44 (0)1252 341400 www.alesis.com

Applied Acoustics release

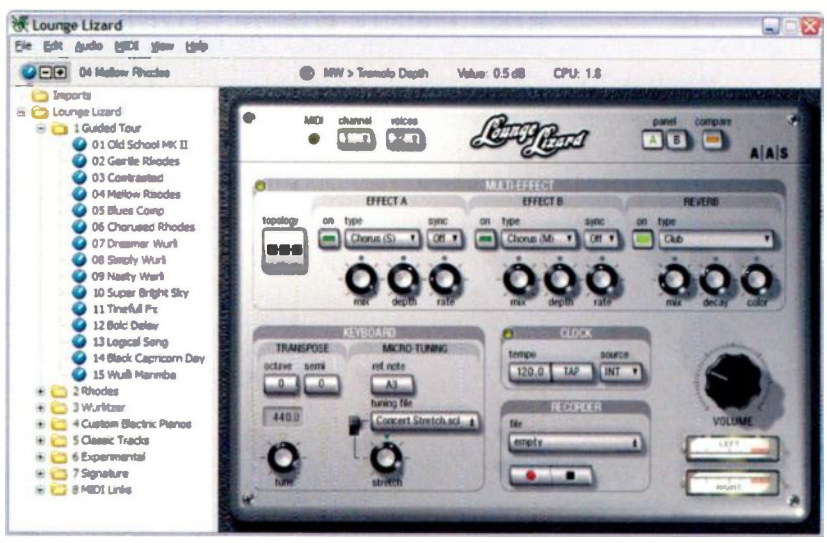
Lounge Lizard EP3

The latest version of Applied Acoustics Systems' acclaimed *Lounge Lizard* virtual electric piano is out now. *Lounge Lizard* uses physical modelling to recreate the sound of the Wurlitzer, Rhodes, RMI and Hohner electric pianos and version 3 further refines this approach, adding two separate modelled pickup types (the Rhodes' electromagnetic type and the Wurlitzer's electrostatic type) and new and improved fork and damper models. AAS have also added some new presets and effects. *Lounge Lizard EP3* is compatible with Mac OS X and Windows, and can run in stand-alone mode or as a VST or Direct X plug-in on Windows PCs, and as an Audio Units, VST or RTAS plug-in under Mac OS X. Pricing had not been confirmed when we went to press.

SCV London +44 (0)20 8418 1470.

www.scvlondononline.co.uk

www.applied-acoustics.com



SOS Live supplement goes on-line

Launched in August 2004, *Sound On Sound*'s quarterly 48-page live sound supplement has until now only been available with the print edition of the magazine. But from now on, all of *SOS* Live's content will be available on-line via our eSub web subscription service. The next Live supplement will accompany the March issue, on sale on the 16th of February.

www.soundonsound.com/articles

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LINE/PHONO INPUT GAIN

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ZERO LATENCY MIXER

FRONT PANEL INPUTS 1 & 2 MIC/INST GAIN & BOOST

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Finally THE WAY IT SHOULD BE - record today and recall tomorrow. No more twisting knobs and pushing buttons to get the exact settings you had in yor last session...or your session two months ago. When you need to fix a track, simply reload. Every function in the INSPIRE 1394 is under precise digital control by an easy-to-use software mixer/control panel. You can even daisy-chain 4 units together and recall the settings of all sixteen inputs and monitor mixes whenever you want! The INSPIRE 1394 is the latest in ground-breaking technology from PreSonus.

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RRP: £159inc VAT

CENTRAL STATION

THE ULTIMATE STUDIO CENTER

FREE CSR-1 REMOTE CONTROL PACKAGE

The 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 between 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 RCA 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 conversion up to 24Bit/192kHz.

CSR-1

The CSR-1 can be connected to the rear of the Central Station via DB9 connector to control VOLUME. TALK-BACK, MUTE,input source switching and speaker output switching functions.

FIREPOD

24-BIT/96K RECORDING STUDIO - CUBASE LE INCLUDED

NOW WITH THE ABILITY TO LINK TWO UNITS TOGETHER

The FIREPOD is a complete 24-bit/96k recording studio combining eighthigh-quality PreSonus microphone preamplifiers, 24-bit/96k sample rate conversion and as an added bonus, Steinberg's Cubase LE 48-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 microphone preamplifiers perfect for recording a wide variety of sources including vocals, drums, guitars, bass, piano, keyboards, guitars, synths, horns, orchestras, choirs, and more.

The Presonus Firepod also ships with Cubase LE 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 professional editing and effects.

FIREBOX

24-BIT/96K FIREWIRE RECORDING INTERFACE - CUBASE LE INCLUDED

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.

"ONE OF THE BEST LAPTOP-ORIENTATED INTERFACES WE'VE SEEN TO DATE, THE FIREBOX IS A WINNER. 9 OUT OF 10 Computer Music, June, 2005

PreSonus

DIGIMAX LT £599 inc VAT

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 market. Each channel features our award-winning, high performance, dual servo microphone preamplifiers with 48V phantom power, and -20dB pad. Each channel features a Neutrik® connector that accepts line level or microphone input. DigiMAX LT digital synchronization is achieved by offering word clock in and out via BNC connectors. The sample rate can be set on the front panel to 48K, 44.1K, and 32K

ACP88 £695 inc VAT

The ACP88 gives you total dynamics control for multi-tracking and live sound reinforcement. Eight compressor/limiters deliver transparent dynamics control. Eight full featured gates seamlessly control unwanted noise and bleed-through. Control vocals, tame drums, protect speakers, tighten the low-end - all from just two rack spaces of powerful processing.

DIGIMAX 96 £995inc VAT

Now with 96k sampling rate*, the DigiMAX is the newest member in the award winning family of Presonus mic preamp's. Combine eight channels of pristine mic preamplification with 24 simultaneous digital and analog outputs, and the DigiMAX 96k seamlessly fits into any digital recording situation. The DigiMAX 96k is the perfect front-end for DAW's as well as adding mic pre's to digital mixers and sound cards.

COMP16 £79inc VAT

The COMP16 is the simplest professional quality compressor in the world. Sixteen presets have been carefully tailored for a wide range of applications including vocals, percussion, fretted instruments, keyboards, stereo program material and compression effects.

EQ3B £79inc VAT

The EQ3B is a three-band fully parametric single channel analog EQ with smooth highs and solid lows. Perfect for carving out unwanted frequencies or musically boosting frequencies that need to be empasized.

HP4 £79inc VAT

The new HP4 from 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.

TUBEPRE £79inc VAT

The TubePRE is the highest quality vacuum tube preamp in its class. Loaded with PreSonus' award winning dual servo preamplifier, the TubePre affordably delivers low noise tube warmth for vocals, guitars, bass guitars, synths and sound modules.

Distributed in the UK by: Hand in Hand Distribution - Tel:01579 326155 - WWW.HANDINHAND.UK.NET

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Aimed at the project studio, AKG's new Perception 100 and Perception 200 are large-diaphragm cardioid condenser mics. Priced at £129.99 and £169.99 respectively, the Perception 100 and 200 feature one-inch capsules and have a quoted frequency response of 20Hz to 20kHz and maximum capable SPL figure of 135dB. In addition, the Perception 200 has a 10dB pad and a 12dB-per-octave bass roll-off filter set at 300Hz. It comes with an elastic shockmount and a hard-shell case, while the Perception 100 ships with just an ordinary standmount. Both are available now.

Harman Pro UK +44 (0)1707 668222 www.harmanprouk.com
www.akg-acoustics.com

AKG Perception

New budget studio mics

Wave Arts release *Power Suite 5*

Wave Arts have released *Power Suite 5*, the latest version of their popular multi-purpose plug-in bundle. The new version 5 plug-ins support sample rates up to 192kHz and have been given a smart new look. The *Trackplug* channel strip has four new EQ filters and a side-chain EQ. The *Masterverb* reverb has new early reflection controls and a flexible three-band EQ. *Finalplug*, a limiter and maximiser, has a new limiting algorithm and an automatic release time control. The *Multidynamics* multi-band compressor now has Clean and Vintage modes, plus some new presets. Finally, the *Wave Surround* spatial enhancer from the version 4 bundle has been replaced by a plug-in called *Panorama*, but the new plug-in serves the same purpose — it uses HRTF (head-related transfer function) technology to create 3D effects over headphones — albeit with a little more sophistication. The v5 *Power Suite* bundle costs $599.95 for the Wave Arts on-line store, roughly equivalent to £342 when we went to press. You can also purchase the plug-ins separately for $199.95 (£114) each.

Wave Arts +1 781 646 3794 www.wavearts.com

Ultimate Sound Bank price cuts

Ultimate Sound Bank have permanently reduced the prices of their *X-treme FX*, *Ultra Focus* and *Charlie* sample-based virtual instruments. *X-treme FX* (previously £266, now £199) is dedicated to sound effects, foley and atmospheres; *Ultra Focus* (previously £266, now £199) is a large collection of vintage synth sounds; and *Charlie* (previously £199 and now £99) is a virtual tonewheel organ. All three are Mac- and PC-compatible and can operate in VST, Audio Units, Direct X, RTAS and MAS formats.

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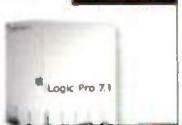

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PCR-A30
MIDI CONTROLLER

EDIROL

A multifunctional controller keyboard with a lot to offer the computer based music producer. Compact and portable enough to travel with your laptop, and self powered via USB. The PCRA30 offers MIDI or USB interfacing and 32 full size touch sensitive keys (F-C), pitch / mod combination joystick and assignable hardware controls with 8 sliders, 8 knobs, 9 buttons and 2 pedal inputs. It's a useful USB audio interface too with stereo 24 bit 96kHz converters and built-in stereo active mini-speakers so you can listen without headphones. There is analogue audio line in / out via stereo jacks, and S/PDIF optical out. Includes PCR Editor software for Win / Mac, and preset MIDI controller templates for numerous popular software platforms.

RRP £99 **£99*** EDI-PCRA30

6306
COMPACT 6 CHANNEL MIXER

TAPCO

Tapco is a new division of parent company Mackie, set to market extremely affordable products with high quality features and design. The 6306 is a very tough, compact utility mixer with 6:2 configuration and weighs just 1.6kg. It includes high headroom circuitry (up to +18dBu) and offers 6 input channels including 2 XLR mic preamps and high impedance jack input ideal for guitar pickups. Up to +84dB gain is available through the mixer yet the overall THD is below 0.025%. Featuring 2 band high and low shelf EQ (at 80Hz and 12kHz) and 2 aux sends per channel, plus stereo aux return, stereo tape input with tape output, 8 segment LED metering, rotary faders and 9V PSU.

RRP £100 **£49*** TAPC-6306MIX

SAMSON C05
CONDENSER MIC

SAMSON AUDIO

The new C05 mic offers Samson condenser technology in a comfortable to use hand held design. It's 19mm shockmounted capsule with a cardiod pick-up pattern provides a smooth flat frequency response, which excels in both live performance and recording applications. The C05 has a quality finish capped with gold-plated XLR connectors. Carry case and mic clip included - a whole lotta mic for the money!

RRP £XXXX **£PRI*** SAMS-C05

UM-1X
USB MIDI INTERFACE

EDIROL

The UM-1 is a USB to MIDI interface for 1in1 operation (16 channels) and is available in two versions. Both are self powered via USB and have a 3 metre flying lead USB cable and plug. The UM-1X (main pictured) has a flying lead twin MIDI cable with Y split to MIDI in and MIDI out 5 pin DIN male plugs. The UM-1SX has female MIDI sockets on the base unit instead, which maybe more convenient in many circumstances, and it now supports Mac OSX too!

RRP £XXXX **£PRI*** EDIR-UM1X

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Solutions

GigaStudio Orchestra has an incredible specification: sample sizes in excess of 512 Gigabytes, unlimited polyphony and 128 part multitimbrality. Loading is virtually instantaneous, you can keep hundreds of sounds 'live' simultaneously, and there are huge libraries of frighteningly realistic instruments available. In practice, actually achieving this professionally and reliably is largely dependent on the computer you are running it on. Although it will run brilliantly with our whole range of systems, for superb and professional power we'd recommend our Core 3 as the perfect system.

Solution of the month!

Tascam GigaStudio 3 Orchestra & RME HDSP9652

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EastWest Symphonic Plat & RME HDSP9652	£1415
Sonar 4 Studio & Behringer BCA2000	£179
Sonar 4 Studio & Emu 0404	£89
Sonar 5 Producer & Emu Emulator X Studio	£669

Solution packages only available at these prices when you purchase a Carillon PC
All prices include VAT

World Radio History

TOTAL SATISFACTION
NO EXTRA CHARGE

When you buy a music computer, all bases should be covered. To that end, we include everything below as standard in the price - all you need to get started plus all you need to keep working, and then some! This stuff could easily set you back nearly £2,000 if bought separately, but then you'd still have the familiar issue of one supplier blaming another for your problems if things went wrong. Go on - how many other reasons do you need?

FIX

Carillon Fix is quite possibly the most useful piece of software we've ever encountered. It allows us to 'dial-in' to a computer and control it as if we were sitting in front of it. One of the hardest things in tech support is extracting from the caller exactly what they mean by 'it doesn't work'. Using Fix we can instantly see what the caller is talking about. They can sit and watch while we show them how to do what they want to do. Unlike some other remote solutions, Fix provides realtime chat windows, on screen drawing, file transfer and the ability to reboot the computer and dial back in - vital tools for troubleshooting.

Carillon Fix allows us to solve nearly all problems quickly and without fuss, and without having to have the system returned to us.

PRICE ELSEWHERE ~~£24.99~~ **£FREE**

RESTORE

Having a backup of your system is vitally important, especially in these days of sneaky viruses. Carillon provide each system with a complete factory backup of the original configuration which will return your system to how it was when you first received it - clean and working (but with your audio files still intact). With the internet and cover disk demos, computers can get clogged up with rubbish over time and there are many things out there that may interfere with your music software.

Even more useful is that you can create your own system backups! So, once you have the system how you want it then you can create your own 'Recovery', and if the worst happens, you're back up and running in no time.

PRICE ELSEWHERE ~~£38.99~~ **£FREE**

SOFTWARE

We've got together with Intel and leading software house Native Instruments to bring you a superb collection of synths and mixing software that takes full advantage of Intel technology for unparalleled performance. Xpress Keyboards recreates the sounds of three legendary classics, which to this day have not lost an ounce of their popularity. B4 Xpress delivers the powerful sound of the B3 drawbar organ including rotary speaker, FM7 Xpress delivers the sounds of the famous FM synths of the 1980's, and Pro-53 Xpress recreates the sounds of the beloved Prophet-5 analog synth. On top of that you also get Traktor DJ Studio - simply the best DJ-ing software around for mixing rip your MP3s, CDs or other recorded sound files. It goes beyond the possibilities of conventional DJ equipment by implementing a vast range of mixing features that only software can provide.

PRICE ELSEWHERE ~~£189.99~~ **£FREE**

HELP

Software generally comes with a manual of some sort to show you how to uncover the mystery of how it works. Soundcards similarly have documents telling you which bits do what. However, there's always been one bit missing that tends to create a yawning gap between making music and not being able to do anything - how the soundcard and software relate to each other. The sofware company don't know what soundcard you are using and vice-versa.

All of the 'Solutions' we offer come with comprehensive specially written tutorials that bridge the gap between the soundcard and the software and show you how to use the system as a whole. It's an invaluable resource for new users or anyone who needs a point in the right direction.

PRICE ELSEWHERE ~~£24.99~~ **£FREE**

SOUNDS

SampleLab was formed to produce the most sonically accurate recordings possible by using only audiophile quality equipment and a fully 24 bit recording, editing and mastering process from start to finish. The resulting collection of sample CDs has received rave reviews in the music press. All 6 titles are provided, free of charge, in .Wav format with Halion and EXS24 instrument definitions.

The titles are: Drum Fundamentals, Discography, Luscious Grooves, Spatial Awareness, Analog Archive, and new Broken Beats - check out www.samplelab.com for full details and audio demos.

PRICE ELSEWHERE ~~£359.70~~ **£FREE**

QUIET

In an ideal world with little pressure on finances and floor space, noisy stuff like tape machines and computers are exiled to a 'machine room' which is acoustically isolated from the studio mixing area. The reality is that most studios operate from one room. In this situation, comfortable, accurate monitoring is seriously compromised by a noisy computer (how can you hear your gate thresholds properly, or long fade-outs against a background of fan and drive noise?). Worse still, the need to record clean acoustic instruments and vocals can rule out the use of a standard PC altogether. The Carillon AC-1 is no standard PC. We've invested hundreds of hours in the testing and sourcing of quiet components and designed the system from the ground up to be as silent as possible - you'll find our four AC-1 Core systems to quieter than anything else in their class.

PRICE ELSEWHERE ~~£180.95~~ **£FREE**

KEYBOARD

This is an absolute stroke of genius. Keyboard shortcuts in software enable you to navigate about and perform actions so much quicker than messing around with a mouse. Our hard wearing keycap sets for the included keyboard (the mouse is free too!) are subtle and unobtrusive and don't render your keyboard useless for any other applications - they simply encourage you to use the shortcuts and in no time at all your speeding around your software without even thinking about it.

Available for Cubase, Nuendo, Sonar and Pro Tools and provided free of charge when you buy any Carillon system - just tell us what software you want to use.

PRICE ELSEWHERE ~~£09.99~~ **£FREE**

SUPPORT

We know our computers and we know the software and hardware. We're not a computer company with a passing interest in music, we're a music company that has a passion for getting the best out of computers. We're musicians and we all use computers in our music making. When you contact us you're talking to the most concentrated bank of computer music knowledge that you'll find anywhere, plus you get access to the restricted support area of our website.

We've used pretty much every soundcard and piece of music software there's ever been, so if you can't get sound in, or MIDI out, or sync synchronising, then come to us for the highest quality support around.

PRICE ELSEWHERE ~~£699.00~~ **£FREE**

SYSTEM

Carillon's audio PC systems integrate hardware and software as never before. Painstaking attention to detail means we worry about stuff like low-level Windows settings, and leave you with the creative dilemmas. Carillon has direct access to thousands of audio software and hardware products. Critically, our selection of components for each system is totally independent of any supplier our selections are based on rigorous testing, active participation in user forums, up to the minute market information, and literally thousands of man years experience with hundreds of brands - our engineers' experience is our number one benefit.

Each Carillon Audio System is carefully designed like a dedicated hardware product to be produced in large numbers, so you don't have to be the guinea pig.

PRICE ELSEWHERE ~~£300.00~~ **£FREE**

Unsolicited *Sound On Sound* web forum quotes!

"I just got a Cubase SX Pro Studio from Carillon, and it is the best quality PC I've ever seen. It's built like a tank, and all the hardware is first-rate - all I had to do was hook it up, turn it on and go."

"I must say that I have found the general after-sales and customer services provided by Carillon to be extremely impressive. They are the only company that I have dealt with in the last few years who have pro-actively made sure that I was satisfied."

"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.'

"Carillon PC's are as professional as you can get."

"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"

"Reliability has been excellent - no problems at all."

"I bought an AC-1 15 months ago and will repeat what others have said - great build quality, very quiet, cool case, configured BRILLIANTLY and full of freebies."

"The price is incredibly reasonable considering the expertise and support that you're getting access to."

"I have just bought a Carillon music PC. Top notch kit, very quiet and rack mountable as well. 10/10."

"The machine I bought from them is brilliant."

Sound On Sound PC Music Forums at www.soundonsound.com

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NI Traktor DJ Studio	£129.99
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carillondirect.com 020 7692 7629 Carillon

email: info@carillondirect.com Carillon Audio Systems 12 Flitcroft St London WC2H 8DL. You're welcome to visit us for a demonstration, please call to make an appointment.

World Radio History

VSL Vienna Instruments

VST/AU Orchestral Plug-ins For Mac & PC

VSL, makers of the world's largest orchestral library, have unveiled their next phase of development. *SOS* were at the launch...

Matt Bell

The new *VI* front end, with cells for different articulations at the top left, and the matrix below them. The eye-like display in the centre is a meter — the green ring displays MIDI activity, while the blue 'LEDs' represent audio.

No orchestral library has dedicated itself to the cause of recreating a complete orchestra from samples in quite the same detail as the Vienna Symphonic Library. Their original release, the *VSL First Edition*, was over 90GB in size, while the subsequent *Pro Edition* was a hard-drive-munching 240GB. Their newest offering, the *Symphonic Cube*, continues the trend — it's planned to consist of over 550GB of 24-bit samples, comprising all those in the *Pro Edition* and the more affordable Horizon series, plus many new instruments and performance articulations.

However, VSL have also been beavering away on enhancements to ensure that theirs remains the last word in virtual orchestras. They recently unveiled the first fruits of this work at an impressive presentation in Munich organised by their aptly named local distributors Best Service. Once again, VSL didn't disappoint; what they announced was effectively the overhaul of their entire library. When it was first planned, the *Symphonic Cube* was going to ship on its own hard drive array, but it will now be available as 10 themed libraries (strings, woodwind, brass, and so on), the so-called *Vienna Instruments* or *VIs*, which are accessed via a new custom-built virtual-instrument front end.

Designing this has allowed VSL to improve some of the less well-integrated parts of their library, and put everything under the control of one neat VST- or AU-format plug-in. For example, functions that used to be handled by the stand-alone *Performance Tool* (which *Gigastudio* users had to run separately), such as interpreting performance data and calling up appropriate legato and note-run samples from the library, are now integrated into the *VI* interface. This allows you to combine many different articulations in an editable, recallable preset, triggerable on one MIDI channel.

Different performance articulations are loaded into the top cell on the left of the window by dragging and dropping from an articulation browser that can be accessed on the right. Each of the articulations is represented by a cell in the 12 x 12 matrix below, and you can then define the keys you use to step vertically and horizontally through the articulations in the matrix by means of a simple controller assignment page on the right, or by using a hardware controller and the built-in MIDI Learn function.

Up to 12 custom switching matrices can be saved and recalled by more keyswitches, but if you don't want to work at this detailed level, there are plenty of pre-assigned Presets and a so-called Universal mode in which the most suitable articulations for a given instrument are pre-mapped to one controller. There's even a built-in Performance detection algorithm, which can analyse what you're playing and seek to call up appropriate performance samples to match. If you 'trill' on a flute sample between two notes, for example, the *VI* will detect this and pull up one of the new sampled trill performances instead of playing back discrete sampled notes. You might object that all these performance samples could eat up your sequencer host's available RAM, but VSL have created a Learn mode that analyses passages you record and detects precisely which samples you've used. The rest can then be jettisoned from your computer's memory using the built-in RAM Optimiser. You can restore samples at any time, permitting you to change the phrase later if you wish.

We think the *VIs* are a big step forward for expressive digital orchestral production. Of course, the full *Symphonic Cube* isn't cheap, but you can buy the *VIs* one at a time, and if you already own parts of the *VSL First Edition*, *Pro Edition*, or Horizon-series libraries, upgrading to the *VIs* is much more affordable than buying them from scratch. VSL have thoughtfully made an on-line Discount Calculator available at their web-based shop, so that you can work out what discounts apply to you, based on what you already own.

The first five VIs are scheduled to ship in early 2006, with the other five to follow later in the year. Look out for our reviews then! SOS

information

£ Complete *Symphonic Cube*, £6137 including VAT. For existing user discounts and pricing on individual libraries, contact Time + Space.
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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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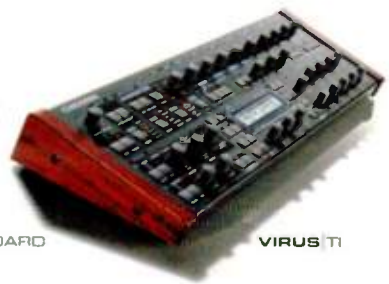

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Q&A

Your technical questions and queries answered

Q Can you explain the origins of wavetable, S&S and vector synthesis?

I keep reading about different types of synthesis like 'wavetable', 'S&S' and 'vector' but I don't know what they are. I've looked around the net for information but either the descriptions are very simplistic or they're too technical. Could someone at *SOS* please explain the origins of these techniques?
Michael Cullen

***SOS* contributor Steve Howell replies:**
Wavetable synthesis is actually quite easy to understand. In the early days of synthesis, (analogue) oscillators provided a limited range of waveforms, such as sine, triangle, sawtooth and square/pulse, normally selected from a rotary switch. This gave the user a suprisingly wide range of basic sounds to play with, especially when different waveforms were combined in various ways.

However, in the late '70s, Wolfgang Palm used 'wavetable' digital oscillators in his innovative PPG Wave synths. Instead of having just three or four waveforms, a wavetable oscillator can have many more — say, 64 — because they are digitally created and stored in a 'look-up table' that is accessed by a front-panel control. As you move the control, so you hear the different waveforms as they are read out of the table — the control is effectively a 64-way switch. If nothing else, this gives a wide palette of waveforms to use as the basis of your sounds. However, the waveform-selection control is not a physical switch as such, but a continuously variable control implemented in software. The advantage this has (apart from the 60 extra waveforms!) is that it is also possible to use LFOs or envelopes or MIDI controllers to step through these waveforms.

Now, if the waveforms are sensibly arranged, we can begin to create harmonic movement in the sound. For example, if Wave 1 is a sine wave and Wave 64 is a bright square wave with Waves 2 to 63 gradually getting brighter as extra harmonics are added in each step of the wavetable, as you move through the wavetable, you approach something not unlike a traditional filter sweep. However, one disadvantage to this (but something that characterised the PPG) is that the sweep will not be smooth — the waveforms will step in audible increments.

Each oscillator in the PPG, however, didn't just have one wavetable — there were 32 wavetables, each with 64 waveforms! Many were simple harmonic progressions as described above; others were rudimentary attempts at multisampling, whilst others attempted to emulate oscillator sync sweeps and PWM (pulse-width modulation) effects. Because the wavetable sweeping was so audibly stepped, the latter two weren't entirely convincing emulations, though they had a character all their own nonetheless.

Where things begin to get interesting, however, is when the waveforms in the wavetable are disparate and harmonically unrelated, as the tonal changes become random and unpredictable. For many, this feature of wavetable synthesis was unusable, but some creative individuals like Tom Dolby exploited it to create unique and distinctive sounds, as can be heard on his 1982 album *The Golden Age Of Wireless*.

The PPG had something of a trump up its sleeve, however — totally analogue filters! Using these, it was possible to smooth out the wavetable sweeps. Another endearing quality of the PPG was its low-resolution digital circuitry, which exhibited aliasing at extreme frequencies that added a certain 'gritty' quality to the sound. Later manifestations of the PPG (in Waldorf products) were of a higher quality and offered smooth wavetable sweeping. But while they sounded better, they lacked that (arguably) essential 'lo-fi' character.

Other synths have employed wavetable synthesis in one guise or another since then and there are several software synths available today which incorporate wavetable synthesis capabilities.

'S&S' is short for 'samples and synthesis' and refers to the new breed of synth that appeared with the introduction of the seminal Roland D50 in 1987. Whereas synths prior to this used analogue or digital oscillators to create sound, samplers were now in the ascendent, with the introduction of affordable sampling products such as the Ensoniq Mirage, the Emu Emax and the Akai S900. These allowed almost any sound to be sampled and mangled but they had one inconvenience — the samples took time to load and were inconveniently stored on floppy disks. Roland could see that by using short samples as the basic sound sources, and storing them in ROM for instant recall, they could make the same type of sound as a sampler but with no tedious load times. However, they also retained many of their previous synthesizers' functions such as multi-mode filters, envelopes, LFOs and so on. To all intents and purposes, the D50 'felt' like a synth but sounded like a sampler. Furthermore, to smooth out any inadequacies in the very short samples such as clicky and/or obvious loops, the D50 also ▶

The PPG Wave wavetable synthesizer. This one belongs to synth programmer, engineer and producer Nigel Bates.

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had chorus and reverb which 'smudged' these artifacts quite effectively.

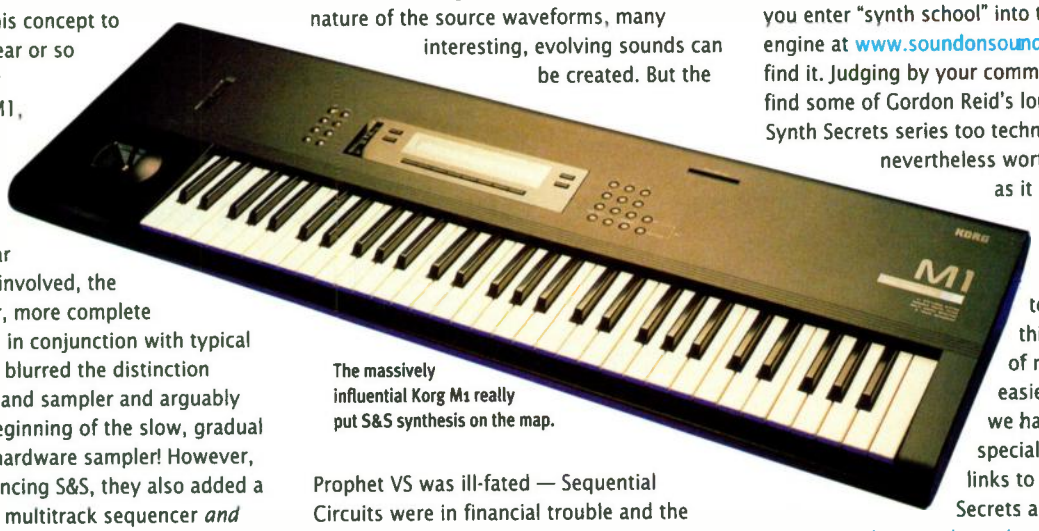
And so a legend — and a new synthesis method — was born! Roland called it 'LA (linear arithmetic) synthesis'. In truth, it was a simple layering method where up to four samples could be stacked to create more complex sounds. Because of memory constraints (ROM/RAM was very expensive at the time), Roland had to use very short samples, and there were two categories of sample on the D50 — short, unlooped samples (such as flute 'chiff' or guitar 'pluck') and short sustaining loops. By combining and layering, for example, a flute 'chiff' with a sustained flute loop sample, you could (in theory) create a realistic flute sound. In practice, it didn't quite work out like that, but this layering technique also gave the instrument a new palette of sounds to work with and it was possible to layer, say, the attack of a piano with the sustain of a violin. With the wealth of synthesis functions available to process the samples, this allowed the user to create interesting hybrid sounds.

Korg took this concept to a new level a year or so later when they released their M1, another legend in modern music technology. Although similar concepts were involved, the M1 used longer, more complete samples which, in conjunction with typical synth facilities, blurred the distinction between synth and sampler and arguably heralded the beginning of the slow, gradual demise of the hardware sampler! However, as well as advancing S&S, they also added a very functional multitrack sequencer *and* good quality multi-effects so that (maybe for the first time) it was possible to create complete works on a single, relatively affordable keyboard. And so the 'S&S workstation' was born. I think it's fair to say that most modern synths owe something to the Korg M1 in one or another aspect of their design.

These days, many synths and keyboards routinely use these same basic principles, but memory is now far more affordable and so it is possible to have many more (and considerably more detailed) multisamples in the onboard ROM. Whereas early S&S synths boasted around 4MB of onboard ROM, figures of 60MB or more are bandied about today. That said, many of the same techniques used for optimising samples and squeezing as many into ROM as possible are still used today.

The ill-fated Sequential Circuits Prophet VS introduced vector synthesis to the world.

Vector synthesis is a slightly different (but related) technique. First pioneered by Dave Smith in his Prophet VS, vector synthesis typically uses four oscillators which the user can 'morph' between smoothly using real-time controllers such as a joystick or automated controllers such as LFOs and/or envelope generators. As the joystick is moved, so the balance of the four oscillators changes and, depending on the nature of the source waveforms, many interesting, evolving sounds can be created. But the Prophet VS was ill-fated — Sequential Circuits were in financial trouble and the company soon went to the wall. However, the concept lived on in the Korg Wavestation, which was a joint venture between a post-Sequential Smith and Korg. The Wavestation had a significant advantage over the VS in that it used multisampled waveforms, allowing more complex building blocks to be used — in many ways, it was a hybrid S&S and vector synth. As well as extensive synth facilities (filters, multi-stage envelopes and so on), it also had comprehensive multi-effects and other facilities (not least of which was 'Wave Sequencing') that made the Wavestation a programmer's dream, and a casual user's nightmare! Indeed, they are still a staple component in many players' keyboard rigs today. The Wavestation was discontinued many years ago (though it's been resurrected in Korg's *Legacy Collection* software), but vector synthesis lives on in Dave Smith's Evolver range of keyboards.



The massively influential Korg M1 really put S&S synthesis on the map.

If you're looking for further information on synthesis out there on the web, I can suggest two sections of the *Sound On Sound* web site worth investigating. Paul Wiffen's 12-part Synth School series, which appeared in the magazine between June 1997 and October 1998, is a good introduction to the basics of synthesis in its various forms. If you enter "synth school" into the search engine at www.soundonsound.com, you'll find it. Judging by your comments, you may find some of Gordon Reid's long-running Synth Secrets series too technical, but it's nevertheless worth a mention as it covered so much ground in its five-year tenure. To make this vast amount of material a little easier to navigate, we have created a special page with links to all of the Synth Secrets articles: www.soundonsound.com/sos/allsynthsecrets.htm.

Q How can I clear my head?

I have an odd, but I'm sure not uncommon, problem that I hope your experienced staff can help with. This time of year the outside world is an especially ghastly, germ-ridden place. During a rare occasion out of the studio last week, I managed to catch myself a cold. This would not normally be a problem, only I had some very important work to complete and mix by the end of the week. So, replacing the biscuit tin with a box of tissues and a mug of Lemsip, I soldiered on. However, all my studious investment in

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Q&A

fine hardware couldn't make up for the fact that with blocked sinuses I felt like I was mixing with a motorcycle helmet on! So, what I need to know is, are there any recommended products or remedies (apart from hiring another mix engineer!) to use in this situation? I have tried sinus sprays but they only work for an hour or so and I'm slightly worried that over-use will affect my hearing in the long term. My doctor doesn't really understand the issues either, which doesn't help. We're only as good as our ears, right? Your help on this issue would be more useful to me right now than any advice on speaker placement, room treatment or the latest and greatest convolution reverb — I can't hear it anyhow!
Simon West

Technical Editor Hugh Robjohns replies: This is not an unusual problem and I completely sympathise. I tend to suffer from this problem quite badly myself.

All I can suggest is to find a good decongestant that works for you. I find Olbas Oil safe and useful — pour a few drops into a bowl of hot water and breathe the vapours for a while. However, the congestion will inevitably come back.

There are lots of pharmaceutical decongestants available, but many are combined with other drugs (paracetemol, for example) which limits how often they can be taken, and some have side-effects that may not agree with you. Try talking to your local chemist for specific product advice — I generally find that approach more helpful than talking to the doctor in situations like this.

But I'm afraid the bottom line is that your ears will not work properly until the cold has passed and the sinuses have cleared.

Q Can you recommend a digital multitracker?

I am not sure if you can help me but I thought it would be worth a go! I am a guitarist and I want to buy a four-track digital recorder for less than £300. Do you have any recommendations? I do not want to buy a piece of computer software for recording, just a stand-alone recorder.
Mark Taylor

Reviews Editor Mike Senior replies: For that kind of money, you can get eight tracks if you want, assuming that you're after something new. The Fostex VF80EX (retailing at £298.45 when we went to press, but now on sale in some shops for as little as £229) gives you eight tracks of audio recording without data compression, S/PDIF digital input and output, and an onboard CD burner. It would probably be quite a good choice in your circumstances. The Tascam DP01FX might also be an option (at a retail price of £345, but often discounted to as low as £299), although this has no CD drive built in, so you'll have to back it up to a computer over USB. It also has no digital input, so you're stuck with the internal preamp and A-D electronics for recording. If you went for the Fostex, you could, at a later date, connect a decent mic/instrument preamp with built-in A-D conversion and hence bypass the internal preamp electronics of the multitracker.

Digital recorders like the Fostex VF80EX and Tascam DP01FX offer affordable eight-track recording.

There are lots of other models of eight-tracker available in this price range, but I wouldn't really recommend them over the ones I've already mentioned for any serious recording. For a start, most other multitrackers in this price band use data compression for recording, which I wouldn't recommend if there's any chance that you might want to use anything you record on your multitracker for a proper commercial record production later on. Some models record to solid-state memory (such as Smart Media or Compact Flash cards), and usually don't include a particularly large card at the outset, so you'll have to budget for additional cards as well.

Many cheaper multitrackers also don't offer phantom-powered mic inputs, which means you won't be able to use the majority of decent condenser mics unless you already own an external preamp or mixer.

If you're willing to look into the second-hand market, there's a lot more choice, but I'd steer clear of Minidisc multitrackers, again for data-compression reasons — technology has moved on quite a way from these now. You might even be able to pick up a 16-track machine within your price range in the *SOS* Readers Ads. In particular, keep your eyes peeled for a Korg D16 — it's small and has great effects, a built-in CD-RW drive and a touchscreen, but no phantom power — or a Fostex VF160, which has phantom power, a built-in CD-RW and individual track faders, but slightly underwhelming effects and mixing capabilities. Both machines will also record eight tracks at once and include S/PDIF digital input and output.

Q What determines the CPU reading in *Cubase SX*?

I remain baffled by the CPU load in *Cubase SX 2* (as shown in the VST Performance indicator). I'm particularly curious to know why in my larger projects the indicator shows a constant load (typically 80 percent

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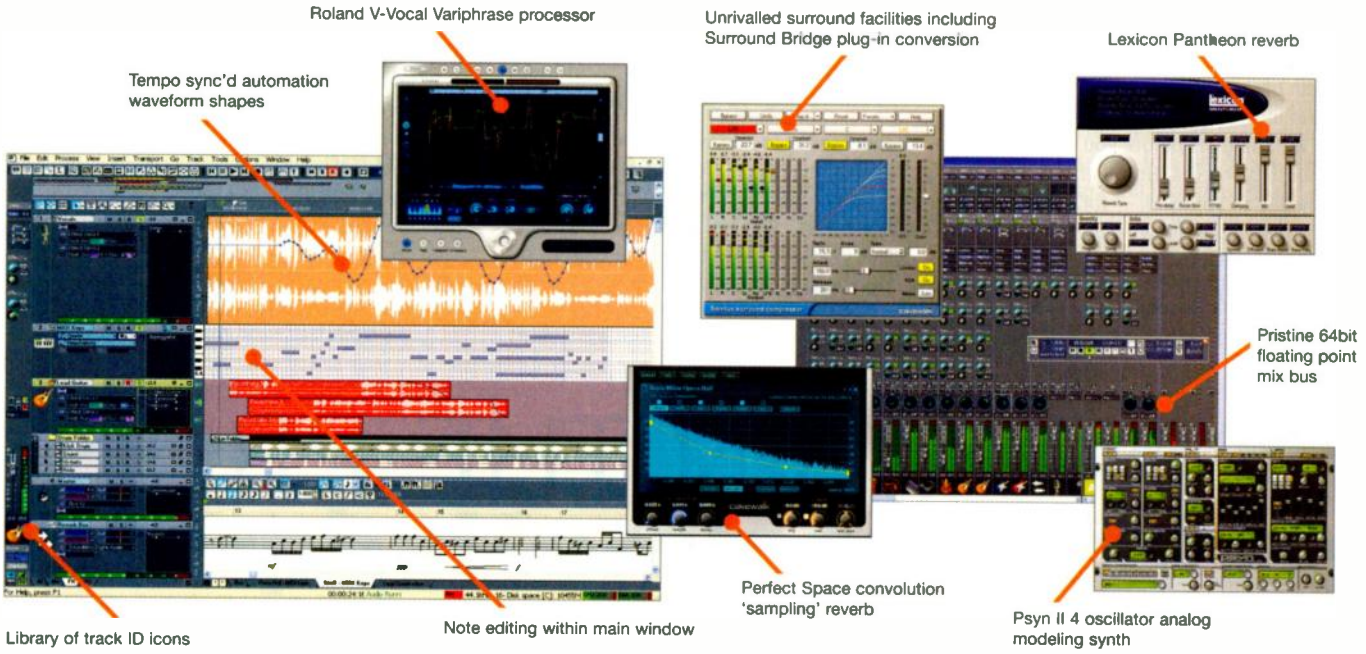
TIME TO SWITCH?

For years the best selling sequencer in the States, Cakewalk's SONAR has long been at least the technical equal of the other major applications. Although less well known over here, with the release of Version 4 many professionals found that they could no longer ignore SONAR's persuasive combination of powerful features and a superbly easy to learn user interface. Now with the advent of Version 5, SONAR has taken a genuine leap into the lead with a host of new technologies, instruments and effects. This ad isn't nearly big enough to do justice to them all, but check out some of the major features below and make your own mind up - *is it time you switched?*



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SONAR 5 Studio Edition	unlimited	unlimited	96kHz	64-bit FP	•	•	•	•	•	•	–	–	•	5: (2) Roland synths, groove sampler, SoundFont sampler, analog modeling	•	•	•	•	•	•	•	•
SONAR 5 Producer Edition	unlimited	unlimited	96kHz	64-bit FP	•	•	•	•	•	•	•	•	•	8: (2)rgc:audio synths, REX synth, (2) Roland synths, groove sampler, SoundFont sampler, analog modeling	•	•	•	•	•	•	•	•
Cubase SL 3.1	128	5	96kHz	32-bit FP	•	–	–	–	•	•	–	–	–	3: dual-oscillator, virtual bass, drum machine	•	–	•	•	–	–	–	–
Cubase SX 3.1	256	8	96kHz	32-bit FP	•	–	–	–	•	•	–	–	–	5: dual-oscillator, virtual bass, drum machine, surround pad, mono analog	•	–	•	•	–	–	–	–
Pro Tools LE 6.9 (and M-Powered)	Digi002:18 Mbox:2	5	96kHz	32-bit FP	–	–	–	–	–	–	–	–	–	4: Reason Adapted 3, Ableton Live Lite 4, SampleTank LE, Fxpansion BFD lite	–	–	•	•	–	•	•	–

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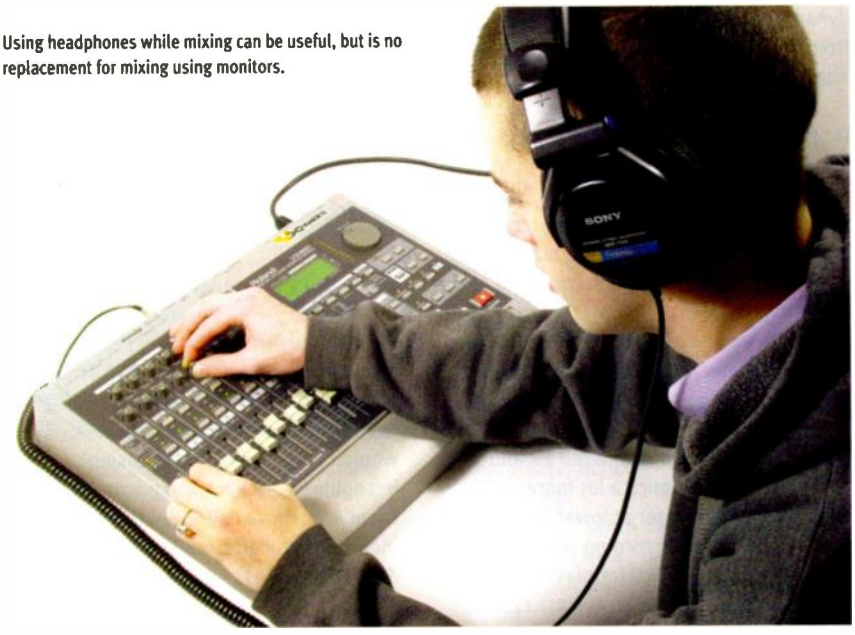
Q&A

▶ allows us to perceive phantom images between the speakers, and coincident-mic and stereo-panning techniques (which employ only level differences between the two channels to convey the spatial information) rely entirely on this acoustic crosstalk to work properly.

When listening to ordinary stereo material via headphones, this interaural timing information is missing — we have only the differences in level between the two channels to go on — and hence the stereo images become non-linear and ill-defined. In fact, most people perceive the individual sound sources to lie on a line running directly through the centre of the head, instead of being portrayed in front of us as they would be with loudspeakers. This radically different presentation is what makes judging stereo signals and panning mono ones so much more difficult on headphones.

There are ways of introducing interaural timing differences for headphone listeners. The binaural recording technique is one way (see my article on stereo recording techniques in *SOS* March 1997, readable at www.soundonsound.com/sos/1997_articles/mar97/stereomictechs2.html), and HRTF (head-related transfer function) processing is another, but neither really recreates a true stereo image for most people in the same way as listening on speakers can.

If your room is acoustically problematic and you have poor monitors, then headphones may well be a better and more reliable approach. It is certainly possible to



Using headphones while mixing can be useful, but is no replacement for mixing using monitors.

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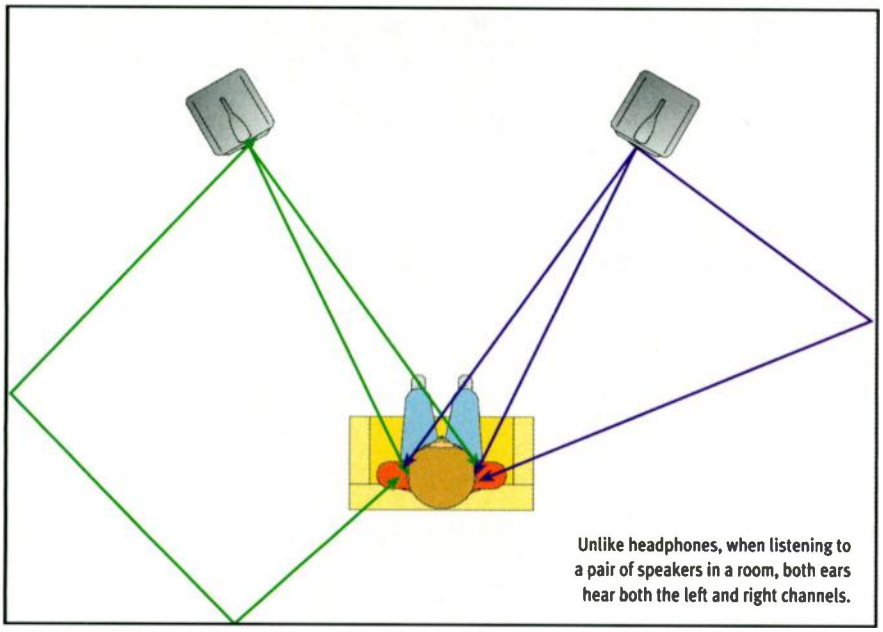

Unlike headphones, when listening to a pair of speakers in a room, both ears hear both the left and right channels.

achieve good results by mixing using headphones alone, although it does take practice and require a good deal of familiarity with the particular headphones you use. But whichever way you look at it, using headphones, it is a lot harder in some respects to achieve the same kind of quality and transferability that comes more naturally on good monitor speakers in a reasonably good acoustically-treated room.

Q How do I lower the latency on my laptop?

I have been experiencing some big problems with latency whilst trying to use *Cubase SX*. I would be grateful for any help or advice you can offer me. I'm using a Sony Vaio laptop with a 1.4GHz Intel Celeron M processor, 512MB of RAM, a 60GB hard drive, and a Realtek High Definition Audio sound chip. I've tried reducing the buffer size on this driver and upping the sample rate to 96kHz, with no effect on latency. Could the cause be my hardware?
Carol Robinson

Features Editor Sam Inglis replies: The latency is almost certainly caused by the hardware — most built-in laptop sound chips only have Direct X and MME drivers, and these can suffer latencies of half a second or more. Ideally, you'd be better off with a specialist audio device for music with proper ASIO drivers: upgrading your sound ▶

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hardware will improve both audio quality and driver performance. Either a PCMCIA or USB device should be OK, or a Firewire one if your computer has a Firewire port. However, you could also investigate third-party ASIO drivers such as ASIO4ALL (www.tippach.net/asio4all) which are designed to work with any hardware.

Q Which digital multitracker is the right one for me?

I read Tom Flint's piece on the Zoom MRS1608 multitracker and think it may be the right machine for me. I still use a Roland TR707 drum machine which allows you to step write and tap write. The sounds, of course, are ancient. I write simple country songs, mostly backed by drums and guitars. I think the Zoom's drum machine would be great for what I do. I would think the guitar effects would also be pretty good on this machine. I currently own the Tascam 2488. I think my recordings sound really good on this machine, but I don't like the guitar effects much and find them a little difficult to use. I don't even use the drum machine and I don't use MIDI or edit much at all. Based on what I have told you, do you think I would be pleased if I unloaded the Tascam and bought the Zoom? I would appreciate your opinion on this subject and thank you in advance.

Robert Tambuscio

***SOS* contributor Tom Flint replies:**

Before they entered the multitracker market, Zoom were busy gaining a name for themselves producing drum machines and guitar effects (amongst other things), so you can expect a reasonable level of quality and competence in both these areas. If I remember correctly, the MRS1608's internal drums sounds are good and varied — if country music is your thing then the chances are that the sounds in the MRS will serve you better than the TR707! The MRS has 50 drum kits which should certainly include a few that are suitable, and it is possible to take the best sounds from various kits and create a custom kit yourself. If you're not satisfied with the onboard sounds, the Pad Sampler facility allows AIFF and WAV samples to be loaded from CD and used as alternative drum sounds. Alternatively, you could use the Phrase Loop sampler to put together drum and percussion loops taken directly from sample libraries, or choose from among the MRS's 475 preset drum and bass patterns.

The Zoom MRS1608's dedicated drum pads set it apart from other similarly priced multitrackers.

The sequencer itself offers both real-time and step-based recording, so it should allow you to program drums in a similar way to the TR707, although I believe the Zoom's grid has a finer resolution than the 707 and there are more time-signature options. It's also worth noting that some of the Zoom's programming facilities will be familiar to TR users. For example, just as the 707 has a set of faders for setting sound levels for each kit component, the MRS allows the channel faders to be used for adjusting its own drum samples. The Zoom multitracker also benefits from having 12 touch-sensitive pads for triggering drums.

Tascam have a long history of producing multitrack recorders, but they're not known as makers of effects or drum machines so it's not surprising to hear that the 2488 hasn't quite lived up to your expectations in these areas. It does have an internal GM sound module with many useful drum and instrument sounds, and, like the MRS, it can Import and play Standard MIDI files, but it doesn't have anything approaching a pad bank, and there are no sampling facilities. So as far as the drum machines are concerned, the MRS is much better equipped.

That said, a decent drum section shouldn't be your only consideration. Before you offload the 2488, think carefully about whether there are any recording, editing or mixing facilities that you regularly use, and check they are also available on the Zoom. The Zoom has a rather more basic display which may hinder its usability a little. That has to be something to consider, given that you say you find some of the 2488's features difficult to use. Without doing some objective side-by-side testing it's impossible to say whether the Zoom sounds as good as the Tascam or not, but I can say that I didn't think the Zoom was particularly weak in that department, and I suspect there's little to choose between them.

Nevertheless, I'd advise anyone using a budget multitracker to use a good-quality external preamp for any important lead work if at all possible, simply because the onboard preamps are not going to be of the highest quality. What's more, if your preamp has a decent A-D converter with an S/PDIF output built in, it would be a good idea to bypass the multitracker's converters by using its S/PDIF input, and clocking the multitracker to the preamp's digital clock.

Normally I'd probably suggest upgrading to a better machine when trading in your old multitracker for a new one, but there aren't really any high-end products which go in for drum machines and sequencers in quite the same way as the MRS1608, so I'm not sure you have much choice if you really want these kinds of features. The other option would be to hold onto the Tascam 2488 and buy a more modern drum machine — Alesis, Boss and Zoom all make self-contained drum machines which cost less than £300 — and slave it to the 2488 via MIDI. SOS

For more hints, tips and problem-solving visit the *SOS* Discussion Forum via **www.soundonsound.com**

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SSL XLogic G-series Compressor

Hugh Robjohns

Dynamics Processor

The celebrated mix-buss compressor design from the G-series consoles has been brought up to date using SSL's latest Superanalogue circuitry.

The Oxfordshire-based company Solid State Logic — SSL to their friends — have been at the cutting edge of analogue mixing-console design for many years, and have recently also branched out into rackmount processing. I reviewed their XLogic Superanalogue Channel back in *SOS* February 2005, and its sibling is now under review here: a high-quality stereo mix compressor derived from that first seen in the centre section of the G-series consoles, but improved using their latest Superanalogue circuitry.

SOUND ON SOUND

SSL XLogic G-series Compressor
£2233

pros
- Superanalogue sound quality.
- Easy user controls and clear gain-reduction metering.
- Useful Autofade feature.
- Superb build quality.
- External side-chain key facility.

cons
- The unit needs a lot of room, not only because of the very deep rack case, but also because it gets quite warm in use and requires extra space for ventilation.

summary
SSL's G-series stereo mix-buss compressor has been supercharged with the company's Superanalogue circuitry and fitted into a 1U rackmount box. Simple controls allow fast, easy adjustment, and almost everything that passes through this unit emerges sounding louder in a complementary way.

Construction & Controls

The unit is housed in a 1U rackmount case which extends 325mm behind the rack ears. Two pairs of XLRs on the rear panel supply balanced stereo line I/O, and a further female XLR offers an external key input. A recessed switch isolates signal and chassis earths if necessary, and the IEC mains inlet incorporates a fuse holder which can configure the operating voltage for different regions. Construction is to exceptionally high standards, with very neat and safe wiring.

The classic functional styling of the front panel makes it easy and quick to use, with simple controls providing all the essential parameters, and a traditional moving-coil gain-reduction meter indicating up to 20dB of attenuation. The first of the six rotary controls adjusts the threshold continuously from -15dBu to +15dBu. The next three are rotary switches, providing attack times of 0.1, 0.3, 1, 3, 10, or 30ms; ratios of 2:1, 4:1, or 10:1; and release times of 0.1, 0.3, 0.6, or 1.2s, or an automatic release mode. The continuously variable Make-up knob spans -5dB to +15dB, and large illuminated buttons activate the compressor circuitry, the external side-chain key input, and the separate Autofade facility. The final rotary control adjusts the fade time from 1s to 60s.

Circuit Design

Although the controls are very simple, there are a number of clever things going on 'under the bonnet' here. The first thing to mention is that the Compressor In button normally provides a 'soft bypass' which just forces the gain-reduction circuitry to provide unity gain. However, internal circuit jumpers allow a 'hard bypass' to be selected instead, in which case four sealed changeover relays connect the inputs directly to the outputs — the disadvantage being that you can't then use the Autofade function if the compressor

World Radio History

is bypassed.

Another nice touch is that the Autofade circuit generates a control voltage that, rather than being linear, replicates the audio taper of a real fader, so that the slope gets steeper towards the bottom of the fade, and sounds more natural, especially with longer fade times. The Autofade feature can be controlled remotely through the rear-panel nine-pin D-Sub connector, and you can also connect up an external

Photos: Mike Cameron

gain-reduction meter to mirror the display of the unit's internal meter.

Analogue Warmth?

The XLogic series all get quite warm in use, largely because of the current demands of the Superanalogue circuitry. The G-series Compressor is no exception, and it is well worth heeding the handbook's warnings about leaving 1U of rack space above the unit, and about not placing it above anything else hot.

While on the subject of handbooks, The Owner's Manual supplied with the G-series Compressor is a classic for 'tech heads'. After some perfunctory operational instructions and technical specifications, you quickly find yourself amidst fairly detailed technical descriptions of how the circuitry works, complete with full circuit diagrams — proper engineer's stuff, but not perhaps of much help to anyone struggling to understand what the Attack control does!

Plugging the G-series Compressor in is simple enough, with nominal +4dBu balanced signals in and out. The unit has a maximum output level of a healthy +24dBu, so there shouldn't be a problem feeding digital mastering recorders directly from the output if required. Achieving a suitable setting is as intuitive as selecting the required ratio, dialling up the Threshold to achieve the amount of 'squash' needed, and then fine-tuning the Attack and Release controls to optimise the sound character.

Like the mix compressor from which it is derived, this XLogic unit does a great job of making any mix sound louder, but without becoming aggressive or obvious about it. The automatic release mode was rarely caught out (so I tended to leave it set in that mode), while the ability to fine-tune the Attack time to suit the material was sometimes very useful indeed. Although you only get three ratios, you won't want any more: the 2:1 setting introduces relatively subtle and transparent control, the 4:1 mode is a little harder and more obvious (but in a good way!), and the 10:1 mode is essentially peak limiting, which can be used either to keep a wary eye on any unruly transient peaks, or to squash the sound to death in those circumstances where that might appeal!

The Autofade facility is something I've never personally felt the need for — I like to pull the main fader up or down by hand. But where you want consistency of fades across several versions of a mix it can be used to advantage — assuming that you hit the button at the same point in the track each time, of course! The attenuation law sounds natural for the vast majority of mixes, although I did find that I could achieve more pleasing fades manually with some material.

Most studio engineers look upon the SSL console mix-buss compressor as an essential tool of the trade, and having access to one in a stand-alone box, with the added sonic benefits of the SSL's Superanalogue topology, is a masterstroke. If you are looking for a simple but very effective master stereo compressor, built to exemplary standards, then you can't go far wrong with the SSL pedigree. SOS

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Audient Sumo

Summing Mixer

Paul White

Can analogue summing really make a difference to the sound of digital mixes? We test out a new unit which offers this controversial facility.

There are many technical and philosophical arguments both for and against audio summing. Although adding anything extra into a signal path must degrade it in some way, the subjective improvements that can be achieved when mixing DAW audio streams externally clearly indicate that the introduction of an analogue element has some psychoacoustic benefit. Furthermore, where the DAW uses an imperfect digital summing technology, using an analogue mixer may conserve some aspects of the signal resolution more effectively.

In theory at least, digital summing must always produce a result that has an inferior resolution to that of the individual source signals, as some data reduction has to take place in order to scale down the mixed signal to prevent the summed signals exceeding digital full scale. As you might imagine, the more streams are summed, the greater the loss of resolution, as the mix level needs to be scaled down more. Having said that, modern DAW systems with internal 32-bit (or better) audio streams have resolution to spare, but there are still those who say analogue summing sounds noticeably better.

Using a full-scale studio console for such a purpose makes little sense if you do all your processing and automation within your DAW system, so a number of companies have introduced high-quality, but basic, summing mixers to do only what is necessary to combine multiple mono and stereo streams into a stereo mix.

Audient Mixing In A Rack

Audient are in the fortunate position of having a very strong reputation in analogue mixing circles, and the rackmount Sumo reviewed here is a spin-off of their existing console technology, sharing the same balanced stereo mix buss to minimise noise and distortion. Overall the frequency response is flat within ±0.1dB from 22Hz to 22kHz, and is only 3dB down at 135kHz. In addition to its ability to mix eight stereo analogue audio input streams, the Sumo also includes the stereo master compressor and peak limiter taken from Audient's ASP8024 recording console.

A stereo monitor control section is built in, while a 192kHz digital output converter (AES-EBU and S/PDIF with word-clock sync socket) can be bought as an option. Where eight stereo inputs are insufficient, a linking system allows up to three more units to be used as slaves, the whole functioning as a single 64-channel mixer in just 4U of rack space. If you need more still, you could use the link inputs on the slaves to add even more units. Usually stereo submixes would be fed from the DAW's audio interface into the Sumo's input channels, but for those occasions where mono streams also need to be added, channel pairs 1+2 and 3+4 can also be used as mono inputs.

In keeping with Audient's design philosophy, the inputs all have better than 24dB headroom, while the variable gain differential mix amp has more than 27dB headroom. Having plenty of mix-buss headroom is particularly important, because adding signals adds their levels, meaning that the peak output level is likely to be significantly higher than the individual peak input levels.

The stereo buss compressor and peak limiter can be used to process the mixed stereo output, but there are also balanced insert points (switchable before or after the

SOUND ON SOUND

Audient Sumo £1169

pros
- Exceptionally clean audio path.
- Compact and simple to use.

cons
- No headphone output.
- Monitor section very basic.

summary
The Sumo sounds really smooth and musical, but I'm not convinced that it's necessary to mix within it to hear a significant improvement in sound quality. There are numerous summing amplifiers doing the rounds, some very much more expensive than this one, but to my ears the Sumo works exceptionally well, and it also offers expandability if you need it.

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Photos: Mark Ewing

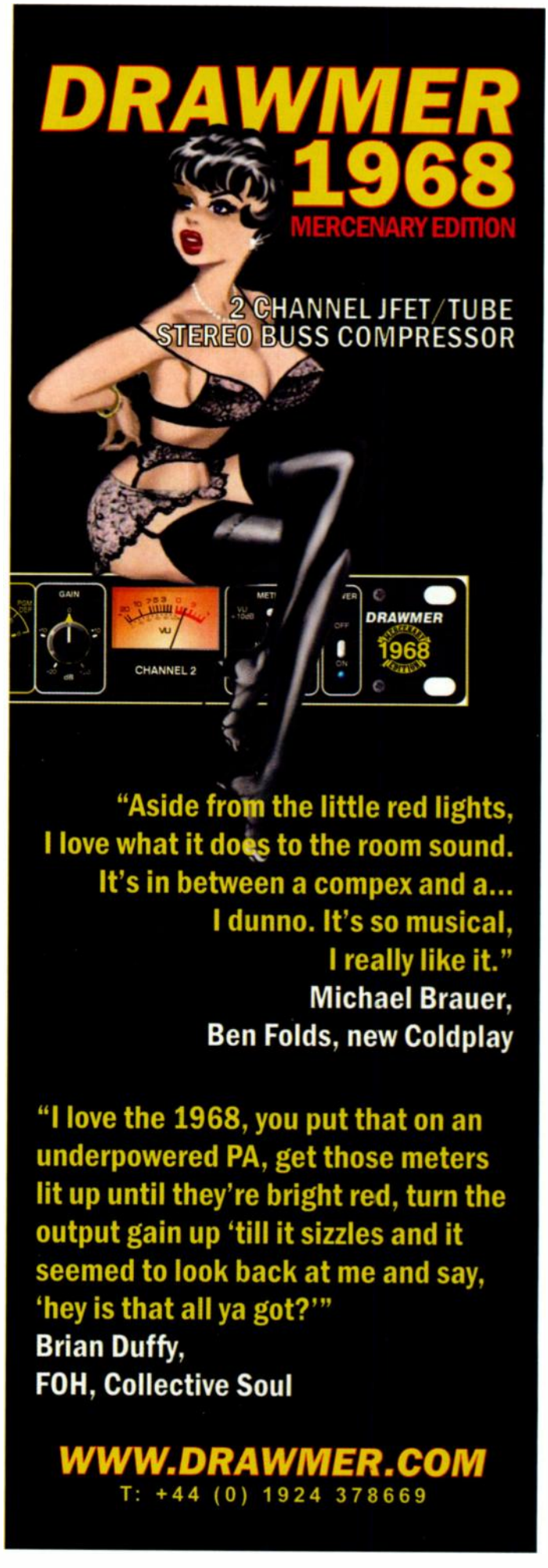
dynamics) that allow other processors to be used on the stereo mix where necessary. The monitor control section is a simplified version of what you'd expect to find on an analogue console, offering control-room volume and mono controls, plus the facility to monitor an external input. Extremely precise stereo metering (26-step LED) is provided on the front panel, measuring from -36dBu to +24dBu, which for most professional digital systems equates to -60dBFS to 0dBFS.

If you're wondering how Audient crammed a 16-input mixer, a compressor, a limiter and a digital option card into a 1U rack, the answer is that that the mixer section has no controls other than Mix Gain and Mix Master. Mix Master provides the final gain control before the mix leaves the unit or

"To make sure the difference wasn't just psychological, I opened up both song versions, one mixed via the Sumo and one mixed internally, so that I could switch between them fairly quickly."

enters the digital card after the dynamics section. All the inputs arrive on three sets of 25-pin D-Sub connectors (two for inputs, one for linking to subsequent units) wired according to the Tascam system, with the analogue main mix outs and monitor outs on balanced XLRs. A further XLR and RCA phono are fitted to carry the AES-EBU and S/PDIF digital output signals, while word-clock input is handled by the usual BNC bayonet coaxial connector.

The balanced mix insert points are on four TRS jacks at one end of the rear panel. Two front-panel buttons allow these inserts to be switched before or after the dynamics section, or to be bypassed entirely so that the jacks can be left



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permanently connected to a patchbay. Two further switches allow channel pairs 1+2 and 3+4 to be individually set for mono operation, where the input is panned centre instead of the hard left/right that pertains in stereo mode.

The centre section of the front panel is dominated by the controls and meters for the soft-knee buss compressor, which can be bypassed when not in use (to allow the limiter to be used on its own) by means of a switch built into the Ratio control. A separate Bypass button bypasses both compressor and limiter. Controls include the usual Threshold, Ratio (1.5:1 to 20:1), Attack, Release, and Make-up Gain knobs, with eight-section LED metering for both the compressor and limiter gain-reduction read-outs. A separate Peak Limiter Threshold control allows the limiting level to be set anywhere between +10dB and +24dB, which is adequate to provide overload protection when feeding either -10dBV or +4dBu systems, though the Sumo is optimised for use in +4dBu systems.

That leaves the master section, which, as explained earlier, is fairly basic. There's no speaker switching, talkback, phones output, or even monitor dim button, but you can switch to monitor an external source, mono the control room output, and adjust the control-room level. To the right of this is the digital section, which only operates when the digital output option is fitted. Here you can select all six standard sample rates, from 44.1kHz to 192kHz by stepping through six status LEDs denoting the options. All the buttons on the unit have internal LED illumination, and the digital button doubles as a lock LED when an external clock is being used via the word-clock or digital-signal inputs. To select external sync mode, you simply hold down the button for a couple of seconds — the switch LED flashes until sync is achieved, after which it glows solidly.

In The Ring With The Sumo

Testing the Sumo proved to be most revealing, and using it to remix a track I'd originally mixed within Apple *Logic* showed up a noticeable difference in what might best be described as 'smoothness'. To make sure the difference wasn't just psychological, I opened up both song versions, one mixed via the Sumo and one mixed internally, so that I could switch between them fairly quickly. The difference was most noticeable on the DI'd acoustic guitar, which when mixed within *Logic* showed up its piezo honk and scratchiness rather more than when it was being mixed via the Sumo. However the overall Sumo mix sounded more refined, with more stable stereo imaging and a better ability to separate instruments within the mix. Even when I soloed the acoustic guitar parts in both mixes, the sound was better from the Sumo, which is slightly curious given that there's no mixing going on in the case of a soloed sound!

This lead me to my next test, which was to go back to mixing within *Logic*, but then to pass the stereo mix through the Sumo to see if it sounded any different. If the Sumo was simply avoiding summing problems in *Logic*'s mixer, I should hear the sound get worse, but as it turned out I could detect little or no difference between the sound of a mix done in the Sumo and that of a *Logic* mix passed through two channels of the Sumo. Why this should still sound better than listening directly to the output of my audio interface isn't clear, especially as its converters were being used throughout. It's also unlikely to be a case of analogue distortion adding something magical, as Audient's signal path is extremely clean.

Audient's compressor, if used in moderation, is good for smoothing and fattening mixers, though I'd have preferred to be able to get down to ratios of 1.1:1, rather than the minimum 1.5:1 on offer here, especially for mastering purposes. I also found the gain-reduction meters rather confusing, as the amber LEDs in the lower meter tend to show through the windows of the top meter, leading you to believe that there is some limiter gain reduction going on where in fact there may not be. The peak limiter works very well, but the manual indicates that this comes before the Mix Master level control, which seems to defeat the object of having the limiter as a final stage of protection.

Fat Sounding Or Fat Headed?

Despite a couple of minor design whinges, there's no getting away from the fact that the Sumo helps make your mixes sound more 'analogue' without adding noise or obvious coloration. Personally I could hear very little difference between using the Sumo as a mixer and using it to process a stereo *Logic* mix. This being the case, perhaps there's a potential market for a two-channel unit for those of us who can't justify the cost of a Sumo? As to why external analogue boxes of this calibre have such a profound effect on the sound, I don't feel I know enough to offer an opinion, but I'm convinced that it isn't simply to do with getting the summing away from the DAW. I'm equally convinced that it's not just a case of the emperor's new clothes either. Maybe it's just that the inherent flaws in analogue and digital, at least from a psychoacoustic viewpoint, are in some sense opposite and so tend to cancel out when the Sumo is introduced into the system?

Because of limited rear-panel space, most of the analogue connections are accessed via three 25-pin D-Subs. Separate sockets are given only for mix and monitor outputs, mix-buss insert sends and returns, and the optional digital interface.

In the Sumo, Audient have produced a compact and sweet-sounding summing box that, while not exactly cheap in the UK, is realistically priced given the quality of circuitry on offer. The master section isn't a replacement for a fully featured desktop master controller, but it offers the essentials. To be realistic, nobody is really going to want to do all their master control work from the front of a rackmount box anyway — they'll probably have a dedicated desktop unit for that purpose. Nevertheless, a headphone output could have been helpful. Whatever the real reason, the Sumo does bring about a subjective improvement in sound quality, and it seems to do so on typical project-studio converters as well as when working with esoteric ones. If your mixes are missing that magical something, then the Sumo may help you wrestle with the problem. SOS

information

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World Radio History

Classic Tracks

The Fifth Dimension
'Aquarius/Let The Sunshine In'

Artist: The Fifth Dimension
Track: 'Aquarius/Let The Sunshine In'
Label: Soul City
Released: 1969
Producer: Bones Howe
Engineer: Bones Howe
Studios: Wally Heider, United Recording Of Nevada

Photo courtesy of Bones Howe

The art of the record producer blossomed in the 1960s, with the likes of Phil Spector crafting miniature symphonies in the studio. As that decade drew to a close, Bones Howe masterminded one of its biggest and most innovative hits.

Richard Buskin

"Part of the essence of pop music is that you're not trying to create something that is so totally original," says Bones Howe. "If you do that, then you end up leaving people behind. There has to be some connection to your audience, and my connection to my audience was always me. I was always my best audience."

Indeed he was. During an illustrious career that spanned five decades, Howe brought a significant degree of musical insight and technological innovation to records by, among others, Elvis Presley, Tom Waits, the Turtles, the Mamas and the Papas, Frank Sinatra, Johnny Rivers, the Association and the Fifth Dimension, as well as the soundtracks of films such as *La Bamba*, *One From The Heart* and *Back To The Future*. In the process he earned more than 20 gold and platinum discs, a slew of Grammy nominations and a couple of Grammy Awards, illustrating that, while he was his own best audience, the critics and the punters ran him a close second.

Born in Minneapolis, Minnesota, in 1933, Dayton Howe moved to Sarasota, Florida, at the age of eight and picked up the 'Bones' nickname as a skinny teen while indulging his love for jazz and teaching himself to play drums. After gigging with both a quintet and a dance outfit, he then played with numerous bands around the Atlanta area when studying electronics and communications at Georgia Tech. Several of the road musicians who passed through town urged Bones to relocate to the West Coast, and when he learned that many studio techs there were old-time radio engineers who knew next to nothing about music, he took the advice and, upon graduation in 1956, landed a job at Radio Recorders in Hollywood.

Familiarising himself with the intricacies of tape editing and even stereo recording at a time when neither were industry standards, Howe soon became recognised for his expertise and understanding on both sides of the control room glass, and during the latter part of the 1950s he mixed records by, among others, Elvis, Pat Boone and BB King. Five years at Radio Recorders were followed by an 18-month stint at Bill Putnam's United-Western facility, before Howe took the bold and highly ambitious step of becoming the industry's first independent engineer. That was in 1962, and three years later he was producing as well.

In 1968, working alongside director and business partner Steve Binder, Bones Howe served as co-producer and music producer of the legendary Elvis 'Comeback' special on NBC TV. Nevertheless, probably his career apotheosis was the Fifth Dimension's 'Aquarius/Let The Sunshine In', which sold three million copies and topped the *Billboard* singles chart for six weeks following its release on March 8, 1969, before scooping the Grammys for Record of the Year and Best

Photo: GAB Archive / Redferns

The Fifth Dimension combined soul vocals with the 'flower power' ethos to impressive effect.

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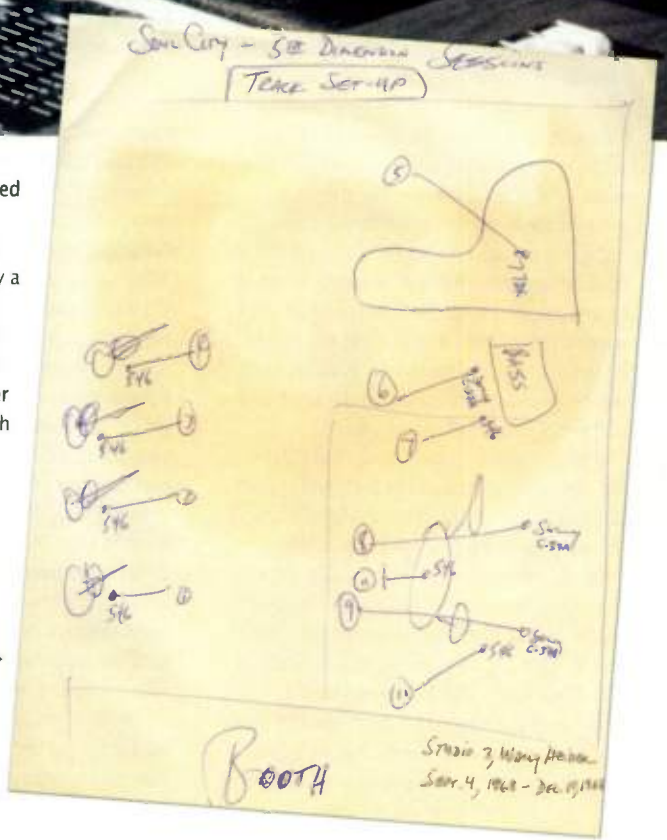
Producer Bones Howe in Wally Heider Studio 3, where 'Aquarius' was tracked.

Contemporary Vocal Performance by a Group. Blending smooth yet powerful harmonies with soul sensibilities, a sweeping orchestral arrangement and lyrics heralding universal peace and love, this medley was the perfect embodiment of the 'flower power' spirit. Its creation makes for quite a convoluted story.

The Black Mamas & Papas

"My involvement with the Fifth Dimension came about during a period when I was doing several different things at once," Howe recalls. "I was playing drums on the Grass Roots records, engineering the Mamas and the Papas and Johnny Rivers for [*producer*] Lou Adler, doing the same for Snuff Garrett with Gary Lewis and the Playboys, and producing the Turtles. The Mamas and the Papas' recording of 'Go Where You Wanna Go' was intended as a single, but then at the last minute they came up with 'California Dreamin',' so Johnny Rivers, who had heard their record when Lou played it to him in the studio, decided to have 'Go Where You Wanna Go' recorded by a group of five black singers named the Versatiles. They were on Johnny's own Soul City Records label, and after he'd failed to have a hit with them he had this idea that maybe they could be the black Mamas and Papas.

"So, he called me and asked me to record them, and he also said 'I need you to tell me all of the people who played on ▶



Bones Howe's original layout notes for the tracking session at Wally Heider Studio 3.

World Radio History

▶ the Mamas and the Papas record.' Those sessions for their first album had only been a couple of months before, so I told him the people were Hal Blaine on drums, Joe Osborn on bass, Larry Knechtel on keyboards, Tommy Tedesco on guitar — basically, this was the first incarnation of Phil Spector's Wrecking Crew.

"As a drummer myself, I always loved the feel of the way that Hal played. He played rock & roll with authority. Some people have that feel and some people don't, and no matter how precise they are and how good their technique is, they just don't have that feel for the music. Well, Hal always had this great feel for the music. OK, so he played a little loud and he pushed the time a little bit — whatever. It was his style, and his style worked for the kind of music that he played. I never thought he was much of a jazz drummer, quite frankly — I heard him play a couple of times and I didn't think he knew how to lock in with the rhythm section, but with rock & roll he was just wonderful. The fills that he played were fantastic, and he wasn't afraid to try things. He would ask me 'What do I do in these two bars?' and I'd always say 'I want you to make me see stars.' And he would do that.

"With those guys it was about what ended up on the tape. Joe Osborn was a bass player who sat on the time. He didn't play anything fancy, he would just play the time, and that let Hal loose to go wherever he wanted to go, because he knew Joe would always be there when he got back. Joe was like the metronome in the band, but those guys all had great timing. I mean, Larry played electric bass around town for several years, so when he and Joe were together you could set your watch to them. And that just left Hal free to do whatever he wanted to do. With his great feel he would get up on top of the time, and that's where you got that tension.

"When it came to keyboards, Knechtel was the guy because he had the feel. And I loved the way he hit the keys. For the kind of music that he played, his touch was absolutely amazing. I mean, I used him the first time to play piano because Leon [*Russell*] didn't show up. Larry was supposed to be the bass player and he ended up playing piano, and the first time I heard him play I went 'Oh boy,' just because of the sound that he made, the sound that he got out of the piano. If you've got those kinds of ears and you hear those people playing, you go 'Those are the guys.'

"For me it was always about the feel. I'd played as part of some rhythm sections, I bought lots and lots of records before I made any records, and as an engineer I sat behind the console and listened to all these different configurations of rhythm sections and string sections and so on. Well, talk about opinionated — by the time I came out the other end I already knew the people who I wanted to work with. By name. I knew who the people were going to be, even though it wan't carved in stone because there were always new people coming up."

"At that time, Billy Davis, Jr., was really the lead singer of the group... In the studio, we'd always record them four bars at a time or two bars at a time."

Versatile Folk

Meanwhile, transmogrified from the Versatiles into the Fifth Dimension by Johnny Rivers, the quintet of Billy Davis, Jr., Marilyn McCoo, Lamonte McLemore, Ron Townson and Florence LaRue enjoyed a top 20 hit in early 1967 with their straightforward cover of 'Go Where You Wanna Go', courtesy of a fun-in-the-sun production that incorporated Rene DeKnight's soaring string arrangement. Nevertheless, while this helped establish the group, there was a general assumption that said group were yet another white folk rock outfit, a view solidified by their recording of 'Another Day, Another Heartache' just a few months later. But then 'Up Up And Away', written by Jimmy Webb, climbed to number seven in the charts in the summer of '67, won five Grammys, and served as the title of a gold-selling debut album, produced by Johnny Rivers and engineered by Howe.

"At that time, Billy Davis, Jr., was really the lead singer of the group," he says. "Everyone else performed group vocals, and it was pretty much understood that Billy would take care of the solo on any strong song. They all learned their parts by rote — in other words, somebody would work with them and teach each one his or her part like it was a melody. Jimmy Webb took care of that job on the first two albums and Bob Alcivar did the same on the third, because none of them read music, and they'd work on their respective parts four bars at a time until they learned them. In the studio, we'd always record them four bars at a time or two bars at a time — we'd get whatever we could and then we'd go on. There were very few occasions in the beginning when they'd sing a vocal all the way through."

While the Fifth Dimension's two subsequent Howe-produced albums, *The Magic Garden* (1967) and *Stoned Soul Picnic* (1968), spawned further hit singles, including the latter's Laura Nyro-penned R&B title cut which climbed to number three, Bones enjoyed chart-topping success with the Association's 'Windy' and 'Never My Love' and helped revive Elvis's career with the aforementioned TV special. He was therefore on a roll and at the top of his game by the time 'Aquarius' entered the picture.

Hair Today...

"The Fifth Dimension were in New York, performing at the Americana Hotel, and after Billy left his wallet in a cab one day the guy who found it just happened to be one of the people involved with the show *Hair*," Howe recalls. "When he called Billy, he said 'Come to the show. All of you guys can have free tickets,' and after they'd seen it I received a phone call in which they were all talking over one another, saying 'We've got to cut this song "Aquarius". It's the best thing ever.'

"I was aware of the album, and I said 'Well, you know, there have been some other people who have cut this song and it hasn't been a hit...' 'Oh no, the way we'll do it, it'll be a hit. It'll be a hit!' So I said 'Look, I've gotta come to New York so we can record the vocals for the rest of the songs on the *Stoned Soul Picnic* album. When I'm there, why don't I see the show? Then we can talk about "Aquarius".'

"Beforehand, I listened to the cast album, and I thought 'This isn't a complete song. It's an introduction.' There was so much talk about that show at the time because people were naked on stage, and 'Aquarius' was just part of the opening routine. Well, I went to see the show, and about four-fifths of the way through there was a song called 'The Flesh ▶

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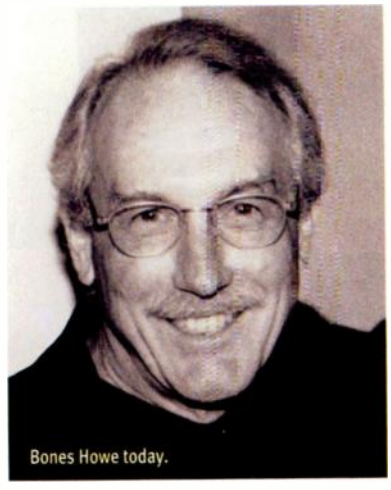
RECORDING 'AQUARIUS'

Failures', which was a typical '60s downer — you know, the world is falling apart, we're all killing each other with poison, and so on. A total environmental downer. But at the end of the song there were three bars just repeating 'Let the sunshine in, let the sunshine in, the sunshine in,' over and over and over again."

James Rado and Gerome Ragni, who were the show's writers alongside music composer Galt MacDermot, were also its star performers. "Rado was running through the audience while Ragni swung from a chandelier," Howe continues, "and they got the whole audience clapping along — 'Let the sunshine in, let the sunshine in...' It was very rousing and went over huge with everyone there, and I turned to my wife Melodie and said 'That's it! That's the other song! We can put the two of them together!'

"I went back to the Warwick Hotel — didn't everyone stay there back then? — and I thought 'You know what, I've got to call the publisher. I can't just cut these songs together. Rado, Ragni and MacDermot will have me if I do that.' If it's a pop song, you can do that and nobody objects, but a Broadway show number commands a different kind of respect. So, I called the publisher and I said 'Look, I know there have been a couple of recordings of "Aquarius" and they haven't been successful, but I've got this idea — I want to make a medley out of "Aquarius" and the last three bars of "The Flesh Failures".'

"He said 'Well, several people have also recorded "The Flesh Failures"...' and I said, 'No, I don't want the song. I just want the chorus at the end: "Let the sunshine in, let the sunshine in..."' So he said 'Well, let me ask them and I'll call you back.' I said 'Fine,' and the next day I went into the studio with the Fifth Dimension to cut some vocals and I got a call back from the publisher. He said 'I've spoken to all three of them and it's fine with them. If this makes you want to cut this song, you can pretty much do it any way you want to.' Years later, I found out that this guy was doing interviews, saying it was his idea to put these two songs together. What's that saying about 'Success has many fathers, but failure is an orphan?'"


Bones Howe today.

Tracking Back

The Fifth Dimension toured virtually non-stop following the completion and 1968 release of the *Stoned Soul Picnic* album. So, if Bones Howe and Bob Alcivar worked with the band members on new material, this was whenever they returned to LA for a few days' break. And while the singers commenced an engagement opening for Frank Sinatra at Caesar's Palace in Las Vegas, the backing track was committed to eight-track tape on the 3M machine in Howe's favoured Studio 3 at Wally Heider Recording in Los Angeles. There, inside the compact, long and narrow live area — an almost exact duplicate of Bill Putnam's Studio 3 at United-Western, although it was slightly longer — the aforementioned Wrecking Crew rhythm section of Hal Blaine, Joe Osborn, Larry Knechtel and Tommy Tedesco was augmented by guitarist Dennis Budimir, while Bones Howe spent a good part of his time behind the control room's API console, monitoring with Altec 604s.

Through the window, he could see the guitarists sitting with their backs facing the left wall, while the drummer, bass player and pianist sat against the right wall. "They could take two paces and touch the person facing them," Howe says. "People often ask me 'How did you isolate the drums to get that sound?' and I've explained that the first thing they've got to understand is that the musicians were in a room where they had to watch out they didn't bump into each other when they got up for a break. It was a tiny room and all the mics were open. That meant you had to know the microphones you were using, because the entire sound from every instrument went into every mic. The sound was therefore down to the room that we were using, the instruments

Jamming Like Trains

Bones Howe's decision to merge the mid-tempo pop tune 'Aquarius' with the gospel-flavoured refrain 'Let The Sunshine In' was one very much in tune with the era — he almost certainly wouldn't have conceived such an idea just a few years earlier. "As I got more and more experience as a producer, I trusted my gut more and more," he said. "I was on firm ground in the studio, having already spent a dozen years in that environment, and if something hits you in the face, you have to do it. Then you must have the confidence to know you're doing the right thing. And it was always about the music for me. If something bowled me over musically, I'd go with it. So, in the case of 'Aquarius/Let The Sunshine In' I told Bob Alcivar 'Don't worry about this. The girls are going to sing their part — "When the moon is in the Seventh House..." — and they'll love it, and then we'll have "Let the sunshine in, let the sunshine," at the end and it'll be great. Don't worry about how we're gonna get it together.'"

There was, however, an immediate stumbling block when Alcivar discovered they couldn't sing the two songs in the same key.

"Bob, don't worry about it," Howe reassured him. "We'll just do a modulation."

"Yeah," came the reply, "But if I arrange 'Aquarius' in the key that's right for the girls, then I've got to take it down a whole fifth in order for it to work with everybody singing together on 'let the sunshine in'."

"Bob, this is music," said Howe, as if Alcivar needed reminding. "What's wrong with inverting back up a fourth? If you do that, you'll be in the same key as if you go down a fifth. Look, do this: find a key that fits both parts of the song, that shows off their voices the very best we can, and then find a way to invert it up and don't worry about how the keys relate to each other. If it comes to that, I'll jam them together like two trains."

Which is what happened.

"By that time, Bob Alcivar was not only the Fifth Dimension's vocal arranger, but he was also picking keys and writing out the lead sheets," Howe explains. "I said 'Bob, what do we need an arranger for? We don't need someone to write the tracks. You and I will write the tracks.' I would provide him with the form and shape, describing the verse-chorus structure and where I wanted the breaks — the arrangements were very open. There were just chord sheets, and only occasionally would there be a written part that we'd want a pianist or guitarist to play. Most of the time they were left wide open, and I'd work on the arrangement with the guys in the studio — all they needed to know was what the chord changes were, as well as the rhythm and the tempo.

"Bob said 'Well, how are were going to start this?' and I said 'I have no idea what the intro's gonna be. We've got to figure out something really kind of spacey, so we'll just do the Phil Spector thing — we'll go "gung gung-gung, gung gung-gung" until the point where the girls come in, and then we'll go through the chord changes, and then I'll figure out what I want to do with it later. When we get to the end, we'll just go "Aquarius, Aquarius..."'

"When I went into the studio I cut the track in two pieces. I said 'OK, guys, here's what's gonna happen: when we start the second part, we're going to start with Hal playing straight eights on the big tom-tom and the snare drum together, so it goes "gung-gung-gung-gung-gung-gung-gung". And when we get to the end of the first part and finish the section where the girls are singing, what I want you to do, Hal, is play a fill and then just go "gung-gung-gung-gung-gung-gung" and I'll cut you off.'

"That's what we did, and I jammed them together like two trains, exactly as I said I would. I just made an edit — bang! — editing from one set of eighth notes to the other set of eighth notes, and we went into 'Let The Sunshine In' and nobody cared that it was in a completely different key. For me it was a case of 'OK, you've made this bed and now you've got to sleep in it. You figure it out and make it work.'"

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that we had and the way that we miked them. There was no isolation, there weren't even any baffles."

The guitars, on track 1, were invariably miked with Electro-voice 666s; the piano was on track 2; the drums, recorded mono to track 5, had Sony C64s as overheads and Shure 546s on the snare, kick and hi-hat; and the bass, on track 7, went through an amp that was also miked with a 546. The vocals were destined for tracks 3 and 4, while tracks 6 and 8 were reserved for string and percussion overdubs.

"The overheads were condenser mics, and the others were dynamic," Howe says. "They were all what you would call inferior microphones, bottom-of-the-list kind of stuff, but the 666s and 546s were what everbody used on stage in those days. You could hammer nails with them. At the same time, there were no more than 12 inputs on the API console, so we had to bring things in and make decisions about what we were going to mic. It was contemporary for its time, yet this kind of equipment is now a collector's item."

Waiting For The Trains

The vocal sessions took place in Vegas, at the Putnam-built United Recording of Nevada, with the group members standing in a semi-circle as if they were onstage, gathered around a pair of RCA DX77 microphones that were positioned back to back, with the 'boys' on one side (track 4) and 'girls' on the other (track 5).

"They were the only vocal mics I used back then," Howe remarks, "and that was the same format I used for the Mamas and the Papas. Solo parts were done separately on a 77 using the 'V1' setting — 'M' was the music setting, 'V2' had a high low-end cutoff which made it ideal for radio announcing, and 'V1' provided way more low end and made it what I've always thought was the best microphone for the human voice. It got all of the music and none of the mouth noise or tongue noise, and I ran that through a [*Urei*] 1176 that was absolutely the best limiter for vocals: threshold/attack at 6, release at 7, and a 12:1 compression ratio.

"United Recording of Nevada was that horrid studio where you had to stop recording when the train went by, but that's where we did the vocals. The group members were working late every night, so I got four hours with them each afternoon. That meant I lived in Vegas for a month, which was like living in Vegas for a year — there was nothing to do. 'Aquarius' featured the girls singing together, and a lot of those parts were drop-ins, but when I did solo parts I would always run the track, give them a separate track to work with and then use the parts that I thought were while these were again recorded in two sections, they weren't cut together until after Bones Howe had mixed them separately. "Of course, when the guys laid the strings down, they heard the rhythm part from the count-off," he says. "They heard 'gung gung-gung' but when I mixed it I didn't bring the rhythm in until after the strings had already started and gone through the first four or five bars. Then I began sneaking that in. So, it starts with the flutes going 'doo doo dee doo' and the strings going 'na na na na', and then underneath you begin to hear 'gung gung-gung, gung gung-gung' and it gets louder and louder, again reaching its peak when the girls come in, singing 'When the moon...' It was like editing a movie production."

From The Stars

With the vocals for 'Aquarius/Let The Sunshine In' recorded, Bones Howe set about tracking the same for the rest of the numbers on what would come to be the *Age Of Aquarius* album, a long player that would include another chart-topping single in the form of Laura Nyro's 'Wedding Bell Blues'. Four hours each afternoon were spent in the studio with the Fifth Dimension, and after one such session he returned to Caesar's Palace and was struck by a bolt of inspiration.

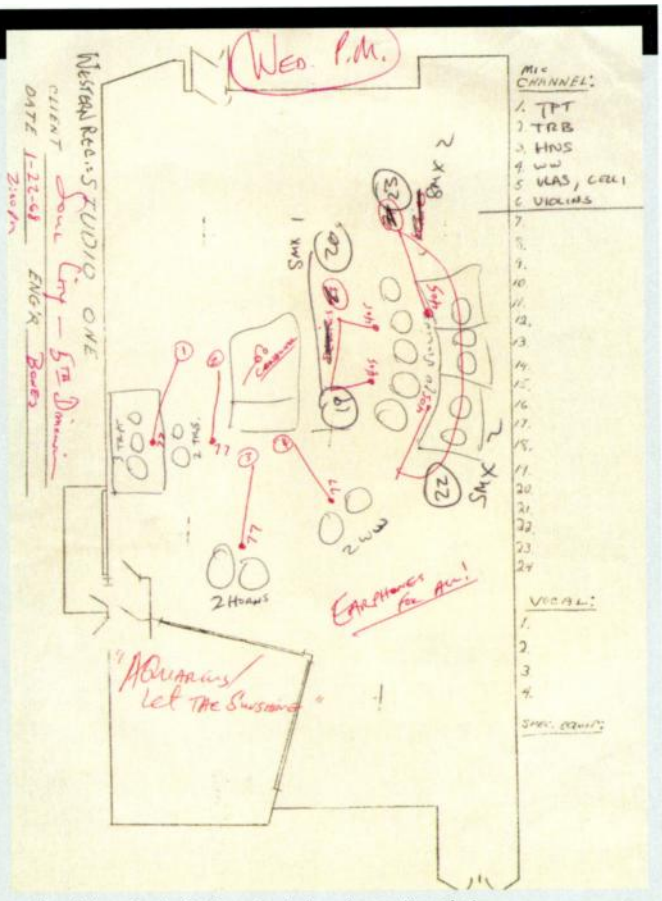
"Since Sinatra was performing there, and the hotel had all of his songs on tape, they ran 24 hours a day in the casino, lobby, elevators, you name it," Howe explains. "In one day you wouldn't hear the same song twice, so you never knew what was coming next. Well, there I was with my briefcase in my hand, I was wiped out, my ears were tired and all I wanted to do was get a glass of wine and something to eat back in my room, so I stepped into the elevator and as it began to move I heard these swirling strings. Sinatra started to sing 'And we're lost out here in the stars, Little stars, big stars...' and I went 'Oh shit, that's the intro. That's the intro!'

"The song was 'Lost In The Stars' from the *Concert Sinatra* album. Don Costa did the arrangement, and the intro features all of this swirling stuff; strings and woodwinds. At that point I wasn't looking for an intro to 'Aquarius'. We still had to overdub the strings and horns, so I thought I'd figure that out when I sat down with Bill Holman to work on the arrangement. However, the minute I got out of that elevator I ran to my room and called Bill on the phone. I asked him if he'd heard Sinatra's 'Lost In The Stars' and he said 'No,' so I told him to go out and get the *Concert Sinatra* album. I said 'Listen to the song's intro. That's exactly the right idea for the intro on "Aquarius".'

"Bill got the album, and I must say that if you listen to the two records side by side there is a similarity between the intros of 'Lost In The Stars' and 'Aquarius', even though the concept is different. Don Costa's arrangement has strings and woodwind swirling like some motion picture score, whereas Bill's and mine has 'gung gung-gung' running underneath it... As I said before, if something hits you in the face and you know what it is, you've got to use it, and this struck me as being right and I knew it would work.

"I returned to LA and we laid these parts down with a full orchestra — there were eight brass, three or four woodwinds and a whole string section. By that time I was hot stuff in Hollywood. I could call the musicians up and it wasn't all that expensive to round up an orchestra in those days. We were in the big studio at Heider's, and as usual I did group miking. I believe that you should record an orchestra like an orchestra's meant to be recorded, and that's one reason why I did them separately from the rhythm section. It's really hard to track an orchestra with a rhythm section banging away in the room, so I recorded them on a separate track. And everything was in the room at the same time, because I really felt it had to have that concert sound. You know, if there's some leakage from the brass, that's still OK."

AKG 405s were utilised for the strings, RCA DX77s for the horns. And



Howe's layout notes for the orchestral sessions on 'Aquarius'.

World Radio History

really the best. This didn't interrupt the flow — I mean, I wasn't cutting word by word. I would use phrases, and bits and pieces, and give them their best shot."

The 'Let The Sunshine In' section also featured an improvised solo by Billy Davis, Jr. "Having finished the vocals for 'Aquarius', we were rehearsing the second part," Bones Howe recalls. "Well, towards the end of the session, after they'd sung the lines over and over again, Billy started riffing: 'Let the sunshine...' I don't know if it just occurred to him or whether it was something that he'd figured out before he came by the studio, but he really got into it and I went 'Hang on a second.' I shut the tape off and I said 'Billy, just sing your part, I'm going to give you a track all by yourself, you can do as much of this as you want, and we'll put it in where it really works.'

"So, he sang his part, I gave him a track all by himself, and he did all that stuff that he does at the end of the song, ad-libbing while I rolled tape and played him back the other vocals. He was hearing the whole record and singing over the rhythm section and background voices, which were finished at that point, and right in the middle of him doing that in walked Jimmy Webb, of all people. He stood there next to me in the booth and he said 'My God, that's a number one record.'

"I said 'Jimmy, this record's gonna be five and a half, six, seven minutes long.' He said 'I don't care how long it is. It's a number one record,' to which I said 'Well, Jimmy, I cut them all like they're hits and then the record company makes its decision afterwards.' However, that really stuck with me. When you have to grind through all the pieces of putting something like that together, you've heard it so many times that you don't know if the excitement you feel is due to the music or the relief of having got it over and done with. And so when somebody who'd never heard it before walked in off the street and stood there with his mouth open — especially somebody who I liked and whose opinion I respected — this convinced me that the record was at least worth listening to."

The Long And Short Of It

Following the addition of an orchestral introduction (see box) and mix to two-track, Bones Howe was convinced that 'Aquarius/Let The Sunshine In' was a great piece. Yet, in spite of this and Jimmy Webb's ringing endorsement, he still wasn't sold on the track's viability as a radio-friendly single, not least because it clocked in at 4'49". The promotion man at the label thought differently. "'We've got to put it out,' he insisted. 'We're going to make some test pressings and send the record out to a couple of radio stations.'"

"Whatever," figured its producer/engineer. Then, one night, while having dinner with Melodie at Martoni's restaurant across the road from Wally Heider Recording, he ran into good friend Bill Drake, the programming director for Drake-Chennault radio stations such as KHJ and KFRC, which were then the key pop sources right across America.

"Drake came over to the booth where Melodie and I were sitting," Howe recalls, "and he sat down and said 'I heard your record. It's amazing.' I said 'Well, I know it's long...' and he said 'You don't have to cut this record down. It will get played and it'll be a big hit, but I'll tell you something: if you can make a three-minute version, it will get played all the time.'

"He said 'You know a lot about radio. Well, just think about that guy who's sitting there, he's in a music sweep, he's got two-and-a-half, three minutes until he comes straight up on the hour, and he's saying to himself "What am I going to play going into the next hour?"' I said 'Say no more!' I finished dinner, I went back to the studio and stopped what I was doing, and I made three different versions. I made a short version, a medium version and a long version, and I took them into the record company the next day and told them about my meeting with Drake the previous night. The result was that we mastered a single that day, with the long version on one side and the short 2'59" version on the other — the medium version really didn't make much sense.

"The long version had two verses and two choruses, and I took a verse and a chorus out of the first part of the record, going from the end of the first verse to the end of the second chorus. Then I went into the 'gung-gung-gung-gung-gung' and left the entire 'Let The Sunshine In' part intact. And Drake was absolutely right. The song went to number one and it was the short version that got played, although DJs also played the other side."

Bordering On Jazz

Having worked with Phil Spector a couple of years earlier, Bones Howe appeared to be taking a leaf out of his book when he crafted much of his and the Fifth Dimension's biggest hit from top to bottom. It was, essentially, his own baby, conceived and nurtured to the point of fruition. "I always said I made disguised jazz records," he remarks. "They contained harmonic things that you don't normally hear in pop music, and that's why 'Aquarius/Let The Sunshine In' was not your straight-ahead hit. It didn't have the one-three-five string arrangement. It was meant to sound full and fat. And you also have to think back to the times — you had Blood, Sweat & Tears, but even that was bordering on jazz.

"The funny thing was, after 'Aquarius' was a hit I got all this heat and the guys in promotion said to me '"Wedding Bell Blues" will be a big record.' Al Bennett was the head of Liberty Records in those days, Soul City was a part of Liberty Records, and when they played the record for him he said 'No way that's a hit. No way.' He prided himself on his judgement, because I guess he'd picked a few hits in his time, and when the record went to number one the guys in the promotion department gave him a plaque with a tin ear on it." SOS

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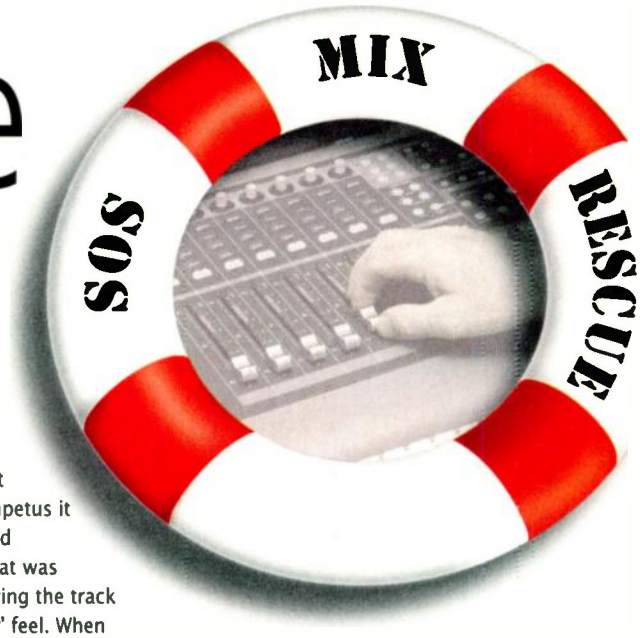
Mix Rescue



This month David Lowdon's synth-pop song gets the *SOS* makeover treatment.

Paul White

When David Lowdon contacted *SOS* for help, he was working on a song called 'Whispers', written by him and his colleague Michael Muir. The only audio tracks were a couple of acoustic guitar parts, three electric guitar parts, and five separate vocal lines sung by Michael's daughter Blue Jean. Everything else was provided by synths and samplers. Although David's original mix was fairly well balanced, the prominent and slightly out-of-tune acoustic guitar part didn't seem to gel with the more highly produced sounds, and David felt the mix could be made to sound more commercial overall.

Preparation & Setup

I loaded all the WAV files from David's mix into a new *Logic* project, named the different parts, and created some mix groups using *Logic*'s busses, including groups for vocals, backing vocals, bass, drums, synths, and guitars. This not only allowed me to work on the mix in broad strokes, but it also opened up the possibility of overall group processing.

I quickly concluded that the original out-of-tune guitar wasn't worth keeping, so I played the same thing in again on a Fender Strat through Waves *GTR*, automating the channel pan control to recreate the original alternating stereo effect. Once this part was in place, I decided to mute another original electric guitar part which largely mirrored the acoustic part I'd replaced. I also created a couple of intro and outro parts by copying and pasting what David had already done — for example, the accelerating snare roll at the start was made from a single beat of the main snare track, with some flanging added.

Kick, Synths, & Guitars

As far as the synths were concerned, I felt that some of the sounds were just a bit too dated, so I decided to try varying degrees of processing to rescue these. I also left off a legato sampled-sax part that sounded rather like a Stylophone once in the mix. David had originally chosen a mainly 'two to the bar' kick-drum pattern that I felt didn't gave the song the impetus it needed, so I added a second kick-drum part beneath what was originally programmed, giving the track more of a 'four on the floor' feel. When I found a suitable kick drum in Spectrasonics' original *Stylus* instrument it all locked in nicely, with David's existing kick beats working as accents so that the drum part didn't end up being too uniform.

David had also used a general rhythm guitar part that sat reasonably well under the track, but it was again very slightly out of tune, and sounded rather dry and 'stuck on' next to the rest of the instrumentation. A little early-reflection ambience reverb plus a touch of *Logic*'s *Exciter* plug-in to bring out the top end gave it a far more lively sound to which *Logic*'s *Ensemble* plug-in was added to produce something like a 12-string/chorus effect. A track of TB303-style bass-note runs that pop up throughout the song was left alone, except to balance the level, but the main resonant synth-bass part suffered from being very bass light, and it also seemed too clean and harmless to work properly in a modern track, even one tipping its hat to the sounds of the '80s.

To bring the bass more up to date, I added some sub-octave using *Logic*'s *SubBass* plug-in, then dirtied up the sound a little using *Logic*'s *Phase Distortion* plug-in, which gives sounds a kind of rough-edged frequency-modulation character. Other distortion devices could also have been used here. A Waves *L1* limiter was placed at the end of the plug-in chain to catch any level spikes. The final result wasn't quite Leftfield, but at least we'd left the '80s behind!

To stop the mix getting cluttered, particularly towards the end, where David had brought in several synth parts, I brightened up and/or thinned down the synths using EQ and other tricks. The part called Echo Stabs was simply treated with a low-cut plug-in, while Pad 1 was subjected to both low cut and the Waves *Metaflanger* to add movement and interest to what was otherwise a fairly stodgy pad part. A panning bass synth part that comes in around halfway through the song was processed using Noveltech's *Character*

Rescued This Month...

David Lowdon and Michael Muir have been writing together for a good few years now, building a catalogue of pop songs and ballads. They recorded the song 'Whispers' in the summer of 2005 in David's home studio, using an AMD Athlon-based PC based running Cakewalk *Sonar 4*, Propellerhead *Reason*, and Sony *Sound Forge 8*. Michael's daughter Blue Jean sang the lead and backing vocals through an MXL condenser microphone, and the initial mix was carried out using Tannoy Reveal monitors. The mix was then exported to *Sound Forge 8* to add final normalising and compression.

The vocalist on 'Whispers': Blue Jean.

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Here you can see the processing chain that Paul used to transform the rather weak original bass line into something much more powerful and upfront.

plug-in (running on the TC Electronic *Powercore*) to give it more definition, while a very bland synth horn part was turned from a pad into something that reinforced both the rhythm and the stereo image by using two instances of *Logic*'s Tremolo. The first tremolo plug-in was set up as a square-wave chopper sync'ed to 16th notes, while the second panned at four sweeps to the bar. A string pad part was processed via the Universal Audio UAD1's Roland ▶

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Logic's *EVOC20* and *Tremolo* plug-ins were applied to some of the more static synth sounds, increasing the sense of movement and interest, and also bringing them more up to date.

▶ *Dimension D* plug-in to add an ensemble effect with width, while a further resonant synth line that added bleepy percussion sounds with echo was also chopped into 16th notes and then brightened up using *Logic*'s *Exciter* to help it reinforce the rhythm more strongly.

Treating David's original drum parts was mostly down to balancing the various hi-hat, snare, and kick parts, though I used the *Exciter* plug-in again on the hi-hats to give them some edge. I also played around with the kick, which I felt was rather insipid, adding some deep low end with *Logic*'s *SubBass*, and then using *Character* to give the whole thing some bite. At the end of the chain, I used another *L1* limiter to guard against excessive peaks.

The crash-cymbal track sounded too much like, well, samples of crash cymbals, and it was also quite busy, so I passed it through *Logic*'s *EVOC20* filter bank to give it a tempo-related filtering treatment. This produced a metallic pulsing effect that again added interest without getting in the way of the more important elements of the mix as a whole.

Vocal Processing

The vocals comprised three main parts, with two further backing-vocal tracks singing 'whoa' and 'uh-uh-oh' phrases. A gentle touch of *Logic*'s *Pitch Correction* plug-in fixed a couple of minor vocal pitching problems on the vocal parts, and then three sends were set up, one feeding a bright ambience reverb (TC Electronic *Classicverb*), one a longer plate (the UAD1's *Plate 140*), and one a tape-style delay from *Logic*'s own repertoire.

A harmony part sat alongside the two main vocal parts, which I panned slightly left and right of centre to get a kind of 'call and response' feel. With the harmony sitting close to centre, this gave a nicely balanced effect, and I used a combination of ambience reverb and the UAD1's *Plate 140* plug-in to add life to the sound, but without making it sound washed out with reverb. I didn't want to use a convolution reverb in this case, as I felt something more traditional sounding would work better. After trying several different options, I settled on the *Plate 140* as adding the right feel.

My idea was to process the two backing-vocal parts using some 'telephone' EQ to give them a distant quality, then to add a little reverb and some tempo-sync'ed repeat echo. I used *Logic*'s *Channel EQ* to cut below 1kHz at 12dB/octave and above 4.5kHz at 18dB/octave, and then put the tracks through a Waves *L1* limiter to apply a bit of assertive gain reduction on the peaks. A UAD1 *LA2A* compressor on the bass squashed them some more — I wasn't after realism here! — and the result worked really well once I'd added some reverb and echo.

Mix Balancing

I felt that the drums and the main bass line formed the backbone of the song, so I balanced these first and then brought up the vocals. By getting these key parts to sit together, the other elements could be slid into place without too much problem. The track starts with a flanged 'noise' sound which reappears throughout the track, so I simply built in some panning each time this occurred and then treated it to a generous dose of plate reverb. David had constructed the track so that the various elements joined in as the track progressed, which worked pretty well with very few modifications. I killed a few prominent synth phrases earlier in the song when I felt that they got in the way, but otherwise left the arrangement much as it was. Thinning and brightening those synth parts really paid off, as they now sat nicely in the mix without getting in the way, yet they were clearly audible and added a lot of interest, especially when listening on headphones. I stuck to the tried-and-tested approach of keeping the vocals, drums, and bass close to the centre of the mix, while panning synth parts that occupied similar parts of the audio spectrum to the left and right.

David had added a distorted rhythm ▶

Hear The Differences For Yourself!

Judge the changes to 'Whispers' for yourself by checking out the following audio examples I made during the session — they can be found at www.soundonsound.com/sos/feb06:

- /audio/OriginalMix.mp3

This is the original mix which was sent in by David.

- /audio/OriginalBVs.mp3
- /audio/ProcessedBVs.mp3

These files let you compare the original backing-vocal parts with the ones which I processed using 'telephone' EQ settings, compression, reverb, and delay.

- /audio/OriginalBass.mp3
- /audio/ProcessedBass.mp3

In order to add low-end weight and attitude to the original bass part, I processed the part with *Logic*'s *SubBass* and *Phase Distortion* plug-ins.

- /audio/OriginalCymbals.mp3
- /audio/ProcessedCymbals.mp3

The cymbal samples which David has used weren't very inspiring, so I used *Logic*'s *EVOC20* filter plug-in to add some tempo-related interest.

- /audio/OriginalSynthPerc.mp3
- /audio/ProcessedSynthPerc.mp3

A percussive synth line was given more definition using a combination of tempo-sync'ed tremolo and psychoacoustic enhancement.

- /audio/OriginalSynthHorn.mp3
- /audio/ProcessedSynthHorn.mp3

The rather bland synth horn part was spiced up using a combination of two different *Logic Tremolo* plug-ins.

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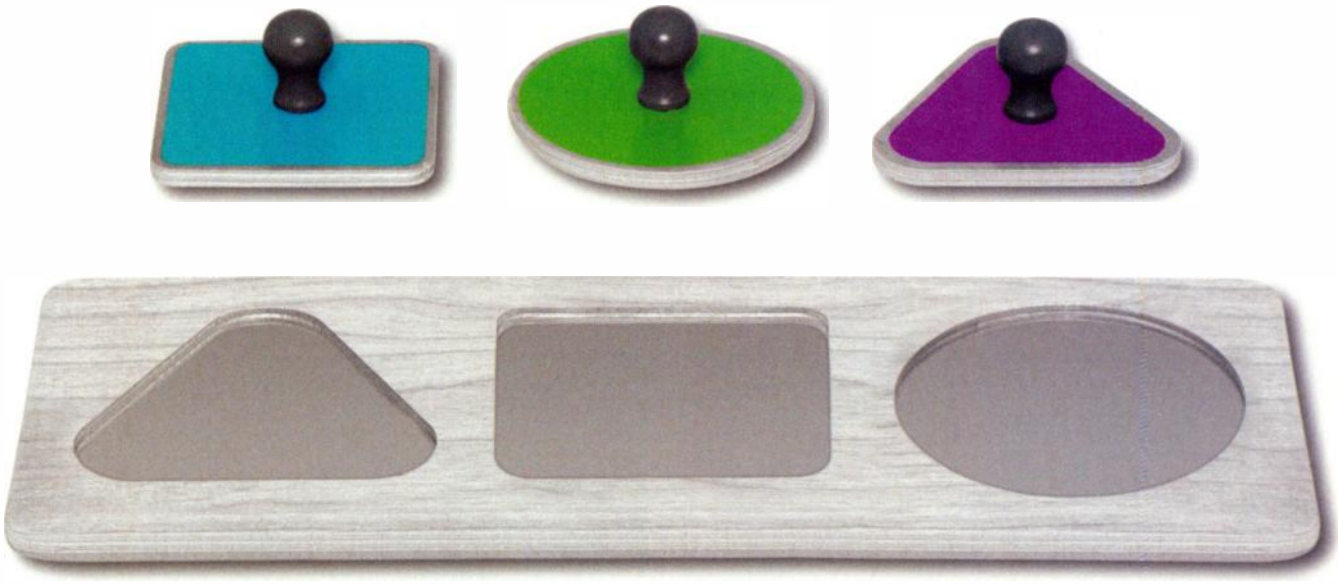

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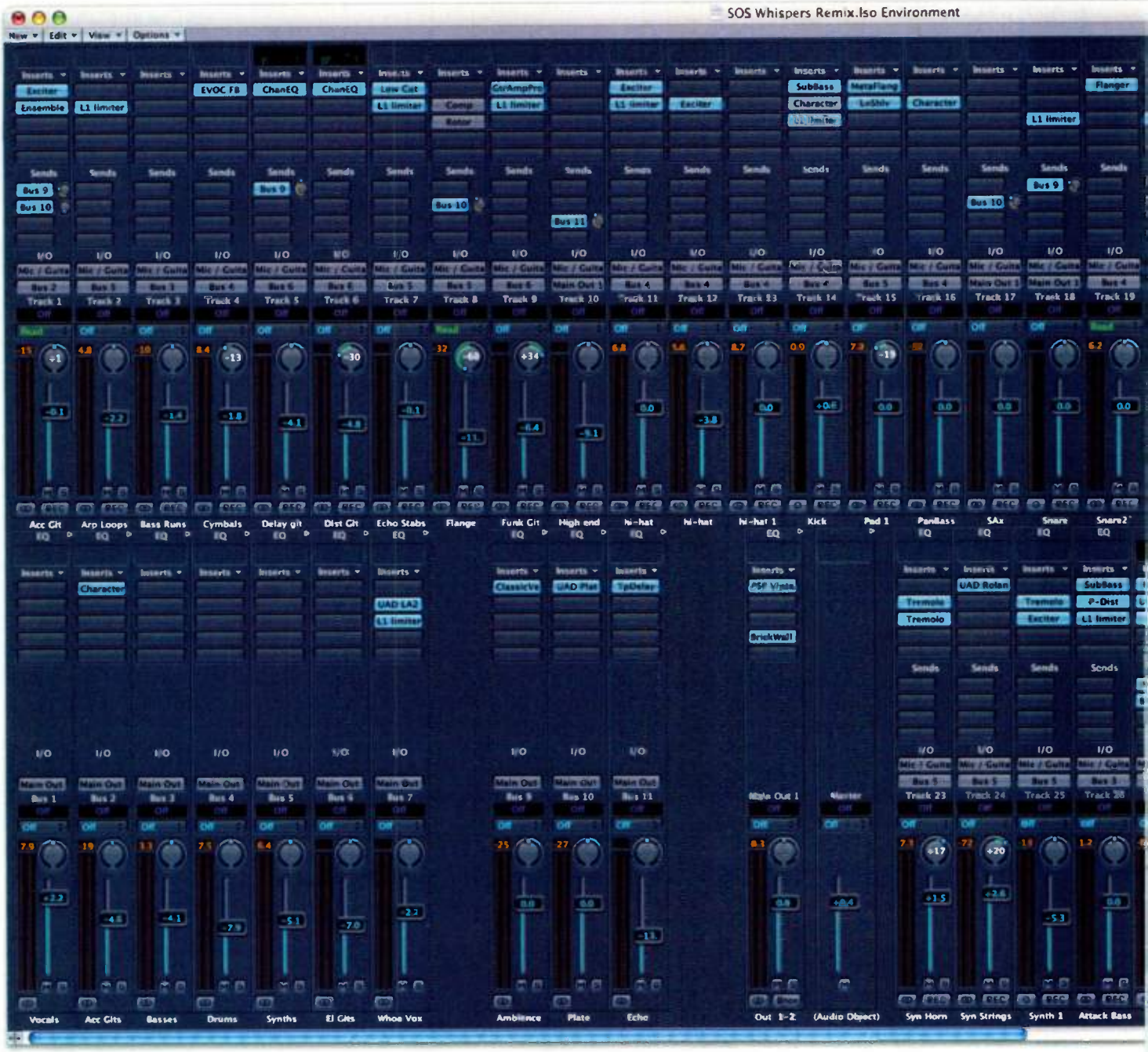

guitar part in the choruses of the second half of the song, and this sounded to me as if it was covering too wide an area of the spectrum once everything else was running, so I used a strong EQ peak at 2.9kHz to give it some focus, and also used a 24dB/octave filter to cut everything below around 180Hz. This meant I could turn it up just loud enough for it to be audible without it getting in the way as it had before. Had I been playing this part, I would probably have used a more staccato style to leave more space, as wall-to-wall guitar chords and legato synth pads soon eat up space.

Once I had what I felt was a good balance, I fine-tuned it using *Logic*'s mix automation, paying particular attention to

Remix Reactions

David Lowdon: "I'm glad to say that you've nailed it! The overall feel and balance is great now, and it definitely got my foot tapping straight away. I love the intro, the snare fill and 'telephone' vox are great, and the driving kick has transformed the whole feel of the track. Brilliant!"

Michael Muir: "I've received a copy of your mix from David, and blasted it out on the stereo. Blue is really chuffed with it, and loves how you've stripped it down and got rid of the sax. In fact, she said that if she ever gets signed, then you're top of the list for mixing! I always get put to the back of the queue..."

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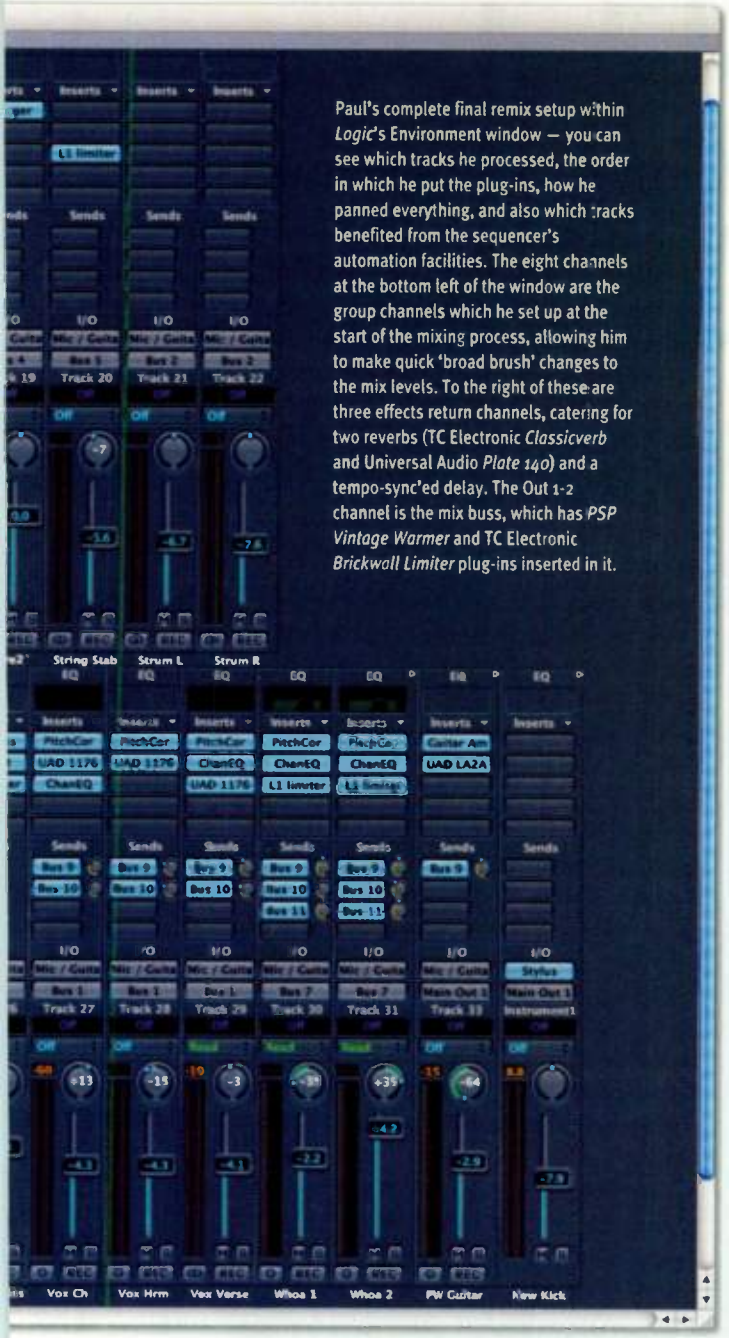

Paul's complete final remix setup within *Logic*'s Environment window — you can see which tracks he processed, the order in which he put the plug-ins, how he panned everything, and also which tracks benefited from the sequencer's automation facilities. The eight channels at the bottom left of the window are the group channels which he set up at the start of the mixing process, allowing him to make quick 'broad brush' changes to the mix levels. To the right of these are three effects return channels, catering for two reverbs (TC Electronic *Classicverb* and Universal Audio *Plate 140*) and a tempo-sync'ed delay. The Out 1-2 channel is the mix buss, which has *PSP Vintage Warmer* and TC Electronic *Brickwall Limiter* plug-ins inserted in it.

the vocal balance. I also cut and pasted a few of the backing-vocal parts just after the middle of the song, running them beneath the first words of the following main vocal and giving them a long, decaying echo feel. The final touch was to use the *PSP Vintage Warmer* for gentle mix compression plus mild high and low EQ, adding weight and 'air'. This was followed by a limiter to catch the transients, allowing me to get the mix sounding loud without killing all the dynamics, though the limiter was used very lightly.

I decided not to do any heavy mastering treatment, as that should really only be done when you have the other tracks on the album there too. Part of the mastering engineer's job is to make the various tracks sound as though they belong together, and you can't do that in isolation. It would also be possible to 'pump up' the rhythm more at the mastering stage if that were the artistic direction the client wished to go in. SOS

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Audio-Technica

Condenser Microphone AT2020

Audio-Technica's new entry-level mic puts in a star performance.

Paul White

Audio-Technica's new AT2020 is unashamedly a 'no frills' mic, with basic standmount and a soft zip-up vinyl case. The polar pattern is a fixed cardioid, and there are no switches for pads or filters. Slightly smaller than Audio-technica's other side-entry vocal mics, the casing contains a 16mm-diameter back-electret capsule, which is slightly smaller than the usual one-inch-diameter capsules adopted by most microphone designs of this type. It's a mistake to imagine that smaller diaphragms equate to a less warm or solid sound, though, and this model offers plenty of bass extension, with a full 20Hz-20kHz bandwidth with only a slight dip centred around 70Hz and a very gentle presence hump between 5kHz and 15kHz. It's also wrong to think of back-electret capsules as somehow being second-class citizens, as many top measurement mics are back-electrets, for example.

This microphone is extremely solid, weighing in at 12.1oz — so solid in fact that I couldn't find a way into it to take a peek at the electronics! The cast metal is quite thick and chunky, and a tough wire mesh protects and screens the capsule. A secondary layer of finer mesh helps reduce popping but, as always, you should still use a proper external pop shield when recording vocals. The open-circuit sensitivity of the mic is 14.1mV/Pa, which is comparable with other studio vocal mics, though the quoted noise figure is just slightly on the high side of average at 20dB. The maximum SPL is a hefty 144dBSPL at 1kHz for one percent THD, so there's no worry about very loud sounds such as close-miked horns. This equates to a dynamic range of 124dB at 1kHz and maximum SPL. Phantom power is required, and there are no battery options.

Photo: Mark Ewing

Studio Tests

Despite its low cost, this mic actually delivers a very mature, believable sound

World Radio History

SOUND ON SOUND

Audio-Technica AT2020 £100

pros

- Inexpensive.
- Well engineered.
- Good sound on vocals and instruments.

cons

- Noise level slightly higher than average.

summary

This is a great-sounding little mic that can deliver very professional results in just about any home-studio miking application.

both on vocals and on instruments. As a vocal mic, it displays the kind of lower mid-range warmth that flatters most singers, and combines this with a very subtle presence peak that adds 'air' and clarity without erring on the side of sibilance or harshness. Because the mic doesn't hype the character of the original sound too much, it's more likely to work well with a wide range of singers. Although the noise figure isn't brilliant by today's standards, noise isn't an issue when close-miking voices or instruments. I don't for a moment imagine that Audio-Technica would recommend this mic for recording classical instruments from several metres away, but you might still get away with it if the performance is reasonably loud.

Tested on acoustic guitar, the mic immediately gave a well-balanced sound, and it was very easy to find a sweet spot where the acoustic sound of the guitar resembled the miked sound. There's plenty of depth and clarity, but without that scratchy honkiness that some mics seem to lean towards. I was also impressed with the off-axis characteristics of this mic, with its exceptionally good rear-axis rejection and good rejection of sounds arriving from 90 degrees off axis. This could be good news when working in studios with computers, as keeping the computer noise out of the microphones can be a major headache.

Final Impressions

As a low-cost, general-purpose capacitor microphone, the AT2020 is hard to fault other than on account of its noise level. I particularly liked the well-balanced sound this microphone produced, both on voice and on acoustic guitar. It's also a pity the mic doesn't come with a shockmount, but I can understand that Audio-Technica wanted to keep the price as keen as possible, and the included standmount works fine.

Clearly Audio-Technica aren't without some stiff competition, but they have a reputation for good engineering and good-sounding mics, and a bit of reputation goes a long way when you're trying to choose between similarly priced microphones. The AT2020 is built to the same standard as Audio-Technica's more up-market microphones, and I certainly have no complaints about its subjective sound quality. Indeed, for some applications in turns in better results than microphones costing several times its UK price, so it probably doesn't take a crystal ball to predict that Audio-Technica will sell a lot of these over the coming months. SOS

Information

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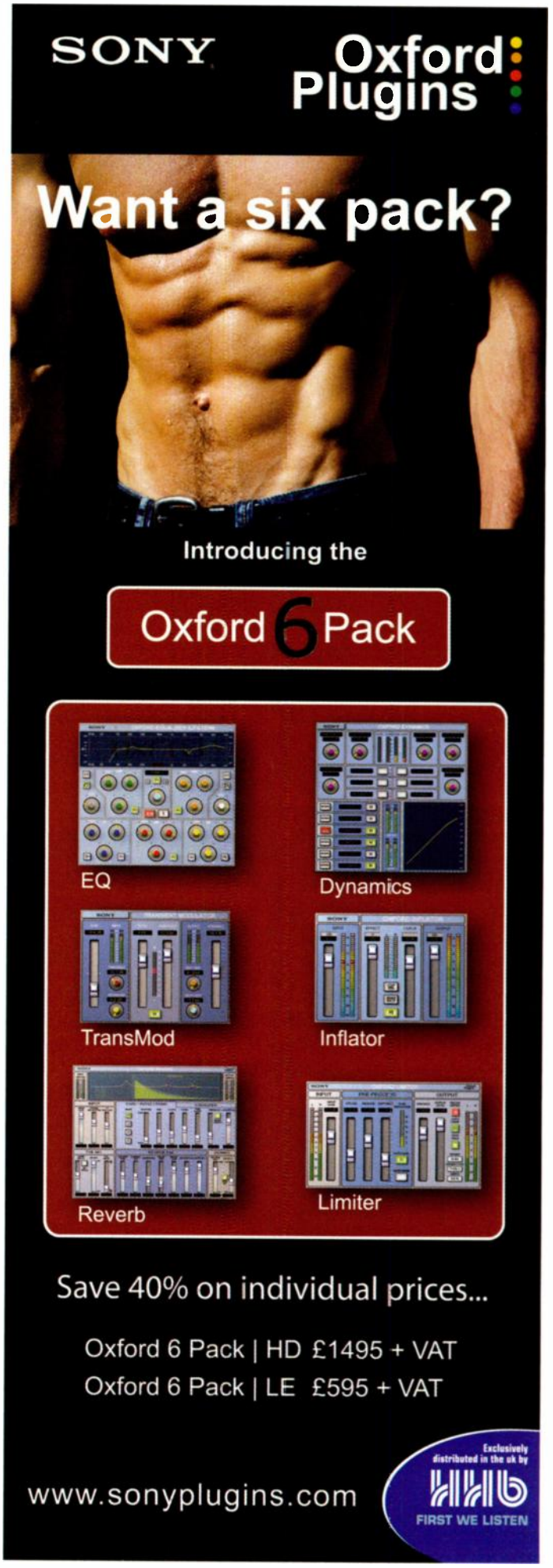

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Clavia Nord Stage 88

Photos: Mike Cameron

Keyboard

Nick Magnus

Combining several types of sound generation in one instrument, Clavia's Nord Stage harks back to the multi-keyboards of the 1970s. Is it a funky revivalist, or should it be considered a thing of the past?

Cast your mind back to the dim, distant past, and in particular to the Korg Trident, ARP Omni, ARP Quadra, and Roland RS505 Paraphonic Ensemble. These now-classic keyboards can be thought of as forerunners of the modern workstation synth. However, they were not the MIDI-equipped, multitimbral, sample-based, sequencer-driven instruments we now take for granted. In fact, they were resolutely analogue, and very much for live playing. The principal factor they shared was that they were 'multi-keyboards', capable of producing more than one sound at a time. A typical instrument of this type might have had separate string, synth and bass sections which could be layered together or split across the keyboard range and played independently. Some of these instruments are still considered desirable today, despite having quite limited options.

It seemed as though the multi-keyboard was a transitional phase on the way to truly polyphonic synths, and yet new examples have appeared in recent years; Generalmusic's Promega 3 (reviewed in *SOS* May 2003) falls firmly into this category, and now Swedish manufacturer Clavia have embraced the concept. Their offering is the Nord Stage, a performance-oriented keyboard employing three totally different and independent sound engines, and based on technology used in the Nord Electro (reviewed in *SOS* December 2001) and the Nord Lead 3 (reviewed in *SOS* July 2001).

Well Red

The Nord Stage is, like all Clavia keyboards, very red, with a great many bright lights. Weighing in at 18.5kg, the Stage sports an 88-note, velocity- and aftertouch-sensitive keyboard, described by Clavia as 'medium weighted'. Whilst it's not exactly lightweight, carrying it upstairs to my studio was no problem.

The Stage boasts three separate sound engines: a Hammond B3/electric organ emulation, a sample-based acoustic piano/electromechanical keyboard engine, and a virtual subtractive-synthesis engine. These three engines can be layered, split or played alone, and selectively directed to three separate effects groups, plus a modelled amplifier/speaker cabinet/EQ section. Additionally, there's a rotary-speaker simulator to which any single instrument section can be directed, and a global effects section which is applied to the combined output and consists of a reverb and compressor. Finally, the so-called 'Extern' section provides master MIDI keyboard control of external MIDI instruments.

The Stage's construction is reassuringly solid and chunky; the casing is made entirely of metal, and is topped off with a pair of lacquered end cheeks in the standard red Nord livery. Clavia's hopes of presenting a simple-to-use stage instrument seem at first optimistic; the front panel is an attractive yet busy-looking affair densely clustered with LEDs and cluttered with panel legending. However, this is because many of the controls have dual functions; the Stage turns out to be more straightforward in use than it looks.

The two main performance controllers are of Clavia's signature design — a sprung wooden stick for pitch bend, and an angled 'stone-effect' mod wheel, both positioned on the panel's left above the keys. The mod wheel is fine, but I just can't get on with the pitch stick. It's mounted at a rather awkward

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angle that works OK for downward bends, but feels very uncomfortable when performing the upward movement. Pitch-bend range for all the internal sounds is also fixed at plus or minus two semitones, which seems daft in the context of the Synth section.

Program Section

The group of controls surrounding the two-line LCD serves not only to select Programs, but also provides access to the Stage's various keyboard-management and Program-storage functions, and System settings. A Program contains all the instrument settings, effects assignments, key splits and External MIDI settings — in other words, much like a complete 'Performance' on a regular synth. The Stage's Programs are set out in 12 banks of six programs each, for a total of 126. This may seem an odd number, but closer inspection of the panel reveals two grey buttons labelled Live 1 and Live 2. These are 'live panel' Programs whose settings are constantly updated into Flash RAM, but not written permanently to memory. The most recent changes you make to either of these Programs will be retained and can be recalled, even if the Stage has been powered off in the meantime. These two Live Programs bring the total to a more 'traditional' 128. All Programs are user-rewritable, but can be restored to factory settings by reloading the factory SysEx file downloadable from Clavia's web site.

Of note in this section is the 'Shift' button — I sincerely hope this is of a heavyweight industrial grade. Due to the sheer number of dual control functions, this button gets more use than almost any other on the Stage! Also of note are the two lower buttons named 'Panel A' and 'Panel B'. At first glance it appears that the Stage has just the three Organ, Piano and Synth engines. However, the Panel A memory contains the settings for one 'layer' of these three sound engines, whilst Panel B is host to a separate, duplicate layer, and the Nord Electro-like use of LED columns to simulate Drawbars in the Organ section and Nord Lead 3-like LED 'collars' on many of the endless rotaries means that you can instantly switch between Panel settings without worrying about having to physically reset controls when recalling memories. In other words, you have two Organs, two Pianos and two Synths, each with completely different settings. Thus you can layer an acoustic piano with an electric piano, or layer two totally different synth patches, and of course this is how 'dual-manual' organ settings are achieved. Each of these engines can be addressed over MIDI on its own MIDI channel, meaning the Stage can be up to six-part multitimbral when played from a MIDI sequencer. Not only are the synth engines duplicated, but the Effects sections are too; Panels A and B each have their own complement of Effects.

The centrally located Program control section and two-line display.

Organ Section

This remarkably good, fully polyphonic Hammond B3 emulation is essentially the same as that featured on the Nord Electro, but with some changes and enhancements. For example, one criticism raised in the *SOS* review of the Nord Electro was that the level of the key click effect was fixed. The Stage addresses this issue (as did the Nord Electro 2); the level of the key click is now fully variable.

Central to the controls in this section are the nine LED 'chain graphs' and Inc/Dec buttons that represent the nine drawbars found on a real B3 (see the picture overleaf). Although not quite as 'organic' (sorry...) as physical drawbars, they satisfy the need for immediate visual feedback of drawbar registrations nicely, as well as sidestepping the need for motorised physical equivalents, thus keeping the cost down and reliability up, at least in theory.

On the Nord Electro, the drawbar Inc/Dec buttons were also utilised to provide eight preset, one 'random' and nine User drawbar memories. This facility is now gone (which is a shame) and has been replaced by a single button named 'Preset II'. This provides a simple, one-click alternative User registration for each organ 'Panel' within each complete Stage Program. Further hands-on flexibility comes in the form of Morphing, whereby the current drawbar registration can be smoothly changed into another. The drawbar Morph settings are also stored within each Program (see the box on morphing over the page).

Apart from the Hammond emulation, the Nord Stage offers two further organ models — a Vox Continental and a Farfisa Compact Deluxe. If this sounds familiar, it's because Native Instruments provide the same extra 'tonewheel' sets for their *B4* and *B4 II* software organs. Clavia have aimed for more authenticity with these, especially concerning the Farfisa. Whereas *B4*'s drawbars offer continuously variable values for this model, the Stage's drawbars default to on/off values, reflecting the fact that the Farfisa used on/off 'rocker' tabs to combine various preset registrations. Similarly, Clavia's Vox Continental model uses six drawbars for registrations (the seventh is non-functional) whilst the eighth and ninth drawbars provide a variable mix between sine and triangle waves, similar to the original. By comparison, NI's *B4* offers only sine, triangle or a 50/50 mix of the two waves, as well as nine fully functional drawbars. *B4* allows use of the percussion and the full range of B3-type vibrato effects on its Vox and Farfisa models, whilst on the Stage the percussion is non-functional for these, and the vibrato types are implemented as they were on the originals. So while NI's *B4* offers extra flexibility with these models, the Stage scores more points for realism. ▶

SOUND ON SOUND

Clavia Nord Stage 88 £2195

pros

- Splendid Hammond B3 simulation.
- Excellent selection of acoustic and electromechanical piano sounds.
- Reassuringly solid construction.
- Nice rotary speaker emulation!

cons

- It's expensive.
- The effects-routing options are restrictive.
- Not an ideal controller for the larger MIDI rig.
- Various limitations and compromises let the Synth section down.

summary

The Nord Stage is a decent alternative to lugging around a truckload of pianos, organs and electromechanical keyboards. The Hammond emulation is especially good, and the comprehensive collection of pianos scores highly both for playability and authenticity. However, the Stage comes with a hefty price tag, and some may feel it is let down by certain compromises in its design, not least of which are the limited Synth section and the rather half-hearted approach to controlling external MIDI instruments.

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As on the Nord Electro and the Nord Lead 3, LED drawbars and endless rotaries with LED 'collars' are used so that the controls are instantly updateable when patch memories are recalled.

Without doubt, the B3 model is the flagship of the Organ section. Despite the cleanliness of the basic tonewheel sound and the absence of any drawbar leakage effect, it packs a very satisfying punch. Turn on the rotary speaker simulator, crank up the Drive, and you'll see what I mean.

Piano Section

This sample-based engine offers a generous selection of acoustic and electromechanical pianos — there are six basic types with a total of 13 variations between them. Unusually, the samples are held in Flash RAM, so individual instruments can be updated or replaced with ease by means of the supplied cross-platform *Nord Stage Manager* software (see the box on the last page of this article). Polyphony is quoted at 40 to 60 voices, as it's dependent on the selected sound.

The two stereo grand pianos — a close-miked Yamaha C7 and a Steinway Concert Model D with rather more room ambience — have a nice wide dynamic range, and are suitable for a wide range of rock/pop and classical applications. The velocity-split points are well placed — the most drastic timbral changes occur in the upper velocity range, which avoids tell-tale timbral jumps at average playing levels — and the loop tails are clean, and generally noticeable only when sounds are played in isolation. The multisample splits, too, are all but unnoticeable, although curiously the volume of both pianos tends to tail off in the upper registers.

Two stereo upright pianos — one made by the Swedish company Svenska Pianofabriken, the other a Yamaha M5J — offer substantially different tones to the grands. The Svenska has been tuned in a 'parlour' style, giving it a very pleasant ringing ambience, and I could easily imagine it sitting comfortably in a Coldplay track. The M5J is perhaps the least impressive of the acoustics — its mid range is so perfectly in tune that it sounds strangely artificial! All four acoustic pianos have a key release layer, and all but the M5J include a nice-sounding soundboard resonance effect when the sustain pedal is down.

The Yamaha CP80 Electric Grand is the first decent-sounding representation I've heard coming from a hardware instrument. Add a little chorus from the built-in effects section, and many famous recordings from the 1980s come instantly to mind. However, I felt that the tuning was just a bit too perfect — some characteristic CP80 detuned 'zing' wouldn't have gone amiss. Also, the apparent lack of a key release layer exposes the existing (uneditable) release time, which I found rather too abrupt.

Three vintages of Rhodes piano demonstrate just how different the various hardware models could sound back in the day. Variation 1, a MkI Stage, has a dominant fundamental harmonic, sampled with the tines set at a moderate distance from the pickups for a mellow tone. Variation 2 is a MkII Stage, but here the tines are close to the pickups, and aimed more centrally toward the pickups' axes, giving a tone strong in upper harmonics and a rich sound when played hard. Variation 3, a MkV Stage, has its tines close to the pickups but off-axis, for a full, clear sound.

The Wurlitzer EP200A electric piano is very realistic, and immediately recognisable. A real Wurly really rocks when put through an amplifier/speaker combo with a bit of drive — and this one does too, if it's routed through the Stage's amp-simulator effect with a dollop of tremolo. Very nice.

Finally, the Stage's Hohner Clavinet D6 comes with four pickup variations, just like the original. Not only that, but the D6's four EQ switches have also been reproduced with commendable accuracy. Being the owner of two D6 Clavinets, I have to say this model is absolutely wonderful, and sounds just like the real deal. However, the lack of a key release layer and the original D6's Damper is a shame — I would assume this is down to limitations of sample memory, as the current piano sample set uses 99.8 percent of the available Flash RAM. Attempting to recreate either effect using a simple envelope shaper would have been a desultory solution, and it appears that Clavia thought so too.

Apart from such small niggles, these are all excellent sounds. The restricted key ranges that especially dogged the 61-note Nord Electro are no longer an issue — all the sounds now span the full 88-note range.

Morphing

Morphing is used to control single or multiple parameters on the Stage, using either the mod wheel, aftertouch or an attached controller pedal. Any parameters that use a rotary encoder can be assigned to Morph control, as can the LED drawbars and the Rotor speed. To assign filter cutoff to the mod wheel, for instance, you simply position the filter cutoff knob at its starting value, press and hold the Morph assign 'Wheel' button, and turn the cutoff knob to its finishing value. Now when you move the mod wheel, you will see the filter knob's LEDs move between the two values you have set.

In this way, you can use the mod wheel to 'morph' between two drawbar settings, apply oscillator sync on the synth, change the rate of an Effect, or any combination of these and more. Morphable parameters can be freely added to and removed from Programs, and are stored with them.

Test Spec

- Nord Stage 88 OS version reviewed: v1.14.
- Piano sample revision: R5.

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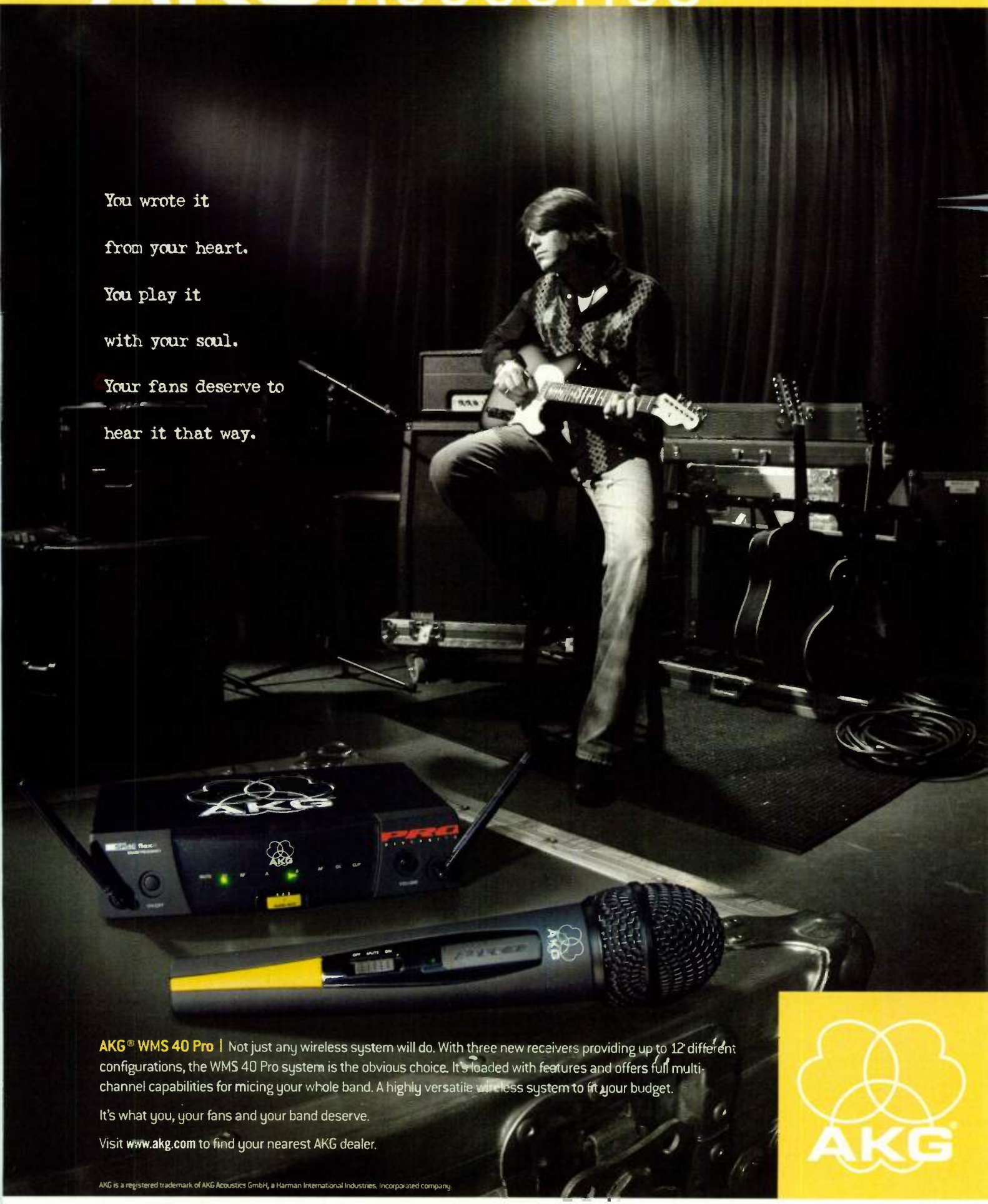

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CLAVIA NORD STAGE 88

The Synth section.

Synth Section

The Synth hosts its own set of programmable memories, divided into three sound categories: Synth, Pad and Bass, each of which has 99 memory locations. At its most basic level, this is a 16-voice polyphonic, single-oscillator subtractive synth featuring a single switchable 12 or 24dB-per-octave low-pass resonant filter and two simple AD/R envelopes, one for the amplifier and one for assignable modulation duties. The single oscillator is also capable of oscillator sync effects, courtesy of a 'hidden' sine-wave oscillator dedicated to this purpose.

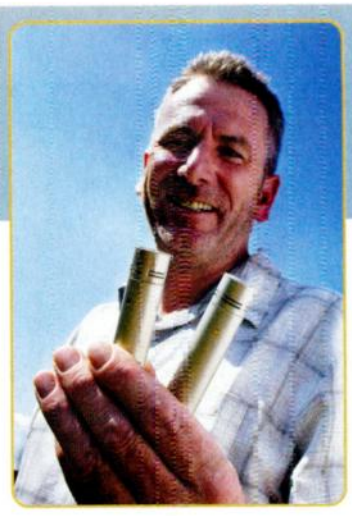
The waveforms are divided into three categories: virtual analogue, sampled digital and up to three-operator FM, providing between them a wide range of waveforms. These waves can be further modified using the Timbre knob, which controls pulse-width modulation, oscillator sync and FM intensity as appropriate. Apply a modulation source such as Morphing or the mod envelope to the Timbre control, and dramatic time-based harmonic changes are possible. As this section is a single-oscillator synth, the Unison detune knob provides a welcome means of thickening the source waveforms.

Despite a number of compromises reminiscent of those old multi-keyboards of yesteryear, Clavia have aimed to squeeze as much as they can out of this synth, given such a basic structure. However, these compromises throw up some interesting problems. For example, there is no dedicated LFO for modulation duties, which begs the question 'how do you apply cyclic modulation effects, such as pulse-width modulation?' The answer lies with the mod envelope, although it's a rather unconventional solution. The mod envelope has three modes: Attack/Hold/Release, Attack/Decay, and Repeat. By assigning the Pulse waveform to the mod envelope and choosing Repeat mode, the envelope will cycle round the attack and decay slopes indefinitely, thus providing a pseudo-LFO-type effect. The advantage is that you can sculpt irregular 'LFO waveforms' using different values for the Attack and Release knobs, but the downside is that you can no longer use the

The Keyboard

Bearing in mind that a weighted keyboard is not ideal for every situation, Clavia have made certain 'comfort' provisions for those occasions where a lighter touch is needed. This is because although the keyboard's default response to velocity suits the acoustic pianos well, some players might find it a little heavy for the electromechanical keyboard sounds. The Clavinet, for example, needs a much lighter touch for true funkiness, to which a weighted keyboard is not particularly well suited. Happily, an optional Piano Dynamics parameter alters the keyboard's response to velocity, using three progressively lighter settings.

Organists, on the other hand, need not only a light action, but one with a shallow key travel. Clavia have thoughtfully provided an optional 'fast' setting, applicable only to the Organ, which causes the notes to trigger much sooner than usual. Under normal circumstances, sounds trigger after around 8mm of key travel, but with the 'fast' setting, this is reduced to 5mm, making sweeping glissandi a less painful experience than otherwise! It's a shame this can't be applied to other sounds — Clavinets have a shallow key travel too.



Like so many other enlightened producers and engineers, live sound mixer Jerry Eade was amazed to find that Røde microphones - in this case the NT5 - sounded every bit as good as microphones costing up to five times as much, and delivered virtually identical test results. So Jerry bought 22 pairs of NT5s for use on a highly prestigious series of Placido Domingo performances - ensuring uncompromised sound quality without having to pay a premium price.

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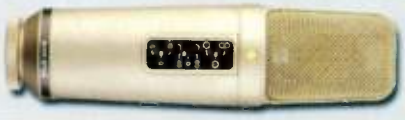

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▶ mod envelope to make one-shot filter sweeps.

Whilst it is not possible to modulate oscillator pitch with an proper envelope, a compromise is provided, but it's available only to the oscillator's analogue 'Sd' waveform. This sawtooth waveform is 'split' to behave like two oscillators, and if you rotate the Timbre knob, the 'second oscillator' detunes against the first, and this relative detuning can be smoothly modulated using the mod envelope. The bad news is that the level balance between the two oscillators is fixed at 50/50, and detuning via the Timbre knob is restricted to semitones only, so the two oscillator 'halves' cannot be fine-detuned against each other, and at unison pitch, they simply sound like one oscillator. If the mod envelope had an additional sustain-level parameter, this could be used to work around the fine-detuning issue — but it hasn't. The only possible solution is to Morph the detune value manually, using a very narrow Morphing range, but then the detune value has to be set by hand every time you select a 'detunable' synth Program.

The implementation of pitch vibrato is also curiously limited. Three types of delay vibrato can be selected, each with a preset delay time. The rate and depth of delay vibrato is set globally in the Sound System menu, and applies to every single Synth Program. At least the depth is variable when Vibrato is assigned to the mod wheel or aftertouch, but the rate always remains fixed, regardless of the Program selected, which is rather silly. And because you cannot fine-tune the oscillator, you cannot detune a Panel A synth against a Panel B synth, which makes numerous classic synth sounds impossible to achieve. All of this is very frustrating.

Effects & Global Effects

The Effects section consists of four independent sub-sections: Effect 1, Effect 2, Delay and the amp simulator/EQ section. Effect 1 offers tremolo, auto-pan, ring modulation and three flavours of wah-wah. Effect 2 deals with pitch-related effects such as chorus, flanging and phasing. The Delay can be mono, or be switched to stereo 'ping-pong' mode, and features a tap-tempo button, which is very handy for spontaneously setting delay times in a live situation. The AmpSim/EQ section, as its name suggests, offers three amp/cabinet simulations, three-band EQ, and a Drive effect.

The far right section of the control panel.

Each instrument type can be directed to one or more of these effects sub-sections, but again, there are limitations. For example, if the Piano section from Panel A uses the delay, no other Panel A instrument can use that delay. In this case, though, another Panel A instrument could still use an effect from Effect 1 or Effect 2, as long as nothing else was already using that effect! To assign two instrument sections to the same effect type, one of them would have to made using the Panel B settings, and use the Panel B Effects group. The effects themselves have little in the way of editing facilities, offering only Rate and Amount controls, and whilst they're not sonically revolutionary, they're perfectly adequate for their intended uses.

The Rotary Speaker simulator, despite having no editable parameters (except fast/slow/stop) sounds excellent, and is the Stage's most impressive effect. The Drive control adds just the right colour, from a gentle growl to full death-metal shredding. Its one major drawback is that only one instrument section at a time can use it.

The Global reverb and compressor are the final sound-sweetening tools, and are applied across the combined output of all the instrument sections. The reverb offers Room, Stage and Hall settings, and apart from the dry/wet mix, has no editable parameters. Frustratingly, you cannot selectively apply reverb to one or other of the instrument sections: everything gets it to the same degree. Similarly, the compressor only has On/Off and Amount controls, and when it's switched on, it's applied to everything. But I guess that's why they're called Global effects!

External Section

This section provides control of external MIDI instruments, though the facilities on offer are fairly basic, comprising only one assignable rotary encoder knob which is switchable between the assigned controller, volume or program change messages. As well as the active/mute status and key range, each Stage Program recalls its own 'Extern' settings for assignable MIDI controller number, plus initial values for the assigned controller, volume, and Program Change number, and these can optionally be sent to the external MIDI instrument each time you select a Program on the Stage. Frustrations abound, however. The external MIDI transmission channel is set in the MIDI System menu, and applies globally to all Programs, so realistically you can only control one external synth from the Stage. Directing control to a different instrument necessitates delving into the MIDI System menu. What's more, the Panic (all notes off) button works only with the Stage's internal sounds, and is not transmitted to external instruments, which is where it's likely to be needed most!

Finally, the transmitted key velocities have an incredibly heavy response curve — even playing vigorously, levels only average in the upper 50s, with Herculean strength being required to hit velocity 127. And the curve can't be altered. Until these issues are

Stage Entrances

Round the back of the Stage, we find a relatively economical complement of connections. The audio outputs comprise two stereo pairs and a headphone socket (shame this couldn't be around the front!). Next to these are two switch-type controller sockets for a sustain pedal and to switch the rotory speaker simulation from fast to slow and *vice versa*. Two more jacks cater for continuous controller pedals — one for a single assignable controller and/or control of the Morphing function described elsewhere in this review, while the other handles Organ swell (volume) control. The Mains on/off button is accompanied by one of those little shaver-type figure-of-eight power sockets, which concerned me — how many spares of this kind of lead do *you* have? Lastly, a USB socket provides connection to a computer for various OS-updating and sample-management duties. Er... sample management? For more details on this intriguing point, see the box on the *Nord Stage Manager* utility opposite.

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Nord Stage Manager Software

As mentioned in the main part of this review, the Stage uses Flash memory to store its piano sounds. This is a fine system, because unlike other digital pianos whose sounds are set in stone and can only be updated by buying a newer model, those in the Stage can be updated as and when improvements are made. Updating the OS is no big deal these days, so why not the sounds too? The *Nord Stage Manager* utility (downloadable from Clavia's web site) makes this a breeze. First of all, you download the required piano sample updates from the company's web site (this would take impossibly long via dial-up connection, so they are also obtainable on CD-ROM). After installing the Clavia USB driver if required (Mac users don't need to do this), you just connect the Stage to your computer via USB and fire up the software utility.

As you can see from the screenshot on the right, your downloaded samples and the ones currently resident in the Stage can be seen in separate windows. You simply delete the ones from the Stage you wish to update, and copy the new versions across to replace them. Although the samples in the review model were all up to date, I deleted one piano and reloaded it to check that the utility worked; it did. The software can also be used as a means to backup and restore the Stage's internal Programs.

addressed with an OS update, it's unlikely anyone will be using the Stage expressly for its master keyboard facilities.

About Key Splits

Each instrument section can address the full keyboard, or be assigned to zones. You can define Lower, Upper and High zones, the split points being indicated by LEDs above the keys, and the splits apply globally to Panel A and Panel B sounds. The Octave Shift buttons found in each section operate only when a particular section has been 'zoned' (that is, when it's playing less than the full key range).

A 'Dual Keyboard' facility enables you to play the Panel B sounds from an external MIDI keyboard. This is useful if you wish to create a dual-manual organ setup where the external keyboard is the 'upper' manual (Panel B) and the Stage's keyboard is the 'lower' manual (Panel A). This also has the benefit that each manual can play across its full key range.

Conclusions

On one level, the Stage is a very desirable musical instrument, but on another, it seems to be a mass of compromises, and at times, there are rather too many 'either/or' decisions to make. For example, which sound gets the rotor effect — the piano or the organ? You can't do both. Want reverb on the synth only? Sorry, it has to be plastered on everything, or nothing at all. Similarly, choosing whether to sacrifice the filter envelope in favour of pulse-width modulation in the Synth section can be wearisome. Clavia's goal in designing the Stage was to make it simple and quick to use in a live context, and indeed, the Piano and Organ sections are straightforward and easy to use, but I feel that the simplicity of the Synth section is its own worst enemy, providing only just enough to justify its inclusion.

Whether the Nord Stage functions well as a master keyboard is also in question — it's hard to imagine a way in which you could independently control more than one external MIDI instrument, and even then you'd be using a frustratingly reduced set of facilities. That heavy external MIDI velocity curve doesn't help matters, either. Personally, I would keep the Stage as a stand-alone keyboard, and use a different dedicated master controller keyboard to play any other MIDI instruments I wanted to use.

Lastly, there is the all-important factor of cost; at £2200, the Stage is certainly not cheap. I know we're looking at a high-quality instrument here, but it's amazing what you can get for your money these days.

On the positive side, the functional compromises I've highlighted may not bother you personally as a player. If so, and if you're prepared to bear the cost, the Stage is absolutely on the money as a stand-alone instrument that covers a range of classic acoustic and electromechanical keyboards in highly competent fashion. I'd advise that you find time to try out the Stage before you make your purchase decision, think about your playing needs and how you might want to use it, and see if its great sounds seduce you. SOS

information

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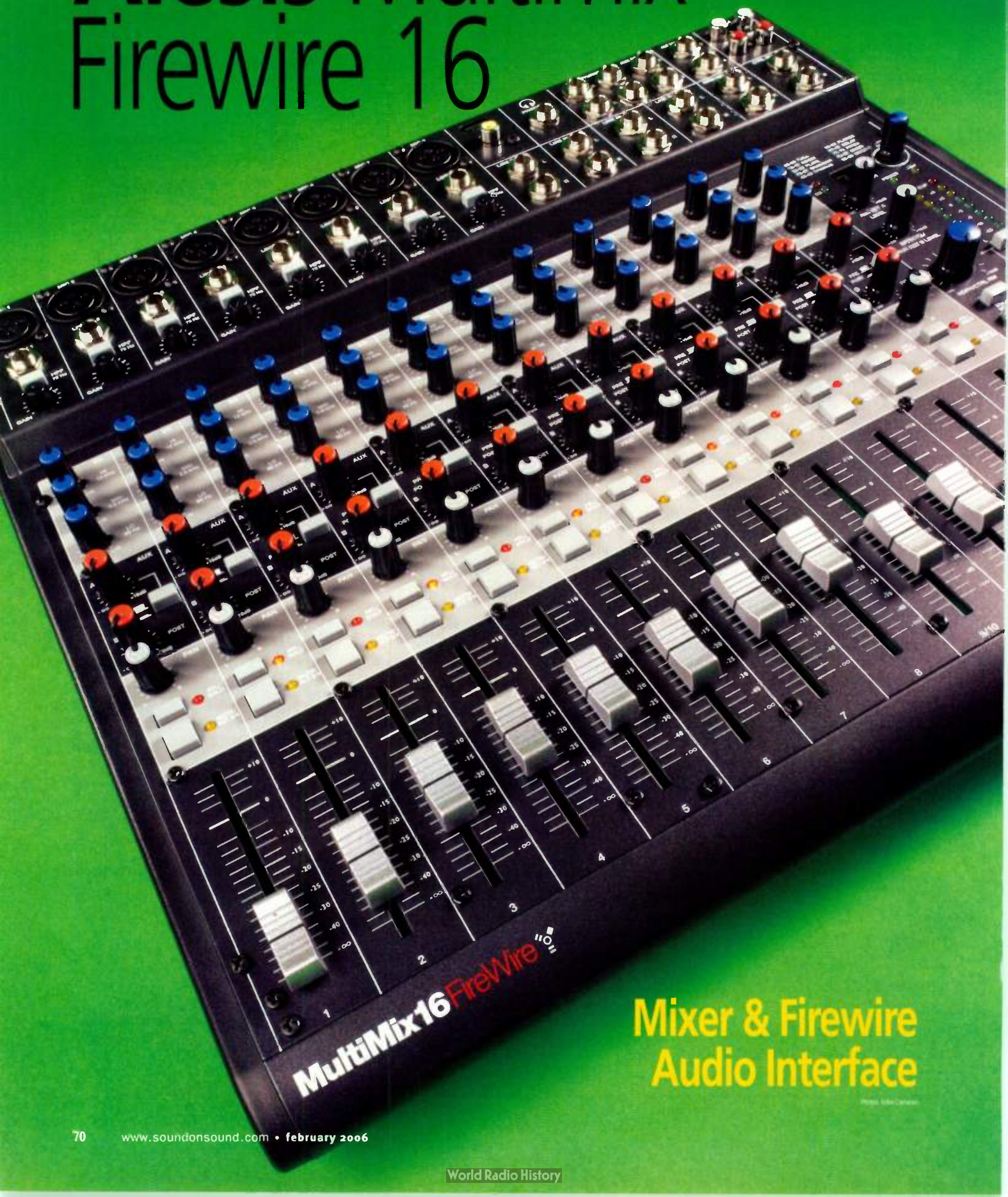
Alesis Multimix Firewire 16



Mixer & Firewire Audio Interface

World Radio History

It may look like just another mixer, but this new entry-level model from Alesis also packs in a hefty 18-input, stereo-output Firewire audio interface. Too good to be true?

Paul White

At first glance, the Alesis Multimix Firewire mixers could be mistaken for any other affordable general-purpose analogue designs, but the inclusion of Firewire interfacing enables them to double as multi-channel computer audio interfaces, placing them in a very different league. Post-EQ, post-fader direct outputs from each channel (eight mic/line channels plus four stereo line channels on the 16-channel model I had for review) are sent to the computer via the Firewire link, as is the main stereo mix, while the stereo mix coming back from the computer is routed to the two-track return in the monitor section. When Mackie came up with their Onyx Firewire mixer, there were complaints that its excellent EQ was bypassed while recording, so Alesis have obviously learned from this feedback and placed their direct outputs after the EQ. While I wouldn't pretend that the mixer section of the Multimix Firewire 16 is as sophisticated as the significantly more costly Mackie Onyx, it does have the benefit of being extremely inexpensive, and its functionality should suit a good many computer audio applications, especially where it is necessary to record multiple sources at the same time. If you have a computer and want to record a band, this is a great solution.

Technical Specifications

My first port of call is usually the manufacturer's spec sheet, as this at least gives me some idea what to expect in terms of quality, but oddly the spec for this mixer misses out many important and informative details, such as noise figures, crosstalk, distortion, and frequency response. Instead, it concentrates on telling you what level the various outputs emerge at and at what frequencies the EQ operates. While this is helpful to the user, it does little to back up the technical performance credentials of the unit. However, in my practical tests there seemed little to be ashamed of given the mixer's low cost. The manual is also somewhat unclear as to which inputs and outputs are balanced or unbalanced, though I managed to piece some of this information together from the block diagram.

The Multimix series (comprising eight-, 12-, and 16-channel models) is based around the DICE II Firewire chip set, which here handles the audio interfacing at 24-bit resolution and at sample rates of 44.1kHz or 48kHz. The interfacing is compatible with Mac or PC machines that have standard IEEE 1394 Firewire ports, and drivers are included on a CD-ROM for Windows XP and Mac OS X. A copy of Steinberg's *Cubase LE* recording software is also provided for those who haven't yet chosen their sequencing software. Additionally, a coaxial S/PDIF socket carries a 16-bit digitised version of the main stereo mix, enabling it to be recorded to a hardware device. By default this runs at 44.1kHz, but when the Multimix is connected to a computer it can be set to either 44.1kHz or 48kHz.

Although there is a paucity of technical spec, the manual is rather more forthcoming about promoting the built-in 28-bit digital effects processor, which can deliver 100 preset effects, including a good selection of reverbs, delay effects, and modulation/pitch treatments. The mic/line channels, of which there are eight on this model, have globally switchable phantom power and all the channels have one send switchable pre/post-fader, with a second fixed post-fader and normally feeding the internal effects, though it also has its own separate output. There's a fixed-frequency, three-band EQ per channel, with high/low shelving filters and a 2.5kHz mid-range control, all bands providing a gain range of ±15dB. The high and low shelving frequencies are set at 12kHz and 80Hz. The EQ turns out to sound nicely musical, with the anticipated exception of the mid-band if used to apply heavy boost. The strategy seems to have been to tune the mid-band to the frequency range responsible for harshness, so that it can be cut when needed, and in this role it works just fine, though a swept mid-band is always more flexible.

Test Spec

- Alesis Multimix Firewire 16 audio driver v2.0.
- Dual 2.5GHz Apple Mac G5 with 4GB of RAM running Mac OS v10.4.2.

SOUND ON SOUND

Alesis Multimix Firewire 16 **£430**

pros

- Inexpensive.
- Up to 18 simultaneous inputs for recording.
- Integral effects.
- Mac OS X and Windows Firewire drivers.

cons

- Fixed mid-band EQ frequency and no EQ bypass.
- No parameter adjustment for the effects.

summary

Alesis have managed to combine a basic but practical analogue mixer with an 18-in, stereo-out Firewire interface at an unprecedentedly low price.

Master Section

The master section includes separate quarter-inch jacks for Main, Alt, and Monitor outputs, a headphone output, and an Alt 3/4 fader in addition to the main stereo fader. The Alt 3/4 buss is the key to this mixer's flexibility, because it can either be used to set up a four-buss output or to keep specific channels out of the main mix so that both the individual channel outputs and mixed channels can be routed to the computer in a reasonably flexible way. It may also be routed to the main mix for setting up a separate subgroup when mixing. Stereo eight-section bar-graph meters monitor the output (or the PFL/Solo buss level when a PFL/Solo button is down), while further status LEDs show when the main power and phantom power are on.

Physically, the mixer is neatly designed, with a tough sheet-metal chassis and moulded plastic end cheeks. All the audio connections are on the top panel, with a locking connector for the included PSU on the rear panel, along with rocker switches for power and phantom power. Metal jack sockets are used, which inspires confidence. As mixers go, this one is very straightforward, with a balanced XLR mic input and a balanced quarter-inch jack input on each of the mono channels. A maximum mic preamp gain of 60dB is available, with a further 10dB of gain provided by the channel fader in its maximum-gain position. These channels also have 75Hz low-cut switches and input gain trim pots, but no insert points. Given that this mixer is likely to be used with a computer audio system that runs plug-in effects and processors, the lack of insert points probably isn't a serious limitation.

Running down the rest of the input channel, we have the three-band EQ with no bypass (though the controls have centre detents), the two aux sends (the first having a button for pre/post-fader switching), and a channel pan control. A PFL/Solo button sits above the 60mm channel fader, where a further button in the master section selects PFL or Solo mode and a larger button ▶

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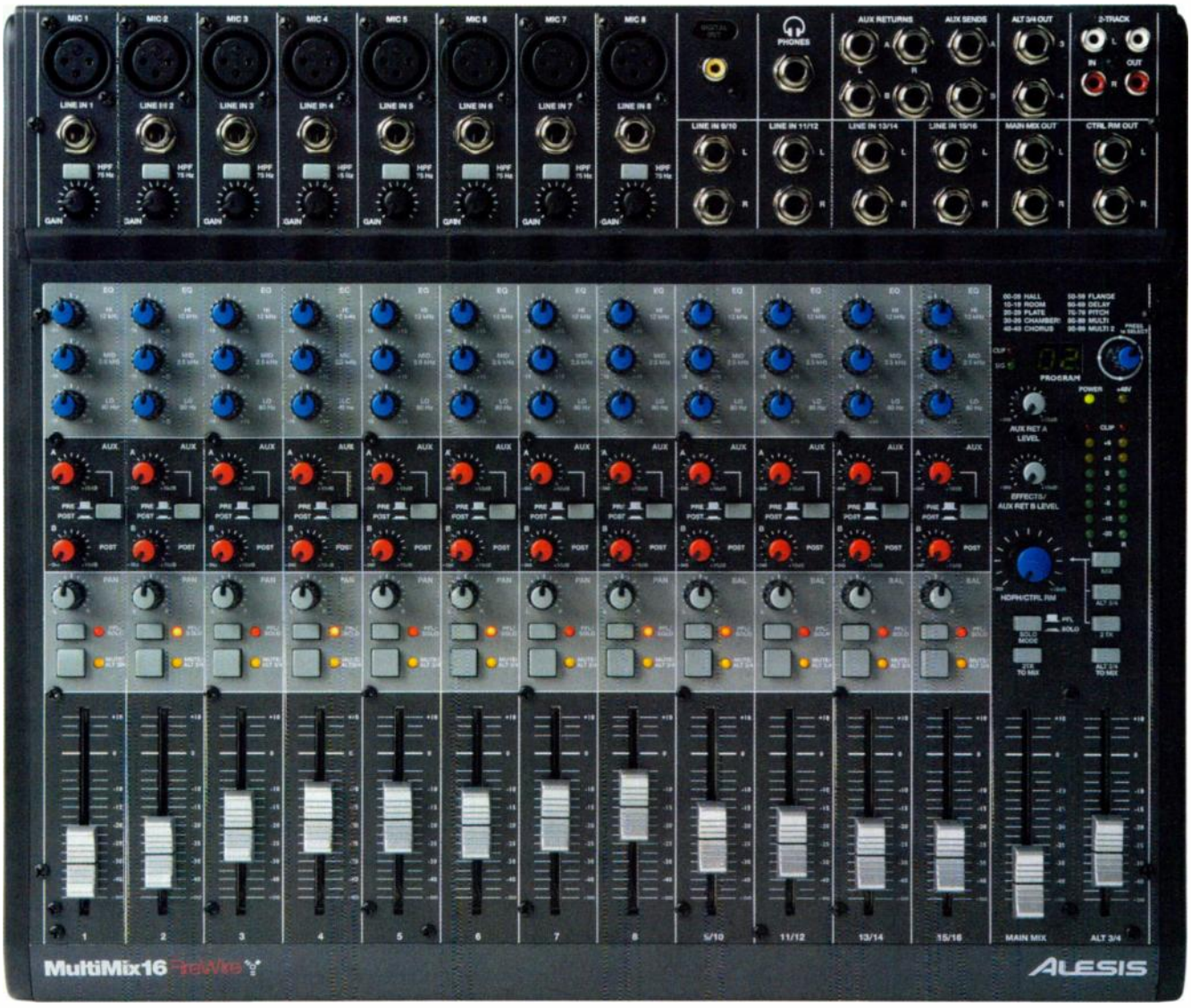
ALESIS MULTIMIX FIREWIRE 16



switches the routing from Main Mix to the Alt 3/4 buss. This dual-purpose arrangement was first seen in some of Mackie's earlier mixers, and is a very practical way of adding flexibility without adding excessive cost. LED indicators are fitted for the Mute/Alt 3/4 and PFL/Solo buttons, but there's no metering on individual channels, as levels can generally be monitored within the DAW software. Each of the (four) stereo quarter-inch jack channels has the same EQ, aux, and fader arrangements as the mono channels, except that the pan controls are now balance controls, and there's no input gain trim or low-cut filter.

There's little unusual in the master section except that the familiar RCA phono two-track inputs and outputs work in tandem with the stereo Firewire input in such a way that the analogue tape return and stereo DAW mix are summed for monitoring purposes. I can't immediately see why you might want to hear both at once, but doing it this way saves the cost of a switch. Other than the two-track RCA phonos, all the audio inputs and outputs in the master section are on quarter-inch jacks.

"The Multimix Firewire 16 offers extraordinary value for money, and is ideally suited to the musician on a budget who wants to record an entire band at once, while keeping all the tracks separate for later mixing."

The outputs comprise the main mix, the monitor mix, the two aux sends, and the Alt 3/4 mix, while the inputs comprise two sets of stereo returns. From the block diagram, it seems that the aux returns are balanced, while the main, Alt 3/4, and monitor outputs are 'impedance balanced', which is a way of making an unbalanced output behave more like a balanced one by taking the cold leg of the TRS jack socket to ground via a resistor that matches the output impedance of the hot leg.

Onboard Effects

At the top of the master section is the effects processor control panel, where a two-digit LED display shows the effects numbers from zero to 99. A 'turn and press' knob selects the effects, which have their categories and numerical ranges printed just above the display. There are 40 reverb presets and, in most cases, these will be the most commonly used effects. The second aux send feeds the effects normally, but if the send is being used for an external effect, then the second set of Aux Return inputs take the place of the internal effects. Although the effects can't really be used very flexibly while mixing within a DAW, they can be

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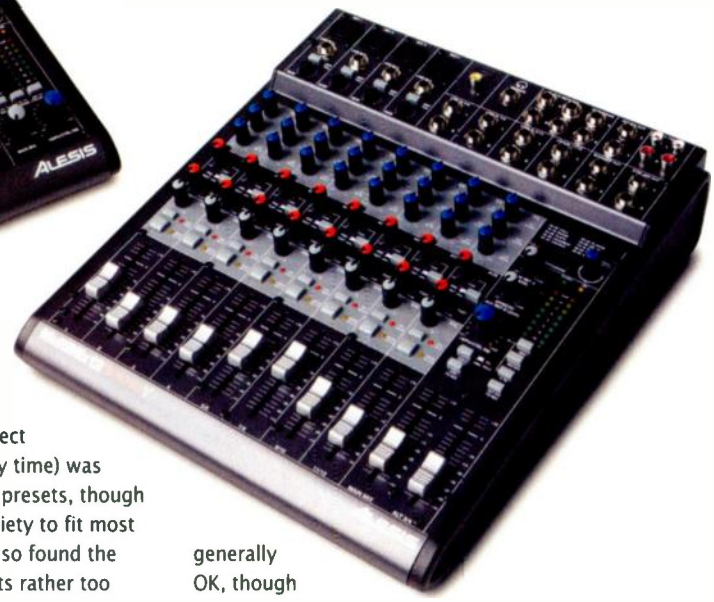


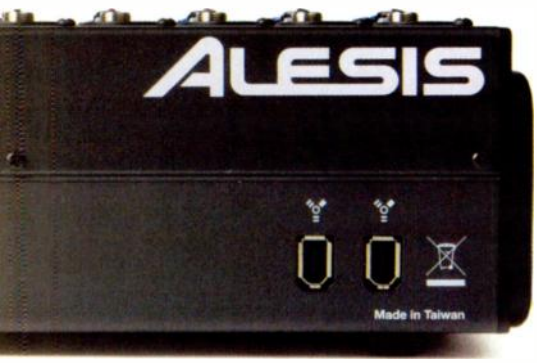
The smaller models in the Multimix range are the eight-channel Multimix Firewire 8 (left) and the 12-channel Multimix Firewire 12 (right).

recorded, and you could always put them on a separate track (by routing all the input channels to the Alt 3/4 buss and recording from their direct outputs) if you felt the need to adjust the amount later. Separate level controls are provided for adjusting how much of each of the two Aux Returns is fed into the main stereo mix, and a monitor control knob adjusts both the monitor output level and the headphones level. There are three possible monitor sources — Mix, Alt 3/4, and two-track, where two or more sources may be selected at the same time where required. Further routing buttons send the two-track return or Alt 3/4 buss to the main stereo mix.

All this adds up to a simple mixer that can also double as an audio interface, providing up to 18 simultaneous computer audio feeds. Given the low cost, this is remarkable in itself. If the mic preamps are competent and the mixer circuitry reasonably quiet, then I don't see how it can fail to be a winner, especially if you need to record several musicians at once. So let's see how it works out in the studio!

Studio Tests

Checked as an analogue mixer, the Multimix Firewire 16 turned in the kind of performance I'd expect from a well-designed entry-level mixer, insomuch as it was free from hum and hiss, other than when using the mic preamps at high gain settings. It isn't esoteric, but it's not in any way bad either. My feeling is that the mic preamps are a touch noisier than those you'd expect on a premium mixer, but not unacceptably so. The EQ sounds fine, as long as you don't use the mid-band for boosting unless you really want a harsh, invasive sound — better to use it to cut such sounds. There's a good choice of effects, even though some of these sound to my ears a little less sophisticated than I'd expect from an entry-level Alesis hardware reverb such as the Picoverb. The inability to make any effect adjustment (specifically delay time) was also frustrating on the delay presets, though there was enough reverb variety to fit most applications. In the main, I also found the section of combination effects rather too gimmicky to be useful — some tasteful delay/reverb combinations might have been more useful. If you have a good software reverb (which probably costs more than this mixer!), then it will almost certainly sound better than the one in the Multimix, but if you are running an entry-level audio program and are using the reverb that came with it, then the Multimix Firewire 16 may well offer a useful sonic improvement, with the added bonus that it won't hog your CPU resources.



Only one of the two Firewire ports on the rear panel of the Multimix Firewire 16 is required for connection to your computer. However, a second is provided to allow you to connect to other computer peripherals as required.

My initial experiences running the Firewire side of the mixer under Mac OS v10.4.2 were a little disappointing, as I experienced occasional playback glitches even on large buffer sizes, and the system seemed very unhappy with small buffer sizes. I contacted Alesis about this and soon found an updated Mac OS X driver (v2.0) sitting in my mailbox. After evicting the old one and installing the new one, everything worked happily. After restarting the computer, I could get down to buffer sizes of 128 or even 64 samples without any sign of glitching. Problem solved!

All Fired Up?

Given its low UK price, the Multimix Firewire 16 offers extraordinary value for money, and is ideally suited to the musician on a budget who wants to record an entire band at once, while keeping all the tracks separate for later mixing. Although the mixer's facilities are pretty basic, it turns in a very acceptable audio performance, and the mic preamps behave well enough to make good, clean recordings, provided that you use either sensitive capacitor microphones or use dynamic mics fairly close to the sound source. The effects are generally OK, though some of the brighter reverbs can be a touch on the 'ringy' side, and not being able to adjust even one parameter can be frustrating. Most of these effects would be fine for live use, but for recording check your plug-ins and see which sounds best. The medium-length reverbs are probably the most useful effects when recording or mixing a finished track, and fortunately there are several sensible presets from which to choose in this section.

As to my initial Max OS X problems, the new driver solved all the glitching and everything worked quite painlessly. The ability to route so many individual feeds to a DAW should appeal to anyone who wants to record multiple sound sources at once, but who prefers to mix within the DAW. The post-EQ direct feeds mean you can tweak the sounds prior to recording them, and if you want to add effects as you record you only need to record the effected track or tracks via the main stereo output with suitable effects applied. The Multimix may be built to a price, with competent rather than esoteric audio performance, but the strategy has clearly paid off. After all, where else can you buy a multi-channel mixer, an 18-input audio interface, and a digital effects processor for such a small outlay? SOS

Information

£ Multimix Firewire 16, £429.99; Multimix Firewire 12, £349.99; Multimix Firewire 8, £249.99.
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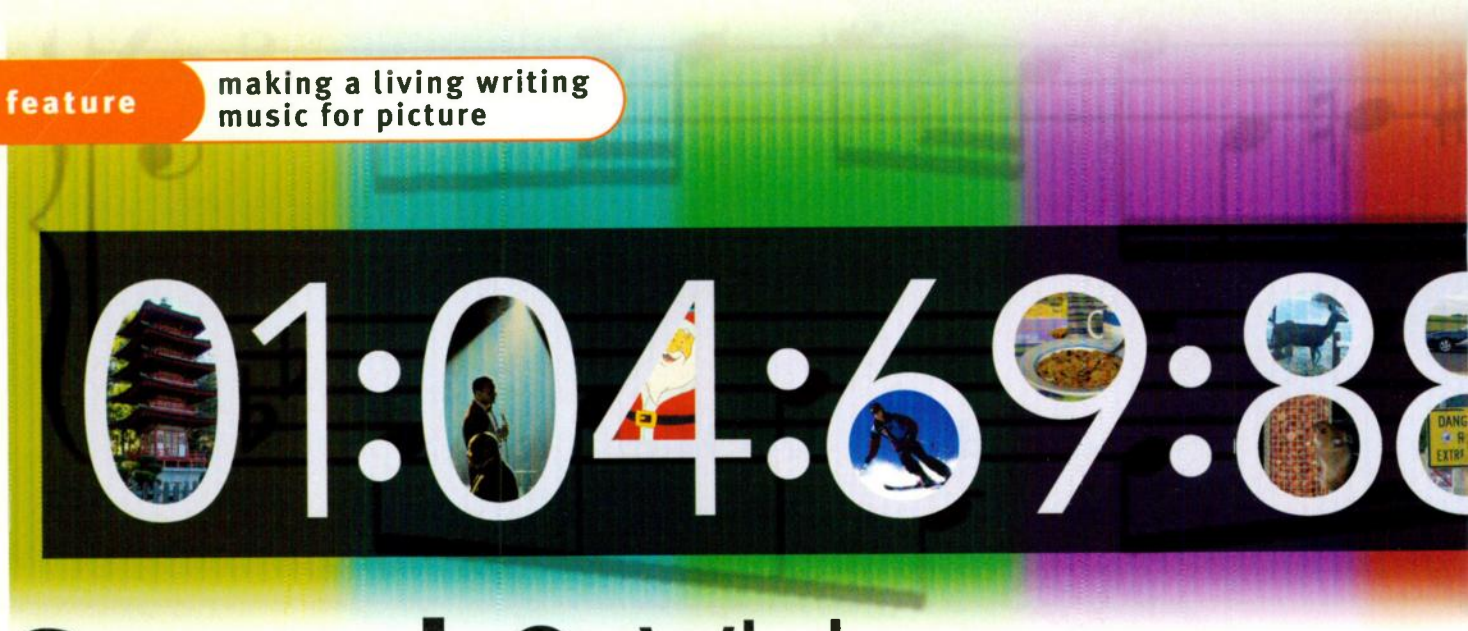

Sound & Vision

Making A Living From Music For Picture: Part 3

Hilgrove Kenrick

The perfect project studio doesn't exist, as everyone has different working methods — and so it is with equipment for creating music for picture. However, there are some fundamental bits of gear you'll need. We provide some guidance...

As readers of *Sound On Sound*, you must have some kind of recording gear already, but how do you go about making your chosen setup suitable for music-for-picture work? To some extent, this is an impossible task for someone other than yourself to suggest. We all have different preferred ways of working — that's why everybody's studio is a bit different — and this is as true for media composers as it is for home-based recording musicians. You'll see just how true this is in the later parts of this series, which will be written by a TV and film composer based in the States with a very different setup to mine!

The Essentials

Nevertheless, if you study the setups of those who've made a successful career in music for picture, some common items emerge (in addition to obvious things that everyone creating music needs, like cables, monitors and talent), and it's these I'll focus on this month. Broadly speaking, they are as follows: firstly, a TV, video-cassette recorder (VCR) and associated synchronisation hardware — but see the box towards the end of this article for more on why these are slowly becoming less important. I would argue that you'll also need a computer and MIDI + Audio sequencer/DAW package of your choice, a MIDI controller keyboard, a mixing desk and/or control surface, sound sources and/or sample libraries. If you choose the latter, you'll also need something to run them on, such as software or hardware samplers.

It's perfectly possible to criticise the choices on this list of so-called essentials, and more on that in a moment. The first major complaint from many of you out there is probably cost — this lot won't come cheap if you don't have much of it already. Fortunately, there are many areas where you can cut corners and combine equipment into single multi-purpose units; however, you need to bear in mind what cul-de-sacs this may lead you down, and what it could cost to buy yourself out of them later. If possible, you ought to try to bear in mind not just the starting cost, but also the cost of the later upgrade path. Assuming, of course, that you can afford the initial cost, there's no point in spending £100 today, only to have to shell out 10 times that tomorrow if you can pay

Serving Suggestions

Here are some suggested setups for creating music for picture on three different budgets. They're by no means all-encompassing or exclusive options, but they'll give you an idea of where to start. Note that these systems are based around a PC. Depending on your choice of sequencer/DAW, you might need to use a Mac, in which case everything would look different (and probably more expensive).

PEANUTS — £2000 TO £2500

- A modest PC (say a 2.4GHz Pentium 4 with 512MB of RAM and one monitor).
- Cakewalk *Sonar Studio Edition* MIDI + Audio sequencer.
- Yamaha 01X digital mixer/control surface.
- M-Audio Keystation 49e 49-key MIDI control surface/controller keyboard.
- Native Instruments *Kontakt 2* software sampler.

PISTACHIOS — AROUND £5000

- A hefty PC (say a 3.2GHz Pentium 4 with 2GB of RAM, and dual monitors).
- MOTU 828 Firewire interface.
- Cakewalk *Sonar Producer Edition*.
- Yamaha 01V96 digital mixing console.
- M-Audio Radium 61 MIDI controller/keyboard.
- TC Electronic Powercore Compact.
- Native Instruments *Komplete* virtual-instrument bundle.

CASHEWS — MONEY TO ROAST?

- A hefty sequencing PC (say a 3.6GHz Pentium 4e with 2GB of RAM, and four monitors).
- RME Hammerfall MADI card with ADI648 ADAT interface.
- Steinberg *Nuendo*.
- Kurzweil SP88X 88-note performance controller.
- Yamaha 02R96 digital mixer.
- TC Electronic Powercore Firewire.
- Extra PCs for *Gigastudio 3* or *Kontakt 2*.

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£1000 initially, and buy some gear that costs less to upgrade later.

Some of you may be surprised that I didn't include any non-computer-based recording alternatives in my essentials list. After all, since the humble (and affordable) cassette-based multitracker went digital a few years ago, and began to include effects and CD burners, you could surely argue that portable digital multitrackers now offer everything necessary to record, mix and master to broadcast-quality standard, at a reasonable cost? Well, it's true — with so much in one little box, and the cost saving relative to buying all the bits separately, it's very tempting to opt for such a solution. However, if one section goes down, you'll lose your entire recorder while it's being sorted. Furthermore, when you want a higher track count, different effects, more inputs and so on, you usually end up junking the stand-alone box and starting from scratch.

OK Computer

For this reason, amongst others, most media composers these days base their setups around a computer (or several). They're expandable, you have a choice of interfacing options, and there's a wealth of available software and hardware plug-ins. What's more, a computer can handle video playback and sync, effects, audio, and MIDI, but unlike the one-box digital multitracker, you get to choose what goes into the computer: the sequencer, the audio interface, what effects you need, and so on. You can add to the list at will, ▶

The Author's Choice

Having explained just how hard it is to offer advice on ideal equipment setups for others elsewhere in this article, I thought it might nevertheless be instructive to see what choices *I've* made! Here's a heavily abridged list...

COMPUTERS

- **Main music PC running *Sonar 5* and *Nuendo* with a TC Electronic Powercore Firewire.**
- **Additional PCs for running *Gigastudio 3* and/or *Kontakt 2* (x3).**

RECORDING

- **Drawmer M Clock.**
- **Mackie HR824 monitors.**
- **MOTU MIDI Time Piece AVs (x2).**
- **RME ADI192 format converter.**
- **RME ADI648 MADI interface.**
- **Sony DMX R100 mixer.**
- **Tascam DA88.**
- **TC Electronic Fireworx & M3000 effects.**

KEYBOARDS/SYNTHS

- **Korg Wavestation and 01/W workstations.**
- **Kurzweil PC88, K2500RS, and K2500XS keyboards.**

SAMPLE LIBRARIES

- **VSL *Vienna Symphonic Library Pro Edition* & Horizon Series.**
- **East West *Symphonic Orchestra Platinum* & *Symphonic Choir*.**
- **East West *Storm Drum*, *Colossus*, and *Ra*.**
- **Spectrasonics *Stylus RMX*, *Symphony Of Voices*, *Vocal Planet*, *Trilogy*, *Atmosphere*.**
- **Native Instruments *Komplete 2*.**
- **Best Service *Real Guitar*.**

The latest version of the author's setup. Note the hardware Sony mixer on the right, despite the plentiful provision of mixing options within *Sonar* and/or *Nuendo* on the main music PC.

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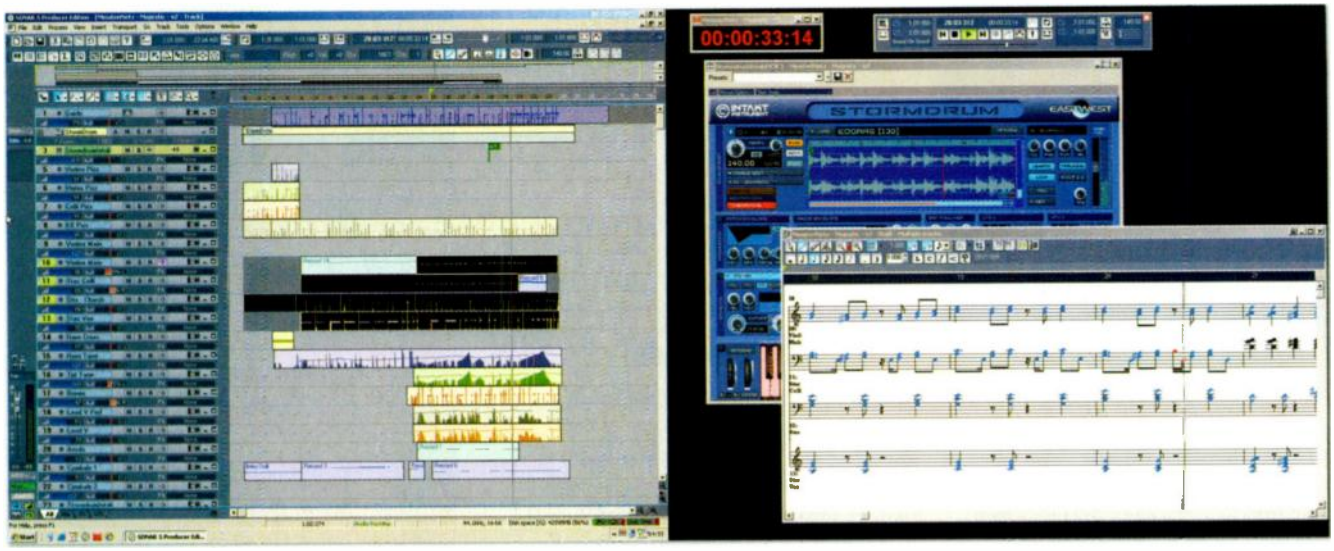

Two *Sonar* screens (the author's sequencer of choice) showing scoring work underway on his multi-monitor setup.

and if you suddenly find the need for more inputs, you pull out the old audio card, drop in a new one and keep moving; there's no need to bin it all and land yourself back at square one.

In this example, as with many other aspects of choosing a studio setup, it's far better to work out what it is you need to be able to do, and then try to fit equipment around it, never the other way around. If you're held hostage to the foibles of a particular piece of kit, you could well compromise both your technical and artistic ability, which is never a good idea. Reliability is another consideration here — I would gladly sacrifice a few bells and whistles for something that doesn't crash or fail to do what it should. In my case this has led to a succession of dull-but-worthy purchases. RME Audio may not be the world's most exciting brand, but in five years, not a single piece of their kit has yet failed on me, whether it's the Hammerfall PCI card series, or the ADI rack boxes with a multitude of MADI, AES-EBU and ADAT interfacing.

Service With Style

I mentioned in the first part of this series how difficult it can be when you're working to a tight deadline and equipment fails on you. It's happened to me many times, but I've found a long-term solution by using a reliable equipment supplier based 15 minutes from my studio whom I can rely upon to replace dodgy gear at short notice.

I would also argue that it's worth paying a little, if not a lot more for impeccable customer service — someone who answers the phone in seconds, delivers when they promise to, and will answer my stupid questions when I don't understand, or will put me in touch with someone who *can* answer if they can't. My suppliers have allowed me to get on with worrying about the work, rather than my kit, which is the way it should be. If you can find someone similar to help you in your endeavours (and if possible, also ensure that they're located conveniently close to your studio), you'll never want to use anybody else.

Recording Software

So, you have a computer — what software do you run on it? To some extent, this will be determined by what sequencer or audio-recording software (if any) you already run, and also by the computer you've chosen. Cakewalk don't write sequencers for the Mac any more, and since Apple bought Emagic, *Logic* is no longer available for the PC. Just to add to the fun, the major packages come in differing flavours depending on your budget and inclination: Steinberg's product line, for example, progresses through *Cubase SE*, *SL3* and *SX3* right up to their high-end production software, *Nuendo*.

Once again, the best course of action is to break down the many options, and consider what you're really going to need, balancing it, of course, with what you can afford. By way of example, imagine you're considering going for Cakewalk's *Sonar*. This comes in two forms, *Studio* and the more expensive *Producer*. The latter offers surround support, a hefty effects bundle, per-channel EQ and video-thumbnail support, all of which are lacking in *Studio*. However, *Producer* is a lot more expensive. When you factor in the cost of the bundled plug-ins as separate items, it's probably worthwhile, but otherwise, going for *Studio* could save you some money. Once you're a registered *Studio* user, there's a reasonably affordable upgrade path to *Producer* that you can take later, when you have a little more money in the kitty and really need the extended features *Producer* can offer you.

Of course, this is just an example — I'm not suggesting that *Sonar* is necessarily the software that all media composers should use, in either of its flavours. The best package for you is of course the one that does what you need it to, doesn't break your piggy bank, and crucially, is the one that you're most at home with. *Sonar* happens to be *my* sequencer of choice, but that's irrelevant — the last reason you should use something is because someone else does, even if they're famous (which I'm not!). The only person using it that matters is you; you need to be able to work quickly, efficiently and to the highest possible level of quality that your budget allows. If anything, consider the famous user's kit from the other way around — why is a famous person using a certain piece of kit? Answer: because it's right for them, so do the same and consider the package that's right for you, whatever that might be.

So why did I end up using *Sonar*? Originally, it was because Cakewalk's MIDI sequencer ran under DOS at a time when my computer couldn't handle Windows, which meant in turn that I couldn't use *Cubase for Windows* v1. And, as so many of us do, I stuck with my first sequencer through its many upgrades, facelifts and relaunches, and ended up a *Sonar* user. In my experience, it's been reliable and powerful, but I'm well aware that there are plenty of devotees of other sequencing/DAW platforms who claim the same for their favoured package. Perhaps the most important reason that I've stuck with it is that I know *Sonar* inside out — so if the same is true of say, *Cubase SX* or *Logic* for you, then that's the package you should keep using as you begin your demanding, deadline-heavy music-for-picture career. However, all of this doesn't mean that you can't change your mind later. Recently, I've begun using Steinberg's *Nuendo*, having been tempted away by its amazing Warp-to-picture functions — but I haven't tried to jump ship overnight, and I've

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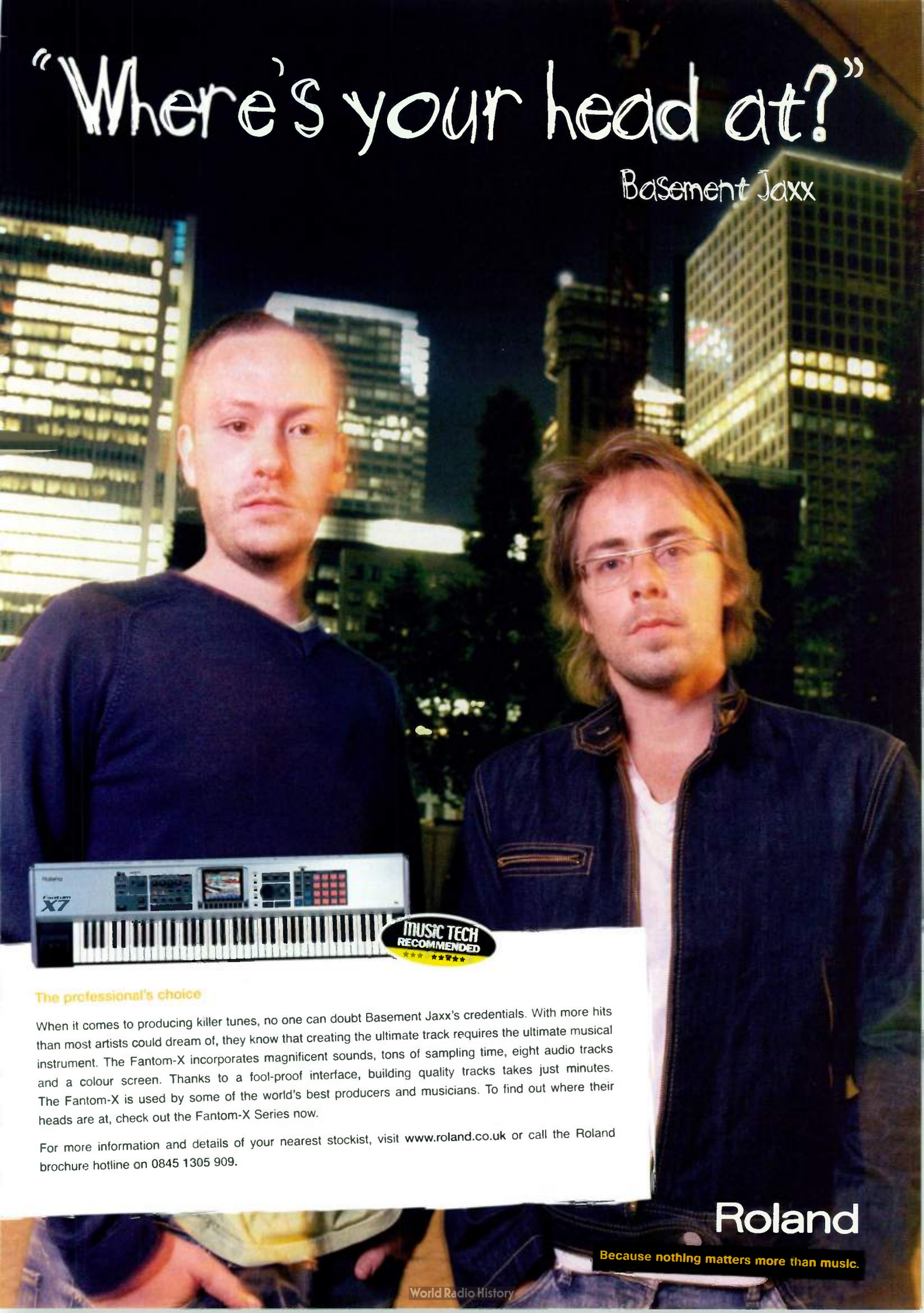

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▶ kept up with *Sonar* so that I can always fall back on it for jobs that need to be completed quickly.

Keys & Controllers

Some composers like the keyboards in their studios to be all-singing, all-dancing workstation synths, providing interesting sounds as well as the ability to trigger MIDI notes. Others are perfectly happy to use 'dumb' controller keyboards, while the sounds come from elsewhere. Personally, I favour a mix of both approaches (I have both two-octave MIDI controllers and several keyboard synths in my setup), although as a traditional player, I find that the physical keyboard itself is even more important than whether it generates its own sounds. If you're expecting to be able to play pieces with the scope and dynamic range of Tchaikovsky's B-flat, say, then a synth-action two-octave controller keyboard simply isn't going to cut it. There are more controller keyboards on the market than ever before, of differing sizes, actions and capabilities; once again, I can do little more than suggest that you pick one that suits your keyboard-playing abilities, or your lack of them — if you're only interested in using a keyboard as a note-entry device, there are plenty of small, affordable synth-action keyboards that will fit the bill. But a decent keyboard will let you extract the best from your sample libraries. Which brings me to...

Samplers & Samples

There's almost as bewildering an array of samplers available today as there are controller keyboards — what started with the Fairlight as a fantastically expensive tool of electronica devotees has become a mainstay of almost all music production. Now there's a wealth of hardware- and software-based options available, ranging from a 200-quid tabletop box to a four-figure sampling workstation complete with keyboard and sequencer — and the sky's the limit when you start to consider powerful software samplers.

As with hardware and software for recording, your choice here will determine your upgrade path, as you also have to consider the sample libraries you're likely to use — the most powerful collections are out of reach of traditional hardware samplers, as they require dedicated PC-based software samplers with fast hard drives from which to stream audio. The industry standard in this field, *Gigastudio*, is fast being caught up by other software samplers like NI's *Kontakt 2*.

The reason these software sampling systems can be so expensive is that they need a lot of computer processing power to run. Although you *can* run a software sampler on a modern computer alongside your sequencer, there won't be much CPU power left over for the sampler, which will translate into low playback polyphony. Tascam expect a high-end PC running *Gigastudio* to produce 300 or so notes of polyphony. This might sound like a lot, but by the time you have layered a couple of instruments with long release times, it can be eaten up very quickly by a couple of chords. The only solution is to add another computer dedicated to sample playback. As you may know, many media composers have two or more PCs dedicated to *Gigastudio* or *Kontakt*. Further up the tree, Hollywood composers such as Klaus Badelt have machine rooms filled with 40 or more PCs dedicated to *Gigastudio*! Again, only you can decide whether you're likely to need this kind of system (you'd better have deep pockets if you do), but there are plenty of smaller-scale systems or affordable hardware, some of it available at decent second-hand prices, which might suffice for your needs at a much lower cost. What else is Ebay for?

Once you've got a sampler sorted out, there's the question of what to fill it with. As I hinted in the first part of this series, media composers often spend a great deal of their money on sample libraries. It may seem crazy buying, say, several different expensive piano libraries, but just as with synths and indeed, with real pianos, it's impossible to say which piano library is the 'best' (a question often asked on the *SOS* forum, despite its complete

Wot, No Synchroniser?

Until a couple of years ago, one of the most dull but crucial pieces of equipment in any music-for-picture setup was the synchroniser. Fundamentally, music needs to be fitted to picture, and if the program is edited again later, you need to be able to go back and tweak the music so it still starts, changes and stop on exactly the right frame of video.

Some years ago, describing how to do this would have required an article in itself — synchronisation is a minefield of formats and acronyms. I started out with a reel-to-reel multitrack which had a separate sync unit, and later moved on to the Tascam DTRS format (a DA88) with built-in sync capabilities. In both cases, my video cassette recorder acted as the master unit in the system, feeding timecode from the video to drive the sequencer and the audio recorder. The time they took spooling back and forth to get in sync was maddening.

However, as you've probably noticed, there haven't been too many articles on video-to-MIDI sync in *SOS* in recent years, and there's a reason for this — most people have gone digital. For the last couple of years, almost all of the video I've been supplied with has come as a digital video file, which I've been able to load directly into a window in my sequencer and use there, locked to the timeline.

Most editors will now supply video masters digitally, be it on DVD, via FTP download or even over email. To deal with the rare cases when you might still be given video on cassette tape, it's usually easier to buy a cheap video-capture card and digitise the video yourself for use within your sequencer. With the powerful Warp-to-picture functions of *Nuendo 3* and the like, you can do far more with the video when it's all in the computer.

Until a couple of years ago, most music-for-picture jobs were supplied on humble VHS cassette, which necessitated slaving a VCR to a sequencer with a synchroniser — in the author's case, a MOTU MIDI Time Piece AV. Recently, though, most video has been supplied as AVI or Quicktime files on CD-ROM and can be run directly within a software DAW such as *Nuendo* (shown above).

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absurdity). Obviously, if one stood head and shoulders above the rest, then the world would have only one maker of piano libraries (or synths, or real pianos). Different pianos suit different music and playing styles, and of course this judgement is subjective anyway. So which one is 'best' for you is a question only you can answer. Thus you need to demo, test and evaluate the libraries that best suit your field to find the right ones for you. In the case of piano libraries, you will more than likely end up with a handful, each one suiting a different genre or mood. With orchestral libraries, you could well find that you end up cherry-picking instruments out of several libraries to create the end result you desire. In this case, the trouble is that you have to pay for the whole library just to get the instruments you want, and you may not even know which these are until you have had a chance to play with the sounds for a while. In short, sample-buying can become both expensive and addictive!

Processing & Mixing

How you choose to handle processing and mixing are two interlinked issues that also depend on the rest of your chosen equipment. If you have an external hardware mixer, you can mix traditional outboard effects with computer-based plug-in ones, and the same goes for EQ and other processing. This is my favoured approach — my mastering effects are software, main EQ is handled by my digital mixer, and TC Electronic outboard produces most of my reverb.

For some composers, a mixer and external hardware processors are anachronisms. These types favour doing everything in their computer, and handling all the processing there too. The most mixer-like piece of kit you'll find in their studios will be a control surface covered with faders and knobs like a mixer, but through which no actual audio passes.

Again, this decision is down to personal choice, existing kit and working requirements — you might not have the space for a separate mixer, or you might still be working with a external recorder that necessitates the use of a mixer. I still have one (a Sony DMX R100) for other reasons; in my case I have to have some way of hearing and mixing audio from several PCs.

Control-surface devotees would have me fly all the audio into the workstation PC and then mix down from there. However, this means rendering every track to audio and if I need to tweak one, I have to pull the MIDI back up on the relevant PC, reload the sample, make the changes and then render it to audio all over again. With all the sampled articulations spread over several copies of *Gigastudio* and *Kontakt*, a typical simple two-minute orchestral cue would have 30 or so tracks, and rendering them in real time would take about an hour. I can't afford to waste that kind of time achieving nothing except shovelling some audio around, so I've retained the traditional console. That way, I can tweak MIDI-based tracks to my heart's content, hear the results immediately, and also use the Sony to create my final mixes.

Next Month

I'll be bowing out of this series after next month, but in my swansong I'll look more closely at pitching for work, and demystify some of the composing jargon you'll need to understand to win commissions. Until then, enjoy your equipment shopping... SOS

Ergonomics & The Magic Chair

Once you've decided what equipment you're going to populate your studio with, there's another, far less glamorous aspect that requires your attention — furniture. Don't worry — this isn't where I start talking about *feng shui* and quoting geometric equations to do with ergonomics. More prosaically, however, I will say that I don't know a single composer without a back complaint. You owe it to yourself to make your studio chair a good one — after all, you're going to be sitting on it for hours on end. After years of back trouble, and much havering because it cost so much, I treated myself to a HAG chair, at a cost of over a thousand pounds, and earned the undying love of my spinal column for evermore. I'm not suggesting that you go this far, but do at least give the matter of seating some thought.

You should also arrange your studio so that you can see, reach and adjust your most important gear whilst still remaining comfortable. Many Back Care centres will give you advice not only on the various chairs available, but also on optimal posture and the height at which you should place desks and other equipment in relation to your seating position. Ask yourself: is your neck constricted, are you sitting upright against the back of your chair, and do you have to lean at ridiculous angles to alter a setting or two on a piece of outboard? Obviously some reaching and contortion will be necessary occasionally, but the more you can limit it, the more comfortable you will be.

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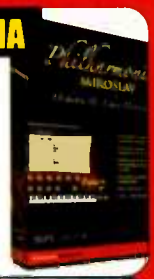

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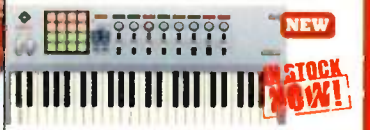

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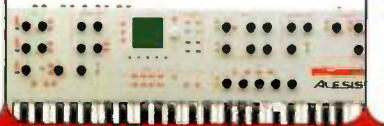

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Ueberschall Liquid Instrument Saxophone

Virtual Sax Instrument For Mac & PC

Liquid Instruments Saxophone running under *Cubase SX*. The view here is of the sound browser: the list of Programs is that belonging to the baritone sax, and each phrase is displayed as a miniature waveform. The last column shows phrases being mapped in the key-assignment area.

Sample libraries with virtual-instrument wrappers are nothing new, but Ueberschall's new Liquid Instruments have an extra twist — the front end is derived from Celemony's *Melodyne*, offering you complete freedom to change the pitch of the phrases in the library.

Derek Johnson

Ueberschall are the latest sound-design company who've made the transition from releasing their libraries on CD to wrapping them up in a virtual-instrument front end and putting them out as plug-ins. But their new Liquid Instruments series takes a different approach, featuring a playback version of Celemony's *Melodyne* pitch- and time-manipulation package, and a library of phrases that come pre-processed by *Melodyne*. In fact, Celemony's Peter Neubäcker and Carsten Gehle were right there in the middle of the development of *Liquid Instrument Saxophone* (*LIS*), the first release in the Liquid series (bass and guitar instruments have just been released as I write this).

Under The Bonnet

In case you're not familiar with it, *Melodyne* is a processing and playback tool that analyses monophonic audio and creates a map of pitch, tempo, time and formant data. Once the number crunching is done, you're free to work with the audio almost as if it were MIDI data: quantise a performance and/or freely transpose it, superimpose the melody of one audio file onto another, or create a completely new melody for a given performance, and all with far fewer of the artifacts you expect from more conventional audio pitch-shifting techniques. For more on *Melodyne*, check out the reviews in *SOS* November 2001 and January 2004 respectively, or head to

World Radio History

www.soundonsound.com/sos/nov01/articles/melodyne.asp and www.soundonsound.com/sos/jan04/articles/melodyne2.htm, where they can be read for free.

The upshot of harnessing Celemony's technology to this saxophone library is that the playback of the sax phrases can be very flexibly altered via a simple front end. You can make any phrase in the collection work with any tempo or scale (as well as different keys, you can work in different modalities), change any note in a phrase, and change the feel of a phrase. You're also offered control over formants, and the on-screen controls can be tweaked via MIDI.

The basic library of saxophone phrases at the heart of *LIS* isn't huge by the standards of many current sample-based plug-ins, at just under 800MB, but it's still too large to fit on a CD with all the other bits that are supplied, so everything comes on a DVD. All the major Mac and PC plug-in formats are supported, including VST, RTAS, AU (for Macs) and DXi (for PC). In addition, a stand-alone version is supplied for both computers. The system requirements aren't too demanding by modern standards, either: users should have a minimum 800MHz Pentium-based PC running Windows 98SE or XP, or a 500MHz G4 Mac, with a minimum of 512MB of RAM in either case.

A full manual is provided — I can think of several other developers who could learn from this example! It's produced as a CD booklet, running to 16 pages in total, 11 of which cover the nuts and bolts of the program. It's good to have, although the text is tiny and some of the terminology is occasionally confusing, and some of the controls described in the manual don't always correctly relate to what you see when you have the plug-in open in front of you.

Public Viewing

On launching the plug-in, you may be surprised at how compact the main window is. But there are just a few controls, with a dual-function display taking up most of the screen space. There are two ways to get phrases into the plug-in, the first being a file browser in the upper part of the window, which is initially labelled 'Program' when *LIS* is newly launched (more on the second in a moment). In the Liquid instruments universe a Program is a collection of related phrases, each assigned to a MIDI note starting chromatically from C1.

The tempo is displayed to the right of the Program browser, and can be set anywhere you like, or be locked to the tempo of your sequencer when you're using *LIS* as a plug-in. Two of the four sliders next to this are labelled Volume and Pan, and are self-explanatory, but the other two, Pitch and Formant, are controls from *Melodyne*. The first lets you fine-tune the current phrase's playback pitch by ±1200 cents: that's an octave up or down in single-cent steps. With the Formant slider, the character of a phrase can be changed quite dramatically. There are few enough artifacts when applying large pitch changes, but working with the formant control can make such changes sound even more natural.

A column of only vaguely related buttons finish off this section, toggling between Multi mode (where you can play several phrases back at once) and Solo mode (where you're restricted to one at a time), and offering access to Load and Save functions (the File button). The curiously named Actions button actually halves or doubles the playback speed of the current phrase in relation to the host's tempo. Finally, the Setup button lets you customise automation, sample colour and display and tell the plug-in where your

SOUND ON SOUND

Ueberschall *LIS* £117

pros

- *Melodyne* engine means the library's basic phrase collection can be flexibly edited.
- Sounds great.
- Relatively easy to use.

cons

- Restricted to main phrase library.
- Some conflict between the manual and on-screen controls.
- Some controls rather tiny and easily obscured.

summary

Liquid Instrument Saxophone creates a unique niche for itself; there's nothing else quite like it (well, apart from the other instruments in the Liquid Instruments series!). The *Melodyne* front end puts an interesting spin on what would otherwise be a well-recorded but fairly standard phrase collection; even if you don't usually buy this kind of phrase library, it's worth checking this one out.

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sound banks are. One Liquid Instrument can play back phrases from another's library (if you have other Liquid Instruments installed, of course), but the program needs to be told where the phrases are located.

The large coloured display that dominates the lower half of *LIS* has two views, Sounds and Editor, each accessed via its own tab, and the Sounds tab invokes the second, more detailed, method of Program selection and creation. The display takes on a hierarchical form somewhat similar to the 'columns' view in Mac OS X (see the pic at the head of this review). The first column starts with your library of choice; if you own one Liquid Instrument, there will only be one library. The next column opens up to tenor, baritone, alto and soprano sax sub-divisions, and the next lists all the Programs for the selected instrument. There's one last hierachical level in the penultimate column on the right, and this shows the actual phrases in the selected Program as miniature waveforms (though you can set this to show phrase names or miniature notes), and reveals that some factory Programs have as many as 18 phrases assigned to them.

As in Mac OS X, each entry in each column has an arrow on its right to invoke the next column. However, the arrows in the column with the mini waveform displays actually plays an audio preview of the phrase, which is rather unexpected — perhaps these buttons should have been made a little more obvious. Once they've been assigned to MIDI notes, phrases can be played back from an attached MIDI keyboard, by clicking the on-screen keyboard graphic along the left edge of the rightmost column, or by holding down your mouse button (the phrase will then play or cycle as long as the mouse button is held).

You can start using the technology from *Melodyne* while browsing the sound bank, transposing the recorded phrases into a different key or altering them to fit your choice of scale (the scale-mapping menu is shown overleaf). Ueberschall provide 28 altogether; standard classical, pop and jazz scales (major, minor, pentatonic, blues and bop, for example) are joined by many European and non-European modes. Whatever your choice, notes will be changed in the phrase to match your chosen scale or key.

The final column on the right in the Sounds view is the key-assignment area. If a Program has already been loaded, you'll see phrase names assigned to the keys on the graphical keyboard that runs up the left-hand side of this column — otherwise, the column stays blank. It's possible to drag phrases or entire Programs into this column — if you want to assemble multiple Programs into one 'super-Program', you just drag and drop them onto empty keys, and the assignment starts at the key where you let go of your mouse. You're even free to mix and match phrases from instrument Programs, and any transposition, key or scale settings you've chosen while auditioning the phrases are dragged along with the phrase, and can be saved using the File button mentioned above (the Volume, Pan, Pitch and Formant settings you've chosen at the top of the display can also be saved with each phrase). This is great.

In fact, there's only a slight restriction here: the bottom note is C1 and the top C4, giving you three octaves' worth of possible note assignments per Program. In practice, this isn't a limitation, as the Liquid Instruments don't currently offer any way to be used multitimbrally. I did notice that the titles of Programs named using the file saver window don't show up in the Program display on reloading. If you name the Program from the lower display first, then that name *is* reflected on reload.

One last file option allows the user to to save 'Keys' — individual edited phrases — so that new Programs can be assembled from bits of other custom examples. This is necessary since non-factory Programs don't show up in the library pop-up menu or sound browser: they can only be accessed via the File menu.

A pair of arrows to the right of each entry in the key-assignment mapping list provides basic audio out routing. This is an under-explained feature in the manual, and seems equally under-developed in the software. Within Cakewalk *Sonar*, a single stereo (ie. non-multi-channel) instance of *LIS* appears in the track list. *Cubase SX* handles this a little better, providing four output pairs, arranged as two stereo tracks. Each of these had a different character, rather as if the sax had been miked in two different ways for each phrase. This is potentially interesting, but no data is provided about it in the documentation.

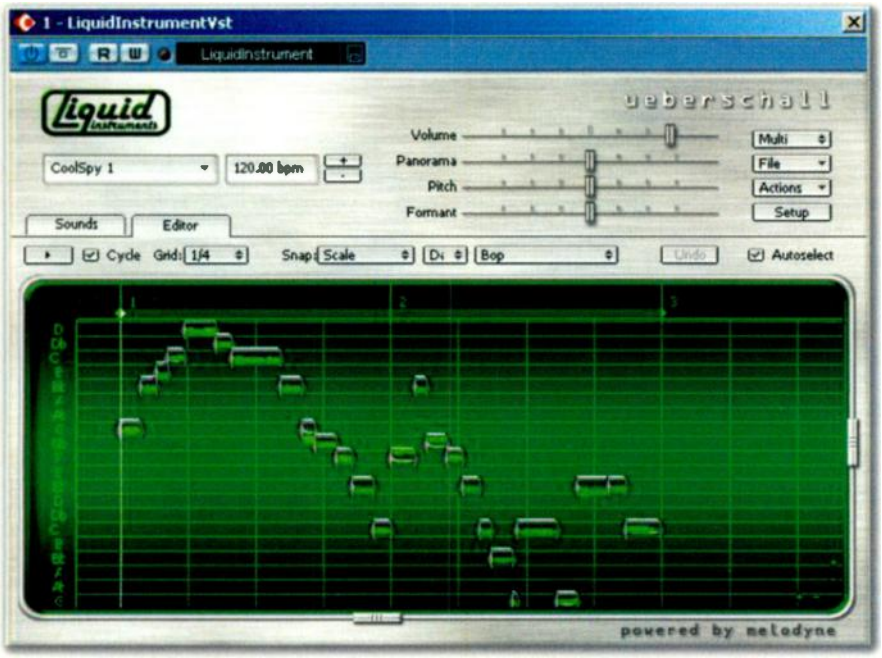
Test Spec

PC REVIEW SYSTEM
- 3.06GHz Pentium 4 PC with 1.25GB of RAM running Windows XP.
- Steinberg *Cubase SX* v2.2.
- Ueberschall *LIS* version reviewed: v1.0.2.1.

Close To The Editor

And so to the Editor, a highly *Melodyne*-like display where note-level manipulation can be achieved. In contrast to the Sounds screen, the main attraction here is being able to work on each note separately rather than on the phrase as a whole. The Editor appears as a simplified piano-roll-type grid. Note names stretch up the right-hand side, and the notes themselves appear on the grid. Even grace notes and most ornaments get their own 'event': a miniature waveform inside what looks like a glass tube. The phrase on show is normally the phrase most recently triggered from your keyboard, or the last selected in the sound browser.

The grid itself is a little strange — it's clear enough what's going on, but I feel it could have been better customised to the job in hand. For example, the phrases in this library are not long — one or two bars mainly, with a couple in the five-bar range — and yet if you zoom out on the display, you can see up to 27 bars, most of which are empty, plus a single pickup bar at the start. Perhaps future libraries will have phrases this long, and need a pickup,



The Editor window looks most *Melodyne*-like: the blobs each represent a note, and you're free to move them up or down in pitch, change their orientation in the phrase, or chop them out entirely.

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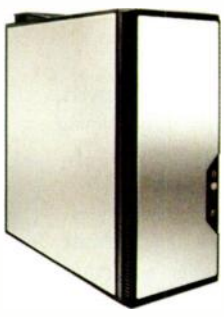

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▶ but why not restrict the display when the current library, or phrase, doesn't need it?

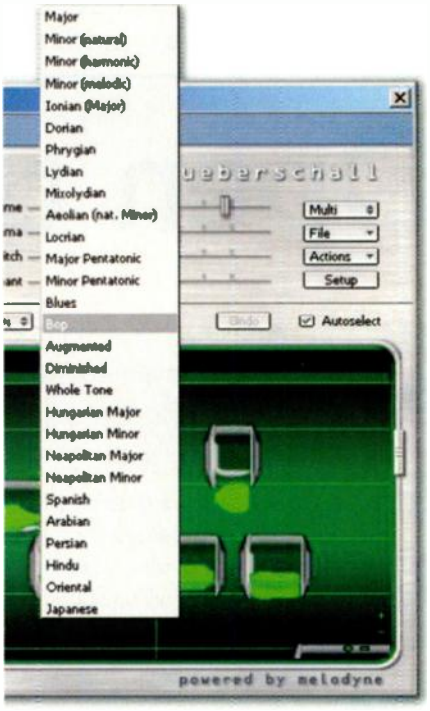
Helpfully, the display can be navigated via vertical and horizontal scroll bars when there's too much data to display, and you can zoom on both the x and y axes, although the buttons for doing so are very small, and are on the bottom-right corner of the display itself, which means that they're often obscured by events on the display.

As in *Melodyne*, audio events can be moved and stretched almost as if they were MIDI data. You drag events up or down to change pitch in semitone steps, and can highlight several, or double-click on the grid to highlight all events in a phrase so that you can edit several at once. Two 'snap' options are available, semitone or scale, the latter only allowing you to select and drag to pitches in the currently selected key or scale/modality. You can also fine-tune notes by dragging events while holding down the Alt key (on Macs) or the Control key (PCs), although you'll need to be zoomed in close and have a steady touch. Shifting microtonally positions the waveform higher or lower within the 'tube' that makes up the event, rather than shifting the entire tube, as with semitone shifts.

Changing pitch keeps the feel of the original performance, although you can edit this too if you wish, changing note length and position. However, this is one area in which *LIS*, and *Melodyne*, don't work exactly like MIDI. It's not possible to move notes around independently; altering the length of a note or its start point simultaneously affects notes to either side, so as not to spoil the flow of the overall phrase. Thus if you shorten a note, the note immediately following will be lengthened and moved back in time to fill the space. Likewise, a note moved forward will not only become shorter, but will cause the preceding note to play longer, again to fill the gap. However, it doesn't take long to become accustomed to this.

The display grid has an impact on how note moves or length changes are made: though the resolution is set at a quarter, eighth or 16th note, the changes are 'quantised' to half that value, so the finest resolution is actually a 32nd note. In addition, in the same way that microtonal pitch changes can be made, 'microtiming' allows notes to be moved freely (while holding down Alt or Control), independently of the grid setting.

Another way to rejig a phrase is to change its start, end and loop points. These are indicated by little arrows above the display, which are almost as insignificant as the Zoom controls! A highlight bar indicates the section to be played and/or looped — you can start the phrase playing back anywhere, and have any section of it loop when the triggering event is held. It's even possible to start inside the phrase and loop from an earlier point. The purpose of the pickup bar now becomes clear; should you want to completely subvert the feel of a phrase, you can set a start point *before* the start of the phrase. You can even erase individual notes entirely (and you can Undo if you delete by mistake). Deleting is one case in note editing when the preceding or following notes don't stretch to fill the gap.



This image shows the scale pop-up list which *LIS* uses to 'quantise' pitches. In the background, you can see notes zoomed in nearly as far as they can go, which is great for working on fine changes in pitch or position. Note the tiny zoom buttons in the lower right-hand corner. You'll have to look hard!

Generally, altering phrases with the Editor is very intuitive, and it's easy to forget that you're editing the performance within a plug-in, not your host sequencer — but of course, whatever you do to the blobs in *LIS*'s editor display, the whole phrase is always triggered by a single MIDI event.

Turns Of Phrase

The most important thing about the phrase library is, of course, the player (David Milzow) and the music he's playing. Using a variety of vintage horns and mouthpieces, David blows his way in jazzy and soulful fashion through the basic soprano, alto, tenor and baritone family (there's no bass sax, sadly). His experience shows in the neatly executed, stylistically appropriate licks, riffs and solos he provides. The baritone patch 'SoulSlap' is a standout amongst dozens, funky mouthpiece pops and all. In fact, it's the feel of these recordings, enhanced by the key noise and breaths, that makes them so strong. Sadly, the Program names don't give you much idea of what to expect: 'AFunk', 'Boogalues', 'MightyBop', 'SoulSlap', 'SoulGlow' are some of the more comprehensible ones, but some refer obliquely to tracks, styles and players, and you'll have to confirm by listening in many cases.

Whilst the playing is very good, the selection of styles broad, and the recording excellent (no compression or other effects were used, leaving that up to you), the phrases themselves are a little odd. There's little stylistic similarity between the Programs for each instrument — a completely different collection is played by each. Obviously Ueberschall weren't going for the 'mix and match' ensemble approach, but many users might like to at least have some pointers or short cuts to using more than one instrument in a larger context.

And I have to say, too, that as good as the playing is, the actual notes occasionally seem a little random. I feel as though the Ueberschall recording team were eavesdropping on a bit of a jam session, albeit one with some structure!

However, this slightly random feeling is mitigated by how flexible the phrases become in the *Melodyne* engine. It's as easy as clicking on a couple of menus to match the key or modality of a phrase to your host track, and the tempo always matches. This very ease of use makes it simple to forget that you're not dealing with a virtual instrument, but you soon remember if you try to get *LIS* to play your own melodies — re-shaping the existing sax phrases to play what you want takes rather longer than it would to play the same line into a virtual instrument. Getting the best out of this library, therefore, requires you to become familiar with its phrases, and to get used to tweaking them to suit your needs, rather than using it to create new melodies from scratch.

Conclusion

Sampled phrase collections obviously have a place in modern music making; specialised collections of phrases and loops can make up for shortcomings in our musical abilities, or musical circle. If you're bad at drum programming or don't know any sax players, why *not* borrow the playing or programming of a pro via sample collections? And Ueberschall's Liquid Instruments sit intriguingly between being sample libraries and virtual instruments. Sure, *LIS* is a phrase collection, but it's one that offers a lot more flexibility than most. SOS

information

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Yamaha AW2400

Digital Multitracker

After more than five years, Yamaha's AW range boasts a new flagship, offering 24 tracks, a sweeter-sounding automated mixer, four multi-effects processors, and convenient USB file transfer. We find out if it has been worth the wait...

Tom Flint

The AW2400 is a 24-track recorder with an impressive digital mixing engine culled from the company's 01V96 v2. Arriving hot on the heels of the smaller AW1600 reviewed in *SOS* October 2005, it partially fills the gap left by the now-discontinued AW4416 and AW2816 models, offering moving-fader automation, digital editing, four freely assignable stereo multi-effects processors, USB 2.0 interfacing, an internal CD-R/W drive, MIDI controller facilities, a mini-YGDAI expansion slot, and a 40GB disc drive.

Overview

The two newest AW-series machines seem to have been designed with each other in mind, so they share the same operational ethos and a similar basic feature set, despite the AW2400 having a UK price almost twice that of its smaller sibling. Clearly the AW2400 is a more professional product offering a grander feature set, but, according to sources at Yamaha, there is also a quality difference between the two machines. I'm told that the AW1600's processing is similar to that of the 01X hardware controller, whereas the AW2400's digital mixing engine is a taken primarily from the 01V96 v2. This heritage also means that the new flagship multitracker has superior processing to that of its predecessors, which were based on the old 01V technology. The microphone preamps have also apparently been upgraded, as Yamaha were keen to address criticisms which had been made about the rather ordinary preamps in the earlier machines, but these new designs aren't the same as those in the 01V96.

The main physical advantages of the AW2400 over the AW1600 can be observed pretty much at a glance. For a start, there's a much bigger and better screen (the same size as that of the AW4416) and, although you can never really have a display that's too big, what's on offer here seems perfectly acceptable for all the tasks it's asked to perform. The long travel of the motorised faders is also clearly evident, their 100mm range being twice that of the AW1600 and 40mm more than any previous AW machine. Yamaha have used the extra distance to provide the user with more control where it is most needed above and below the unity gain position. Aside from making it easier to set a mix balance, longer faders also allow the user to achieve smoother fades, something which is very useful when sculpting an automated mix.

Initially the AW2400 seems to have fewer controls than the AW4416, but its overall footprint is actually slightly larger, creating the illusion of sparseness. Loosely speaking, the layout places all the mixing, navigating, and editing tools in groupings on the right-hand side, leaving any buttons relating to screen navigation over on the far left and under the screen. The AW2400 actually has far more locator keys than any other AW multitracker, and it retains the same 99 markers, A/B repeat facility, Jog On Nudge sound sample auditioning, and punch-in/out controls, so getting about a song in a variety of ways is not a problem.

The AW2400 also introduces a matrix of knobs and buttons (in the area labelled Selected Channel) that adjust dynamics, effects, and EQ parameters, as well as aux-send levels for each channel. Yamaha have used the types of knobs that double up as buttons when pressed, and the arrangement is intended to provide fast operation and a degree of hands-on control

Test Spec

- Yamaha AW2400 OS v1.10.
- 2.66GHz Pentium IV PC with 256MB RAM running Windows XP Home.

World Radio History

over a variety of on-screen parameters. Clearly, though, there are not enough knobs to adjust all of the variables, for example when changing compressor settings. ▶

SOUND ON SOUND

Yamaha AW2400 £1799

pros

- Flexible routing.
- Fast USB operation.
- Good sound quality.
- Plenty of channel dynamics.
- Long motorised faders.
- Type II EQ from the latest 0-series consoles.

cons

- Gates not available on monitor channels.
- Compressors don't have side-chain input options.
- No fader layer for individual track effect send levels.
- Can't use Waves Y56K card or Apogee I/O.
- Could do with having more editing tools.
- Only 12 tracks in 24-bit mode.
- Cannot import 24-bit files from other AW machines.

summary

A very powerful multitracker that does its job well and efficiently.

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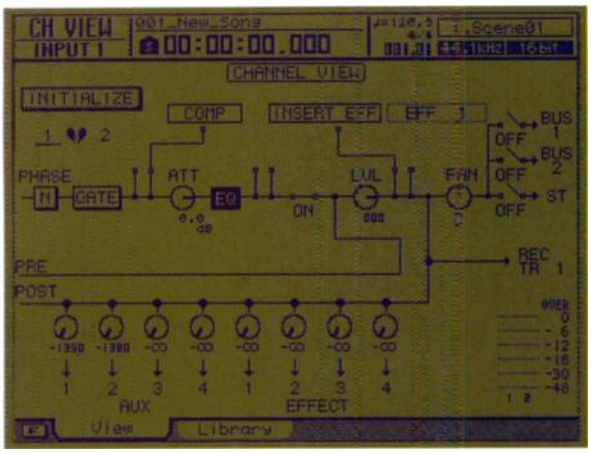

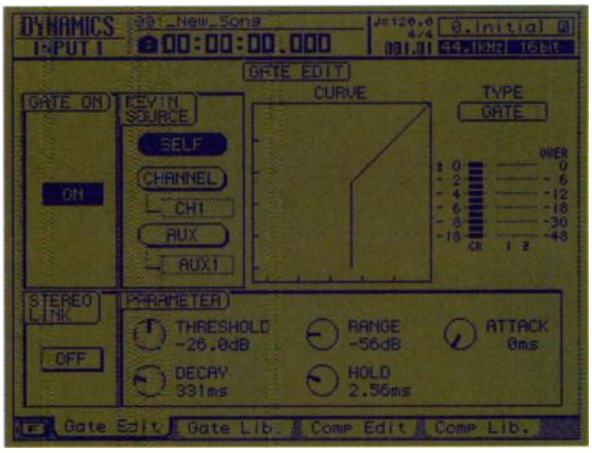

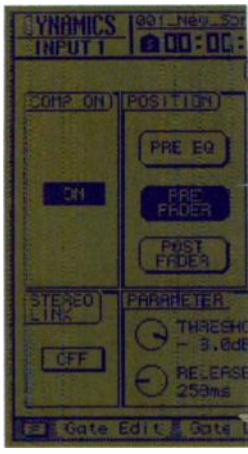

Channels, Signals & Busses

The AW2400's mixer provides 24 monitor channels specifically for handling the playback tracks, but there are a further 16 input channels that can be routed directly to the master buss and mixed in with the recorded material. When a track is recorded it is initially routed through an input channel, and any of its active processors, on its way to the hard drive, so there are enough channels for 16-track simultaneous recording. There are just eight inputs as standard, though, so you'll need one of Yamaha's mini-YGDAI input cards installed in the rear-panel expansion slot if you want to achieve this many simultaneous tracks in practice. The slot also accepts a number of output cards too, so a multitrack recording could be streamed out into another system if the need arose. Yamaha's mini-YGDAI cards offer a variety of different I/O formats, including analogue, AES/EBU, ADAT, and mLAN, but the only third-party card that's currently compatible is the Waves Y96K — the older Y56K cards won't work, and sadly neither will the Apogee A-D and D-A boards that benefited the AW4416.

Elsewhere on the back panel are individual jack and phantom-powered XLR sockets for each input channel. Inputs one and two also have a pair of TRS jack insert sockets which interrupt the signal path before the A-D converter. The four Omni Out jacks are primarily intended for sending custom mixes or solo tracks to external effects processors, but they could also feed stage monitors or headphone amplifiers. As you'd expect, there is a dedicated headphone output with its own volume knob, but sadly there's no second feed so that both a performer and recording engineer can listen in together. The other analogue outputs are a pair of balanced +4dBu Monitor Out jacks with their own volume pot, and an identically rated pair of Stereo Out jacks providing the direct output from the main stereo mix buss. The two MIDI sockets are labelled Out/Thru and In, so the dedicated MTC output socket of the AW4416 has been abandoned. Finally, there is a jack for connecting a footswitch, a pair of RCA phono S/PDIF digital connectors, and a USB socket.

Although the AW2400 can record up to 24 tracks in 16-bit mode, 24-bit songs have just 12 tracks at their disposal. Compared to the AW4416, which could record 16 tracks at 24-bit resolution, that's disappointing, but it is still better than the AW1600's eight. The 12 track faders are either assigned to tracks 1-12 or 13-24 according to the bank that is currently selected. Other bank options enable the faders to control the levels of the input channels and the aux and effect send masters. There's even a dedicated layer for remote MIDI control, in conjunction with a computer sequencer or XG sound module. What does seem to be missing, though, at least from the perspective of an AW4416 user, is a set of layers for setting the aux and effect send levels of individual tracks and channels. In this case the send amounts are controlled on screen using the data wheel or Selected Channel knobs to alter values, which makes level automation more difficult. As is standard digital-multitracker practice, every record track offers the chance to store a further seven alternative takes in its virtual layers, and the same is true of the master stereo track, so up to eight alternative final mixes can be stored within a single Song file without compromising the recorder's track count.

Type II EQ Algorithms

There wasn't much wrong with the design of the old AW's four-band parametric EQ, so it has been retained on all channels. However, the AW2400 also offers Type II EQ on its monitor channels. The Type II algorithm was developed for Yamaha's latest generation of digital mixers, and has been noted as having more of an analogue character than the older processing, now labelled Type I. In both cases the bands sweep from 21.2Hz to

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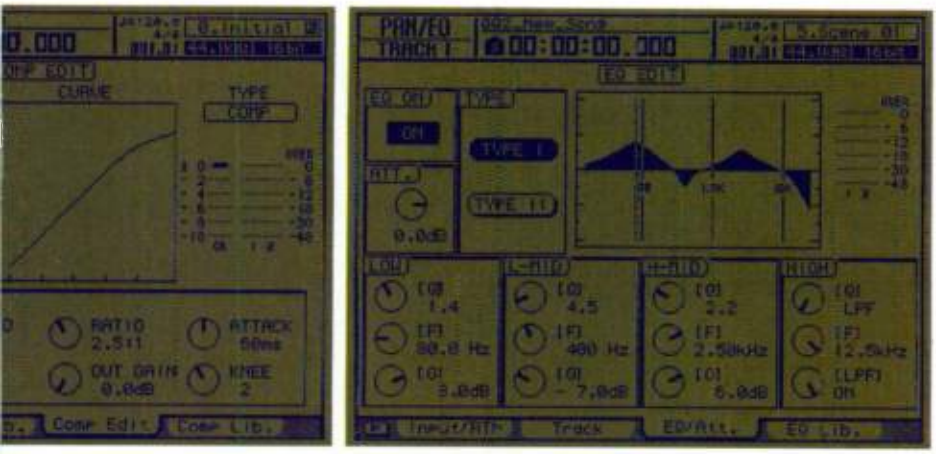

The main Channel View screen (far left) allows you to see at a glance how all the processing is routed for each channel. Separate screens (left to right) then provide detailed settings for the gate, compressor, and EQ.

20.0kHz, have ±18dB gain, and offer a wide Q-value range. The high and low bands also feature the option of shelving-filter and pass-filter shapes. What is new, though, is that the gain controls now have 0.1dB increments instead of the 1dB increments of old.

Each input channel has separate gate and compressor processors, while the monitor channels have only the latter. However, the compressor processor can also function as an expander or compander. The dedicated gate benefits from flexible Key In assignment, where any of the first 16 tracks or four aux busses can be selected to feed the processor's side-chain, but this facility is not available on the other dynamics processor. This is unfortunate, because keying a gate from a kick and snare track is a useful technique which cannot now easily be applied to monitor channels during mixdown. An early firmware update added gates to the effects, so that they could be inserted into monitor channels, but these gate processors also provide no side-chain access. The only workaround would be to send a recorded signal out of the machine and then return it through one of the input channels, but this seems unnecessarily long-winded.

Although there is no channel delay available, the signal path through both input and monitor channels is particularly flexible. There are three insert locations per channel, so that effects and processors can be patched very precisely. The first insert point is located after the phase switch and input-channel gate, but just before the level attenuator and EQ section. Immediately after the EQ comes the second insert junction, followed by the channel On button and the fader level adjuster. The final insert point is next, just before the post-fade sends to the aux and effects busses. Last in the line is the pan control. Although the EQ position is fixed, the channel dynamics can be inserted into any of the three locations, just like the effects, therefore making it possible to process before or after equalisation. What's more impressive is that each of the three insert positions can accommodate both an effect and the ▶

Time For A Sequencer?

Instead of giving the AW2400 a MIDI sequencer, Yamaha have designed it to double as a remote MIDI control surface for computer-based sequencers via a menu of MIDI templates relating to sequencing programs such as *Cubase*, *Sonar*, *Logic* and *Pro Tools*. Yamaha may be catering for those who want a studio controller that can perform the occasional live recording job. However, I suspect that many AW2400 fanciers actually don't use computer sequencers, and are looking at a hardware solution to do the majority of their recording, in which case an onboard sequencer would be more valuable than a computer-controlling remote MIDI facility.

Conversely, those who use software for sequencing are probably going to use it for recording too, in which case the 01X is a better option. Other AW machines, including the AW1600, have incorporated a basic sequencer to manage the triggering of phrase samples, but the facility was always a slave to the 'sampled loop' concept, and never provided the MIDI editing tools necessary for sequencing an array of outboard keyboards and modules.

So why have Yamaha never included a proper sequencer in their multitracker range? They already have a very successful QY range of sequencers, so the technology is already there. All it would take would be a couple of extra MIDI sockets...

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dynamics processor, and their order is interchangeable.

Although all this sounds confusing, the exact configuration of any input, monitor, effect, or buss channel can be observed from its own View page, which shows all the currently established connections in an editable schematic. Although you still have to look elsewhere to see and alter EQ, dynamics, and effects parameters, it is possible to switch the insert points and the on/off status of each section, and attenuate levels, all from this single screen. This arrangement is neater and friendlier for patching than the facilities in previous AW designs, but it is a shame that the page doesn't link directly to the pages for channel EQ and dynamics adjustments.

"In fact, if you can do without sampling, MIDI sequencing, or synthesis facilities in a multitracker, then you won't find anything better for the money than the AW2400."

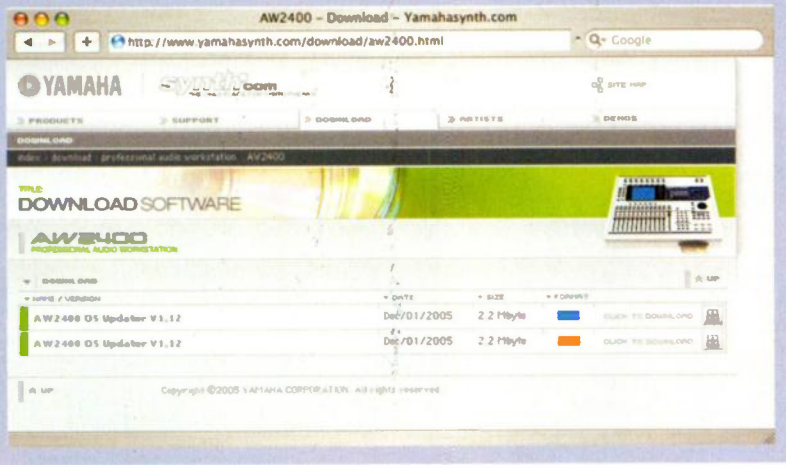
Four Internal Effects Processors

There's not much new to be said about the effects, as they seem to offer the same set of algorithm options as the rest of the AW series, although it's disappointing that the extra guitar amp and speaker emulations introduced by the AW1600 haven't been included. The AW2400 does, however, have four processors, and the algorithms themselves have been given a little more processing power. It's clear that the effects are not nearly as detailed as those of the Waves Y96K card, which I installed in the mini-YGDAI slot for comparison, but they do seem to have a touch more presence than before. That said, it'd still be worth trying to incorporate any good-quality outboard effects processors you have into the setup.

The Pitch Fix tool seen on the AW1600 is also included here, and again it's been kept separate from the effects and processors so that it is available when a recorded track is being bounced through the processor to a spare track. This time, though, there are a few more controls

Transfer Troubles

Having reviewed Yamaha's AW1600 earlier in the season, I'd saved my test track in AW2816 format so that I could load it into my own AW4416. The song did play back more or less successfully, although a 'Warning: Disc Busy!' message constantly flashed across the bottom of the screen and there were a couple of drop-outs in places. I experienced an even worse problem loading the AW1600 track into the AW2400; this time tracks dropped out more frequently, and their timing was wrong. More seriously still, I found that files created by an AW4416 would not load at all. Thankfully, Yamaha were able to send me a firmware update (OS v1.10) which remedied the format problems I was having and also added gates to the effects library. If your machine has an earlier version of the operating system then head over to www.yamahasynth.com/download/aw2400.html to download the latest update.



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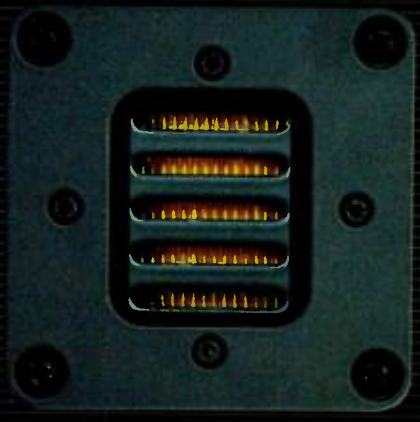

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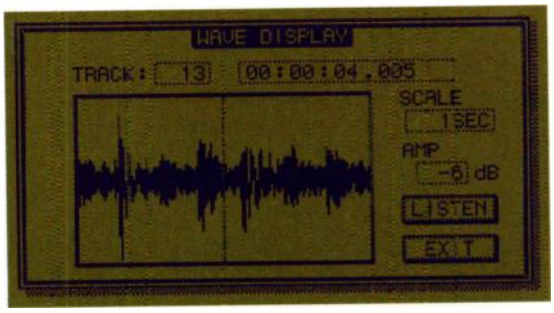
and options to play with, so getting the desired result is made easier.

The one feature found on several other previous AWs that is missing from the AW2400 is the internal phrase sampler and its sequencer — if loops are your thing, then the AW1600 might be a better bet. In contrast, the MIDI facilities are more or less identical across the AW range. The AW2400 can slave to MTC and MMC or act as a master device, and it also sends and receives MIDI Continuous Controller and Program Change messages in its Remote mode, allowing the top-panel controls to send a variety of MIDI messages.

Digital Editing

Sadly Yamaha haven't added any significant new editing facilities, so what's on offer remains as it was on the AW1600 and other OS-updated AWs. The choices are Erase, Delete, Insert, Copy, Move, Exchange, Time Comp, Pitch, Import, and Export. What they have done though, is design the interface so that editing becomes much faster. For example, when the Work Navigate section's Edit button is pressed, a page appears on the screen from where the relevant single track, virtual track, or pair of tracks is selected, and the edited portion is defined. All editing options are found in a drop-down menu which instantly appears when the Command box is activated. From then on either the data wheel or the up/down cursor keys are used to whizz up and down the list, and a press of the Enter key immediately calls up the highlighted choice, leaving any pre-established edit points and track-selection information intact.



The improved Wave Display now lets you fine-tune your edit points by ear as well as by eye.

Audio can be played back from within the editing page, so there's no need to go in and out of modes to check the success of edits, as was the case with the AW4416. This also enables edit points to be placed in real time while the song is playing. All the user has to do is highlight either the In or Out location field and press the Enter button at the appropriate moment to register an edit point — repeatedly pressing Enter as playback continues simply modifies the location accordingly. The only slight niggle is that the track display does not become greyed or highlighted between edit points.

Strangely the waveform display window is not reached from the editing pages, but from individual track pages. This feature resembles that of the AW1600, and is better than the AW4416's offering. Not only does it provide a Listen button for playing the displayed section of waveform, with instant location via the Mark Search and A/B buttons, but the horizontal scale is also calibrated in milliseconds all the way down to sample level, while the amplification value is labelled in decibels.

User Impressions

Although it took me a while to understand the interplay of the buttons and knobs in the matrix area, I found the AW2400 pretty straightforward to use, and I expect that even novice users will get to grips with the operating concepts fairly quickly. Everything about this machine is faster and slicker than on my old AW4416, including the speed with which it saves and shuts down. There's no dawdling when going into the editing pages, or from a track playback position into a setup mode, and the sort of rapid automatic punch-in/out re-recording demands that would provoke an AW4416 to crash were handled without hitch.

Linking up the machine with a computer via USB couldn't be simpler or faster, although the file storage structure only becomes clear after looking at the manual. Yamaha have made good use of event lists for editing the 16 undo levels, the Marker and Locator positions, and the automation data, and the working methodology is pretty consistent throughout. Thankfully, hard-drive noise is minimal, so microphone recording can take place beside the AW2400, and the overall impression is that the product is of a robust build.

Sonically, there does seem to have been an improvement since the AW4416. If I could characterise the sound at all, I'd say this multitracker is a little punchier in the mid-range than either the AW4416 or AW1600. The Type II EQ sounds more natural and richer to my ears, functioning more incisively, and the preamps capture

The rotary controls in the front panel's Selected Channel section have a dual action: turn them and they adjust a selection of different parameters, depending on which button is active to their left; press them and they select different effect slots and aux sends for editing, as well as switching between different parameter pages.

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Previous AW Multitracker Reviews In *SOS*

• AW4416: SEPTEMBER 2000
www.soundonsound.com/sos/sep00/articles/yamahaaw.htm

• AW2816: JANUARY 2002
www.soundonsound.com/sos/Jan02/articles/aw2816.asp

• AW16G: OCTOBER 2002
www.soundonsound.com/sos/Oct02/articles/yamahaaw16g.asp

• AW1600: OCTOBER 2005
www.soundonsound.com/sos/oct05/articles/yamahaaw1600.htm

the roundness of sounds slightly more than the old ones did.

A New Champion?

It's great that Yamaha have applied the core technology of the 01V96 to this product. The Type II EQ, flexible channel routing, faster operation, and improved preamps all add to the product's appeal. Many customers new to this level of professionalism will be well rewarded by the tools on offer here, but Yamaha have missed out on an opportunity to sell this product to existing AW4416 users who are used to working on 16 tracks in 24-bit mode (and who have lots of 24-bit song files they'd like to carry across) or who want to reuse a Waves Y56K card. It's possible, given the improved processing, that a 16-bit song recorded on the AW2400 sounds better than a 24-bit one created by the AW4416, but the compatibility of old material remains a concern. It may also worry some people that an AW2400 song file backed up in AW2816 mode will not store any of the virtual master stereo tracks.

The lack of gates on the track channels is definitely a step in the wrong direction. The gates in the effects menus aren't a substitute for having them on monitor channels, especially as they offer no side-chain access. It's also a shame that the Type II EQ is limited to the monitor channels, and that no new digital editing processes have been added. Both Boss and Korg currently offer a greater variety of editing options more comparable to the facilities found on computer audio editors and samplers.

I also found it curious that the AW2400 should lack some facilities which were available on the AW1600 — the phrase sampler, some of the modelling algorithms, and the dynamics side-chain input options. Admittedly the sampler wasn't very sophisticated, so a dedicated sampler would be preferable anyway, but I can't understand why the other things aren't there.

In some important ways the AW series is now much improved, but the range is now over five years old, so I'm surprised that Yamaha haven't made more advances than they have. Nevertheless, at this UK price the AW2400's impressive range of processing and mixing facilities is not matched by the competition — largely courtesy of Korg's D16XD and Roland's VS2400CD. In fact, if you can do without sampling, MIDI sequencing, or synthesis facilities in a multitracker, then you won't find anything better for the money than the AW2400. SOS

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The Studio SOS Guide To Monitoring & Acoustic Treatment

The Studio SOS visits have shown that many home studio owners are having problems with their monitoring. So this month we explain the principles anyone can use to get their own control room sounding right.

Paul White

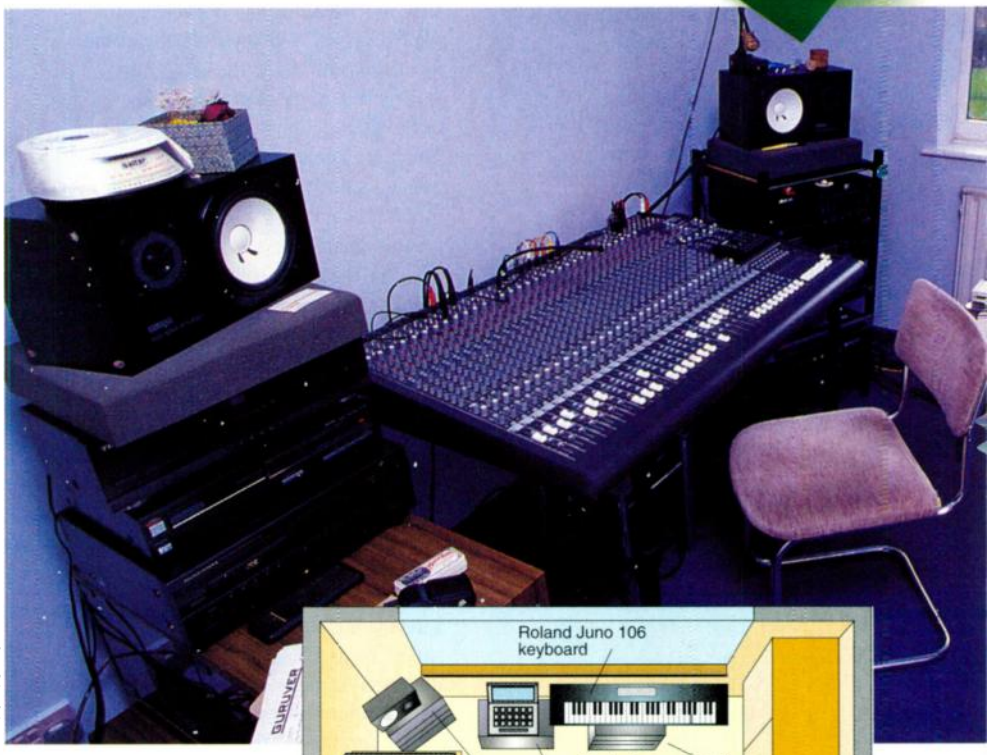
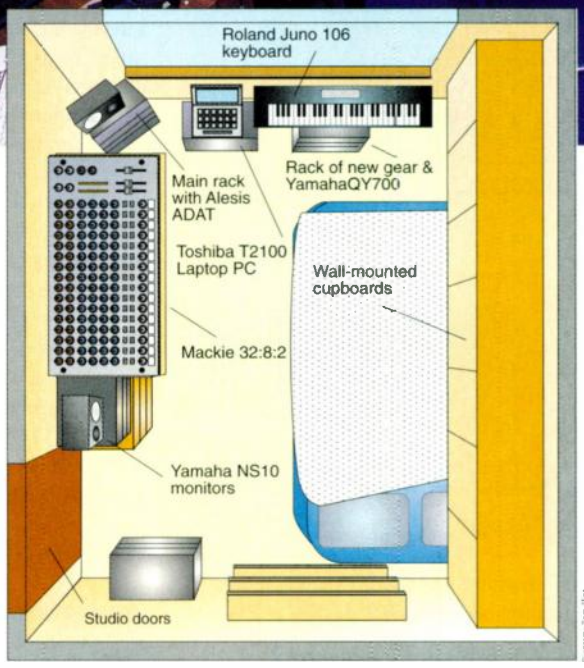


Photo: Richard Ecclestone



Here you can see several of the mistakes commonly made in setting up monitors in the home studio. For a start, a number of factors are compromising the stereo imaging: the speakers being on their sides, their asymmetrical placement in the room, and the insufficient angling of the drivers towards the monitoring position. Also, the right-hand speaker is placed directly in a corner of the room, while the left-hand speaker doesn't appear to be mounted on any particularly solid — both of these factors would have an impact on the bass performance.

Professional studio design is a very specialised science, with more than a touch of 'black magic' thrown in, but as our Studio SOS visits have demonstrated, it is fairly simple to make a huge improvement to an untreated project-studio room without spending a fortune. However, it's also become apparent how often readers' own attempts at DIY acoustic treatment cause more problems than they solve. So I thought it would make sense this month to have a proper look at the principles behind the acoustic-treatment advice we often give on our Studio SOS visits, so that you can apply them to your own setup.

Room problems can be broken down into two main categories: reflections of mid-range and high frequencies from hard surfaces; and peaks and troughs in the room's low-end response caused by the room's dimensions and the reflectivity of the walls at low frequencies. Both compromise the accuracy of what you believe you are hearing from your monitor speakers, and each has to be dealt with in different ways.

Placing Monitors & Studio Equipment

In an ideal world, what you hear when sitting in your monitoring chair should be mainly the direct sound from the speakers. However, unless you record in an anechoic chamber and cover all your gear in rockwool, there will invariably be some room reflections, and the strongest of these should be either absorbed or diverted before they reach your main listening position. In professional studios there are clever tricks that you can do with wall angles to divert reflections. However, most home studios use rectangular rooms, so that's what I'll

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concentrate on here.

Reflections from the desk and other nearby equipment can be a big problem, so sorting out the location of the monitors themselves should be the first priority before fixing up any acoustic treatment. First of all, the monitors should usually be used the 'right way up', because lying them on their sides will compromise the stereo image significantly. Ideally, the speakers should also be on stands that put them at head height, and the drivers should be angled so as to point towards your head. Avoid putting the monitors too far into the room's corners, and observe the manufacturer's recommendations on how far from any walls they need to be. For the best stereo imagining, it's also best to place them symmetrically in the room, ideally firing down the long axis in smaller rooms, and set up such that the speakers form two corners of an equilateral triangle, the third corner falling at or just behind the listening position.

It is important that no hardware, such as computer screens or racks, comes between you and your monitors, and that the desk surface is significantly lower than the monitors, so as to avoid strong reflections bouncing off the desk and into your face. If in doubt, put a mirror flat on your desk between you and the speakers, and if you can see the speaker, particularly the tweeter, when you look in the mirror, you have a potential reflection problem which should be addressed by moving the speakers if possible. Where the speakers must stand on a desk or shelf, foam isolation pads help keep the sound clean, and some products also provide a means to angle the speakers up or down if necessary.

The other consideration is that it helps not to have the speakers set up midway along any of the room's dimensions — so neither speaker should be exactly halfway between the side walls, or halfway between the floor and ceiling, for example. If two or more of these dimensions are equal, you could end up with bumps and dips in the low-end response, even if the rest of the room is acoustically acceptable.

The Sources Of Unwanted Reflections

Mid-range and high frequencies reflect from hard surfaces such as plaster or plasterboard walls in a similar way that light reflects from a mirror. The effect is not quite as exact as with a mirror, as some of the sound energy is scattered, and a little is absorbed, but in simple terms you can think of hard walls as approximate acoustic mirrors. If you put a mirror alongside a light bulb, you see the light bulb itself and also its image in the mirror. Both act as real sources of light as far as you, the observer, are concerned.

The same thing happens if you stand a speaker close to a hard wall — a phantom sound source is created by the reflection, so now you hear sound from both the speaker and the wall. If you know which part of the wall is responsible for reflecting the phantom image to your mixing chair, then you can concentrate your acoustic treatment in that area. In fact, you can use a real mirror to find out where that spot is by getting a friend to hold the mirror up flat against the wall at different locations until you're able to see an image of your loudspeaker from the mixing position. It's for this reason that we often refer to these areas as the 'mirror points'.

In a normal home studio setup (a rectangular room with a flat ceiling), there will be images on the side walls and ceiling between you and the speakers. Strictly speaking, there will also be one on the floor, but the chances are that this will be obscured by the desk holding your equipment. Clearly, we can also hear sounds from behind us, so the rear wall will also ▶

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be a source of reflections, plus there will be reflections from the wall directly behind the speakers, and all these need to be considered when applying acoustic treatment.

Once you have identified the main reflection points, you can place treatment there to absorb the sound and kill the reflections. Bear in mind, though, that most people tend to move around a bit while recording and mixing, so the absorber panels need to be fairly large if they are to cover all possible reflection points as we move around.

Effective & Ineffective Absorbers

Now you've probably read about Technical Editor Hugh Robjohns and I sticking acoustic foam onto studio walls, but before you rush off and do this it is important to understand the limitations of such materials. While a thick black cloth placed over a mirror will absorb all the visible light of its reflection, a piece of acoustic foam will only be acoustically 'black' at high frequencies, becoming increasingly transparent at lower frequencies. In very general terms, a piece of four-inch-thick foam stuck directly onto the wall is only really effective for frequencies above about 200-300Hz, whereas a piece of two-inch foam is only effective above about 400-600Hz. In other words, if you halve the thickness of the foam, the frequency above which it is effective moves up by an octave.

Once you appreciate this, you can see immediately why attempts to deaden walls with carpet don't work too well — carpet is relatively thin and so only soaks up very high frequencies. This leaves the low and mid-range frequencies unaffected, giving a dull and boxy result. You can probably now also understand why acoustic foam would need to be several feet thick to be effective at bass frequencies, which is why foam is rarely the most practical solution for bass absorption.

Although foam is quite convenient, it's not the only option. You can also use one or more layers of high-density Rockwool insulation slab, as long as you cover it with fabric to keep those nasty irritating fibres out of the air. Rockwool is just as effective as foam, if not more so, but it does require more in the way of DIY skills.

One very useful tip is that spacing foam or Rockwool absorbers away from your wall by a few inches makes them more effective at low frequencies. For example, spacing four-inch-thick foam four inches from the wall is almost as effective as using double the thickness of foam in the first place! It can help in this instance to mount the foam or Rockwool onto a board with large holes or slots cut out of it to let the sound through — radiator fret panel is good for this, but not pegboard. This board can then be hung in the right place. Another quicker solution is to simply glue high-density foam cubes to the back of an acoustic-foam panel to act as spacers. I've found that spray carpet adhesive is as good as anything for fixing foam.

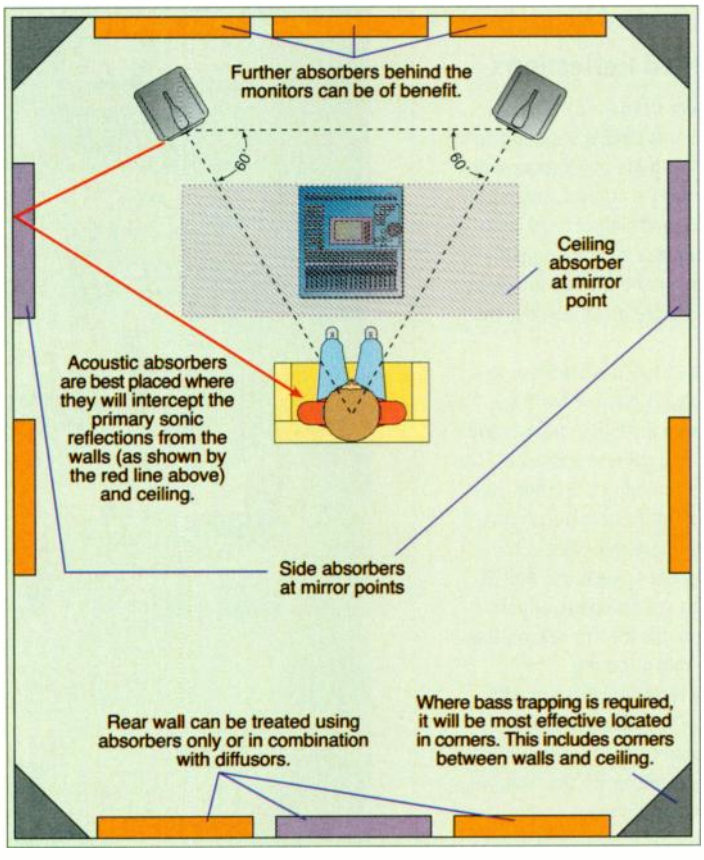
"Attempts to deaden walls with carpet don't work too well — carpet is relatively thin and only soaks up very high frequencies. This leaves the low and mid-range frequencies unaffected, giving a dull and boxy result."

Another way to deal with high-frequency reflections is to break them up so that they become less disruptive. This is called 'diffusion', and requires a very uneven surface with protrusions and wells several inches in depth. Although commercial diffuser designs are available with precisely calculated profiles, putting shelves at the back of your room and part filling them with books, manuals, CDs and bits of unused gear also works quite effectively!

In a normal home studio, 2 x 4-foot panels of foam are convenient to manage, and one panel would typically be fixed to each side wall at the mirror points, with a third at the ceiling mirror point if the ceiling were low enough to cause problems. The next step up from this would be to add further panels behind the monitors, as reflections from this area are potentially very confusing, given that they come from almost the same point in space as the speakers themselves. All these foam panels should be centred according to the engineer's head height when he or she is in the monitoring position. Finally, the rear wall needs to be addressed, which is often best done by combining areas of absorption (foam and sofas!) with areas of scattering.

Room Modes & Low End

In most project studios, dealing with reflections will already vastly improve the stereo imaging and focus of the sound, but some further bass treatment will probably be desirable to even out the bass response in the room, especially if you have monitors that work down to very low frequencies. Bass problems are associated with room modes, which are resonances relating to the room's dimensions — you get them at any frequency with a half-wavelength (or multiple of half-wavelengths) which matches any of the room



This diagram shows how to apply basic acoustic treatment to a typical home-studio room. The absorber panels shown in purple are the most important, but adding in the orange absorbers would improve the situation further. Acoustic foam is a common choice of absorber in this application. If bass trapping is required, then it is usually most effective applied in the room corners (including those corners between any of the walls and the ceiling). Note also the angles and positions of the monitors with comparison to the listening position — arranging the three points in an equilateral triangle will help give a natural stereo image.

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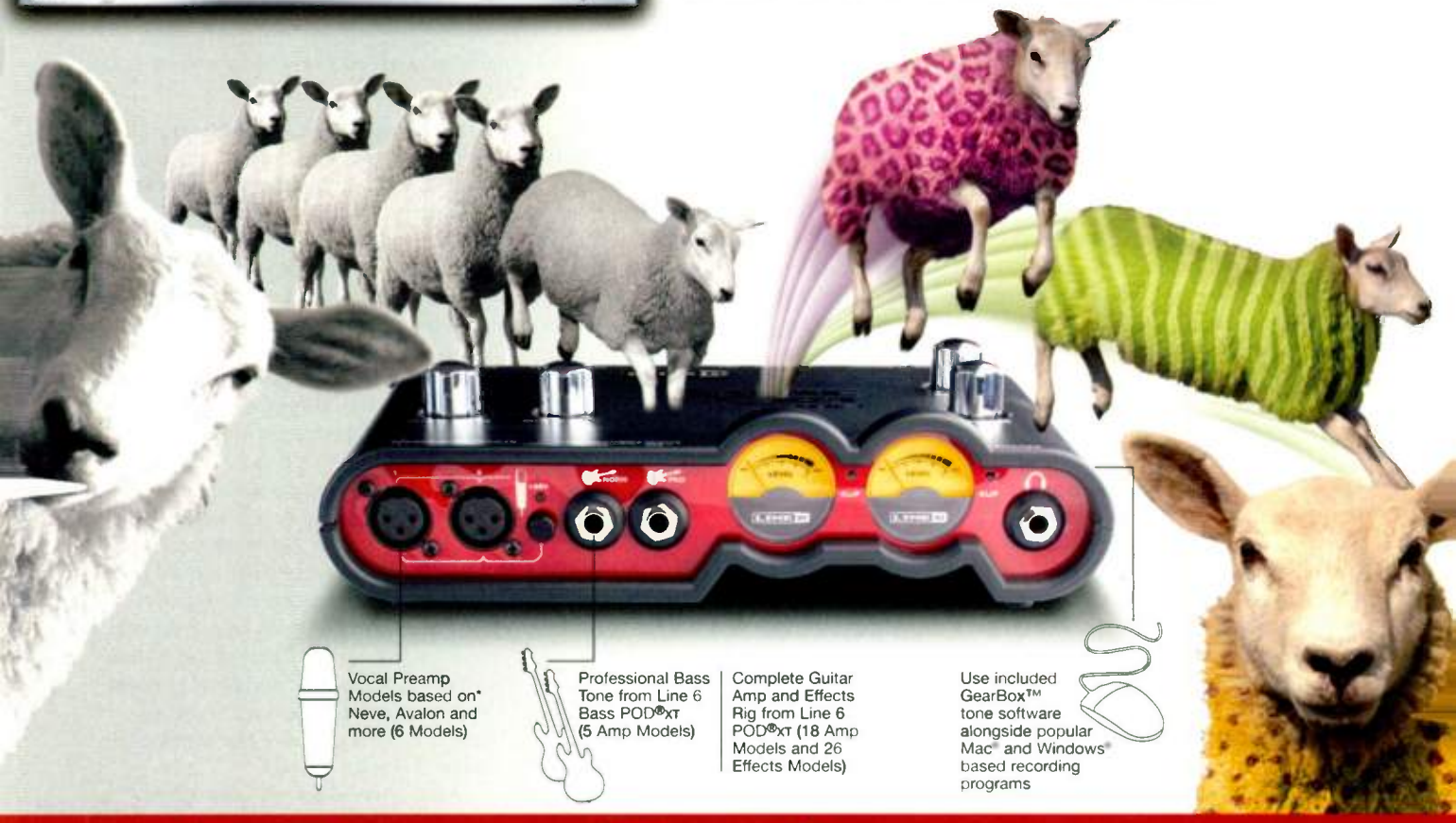

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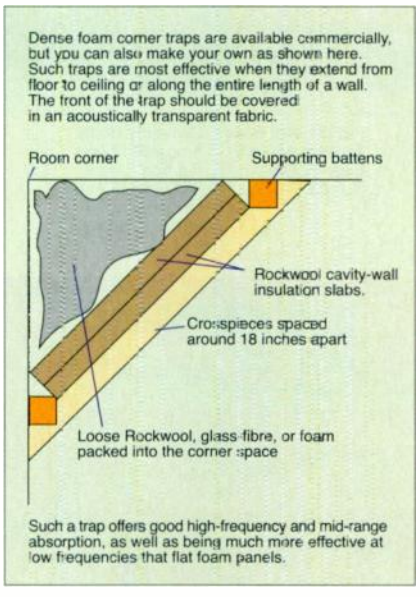
Normally acoustic foam panels will act primarily on mid-range and high-frequency reflections, but you can improve the low-frequency absorption effects by spacing the panels a few inches from the wall surface — the easiest way to do this is simply to stick small off-cuts of foam to the back of each panel as spacers (left). For best results, fix the panels across the room's corners (right).

▶ dimensions. The smaller the room, the more widely spaced the modal frequencies are, so it becomes more likely that the bass response will be uneven.

Depending on the room dimensions, some bass frequencies will be cancelled due to reflections coming back off the wall out of phase with the source, whereas at other frequencies the reflections will be in phase, leading to a boost in level at that frequency. You can often hear these peaks and dips quite plainly from your listening position when you play a chromatic sequence of equal-level bass notes through your monitors. Hugh and I have found particular problems in small rooms that are approximately cuboid in shape, as these often exhibit a big 'hole' in the bass end in the dead centre of the room. What's worse, though, is that the engineer's chair very often ends up being positioned right on the dead spot in such small rooms!

Although low frequencies can be treated using porous absorbers such as foam or rockwool, the treatment needs to be quite thick and also carefully positioned. Where you have a deep ceiling void, you can utilise this as a bass trap by cutting large holes in the ceiling and then stuffing the void with Rockwool, after which the access holes can be covered with acoustically transparent fabric. The same goes for fireplaces, alcoves, or other unused spaces.

Because of the way bass energy propagates, traps in the corners of the room (both vertical and horizontal) are the most effective. You can't usually make these several feet deep, but you can at least make them several feet long by having them go from floor to ceiling, or all along the length of a wall/ceiling junction. Various companies make big foam wedges that can be glued into corners, but you need quite a lot of them to make a real difference. They are also quite expensive, though you can cheat a little by putting flat foam panels across the corners on wooden frames, then filling the inside of each structure with dense rockwool. Fortunately, there are other ways to absorb bass other than by thick porous absorbers.



The main reason that low-frequency energy bounces off solid walls is that the walls don't move significantly — they neither absorb much of the bass energy nor allow much to pass through. The outcome is that most of the low frequency energy ends up back in the room. Of course sound doesn't really 'pass through' any airtight panel, but sound does cause that panel to vibrate, those vibrations producing sound at the other side of the panel. This gives us another clue as how we might absorb bass energy.

One classic method is to fix a resonant panel over a box containing an acoustically absorbent material. The sound energy forces the panel to resonate and, in the process, some of the sound energy is dissipated by the panel and internal absorber. However, this type of trap works only on or around the resonant frequency of the panel, and it also returns some unwanted energy back into the room because the panel tends to continue resonating for a short time after the incident sound energy has stopped.

Another way to prevent low-frequency sound bouncing is to interrupt it with a heavy but non-rigid surface. Here the principle is the same as when bouncing a ball off concrete and then trying to bounce it off dry sand. Clearly the ball will bounce higher from the concrete than from the sand. (In fact, sand can be quite a useful acoustic material, but its weight makes it impractical in most home studio applications other than for filling hollow speaker stands.) A far better option is to use a material called 'barrier mat' or 'dead

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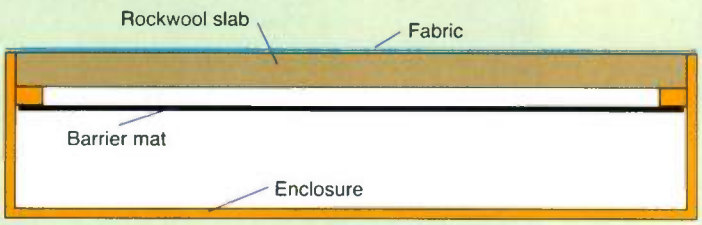
sheet', which is essentially a floppy vinyl sheet (not unlike heavy flooring vinyl) loaded with lead or mineral particles to make it heavy. This weighs about 10-20kg per square metre and allows very simple and effective traps to be constructed with minimal depth.

There are many variations on the 'barrier-mat trap' theme, but the general idea is that you hang the material a few inches from a wall and then hang or fix a porous absorber in front of it to absorb the high frequency energy that the surface of the sheet would otherwise reflect back into the room. Using this technique, an effective full-range trap can be created in a box-shaped space less then 12 inches deep. The greater the surface area, the more energy the trap will absorb. Where the back wall of the studio is less than around 10 feet from the monitoring position, this can be a useful way to treat the entire back wall.

A halfway house between the absorber and non-rigid-sheet approaches is used in some of the Real Traps products, where a thick slab of absorber has a thin, non-porous sheet fixed to one face. Simply put, the sound energy tries to make the sheet move, but the damping material to which it is fixed dissipates the energy. These traps work best when spaced away from the wall or, better still, when fixed across corners.

While you need to be careful not to apply too much high-frequency trapping in a room, it is very difficult to go too far with bass trapping, and as a rule the more you can accommodate, the more even your bass response will be. Some people worry that bass trapping will mean less bass in the room, but this is not the case at all. The trapping removes the reflected bass, and reflected bass often cancels out the wanted bass from the speakers. The result is actually a clearer, tighter, and more uniform bass response, free from booms and weak or missing notes. However, in a lot of cases a complete solution is not practical, so in smaller home studios as much bass trapping as possible should be combined with the simple expedient of making sure that the mixing chair is out of the way of any sonic 'Bermuda Triangles'.

An alternative trap design that can be fixed flat against a rear wall or in a vocal booth comprises a box structure 6-8 inches deep with a Rockwool slab on the front face and a sheet of barrier mat (limp mass) hanging behind it, but not in contact with it. Again a porous fabric covering is used on the front face.



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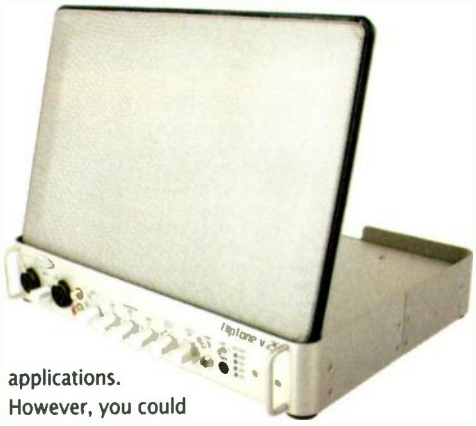

The revolutionary flat-panel loudspeaker technology developed by British company NXT has taken a while to filter down into instrument amplifiers, but it's here now in the form of the Fliptone v.25 from Traveler Guitar. Looking like a chunky laptop computer, the Fliptone incorporates a two-channel preamp with mic and line connections, EQ and on-board effects, plus a power amplifier driving a 12.5 x 8.5-inch flat panel speaker that hinges up from the casing for operation. The system is powered by an integral 12V battery — effectively a lead-acid gel-based car battery — but can be run from its charger whenever mains power is available. Using a lead-acid battery, of course, means that the Fliptone has no issue with the number of recharge cycles and no 'memory effect' (there's no need to discharge it completely before recharging). The only thing you need to avoid is leaving it discharged for extended periods.

SUMMARY: Where size and weight are the primary issue, nothing can match the Fliptone. Just don't expect it to go very loud or produce any real bass.
www.travelerguitar.com/fliptone.htm

In theory, the flat-panel speaker offers a flat frequency response, albeit with limited low-frequency extension, and a bi-directional radiation pattern, characteristics that should make it well suited to amplifying acoustic instruments where a natural sound and good dispersion, rather than high levels and projection, are the goal.

The Fliptone is manufactered by the Traveler Guitar company, who make compact guitars that will fit in a suitcase or that can be easily transported as hand luggage. One of the applications for the Fliptone is clearly therefore that of 'hotel room amplifier'; a role it performs admirably when partnered with a Line 6 Pod or similar modelling processor with half-decent speaker modelling. A pair of RCA phonos (summed to mono, of course) make it easy to connect a portable CD player or iPod to play along with.

Out in the live performance world it fares a little less well, with its limited headroom and lack of bottom end restricting its practical applications. However, you could certainly use it for subtly amplifying a 'lead' acoustic instrument within an otherwise all-acoustic ensemble, and it seems eminently suited to, say, classical guitar in the corner of a restaurant, where you might want any amplification to be particularly discreet. To my ears, on all sources the Fliptone sounded much better with a little mid-frequency cut, so perhaps that could have been built into the response of the system. There is the option of connecting an extension speaker, for more level and bass, but surely that's rather defeating the object? Used within its limitations the Fliptone offers a uniquely effective solution to the challenge of providing amplification without bulk or weight. It costs £499 in the UK. *Dave Lockwood*

Big Bends Nut Sauce

Guitar nut and saddle lubricant

Guitar players have employed many different substances to reduce friction between strings and bearing surfaces, especially in vibrato-equipped instruments, ranging from pencil lead shavings to silicone grease — my own favourite has always been a DIY concoction of pure graphite powder mixed with a small amount of Vaseline to bind it together. Most of these improvised solutions work to some degree, but tend to be either messy, difficult to apply or not very durable.

Addressing all these issues, Nut Sauce is a non-toxic, non-corrosive dedicated guitar string lubricant that won't affect the finish of the instrument. It is also designed to stay in place, in the nut slots, under the string guides or on the bridge and saddles, at least until the next string change. Supplied with a convenient long, narrow applicator that allows you to apply just enough and no more, Nut Sauce really does work. Of course, it's not a substitute for a Floyd Rose, but it will give you greater tuning stability on traditional Strat trems (if used within their design limitations) and I've also used it to good effect on acoustics to stop strings creaking in the nut when using alternate tunings on stage. A little on the bearing points on non-trem guitars allegedly reduces string breakage and it's excellent for lubing the mechanism of a pedal steel — the applicator lets you get it into all the right places and the substance itself has just the right viscosity to stay there.

Two sizes are available: the 1.5cc 'Groove Luber' (£12.50, pictured here) and the 0.3cc 'Lil' Hummer' (£3.50).
Dave Lockwood

SUMMARY: The best guitar lubricant I have used so far, both for effectiveness, longevity and ease of application.
www.madisonandfifth.co.uk

The Swedish-made **Ehrlund Acoustic Pickup** for acoustic string instruments from guitar and violin up to double bass, claims to offer superior performance to other piezo-based contact mics. No technical details are available at present but the company suggest that the unconventional triangular shape of the transducer does have a bearing on its more microphone-like output. The Ehrlund pickup has a larger transducer area than most similar devices and is also significantly more tolerant of load impedance (most piezos need to see about 5MΩ to work properly). The pickup is simply stuck onto the source with the supplied tacky putty, but as with all soundboard transducers, positioning seems to be crucial. Samples have just arrived for testing, but you can download some intriguing MP3s from the manufacturer's web site: www.mikrofonen.se/prod_ehrlund/ehr_en.html.

Parker Guitars have unveiled their first acoustic guitar, the P8E. Its unconventional body shape (we'd expect nothing less from the creators of the Fly) is likely to divide opinion, but there's no doubt that this is a rather interesting instrument. Constructed from premium materials, it has a solid cedar top and flame maple back, laminated flame maple sides, a mahogany neck, ebony fingerboard and bridge and bone nut and saddle. Fishman provide the electronics — a hum-cancelling magnetic pickup in the neck position and an under-saddle piezo transducer — and the guitar has XLR and jack outputs. The PE8, which is also available in black, is to be officially launched at the Winter NAMM show in January 2006, though details of UK pricing and availability had not been announced when we went to press.
Sound Technology +44 (0)1462 480000.
www.soundtech.co.uk www.parkerguitars.com

World Radio History

TECHNIQUE Miking your Pod?

Most people who buy a modelling guitar preamp, such as the Line 6 Pod, do so because it gives them the ability to record without microphones. However, if you're after a more authentic sound, a combination of microphone and DI can yield interesting results, especially if you have a good-sounding space you can use. Many of the classic guitar tones were created using a combination of a close mic and a mic further back in the room, and whilst modelling preamps do a good job at recreating the close-miked sound, it's the way sound interacts with the room that often creates the real magic.

You can replicate this by DI'ing one of the outputs from your preamp into your recording system, whilst using the other to feed a powered full-range monitor which you then mic up. Place the mic around six feet from the speaker and then fine-tune the mic distance and position by checking the results over your studio monitors. You don't need to have the monitor running at ear-splitting levels, though it should be loud enough to hide any ambient noise.

Combine the miked and DI'd signals in mono and adjust their balance until they are approximately equal so you can hear the effects of any phase cancellation and check that the sound is mono-compatible. The miked version will generally sound warmer and more complex than the DI'd sound, but the overall effect will change as you vary the mic's distance and height. Different mics will give different results, just as when miking a real amp.

Miking up the signal from a guitar processor might seem like an unnecessary complication, but a little experimentation should convince you that there are a lot more tonal variations to be had this way than by just DI'ing. *Paul White*

Vox AC30 Custom Classic

Class-A valve amp combines the best of new and old

SUMMARY: A fantastic-sounding amp which lives up to its billing as "the most tonally flexible and affordable AC30 to date", but compromised by a few cut corners.
www.voxamps.co.uk

This latest take on the iconic AC30 seeks to remain true to the sound and feel of the 1960s originals whilst bringing the amp up to date by adding features that today's players want — master volume, reverb, an effects loop and a few more unexpected features to boot.

The AC30 Custom Classic is built in China and, unlike the point-to-point-wired originals, employs PCB-based circuitry. The review model, the top-of-the-range AC30CC2X combo, with two 12-inch Celestion Alnico Blue speakers, is priced at £1049, but cheaper options are available in the form of the AC30CC2 (£699, two Wharfdale speakers), the AC30CC1 (£659, one Celestion Neo-dog speaker), and the AC30CCH head (£499).

All models feature the same amp, an all-valve Class-A affair, using three 12AX7 preamp valves, four EL84 output valves and a GZ34 rectifier. There are two channels — Normal, equipped only with a volume control and a 'Brilliance' mini-switch, and Top Boost, with volume, treble and bass knobs. The Top Boost channel's EQ can be switched between Custom mode, modelled on the recent AC30 Hand-wired's EQ, and Standard mode, which covers a much wider range. A mini-switch allows you to blend the two channels together, mimicking the old trick of using a Y-lead to play through both.

The Normal channel has plenty of clean headroom reaching into some pleasing crunch when pushed flat out, and the Brilliance switch adds some desirable sparkle to what is quite a flat basic sound. The Top Boost channel, on the other hand, is very bright, with equal measures of growl and shimmer once you start to drive it. Link the two together and as you add Normal gain to the Top Boost channel, you'll notice the sound gradually thicken and then increase in drive and distortion in a very controllable and musical way. Like all tube amps, this one performs better with the master volume well up, but it doesn't strangle the sound too badly at lower levels. Things can get a little shrill when using guitars with single-coil pickups, purely because there's so much top end on tap, but a high-cut control just before the master volume allows you to tame this to just the right extent. The vintage-style tremolo circuit and long-tank spring reverb both work well.

The amp can be run at 22W, giving a warmer sound at lower volumes and prolonged tube life, or 33W for more clean headroom and overall level. You can also switch the PSU capacitors for a looser or tighter response. The effect of both is subtle, but if you're an a fan of the AC30 sound you'll welcome the ability to tailor it even further.

But while the sound of the AC30CC is thoroughly convincing, and every one of the new features which have been added is very welcome, a few concerns remain. Accessing the valves requires pulling out the whole amp chassis, which in turn involves disconnecting the reverb tank and un-soldering the wires connecting the speakers! This is something many potential users won't feel comfortable doing themselves (Vox customer support even advise against it), but what if a valve fails in a gig situation? Even if altering the chassis design was just not possible, surely the speakers could at least connect via a jack?

There was some rattling from the handles and back panels when used at high levels; nothing that tightening a few screws can't fix, but it is a small reminder that this is a mass-produced amp. The mini-switches on the control panel don't really seem sturdy enough, and indeed, the Input Link switch in the review model is already misbehaving. Vox should of course be commended for producing such an affordable AC30 that really delivers the goods, but this is perhaps one cost-saving too far. This amp has AC30 character in spades and while it couldn't be considered versatile by modern standards, it covers more bases than you might expect. From clean country and jazz to overdriven blues and rock, it's difficult to get a bad sound out of it. *David Greeves*

World Radio History

Novation Remote 25SL

'Intelligent' Controller Keyboard

Novation have an elegant solution to the tedium of configuring hardware controllers — the Remote 25SL can read your sequencer and automatically map plug-in instrument parameters to its controls. Is this the first 'intelligent' hardware control surface? We find out...

Derek Johnson

Our music-making world may be increasingly software-based, but the combination of mouse and computer monitor is not the greatest interface between us and the music we'd like to produce. It's no surprise, then, that hardware controllers have been so popular over the past few years — knobs, buttons

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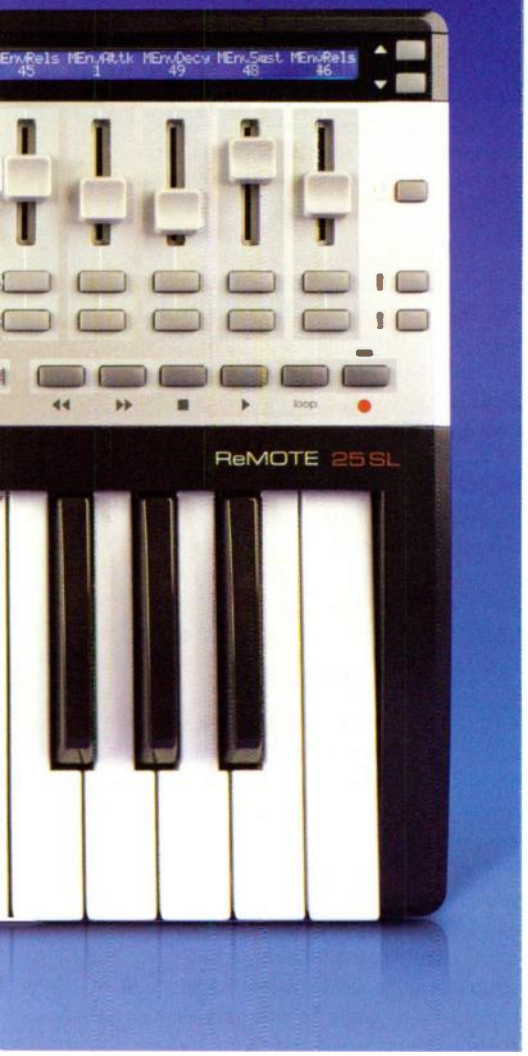
The Remote 25SL working with a *Subtractor* synth in Propellerhead's *Reason*. Many of the most useful parameters have already mapped themselves to the 25SL. The Remote has recognised that the sawtooth wave has been selected for Oscillator 1, and the triangle wave for LFO1 (note the 'Osc1WaveSaw' and 'LFO1WaveTri' legends in its left display, amongst other parameters). Similarly, the Remote has recognised the overall song tempo and left and right loop points (the latter can just be seen on the transport bar at the bottom of the window), and the SL is displaying these on its right-hand LCD.



Original Photos: Mark Ewing

and sliders (not to mention keys) are great ways to manipulate sound and music.

Welding a chromatic keyboard to a control surface has turned out to be a winning formula — from cheerfully cheap, plasticky jobs with 25 keys up to fairly serious 88-note weighted action controllers. Add more knobs, and the formula becomes hard to beat. Novation discovered this with their Remote 25, reviewed in *Sound On Sound* back in the August 2003 issue (see www.soundonsound.com/sos/aug03/articles/novationremote25.htm). Compact, and perfect for desktop or portable music, the Remote offered a commendably high number of physical controls in that small space, and Novation later reproduced the control set in longer keyboards, too (Remotes 49 and 61 respectively).

On Display

One thing that many controllers lack is a decent display: some have cryptic three-character affairs, others a larger LCD panel. The earlier Remotes managed better than many, but their displays were still compact; most of us would continue to glimpse at our computer monitor while working with the controller. A properly affordable keyboard/control surface featuring a full monitor, however compact, is an unlikely proposition. It's perhaps just as well, then, that Novation have been improving their Remote concept. The result is the hardware controller under review here, the Remote 25SL.

There are no prizes for guessing that the 25SL is a compact, 25-note controller keyboard. Your deduction would also be correct if you'd imagine the new keyboard to be festooned with controls, like its predecessor. But then there's that SL suffix: it stands for 'soft label' and refers to the first of this device's two major innovations. Look again at the big picture on the left; you can't fail to notice a pair of long liquid-crystal display strips that dominate the SL's front panel. As far as possible, Novation have designed their controller Templates for the 25SL to use these LCDs in a way that encourages the user *not* to look at their computer monitor.

As for that second major innovation, it's a new technology dubbed 'Automap' which takes a lot of the pain out of assigning SL controls to software parameters by actively reading parameters and their current values from your instrument plug-ins in real time, and auto-assigning them to the SL's sliders, buttons and pots. This feature is only compatible with two sequencer plug-in hosts at the moment, but more are planned. The SL offers some other nice touches, too, but we'll come to them over the course of the next few pages.

Let's Open The Box

First impressions can count for a lot, and the Remote SL's sleek finish starts us off on a positive note. I've already alluded to the dual two-line by 72-character LCDs — that's 288 characters of feedback, plus various LEDs, to keep you on top of your tweaking.

SOUND ON SOUND

Novation Remote 25SL £329

pros

- Brilliant design — and Automap is a big step forward.
- Great value.
- Dozens of assignable controls, and the dual LCDs make the most of the flexible control options.

cons

- PSU not bundled with controller.
- Automap currently limited to two applications.
- Automap also currently limited to instrument plug-ins; host software mixer parameters not covered in the version reviewed.

summary

If I were shopping for a compact, sophisticated controller keyboard for gigging and studio work, my wallet would definitely be attracted to the Remote SL, with me attached. If the same control set were packaged with a larger keyboard, I think that draw would be irresistible.

Using the displays is fairly straightforward; the top line tends, most of the time, to show parameter names (usually abbreviated), and the lower line displays parameter values. I welcome the appearance of the XY touchpad, inherited from the original Remote: the joystick, from the same product range, is sturdy but not my favourite. I do like the way you can choose sprung or unsprung operation for the up/down action, though, using the locking slider on the underside (see the pictures overleaf).

A glimpse at the packaging and all the other stuff in the box reveals a handy *Quick Start* guide, a USB cable (the SL is a USB device), and a DVD. Two pleasant surprises are located on the latter, alongside a software widget or two: the first is a free copy of Novation's excellent *Virtual Bass Station* VST instrument and the second is a series of tutorial videos presented by Focusrite/Novation's Rob Jones. These are lucid and informative — inveterate non-manual users, and complete beginners, should start here for a painless introduction to the SL.

The software widgets provided on the DVD are largely related to the Automap features, which we'll discuss later. They're ▶

Test Spec

PC REVIEW SYSTEM

- 3.06GHz Pentium 4 PC with 1.25GB of RAM running Windows XP.
- Steinberg *Cubase SX* v3.1.0.933.
- Propellerhead *Reason* v3.0.4.
- Remote 25SL OS versions reviewed: v1.0.8 and v1.0.9 (update arrived during the review period).

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not strictly necessary, since the Remote SL is truly plug and play: no drivers are required, and Mac OS X or Windows will recognise it immediately. An anomaly lists the controller as a USB audio device within Windows, but that happens with similar products from other manufacturers.

There's also a full PDF user manual on the DVD. This is pretty good, though I have a couple of reservations. The best bit about it is the way in which extra information is 'hot-linked' to many of the pictures within the text — again, a nice touch for beginners. I did find it a bit sluggish to read on screen, though, and that hot-link feature would mean that a printed-out version wouldn't necessarily contain all the information available.

There is no PSU in the box, since the SL can be powered from its USB connection. It does have a power socket, though, and if you're working with a notebook running from its battery, you'd be advised to invest in a PSU. The alternative is to use four 'C'-sized batteries, and if you use rechargeables, you can even charge them via the USB connection. A PSU or batteries will be required if you plan to use the SL to control external hardware synths via its MIDI Outs. Incidentally, these two MIDI Outs, the MIDI In and the MIDI Thru also form the basis of a handy MIDI interface for whichever computer the controller is attached to.

However you choose to power the SL, the LCDs will glow invitingly, and your eye may also be distracted by the neon-effect 'N' logo between the LCDs. It may be window dressing, but it's a nice touch.

The 25SL has the innovative joystick controller seen on previous Novation Remotes; its action can be sprung or not, depending on how you set the sliding switch on the underside of the unit (see left).

Stay In Control

The SL's main control area is divided into two, with each section headed by one LCD each. Beneath the left display, you'll find (from the top down) a row of eight buttons, eight rotary controllers (continuous travel, stepped), another row of buttons, the eight normal knobs (stopped end to end, and perfect for use as pan pots) and, finally, eight trigger pads. Pads seem to be fairly common amongst hi-tech manufacturers these days, and are a welcome alternative to using the main keyboard for triggering drum sounds or samples, not to mention 'triggering' controller data.

The other half of the panel is similarly laid out, though there are just three rows of controllers: 40mm sliders and two rows of buttons. It doesn't take a great leap to realise that in most modes the LCDs will show a maximum of eight parameters that line up vertically with the controls below. Each control row also has, at its left or right edge, a selector button and attendant LED; pressing the button, which lights the LED, selects the relevant row for parameter display in the LCD above. As we'll discover, there are cases where pressing these a second, and sometimes a third, time reveals up to three levels of assigned parameters to each control. The LCDs themselves have a pair of up/down arrow buttons at their sides, and their function varies depending on how the SL is being used.

In addition to the above, we're provided with what are labelled as transport controls, and this is how they function in most situations. However, these buttons may be just as flexibly assigned as all the other controls. Round the back, we have two pedal sockets (for footswitch and expression pedal), and last of all we have the velocity and aftertouch-sensitive 25-note keyboard. This is a nice semi-weighted example that plays rather better than you might expect. It can be transposed over a full eight-octave range, and also has zone options, just like the original Remote.

Add up all the controls, including the trigger pads, foot-controller sockets joystick, and the four points on the touchpad, and you have no less than 78 control sources, plus the aftertouch transmitted by the keyboard — an impressive tally for such a compact device.

Virtual Bass Station

Reviewed in *SOS* December 2003, Novation's *Virtual Bass Station* is an accurate recreation of the company's popular modelling synth. Here, it's a VST instrument freebie, which is most generous in a package that already offers so much. Needless to say, there's a template that works with this software, and in any case Automap sees the plug-in when an instance is created inside *Cubase*. This isn't the place for a *VBS* review (particularly as we've already done that), but it's definitely a plug-in worth having — it's rich, 'subby', meaty and squelchy, and many other bass-related adjectives besides! The synth is also capable of handling more generic duties (though always monophonically), but bass sounds are all you get in the preset list!

In A Modal Mood

All I haven't mentioned so far is the vertical row of knobs and buttons that runs up the middle, and introducing these also leads me to talk about some basic operating principles of the Remote SL. Four of the buttons select operating modes: Play (where you simply use the SL to control soft or hardware synths), Edit (where the data transmitted by each control can be customised), Template (where the common settings for an entire Template full of controls are managed) and Global mode, where overall settings for the whole controller are managed.

One further button, Write, lets you easily save an edited Template or altered Global settings, and the last button, Tap Tempo, allows you to do exactly as it suggests! The 25SL can act as a global clock source for your MIDI system, and you can set the tempo with this button (visual feedback is provided by an LED which flashes in tempo) or with the Data/Select encoder. The latter encoder also has a push element that

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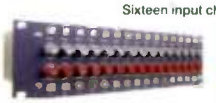
AMS Neve 8816



Sixteen input channels include level, pan, cut and cue controls. A +15dB gain range accommodates both -10dBv and +4dbm input levels. The mix outputs appear simultaneously as balanced +4dBm and unbalanced -10dBv. Mix Inserts are pre-fade for full control and can be switched between normal insert mode and mastering style sum and difference mode with stereo width control.

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accesses four selection functions — tempo selection is just one of these. Template selection is another; you use the encoder to scroll through the 40 onboard Controller Templates (see the box below). It can also be used to transmit Bank Select messages and Program changes to those MIDI devices (soft or hard) which respond to them.

The Means Of Control

Now, what can the Remote SL do? Out of the box, it can control a bunch of popular software synths, courtesy of its 40 factory Templates. No less than 36 are detailed maps for controlling a wide range of popular software synths, and the remaining four slots are dedicated to the more powerful Automap templates. Should the factory set not supply what you need, the existing Templates can be overwritten.

The two large LCDs make creating custom templates from the front panel a much more attractive proposition than if you were attempting the same job with a three-character display. You have clear feedback on what you're doing at any one time, with cryptic abbreviations almost completely absent; returning to a smaller display will introduce feelings of claustrophobia. Any control on the SL can be set to transmit almost any MIDI information — note data, continuous controllers, RPNs, NRPNs and SysEx. Even the drum trigger pads can transmit velocity-sensitive controller data, which presents some very interesting opportunities for playing or recording rhythmic and dynamic parameter changes. The touchpad can be assigned to a maximum of four parameters (two each for the X and Y axes), and the pitch-bend and modulation joystick is not restricted to transmitting that controller data, but can be remapped if you wish.

Each control can also be set to transmit on any MIDI channel, independently of its neighbours, or on a global channel for the Template, a global channel for the SL or on the same channel as the keyboard. Not only can the keyboard have its own independent MIDI routing, but so can each of the four potential Zones that can be assigned to the keyboard (these have range and transposition parameters but not, sadly, velocity switching). In addition, MIDI data can be routed to a number of 'ports'. Quite apart from the two hardware MIDI Outs, the USB pipeline has two MIDI streams of its own for moving data in and out of the host software.

Even when using the preset Templates, you can access more than one parameter from each control. For example, the first three Templates in a factory SL are dedicated to controlling Novation's excellent *V-Station* three-oscillator synth plug-in. But you don't have to keep changing Templates to access the different layers of controls: simply pressing the button next to each row of controls in the first Template does this for you.

The 25SL can be powered by batteries or over USB. Other than that, the connectors are fairly standard, with two MIDI ports, the USB socket for connection to your computer, and sustain- and expression-pedal jacks.

The layered approach works particularly well because Novation have kept to a fixed control-to-parameter regime. As long as a target device has equivalent parameters, its filter frequency and resonance (for example) will always been tweaked by the same knobs on the SL and the sliders will always control ADSR filter and amp envelope controls. Returning to the *V-Station* by way of example, similar parameters for different oscillators — such as your level, octave and waveform settings — will also be on the same physical controls in the three related Templates.

Map Reading

The Automap function is what really sets the Remote 25SL apart from other controllers. If you use plug-ins in your sequencer, you don't have to spend time mapping them to the 25SL, because the Remote detects them, and automatically displays their parameters and values on the controller. As a result, you have almost instant access to nearly every instrument parameter in a session — and what's more, that communication is two-way. Tweak your plug-in on screen, and you'll see the parameters change on the SL's displays.

There's just one snag — currently, Automap only works with two bits of software, Propellerhead *Reason 3*, and Steinberg's *Cubase SX3/SL3*. According to Novation, Apple's *Logic 7* is 'imminent' as I write this (at the end of December), and other packages are planned to follow later. Don't be put off if your preferred host isn't yet supported, though; the SL remains a powerful controller for plug-ins in any environment with standard Templates, or indeed with those you've created yourself.

Automap & *Reason*

With *Reason*, Automap works brilliantly well. The transport controls are mapped sensibly, one of the display options provides an overview of the current song (including song position, loop points and loop activity), and there's an easy way to navigate from device to device in the Reason rack. In fact, Automap feels like the flip side to *Reason 3*'s own Remote Protocol in the way that it takes the effort out of linking controller to software.

Within the Automap are sub-templates for every *Reason* device, including the *Remix*, *Combinator* and all the effects. You select a device on screen by clicking in the sequencer track display and enabling MIDI input, and the relevant template is called up on the SL. The SL can be used to select the device as well (I stumbled across this option; you press buttons seven and eight in the second row to the right), whereupon you'll see the device names change in the LCD above. The only downside of this is that the selected device doesn't appear on screen (unless it's already there), which can be a bit

Factory Templates

Below, for your info, is a list of the plug-ins supported by the stand-alone Templates supplied with a Remote 25SL. You won't see any sequencer mixer maps, as were provided with the original Remote, as these weren't available at the time of my review, although Novation are apparently developing them as I write this, and the plan is to make them available from the company's web site. There aren't 36 instruments listed here because several require two or three templates to cover a decent amount of parameters, and there aren't 40 standard Templates because four of the slots are for the Automaps.

- Novation *V-Station* & *Virtual Bass Station*.
- NI *FM7*, *Pro 53*, *Battery 2*, *B4* & *Kontakt 2*.
- GMedia *Imposcar*, *Oddity* & *Minimonsta*.
- Korg *Legacy MS20*, *Polysix* & *Legacy Cell*.
- Arturia *CS80V* & *ARP2600V*.
- Linplug *Albino*.
- RGC Audio *z3ta*.
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disconcerting when you eventually do look away from the Remote, and back to your computer screen. The right-hand display provides a kind of session overview, and has two sub-pages (accessed by pressing the up/down arrows); interestingly, in one page you have a device name readout and in the other a track name.

As with the ordinary factory Templates, certain assignments have been standardised by the developers so that envelopes, filters, oscillator parameters and so on are the same no matter which device you're using — even if the device is an effect with filter settings, the cutoff and resonance parameters will be mapped to the same knobs that would apply with the *Subtractor* or *Malström* synths.

Novation's standardisation can take a little getting used to in *Reason* — the filter and amplitude envelopes are the wrong way round, for a start — but get used to them you will. In any Automap situation, there will be a certain acclimatisation period as you become familiar with the different layers of parameter assignments, even with the big LCDs; there's no paper or electronic list, so be prepared for a learning process. The paper overlays used by the original Remote 25 might have been a bit fiddly, but you might follow the example and make some notes until you're up to speed. It eventually becomes second nature, and you can always glance at your computer monitor to double-check exactly what's being tweaked at a given point.

My experience using *Reason* with the 25SL was excellent. *Reason* is a knob-heavy program that works well enough with a mouse and keyboard, but it flies with

a controller such as this — especially when using the dedicated Automap. The row select and LCD arrow buttons are used cleverly to access, in the case of the *Remix* module, more than eight mixer channels and all the potential EQ and aux send knobs. Strangely, there is no such option for the 10-channel *Redrum* drum machine; only eight voices can currently be accessed in this Automap, and I also found a parameter or two that weren't mapped. Novation promised to fix these matters with an update where they could, although this wasn't done before I submitted this review. Furthermore, some *Reason* parameters, such as the graintable selectors in the *Malström* synth, aren't available for mapping, so there won't be much Novation can do there.

Automap & *Cubase SX*

Automap implementation seems less comprehensive with Steinberg's *Cubase SX3*. Any VST instrument in your *Cubase* song can be selected and edited, but you can't access anything else at present, apart from transport functions. The Automap has no mixer- or effects-editing options — perhaps unsurprisingly when you consider how big and complex a *Cubase* mixer can be — and none of the SL's buttons are mapped to anything yet. Funnily enough, there are no standard, non-Automap Templates to handle this, either (as there were on the original Remote 25). Novation were promising that they would be on their web site by early in the New Year.

Remote SL Editor

Editing the Templates from the front panel of the 25SL is so easy that you might not bother to think about any other way of doing it. But Novation have: I had a look at a late pre-release version of the cross-platform *Remote SL Editor* application, which Novation were planning to have up on their web site for free download by the time you're reading this. It's graphically simple but effective, and lets you quickly set up control assignments (up to three layers) and keyboard zones, and you can even edit Automaps if you'd rather work in a different way to Novation's standard.

Particularly clever is the option to scan a VST plug-in and generate a Template automatically, although sadly this feature wasn't yet working on my beta copy of the software. Being able to instantly restore the factory Template collection is a handy option, as is being able to effectively manage more Templates than the SL can store. The software also provides the easiest way to update the SL's firmware. In short, I'd recommend you get yourself a copy.

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Within this more limited framework, the Automap operation is as elegant in *Cubase SX* as it is in *Reason*. Firing up a *Cubase* song causes the SL to scan for loaded plug-ins and map the controls accordingly — it's set to handle 20 specific plug-ins, but it also makes a good stab at those it's *not* preset for. The whole process is reasonably fast, too — it seemed to take a couple of seconds on average. Any VSTi located in *Cubase*'s VST Instruments rack can be selected from the SL using the left or right LCD arrow buttons, and the LCD even flashes the current patch name, if it's available. Controls are mapped to parameters in a consistent and logical fashion, as with standard Templates and the *Reason* Automap, and it's amazing how soon you become accustomed to seeing sensible, if abbreviated, parameter names in the LCDs. Where a VSTi is complex, the triple-layered control assignments work well.

One thing to be aware of is that selecting a VSTi from the SL makes it available for editing, but not necessarily for playing. The SL keyboard is separately routed to the *Cubase* track, and you have to manually change tracks via the computer if you want to play as well as edit a VSTi you've selected using the SL25.

Conclusion

Although Automap is in its early stages, and is only compatible with two sequencing hosts (possibly three by the time you read this), it already works extremely elegantly. Using the 25SL with *Reason* definitely changed the way I work with the program for the better. The *Cubase* implementation is almost as good, although I miss being able to access the mixer at the moment, and the lack of support for the buttons is rather odd, but I hope these matters will be fixed shortly.

Even putting Automap aside, though, the Remote SL is a great controller: it's well made and a pleasure to work with, and those extra-large displays improve the experience of interacting with software a great deal. It's one of the better in its field in terms of controls and accessibility, and if it's a little pricier than some of the super-affordable controllers on the market, that's not unmerited, as it does a lot more in a more elegant fashion than most other similar devices. And getting change from £330 for a device of this quality and power seems like a damn fine deal to me.

My only real reservation is personal; if I were buying just one controller keyboard, I'd like this many controls and all the new features, but a lot more keyboard! Of course, the original Remote 25 was ultimately joined by 49- and 61-note keyboard varieties. As we went to press, Novation were keeping very tight-lipped on whether the Remote SL range will expand in a similar way, but I wouldn't be surprised if it did. After all, this is a flagship keyboard controller, and who ever heard of one of those with just 25 keys? I'm fairly confident that a year from now, there'll be a lot more of these kinds of controller keyboards around, and not just from Novation. If you want to get the jump on the future, check out the 25SL. SOS

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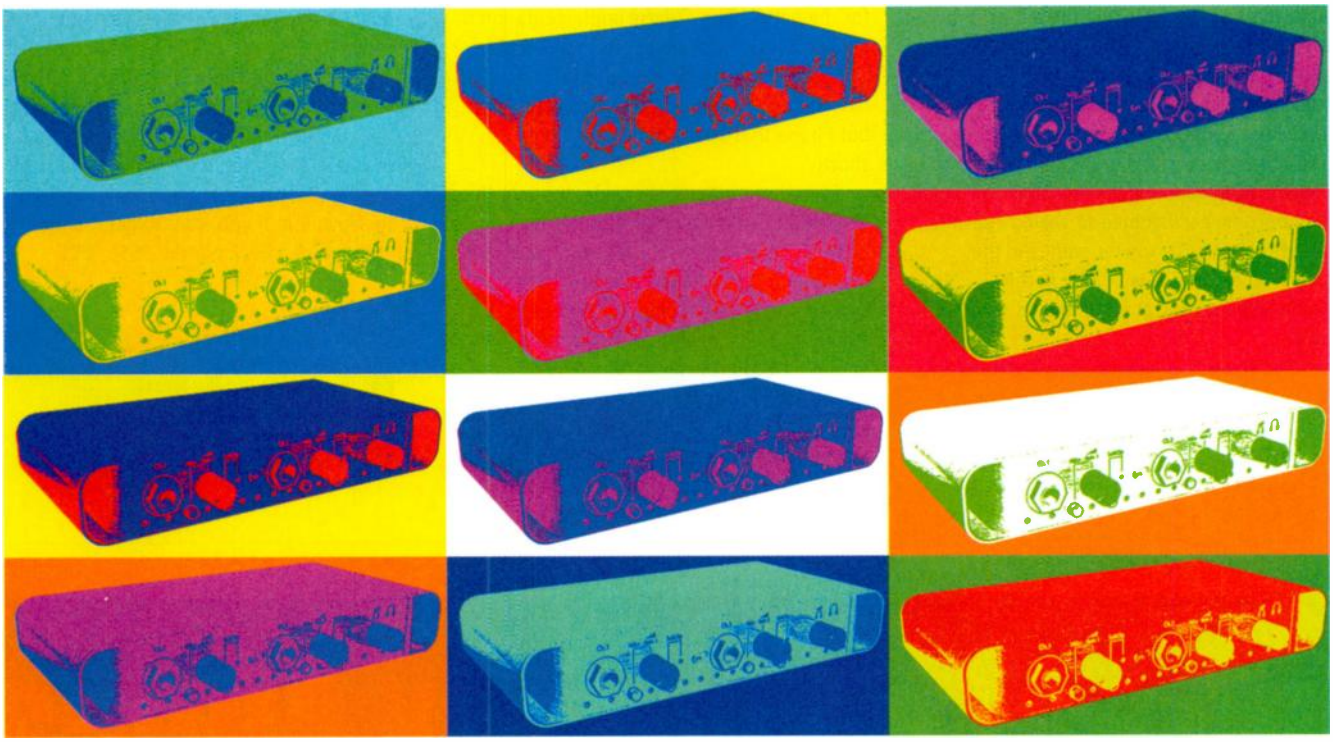
Divide & Conquer

Using Multiple Audio Interfaces Together



Martin Walker

If you need more audio interfacing, do you really have to trash an interface that's otherwise perfectly satisfactory and buy a bigger one? Maybe not, as ways of using several smaller interfaces together are becoming easier to find.

There's been a recent spate of queries from musicians asking how feasible it is to add more inputs and outputs to an existing audio interface, as their recording and playback requirements become more sophisticated. For instance, those moving from stereo to surround work will need perhaps six outputs instead of two, while those who suddenly find themselves faced with a live band or other ensemble recording may suddenly require another half-dozen mic-input channels for multitrack work. Others are lusting after various recent interfaces that offer high-quality mic preamps and built-in DSP effects.

Of course, you could buy a new interface that provides all the features you need in one neat hardware package, but many musicians are loath to abandon the perfectly good interface they already have, especially since it's probably worth peanuts second-hand. After all, while PC technology generally moves forward in huge leaps and bounds, the performance of audio interfaces is a much more measured affair. Lots of musicians are still perfectly happy with the performance and audio quality of units that are a few years old, especially since they cost a lot of money when first bought.

So what are the options? Well, some musicians fall at the first hurdle, by assuming that they can buy a second interface identical to their existing one, to double up on features. This may indeed be possible, but it requires specially written drivers that can recognise and support multiple interfaces. Standard drivers that support a single device would be totally confused when presented with two or more identical interfaces. They wouldn't be able to differentiate between them and the second interface would be ignored, or (more likely) your PC would crash or fail to boot up at all.

Fortunately, quite a few manufacturers have developed suitable multi-device drivers that typically support up to four identical interfaces, or a mix of up to four similar models from the same range. The best advice (as always) is to download the latest drivers for your interface, so that you can read the accompanying Read Me or Help file to see what expansion possibilities there are, before purchasing an additional unit.

It's more tricky to check whether or not a new interface that you're thinking of buying already has multi-device drivers. Over the years, I've noticed that multi-device support for new models is rare but often promised in a future driver update. Unfortunately, this information isn't always

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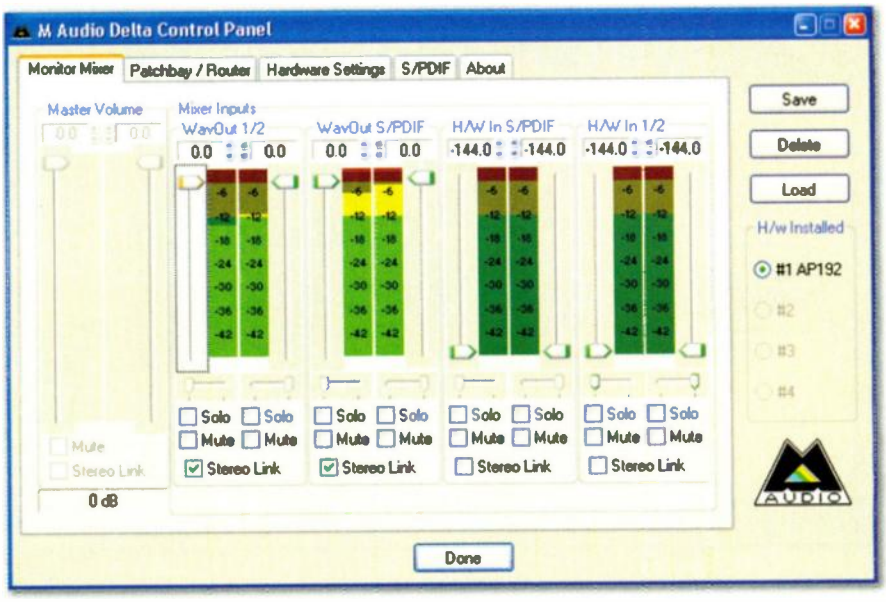

The easiest approach to running multiple interfaces is to buy those that can share the same multi-device driver, such as M-Audio's Delta series (the Audiophile 192's control panel is shown here). Then they effectively become one larger interface with their inputs and outputs pooled.

easy to find on the manufacturer's web site when multi-device drivers *are* finally released, so the safest approach is to telephone or email the local distributor or tech support line to obtain the latest information for the range in question. To help you on your way, here are a few up-to-date examples.

Interfaces With Multi-device Support

M-Audio's Delta range has supported up to four devices under Windows for many years (three under Mac OS X and up to eight with the Linux OSS driver). I know musicians successfully running four M-Audio Delta 1010s under Windows XP, as well as mixtures of the smaller Delta interfaces such as the Delta 44/66 or Audiophiles. M-Audio's Internet Knowledge Base also includes full details on the various settings that are required.

MOTU are also enthusiastic about multi-device support, and if you received one of their PCI424 cards with your MOTU Audiowire interface you can plug a further three interfaces into it, from a large range of options including any 2408 (Mk1 to Mk3), 308, 24i, 24i/o, 1296 or HD192. Similarly, you can daisy-chain up to four 828MkII, 896HD or Traveler Firewire interfaces for more I/O channels.

ESI Pro's Maxio XD drivers support up to four units, and by the time you read this, Echo should also have released multi-device drivers for their Audiofire range, although their PCI products don't have multi-device driver support, and nor does Emu's Digital Audio System range, or any of Edirol's range. However, some older PCI devices do have multi-device support, such as Terratec's Phase 88.

If you ever think you'll need more inputs and outputs than you have at present, the best approach is to choose an interface that already has multi-device drivers, such as the ones I've mentioned. Then, when you buy another compatible interface, your ASIO (Audio Streaming Input Output) compatible audio applications will simply see one larger interface. Most musicians find this runs like a dream, althoughin the case of multiple PCI cards, very occasionally the odd PC motherboard may throw a spanner in the works and prevent the cards from running smoothly alongside each other.

ASIO Driver Options

Those with several entirely different interfaces should find that Windows will run them all separately, but whether or not you can use them all simultaneously in your chosen audio application is another matter. Unfortunately (despite many requests from users), ASIO still doesn't officially support multiple devices, so if you have several completely different models of interface with ASIO drivers, while all will appear in the list of available devices, you can only ▶

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

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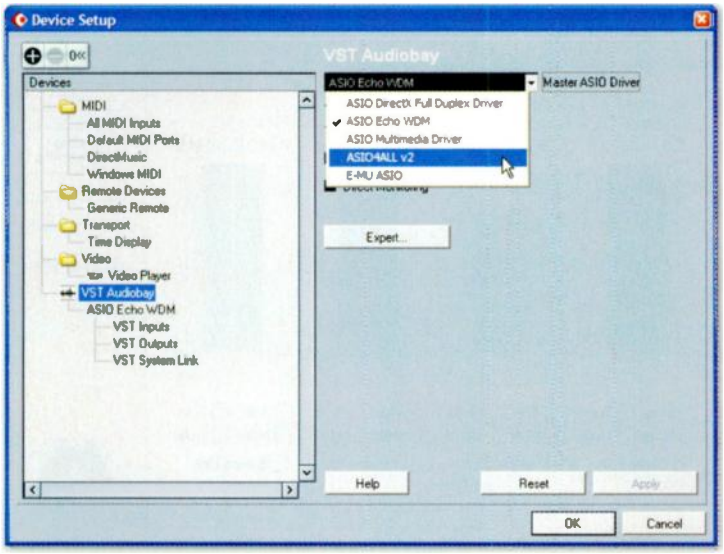
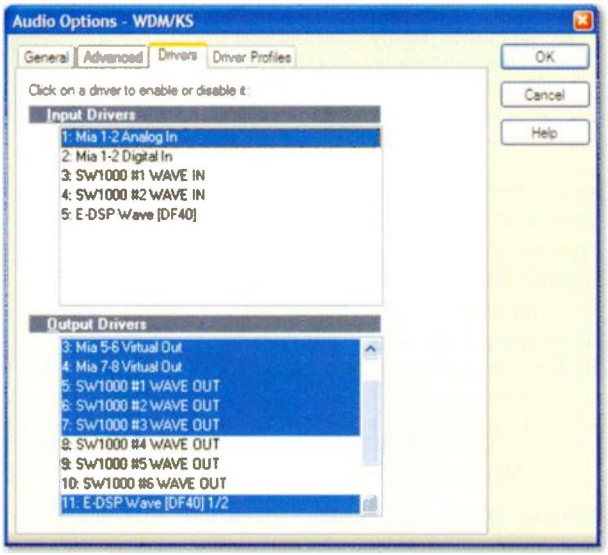
USING MULTIPLE AUDIO INTERFACES



Cubase SX3, an ASIO-compatible host application, allows only one driver at a time to be selected in its Device Setup window, although it may be possible (using special drivers like *ASIO4ALL*, highlighted here) to persuade several interfaces to run with one driver.



With *Sonar*'s WDM/KS driver option, you can run several completely different drivers side by side, as shown here.

choose one at a time. Sadly, some musicians don't realise this before buying an expensive second interface and then finding that they can't add it to their existing one inside their audio application.

Nevertheless, some musicians do buy several interfaces for use with the same ASIO application, with the intention of using them one at a time. For instance, I spotted one person running an RME HDSP 9652 for 24-track playback via ADAT interfacing into a Yamaha 01V96 mixer, but was sometimes using an M-Audio Delta 1010 instead, for old projects and some analogue recording. If you have several completely different requirements, this may make sense.

There is also one sure way of combining several completely different interface models from different manufacturers without running into problems, and that's when they are each performing an entirely separate task. For instance, I'm currently running three PCI interfaces in my PC. The main one I use for my ASIO audio recording/playback is Emu's 1820M, because, of the three, this one has the best converter quality. However, I haven't discarded my old Echo Mia, bought in 2001, because I still use it with GSIF drivers for *Gigastudio 3* (the Emu range doesn't offer GSIF support, and although I could connect *Cubase SX* and *Gigastudio 3* internally, using Rewire, I often find that approach more complex and frustrating). My third interface is a Yamaha SW1000XG, bought in 1998 and no longer used for audio, but still occasionally called upon for its MIDI synth.

WDM/KS Drivers

Those running Cakewalk's *Sonar* from version 2.2 onwards have the option of using ASIO drivers, but choosing the WDM/KS (Windows Driver Model/Kernel Streaming) driver option instead lets you assemble a composite interface from any combination of the stereo inputs and outputs that appear in the drop-down *Sonar* list. Since WDM/KS drivers bypass

Locking The Clocking: Multiple Interfaces & Sync

Whether you're lucky enough to have dedicated multi-device ASIO drivers from the manufacturer of your interfaces, are using WDM/KS drivers inside Cakewalk's *Sonar*, or have made use of the generic *ASIO4ALL* overlay (see main text for details of all these options), your various interfaces will still be 'free-wheeling': although they may all *start* synchronised to sample accuracy, thereafter they rely on their internal clocks, which will inevitably be running at slightly different frequencies. While each new part will be started/stopped in perfect sync, long parts will slowly start to drift apart. If you have no special driver sync options and no word clock or digital audio ins and outs, there's nothing you can do about this except follow the following advice:

- Allocate all time-sensitive tracks, such as drums, percussion, bass, guitar and so, on to the outputs of your first interface to keep them locked together.
- Use the second interface and any others for sounds with less percussive attacks, such as vocals and pads, and you may never notice any drift, particularly if your songs use short parts rather than a single long take.
- Never split the two channels of stereo tracks across two interfaces (at the very least, the stereo imaging will probably prove dreadful). If you have to split drum sounds between free-running interfaces, you may hear 'flamming'.

A few interfaces (notably M-Audio's Delta 44) provide special 'Multiple Card Sync' options in their Control Panel utility. These prevent the interfaces from drifting apart over long periods, by using Windows 2000/XP's 'Kernel Sync' feature. Many musicians may notice no drift at all using such techniques. However, the various interfaces are still not sample-locked, which requires that all the interfaces are synchronised to the same digital clock. If you're using PCI cards from the same manufacturer, it may be possible to lock them together by connecting an internal Sync cable between the cards, but for other PCI cards, and for USB and Firewire interfaces, you'll either need to use Word Clock I/O if you have suitable ports (which generate and receive a dedicated clock signal), or the embedded clock signal from one of your S/PDIF, ADAT or other digital audio ports.

Anyone with a stand-alone high-quality Word Clock generator (as used by larger studios) should connect its outputs to the Word Clock inputs of the interfaces. Those relying on another clock signal from one of their interfaces should choose the one with the best audio quality (and therefore lowest jitter) to provide the Master Clock, make sure its clock setting is set to 'Internal' and then connect a cable from its digital output to the digital input of the next interface, which should, in turn, be set to 'External' clock. Similarly, any further devices should also be attached to this digital chain and set to 'External'.

Once this has been done, all interfaces will be locked to the clock of the one designated as Master and you can safely do multitrack digital and analogue recording and playback across several interfaces, while they remain permanently locked to sample accuracy. Make sure you always use proper digital cables and always observe any specific Sync advice and settings recommended by the interface manufacturer.

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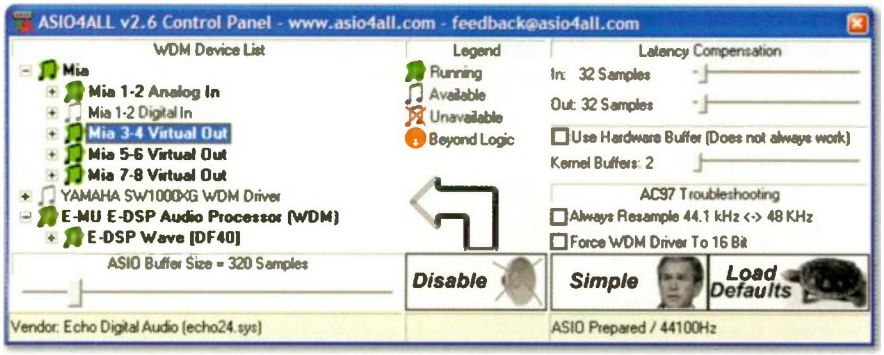

ASIO4ALL may not have the most professional-looking Control Panel, but it can work rather well if you want to mix several different interfaces and run them simultaneously in an ASIO-compatible host application.

Microsoft's kernel mixer (which is normally used to mix the outputs from multiple audio applications into one stereo stream), this option can provide very low latency. However, quite a few musicians also seem to have used the feature to assemble an *ad hoc* arrangement of interfaces from different manufacturers. As long as you lock their clocks together in some way (see 'Locking The Clocking' box, opposite), they should be able to exist in perfect harmony.

But there are some restrictions you should bear in mind. As I explained in some detail in my two-part feature on 'Real World Latency', back in *SOS* September/October 2002, in addition to the latency imposed by the interface's buffer size, the interface's A-D and D-A converters also impose some latency of their own, and there may also be other 'hidden extras', such as interface DSP code, that have further latency implications. For example, I measured a total of 189 samples of extra latency on my Echo Mia, 152 samples on M-Audio's Duo and 91 samples on the Egosys Wami Rack 192X. These figures may also change from driver revision to driver revision.

The upshot is that if you run different interfaces alongside each other (and even if you lock them to the same clock to keep them in perfect sync), their input and output signals may still be separated by a small fixed offset of perhaps 100 samples or less (a couple of milliseconds at 44.1kHz, and less at higher sample rates). Essentially, while notes on different interfaces may be perfectly 'lined up' if you quantise them or zoom in on them and drag them by hand to the same playback position, they may still play back at slightly different times, albeit by a tiny amount.

These offsets won't drift over time, but you may hear them if you're assembling a complex rhythm part across multiple interfaces. If you come across such issues, the answer is to use your ears to set the timing, or to calculate the fixed timing difference between the interfaces (I suspect this timing difference to be the main reason why Steinberg haven't yet added multi-device support to their ASIO driver protocol.)

ASIO4ALL

Although the ASIO protocol doesn't officially support multiple devices unless they have dedicated drivers, there are a couple of

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Multiple Interface Hints & Tips

- **Disable Unused Inputs:** If you're experimenting with multiple interfaces, remember that unused audio inputs will still need to be polled by the computer for possible input signals. So if you know you're not going to use some inputs, disable them or otherwise remove them from the list inside your sequencer. This will save resources and may give better stability at low latency settings. The same advice applies even if you're only using a single interface, and it may prove a useful tip when you're trying to play soft synths 'live' with as low a latency as possible.
- **On The Move:** Here's a tip for if you have a laptop and a host application such as *Cubase* that includes Rewire support, plus *Gigastudio 3* (which also has Rewire support), but you want to work 'on the move' without carting about an expensive audio interface with GSIF and ASIO support. Just use Rewire to port the audio output from *Gigastudio* to *Cubase* and then *ASIO4ALL* to provide low-latency ASIO drivers for the laptop's sound chip.

▶ notable exceptions in the case of generic multi-device drivers that allow several completely different interfaces to be combined. The first generic ASIO driver I came across was Tobias Erichsen's *ASIO2KS* (www.asio2ks.de), back in 2003, which used the WDM/KS drivers that already existed for most audio devices and added a further layer of its own code to provide them with low-latency ASIO functions. A lot of musicians received the beta version of this driver and the results looked promising, but, sadly, the final release never appeared.

To the rescue in 2004 came Michael Tippachs' freeware *ASIO4ALL* overlay, which employed the same techniques and has since been widely used by many musicians to perform two main tasks. The first is providing the on-board sound chips found on most PC laptops with low-latency ASIO support. While these chips are mostly restricted to 16-bit operation and rarely provide good audio quality, they are nevertheless extremely handy if you want to 'travel light' with your laptop and make some music. Prior to *ASIO4ALL*, the only *Cubase* driver alternatives provided by Steinberg for them were the ASIO Multimedia Driver and the ASIO DirectX Full Duplex Driver, neither of which resulted in latencies much below about 20ms. With *ASIO4ALL*, my laptop soundchip managed an excellent 5ms latency.

The second task is providing support for multiple interfaces, introduced in version 2 of the driver. All you need to do is install it and then choose the '*ASIO4ALL* v2' option as your ASIO driver. It's also important to note that *ASIO4ALL* causes no audio degradation — it simply routes audio and makes the various inputs and outputs appear as extra options inside all ASIO-compatible hosts.

Given that it's freeware, we can forgive a few quirks, as well as a 'novel' Control Panel window (see screen on previous page). In addition, sometimes particular interfaces or applications refuse to play ball with it — for instance, some users have encountered problems with *Fruity Loops* and Creative Labs soundcards, and it seems that RME WDM drivers don't work with *ASIO4ALL* either. Remember, also, that *ASIO4ALL* relies on the existing WDM drivers for your interface, so if these only provide reduced I/O support compared with their ASIO drivers, this is all you'll be able to access with *ASIO4ALL*. Echo's current Audiofire drivers and Emu's DAS drivers are a case in point.

I've also found that sometimes, although the correct number of input and output connections appear inside *Cubase SX* when you choose the ASIO4ALL drivers, their names don't appear correctly. However, as long as you remember the total number of inputs and outputs belonging to each device, and count down the displayed list to the appropriate one, the connections still work reliably.

Despite these quirks, many musicians have used *ASIO4ALL* to 'achieve the impossible' and run several dissimilar interfaces side by side inside *Cubase* and other ASIO-compatible applications, to provide them with more inputs and outputs. However, as in the case of *Sonar*'s WDM/KS driver option, there could well be a tiny fixed offset between the different interfaces.

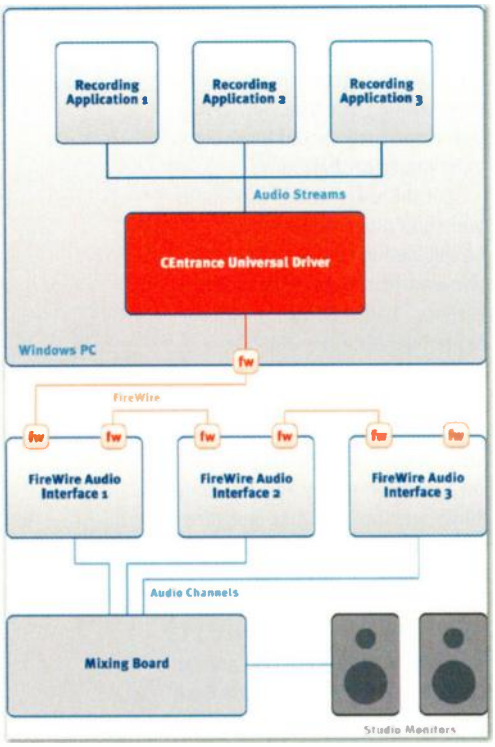
Interface Driver Conflicts

Drivers that only support a single device will become confused when faced with two identical interfaces, but sometimes Windows can also get confused when you plug in a new interface, and can think it knows what the new device is before you've installed the correct drivers. This may be a one-off anomaly that can be ignored, but it may also be because both the new device and a previous one contain a similar chip. Sometimes this previous device is still active, or it may be one that you've removed without properly un-installing its drivers first. In such cases, you should always follow the manufacturer's step-by-step installation instructions for the new interface, and cancel or ignore any attempts by Windows to automatically install any other drivers for it.

Emu, for example, warn existing Creative Audigy 2 users that after installing one of their 1010 cards and rebooting, Windows may attempt to use the previously installed drivers for these older Audigy cards. However, if users ignore Windows and install the 1010 drivers and software correctly, these products can actually run happily alongside each other without conflict.

Professional Universal ASIO Drivers

By the time you read this, Centrance (www.centrance.com) should have released their CE1506 Universal Driver for Firewire audio devices. This uses the low-level 'kernel' mode (without employing the Windows usbaudio.sys file), for low latency, and will support multiple devices. Running under Windows XP, it will not only provide up to 32 input and 32 output channels under Firewire 400 (up to 64 of each with Firewire 800) but will also offer multi-application support, for combining audio streams from several apps running simultaneously (see diagram below).



Centrance's forthcoming Universal Driver promises professional low-latency performance if you want to run several different Firewire audio interfaces simultaneously, and even divide up their I/O amongst several ASIO-compatible applications.

The driver is written for the three major Firewire chip sets (Oxford Semiconductor, Wavefront Semiconductor and BridgeCo), so

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version 1.0 should support a wide variety of interfaces, including the Apogee Rosetta 200, Behringer FCA202, Focusrite Saffire, M-Audio Firewire Solo and Ozonic keyboard and Miglia Harmony Audio. Future versions of the driver could add support for products from Alesis, Presonus and Yamaha, amongst others. Round-trip latency (recording plus playback) should be under 10ms, and supported ASIO host applications so far include *Cubase LE*, *SE* and *SX*, *Nuendo*, *Live*, *Sound Forge* and *Vegas*, *Sonar 5* and *Reason*, with others, such as *Acid* and *Fruity Loops*, to follow. Given the pedigree of some of the supported products and applications, I expect this new driver to create a lot of interest in the ranks of professional musicians.

Converter Expansion

After all this talk of exotic drivers, I should remind those with unused ADAT ports that they already have an easy way to add more analogue inputs and outputs to their interface, to cater for live recordings or surround requirements, simply by plugging in a hardware box containing some A-D or D-A converters, or both. Quite a few audio interfaces offer suitable ADAT I/O, including Echo's Gina 3G and Layla 3G, Edirol's UA1000, Emu's 1820 and 1616 models, ESI's new Maxio XD, M-Audio's Firewire 1814 and quite a few models in both the MOTU and RME ranges.

There are also quite a few compatible converters available in desktop and rackmount formats, many of which have already been reviewed in the pages of *SOS*. If you want eight more inputs and outputs and have a suitable spare pair of ADAT ports on your existing interface, one budget offering to consider is Behringer's ADA8000, reviewed in *SOS* June 2004 (www.soundonsound.com/sos/jun04/articles/behringerada.htm). At £185, it's extremely good value for money, providing eight mic/line inputs with rotary gain controls on the front panel, globally switched phantom power, and eight balanced XLR outputs on the rear panel, along with ADAT In/Out. A more up-market alternative is RME's £900 ADI8 DS, reviewed in *SOS* September 2003 (www.soundonsound.com/sos/sep03/articles/rmead18ds.htm. If you only need lots more analogue inputs, M-Audio's Octane provides eight mic/line preamps with optional phantom power (two with instrument options, and another two featuring Middle & Side decoding for use with a compatible M&S stereo mic pair), feeding a single ADAT output, for around £300 on the street. It was reviewed in *SOS* September 2004 (www.soundonsound.com/sos/sep04/articles/octane.htm). Those with more money to spend might want to look at Mackie's Onyx 800R, once again with eight mic preamps (and M&S options), this time taken from their acclaimed Onyx mixers. Hugh Robjohns reviewed this device in *SOS* February 2005 (www.soundonsound.com/sos/feb05/articles/mackieonyx800r.htm) and it costs about £850 on the street.

If you already have a spare pair of ADAT ports and need more analogue inputs and outputs, you can add eight of each by plugging in a suitable converter box, such as Behringer's ADA8000, shown here.

If you don't need more inputs or outputs but want significantly better recording/playback quality than your existing converters give you, RME's £450 ADI2 (reviewed in *SOS* May 2005) provides high-quality stereo A-D and D-A converters with up to 192kHz capability, in a half-width, 1U, rackmount case. Those aspiring to even higher playback quality could look at Benchmark's DAC1 (reviewed in *SOS* July 2005), which provides stereo playback with superb resolution, imaging and jitter suppression, for around £900.

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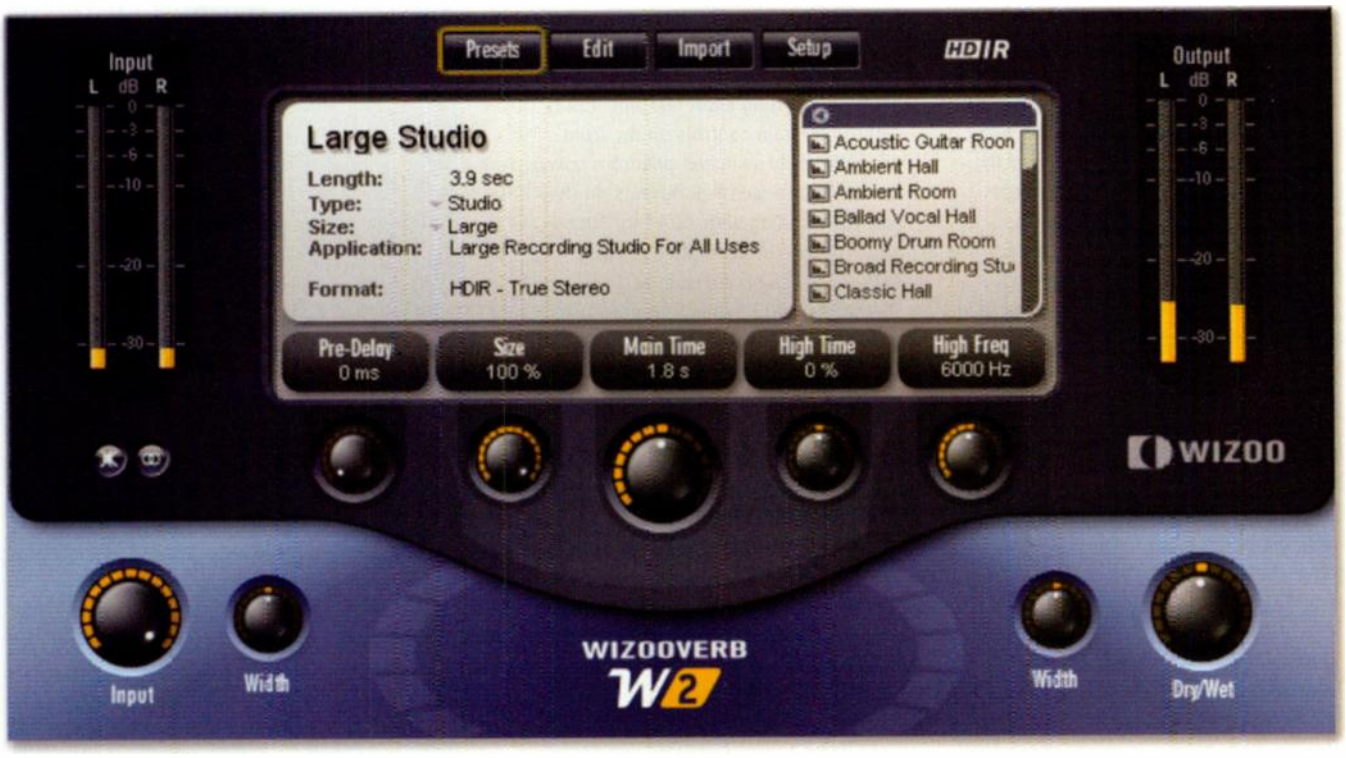

Wizoo W2

Reverb Plug-in For Mac & PC

Paul White

With *W2*, Wizoo's aim is to combine the realism of convolution reverb with the flexibility of an algorithmic design.

As any reverb conoisseur will tell you, convolution or 'sampling' reverbs offer the most accurate recreation of real acoustic spaces, but sometimes a more old-fashioned artificial reverb is what sounds best. Though many companies have come up with clever processing to enable IR reverbs to be edited to a useful degree, the greatest flexibility of editing still rests with synthetic or algorithmic reverbs. Wizoo have clearly set out to provide the best of both worlds, because in addition to giving the user a choice of convolution or synthetic reverb, they have also made it possible to combine the two types in a very flexible way. As shipped, *Wizooverb W2* comes with 15 HDIR (High Definition Impulse Response) models based on impulse measurements taken in a variety of real spaces, but these are backed up by an 'AIR' algorithmic reverb.

Wizoo's HDIR sampling process captures the sonic signature of a real space using mics, speakers and test signals, after which a proprietary process is used to generate metadata, which is used to maximise sound quality when the reverb is being edited. This is a key feature, as without some kind of intelligent processing, the changes that can be made to an IR-based reverb are quite limited.

On the synthetic side, the AIR algorithm is apparently not based on the conventional combination of delay and all-pass filter circuits used in most hardware reverb processors, but is claimed to offer similar advantages at a reduced CPU load. As a very general rule, HDIR is the best choice when you need the material to sound as though it is being played in a real space, while AIR places a lighter load on the CPU and may be more artistically desirable in some cases. When some of the competition offers hundreds of impulse responses, having a library of 15 HDIRs may not seem like a lot, but *W2* will load and optimise third-party impulse responses to extend your library, and Wizoo claim that their IR optimisation will make your imported impulse responses sound even better than in other convolution reverbs.

Test Spec

- *Wizooverb W2* v1.0.
- Apple G5 dual 2.7GHz Power Mac with 4GB RAM, running Mac OS 10.4.1.
- Tested with Apple *Logic Pro* 7.1.

SOUND ON SOUND

Wizoo *W2* £169

pros

- Includes a True Stereo mode for better localisation of off-centre sources.
- Clean and uncomplicated user interface.
- Excellent sound quality.

cons

- More included IRs would be nice, but there are no real cons.

summary

There are already some great reverbs on the market but this new offering from Wizoo is up there with the best of them. The ingenious ability to render IR reverbs as algorithmic reverbs or to combine elements of each really adds to the flexibility of the package.

Pages & Patches

To find your way around this plug-in and to see what it can achieve, it's best to start by looking at the interface, which comprises a

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number of pages accessed by buttons. The Presets window, where reverb types are categorised in different folders, opens automatically when *W2* is launched, and a preset consists of a complete reverb program comprising the HDIR model and all necessary parameters. At the bottom of the display are five parameter boxes with associated knobs, the functions of which change according to what page you're on; the larger knob in the centre usually controls the most important parameter. The user can assign any edit parameter to control knobs four and five, but knobs one, two and three have fixed assignments. This means that up to five reverb parameters can be accessed directly from the Presets page, though you can go into more depth in the Edit page.

A list of all the main operations appears at the right of the display, which is also where patches are saved and loaded. There are input and output level meters at the sides of the panel with level controls directly below. A Dry/Wet knob sets the reverb balance: like all reverbs, when *W2* is used in an aux send loop, this should be set to 100 percent wet.

W2's editing options are, according to Wizoo, designed to work in the same way as a listener's perceptions. Any reverb pattern comprises an early reflections portion, which carries a lot of the audible information about the room type, followed by a decay tail, which tells you how reflective the environment is. The main, and largely familiar reverb parameters include Pre-delay, which places a short delay before the reverb, Room Size, which alters the perceived room volume, and reverb Decay Time. In the Edit page you can select HDIR only, AIR only or HDIR plus AIR, where part of the HDIR decay is replaced using the AIR algorithm. Either type can be used for early reflections or the reverb tail, and AIR editing can be done in real time without waiting for the IR to recalculate. One of the most obvious applications for combined convolution and synthetic reverb is to use HDIR to generate those important early reflections, then add an AIR-generated tail; this will enable you to change the decay time over a very wide range without compromising the signature sound of the room.

One of *W2*'s unique features is the ability to 'render' IR-based early reflections and tails to a synthesized equivalent for greater flexibility.

The reverb can be shaped using EQ.

The other editing pages include Early Reflections, Tail and EQ. In the first of these, Render ER is a function I haven't seen on any other reverb unit to date: this replaces the HDIR model's early reflections with an AIR synthesized version that matches the sound as closely as possible. Not only does this conserve CPU power but it also opens up new editing options, as AIR reverbs are always more editable than IR-based reverbs.

The Tail menu tab allows you focus just on the reverb tail, with options including a Low Freq/High Freq split that lets you vary the relative decay times of its high and low-frequency components. Ambience is another unusual reverb parameter, more commonly being associated with a type of short room reverb; here, it lets you place the sound source further into the room. We're on more familiar ground with Density, which adjusts the density of the reflections making up the reverb tail, while Colour adjusts the timbre of the tail, making it brighter or darker. Where the reverb tail is IR-generated, you can also modify its envelope in natural and not-so-natural ways via the Envelope tab. Like the early reflections, the tail can be rendered and replaced with a synthesizer version. The EQ menu tab brings up a parametric four-band, post-reverb EQ with individually bypassable bands, which processes only the wet signal.

In all cases, the balance of the early reflections and the reverb tail can be changed, and you can also adjust the point where the ▶

Standing Alone

Unusually, *W2* can be operated as a stand-alone application, which means that if you have a spare computer and I/O device, you can run it as a separate reverb unit, just as though it was a piece of hardware. Under Mac OS, the stand-alone version appears in the Applications folder and uses the selected Mac audio I/O. Both the plug-in version and the stand-alone version have identical facilities, as well as sharing the same impulse response library. The included IRs span a whole range of spaces from small ambiences and post-production environments, via the usual studios, rooms, halls and chambers to churches and cathedrals. There are some lovely rooms that sit somewhere between reverb and ambience, adding a nice sense of space without seeming cluttered. Post-production settings include a tunnel, an empty oil tank and even a stone cave, which is pretty handy in musical applications too. The ambience and room sections also include some excellent drum and vocal treatments, but if you're after a real retro drum sound, there's also a folder of non-linear reverbs for all those classic gated and reverse reverb effects. More flexibility is available by taking, for example, an ambience or room early reflections IR and then combining that with a longer reverb tail taken from another IR or AIR reverb setting. This can work particularly well on vocals.

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▶ early reflections stop and the tail starts, though this 'crossing' parameter is not available when combining IRs and decay tails as the system decides on an optimum crossing point for you, based on metadata stored with the IRs. It's also possible to reverse an entire HDIR reverb pattern to create an eerie 'backwards' sound, though this can't be applied to AIR reverbs.

Stereo And True Stereo

W2 is a true-stereo reverb where HDIR IRs are available in both Stereo and True Stereo versions; in standard Stereo mode, the listener perceives the sound as though it is coming from centre stage, as it the case for most reverb units. By contrast, True Stereo mode enables the listener to localise the position of the source, but this requires two stereo IR computations and so doubles the CPU loading. Note that in True Stereo mode, the left and right channels work independently, so a signal fed into the left input will only generate reverb at the left output.

In both modes you can adjust the input signal's stereo spread before it hits the reverb engine, and interestingly, this control affects not just the stereo width of the reverb but also the apparent distance of the sound source from the listener, with lower values equating to larger perceived distances and *vice versa*. There's a further control in the Output section to adjust the reverb's stereo spread.

With HDIR and IR reverbs, there's the facility to adjust Directivity, which is a way of shaving off the first few milliseconds of the impulse response to avoid excessive coloration when combining the reverb with the dry sound. This shouldn't be confused with pre-delay, which is a straightforward delay before the reverb kicks in.

Third-party IRs can be brought in via the Import Page where you can trim the IR, remove the direct part of the sound and adjust its gain to optimise its performance. To create True Stereo HDIR reverbs, you need to load two stereo IRs, where the first stereo file contains left-to-left and left-to-right signals and the second stereo right-to-left and right-to-right signals.

System Requirements

Windows

- **1GHz Pentium III or better, 512MB RAM, 56MB free drive space, DVD-R drive for installation, Windows XP, VST or RTAS host.**

Mac OS

- **1GHz Power Mac G4 or better, 512MB RAM, 68MB free drive space, DVD-R drive for installation, Mac OS 10.3.8 or later, VST 2 or RTAS host.**

On both platforms, *W2* is authorised via the Wizoo web site.

Reverb tails generated from an impulse response can be modified using the Envelope tab.

Wizoo have included three different power modes to help out those with slower computers. The difference between these settings is the amount of latency added to the input signal, so if you're mixing (when latency isn't important), this is a good way to maximise your CPU efficiency at the cost of an overall delay of around one-sixth of a second.

Wizard Reverb

Though there's a lot of control on offer, *W2* is actually very easy to use and the first port of call has to be the factory presets. These are based on the 15 included impulse responses, with or without AIR components, and though they don't all have obvious names like 'vocal plate', you can get a very decent plate sound by fiddling with the stone cave. There are also some lovely bright room ambiences that work fantastically well on picked, clean electric or acoustic guitar. If you do decide to render the tail of a reverb to use AIR instead of an HDIR, the sonic difference is very subtle indeed, and even if you render the early reflections part of the patch, the end result is still smooth and musical, albeit with perhaps a little less real room character.

Using the True Stereo programs really does enable you to localise the source much better than would be possible using a blanket mono-in, stereo-out reverb added to the stereo dry signal. Where you need that degree of focus, it is excellent, but most times the standard stereo reverb will do the trick and will save on horsepower. In fact the only thing I totally failed to do during the initial stages of this review was import a third-party impulse response. According to the manual, interleaved AIFF or WAV files will import directly, but I always got a 'not a valid audio file' message. After consulting Wizoo, it turns out that *Logic*'s AIFF files contain extra data in the header, which is why they are rejected; if you convert them to WAV format within *Logic*, all goes smoothly. *W2* can't import mono impulse responses and I'd found a very nice mono Space Echo IR I wanted to try, so I dropped it onto a stereo *Logic* track, then saved it as a stereo WAV file, and it worked perfectly. In fact the IR import could only be improved by allowing users to drag and drop IRs into the Import window rather than having to find them via a file browser window.

When reviewing reverbs, it's hard to put across the essential character of what's on offer, and it's also impossible to say which convolution reverb is the best: they all sound differerent, yet they all produce musically believable results. Wizoo seem to have achieved a better sense of focus and space than some of their less sophisticated competitors, especially when using True Stereo mode, but I was also seriously impressed by some of the presets involving the AIR algorithms, especially the '80s drum ambience — which, incidentally, works great on guitar. I'd like a greater choice of IRs, but having said that, I found that I could get pretty close to just about any reverb sound I could envisage, which is a testimony to how easy and effective the editing is. There are also plenty of free IRs on the Internet to try out.

Overall, I really like what Wizoo have done in *W2* and I look forward to their forthcoming surround version. It might not have the flashy graphics or compendious libraries of some of its competition but it has a clean-cut interface, it is very flexible without being complicated and it sounds absolutely top-drawer. Definitely worth getting to know better. SOS

information

£ £169; *W5* surround reverb £299. Prices include VAT.
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F +44 (0)1923 204039.
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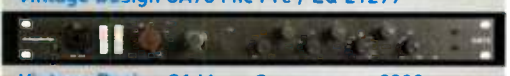

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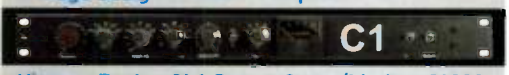

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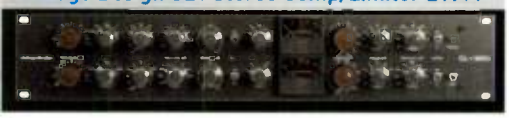

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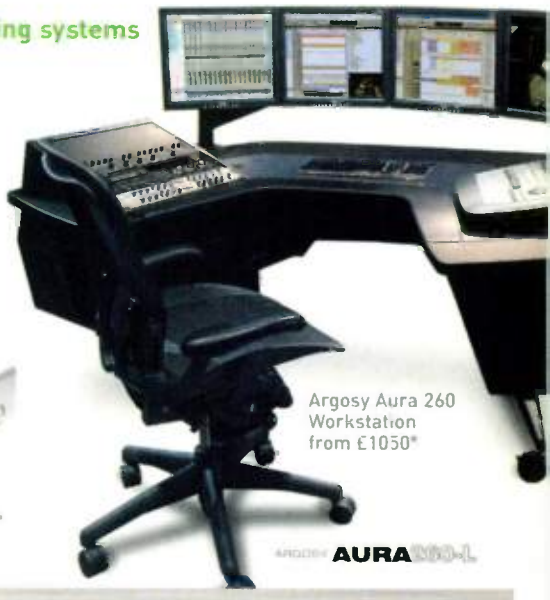

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Line 6 Toneport UX1 & UX2

Line 6's latest products are USB boxes that turn your computer into a low-latency amp-modelling system.

The UXB1, and (above), the UXB 2

Paul White

USB Recording Interfaces For Mac & PC

Line 6's Toneport UX1 and UX2 are computer recording interfaces aimed at the guitarist or bassist who might also want to record vocals and other instruments. In each case, you get a two-in, two-out USB audio interface with mic, line and instrument inputs and a suite of amp and effect modelling software derived from the Pod XT and Bass Pod XT, plus some newly added vocal preamp models. The modelling effects on offer here are not plug-ins, but operate directly on the input source before the host application. The benefit is that you can hear your effected input signal with no perceptible latency when recording, regardless of how large a buffer size you set in the host application.

Both packages come with exactly the same *Gearbox* software (as well as a cut-down version of Ableton's *Live 4* loop-based sequencer) and offer the same sound quality. What's different is that the UX2 has more connectivity options and features a nice pair of frog-eye meters, as well as phantom powering for capacitor microphones. Both use USB connectivity and draw their power from the USB buss so there's no need for an additional PSU. However, as with all USB interfaces, it's best to connect the interface to a dedicated USB port rather than a hub.

UX1 Or UX2?

The cheaper UX1 has stereo line ins and unbalanced line outs on quarter-inch jacks, one XLR balanced mic input and one high-impedance instrument input jack. A single headphone out is also included, but there's no phantom power for the mic input. There are rotary controls for mic gain and output level and there's also a stereo jack monitor input so that you can combine the output of your computer with that of the UX1 if you happen to be running an additional soundcard or interface under those operating systems that allow it. This is important because the included software will only run with the UX1 connected, and the near-zero-latency monitored signal always emerges from the UX1, even if you have routed the rest of your sequencer audio through a different interface. It's important to switch off software monitoring in your audio host software when recording, otherwise you'll hear both the near-zero-latency version of what you're singing or playing plus the DAW version delayed by whatever latency your audio drivers are set to.

As an interface, the UX1 normally operates at 24-bit, 44.1kHz or 48kHz. It works fine as the sole interface in a computer setup, providing you only need two inputs and two outputs, and the output

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level control is ideally placed for setting the level of connected active monitors or headphones. When you install the *Gearbox* software that comes with the unit, you get drivers supported by ASIO, WDM and Mac OS X Core Audio. There's also a 96kHz mode that uses sample-rate conversion. The Toneport still operates at 44.1k or 48k, but the driver will sample-rate convert up to 96k so you can use the device to work on projects created at 96k. Handling this at driver level gets around the USB bandwidth limitation and allows simultaneous I/O while recording at 96k.

The slightly more expensive UX2 provides two front-panel instrument jacks (one normal, one padded down for high-output guitars) as well as two balanced XLR mic inputs with globally switchable 48 Volt phantom power. Note that only one instrument input channel is available, but if you were to use a DI box into the other's channel's mic input or line input, I see no reason not to use two sets of guitar amp models at the same time, or one guitar and one bass.

There are twin level meters, though most people will probably use the meters in their DAW software to confirm the recording levels, and on the UX2 there are separate level controls for the phones and main stereo output. On the rear panel you get the same connections as on the smaller UX1, augmented by a coaxial S/PDIF output and a pair of footswitch jacks, which can be assigned to MIDI commands for stopping and starting recording, bypassing effects and so on.

A signal-to-noise ratio in excess of 100dB is quoted for both models, and having used them, I've found no reason to dispute this figure; they're very clean and quiet.

The *Gearbox* software in action. The row of icons along the middle shows the signal path from left to right, with the selected amp model displayed above, and the effects displayed below.

What's In The *Gearbox*?

What makes the Toneports very different from conventional USB audio interfaces is the included *Gearbox* software. The easiest way to describe the operation of *Gearbox* is that the software amp models, which run on your computer, behave more as though they reside in the interface itself. By this I mean that when you come to select the Line 6 interface as an input source in your DAW software, the signal that arrives is already processed via the *Gearbox* amp modelling section which opens as a separate program in a separate window from your DAW. You don't have to mess around with Rewire or anything like that — what you hear is what you record. Or very nearly.

In fact, the designers at Line 6 have given the units four 'to-DAW' outputs to recording software, two of which come from the end of the signal chain and two of which come before the last few post-output 3/4 effects. You always monitor the full effects chain, but can decide to take your record feed from before the post- effects, enabling guitar, bass or vocals to be recorded without delay or reverb but to still have those effects available for monitoring. This is a wonderfully uncomplicated way of setting up monitoring reverb for vocalists, but the down side is that you can't use these effects when you come to mix (unless you route audio back through the box) as they are not available as plug-ins. This ability to tap into the signal path before the post- effects is also lost when you record both channels at once, as both to-DAW outputs are then needed to route the two channels. In dual-channel mode, you can use two sets of amp or preamp models at the same time, one to process each of the two inputs. In practical terms, this means you can use a chain of vocal preamps and effects as well as guitar modelling when recording guitar and vocals or guitar and bass at the same time, keeping both signal paths completely discrete.

Near Zero-latency Monitoring

I tested the software in *Logic Pro* and deliberately set the largest possible buffer size to give me noticeable latency. As promised, the guitar I was playing appeared at the UX2's output with no noticeable latency at all — it felt just as immediate as playing through a hardware Pod XT. For the next test, I set up an Aggregate Driver under Mac OS 10.4 so that I could use my MOTU 828 Mk2 and the UX2 at the same time. This placed the four possible UX2 to-DAW outputs (1/2 and 3/4) at the end of my list of available input sources, and I chose the MOTU as the default output of my system. This worked absolutely fine, and though using an Aggregate Driver always seems to make the latency noticeably worse in the host DAW software, I could still the guitar I was recording with no noticeable delay.

However, it should be pointed out that ▶

SOUND ON SOUND

Line 6 Toneport UX1 & UX2
£102/£159

pros

- Inexpensive.
- Good-sounding Mac/PC USB audio interfaces.
- Add vocal preamp models to the guitar and bass amps you'd expect.
- You can monitor the modelled and effected sound with virtually zero latency.
- Software can be expanded using optional Model Packs.
- Same modelling quality as the Line 6 Pod XT range.

cons

- Some signal routing restrictions when using multiple audio interfaces.
- Effects can't be added after recording as *Gearbox* elements aren't available as plug-ins.

summary

The UX-series Toneports are remarkable bundles comprising good-sounding USB audio hardware and a very well thought-out suite of modelling software for guitar, bass, vocals and general instrument use.

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you can only hear the input with near-zero latency if you monitor via the line outs (or the S/PDIF socket) on the back of the interface — there is, of course, no way to pipe it via your other audio interface without incurring the latency imposed by its buffer settings. This means in practice that if you use the Toneport with another interface, you need to monitor the audio from both interfaces at once when overdubbing to retain the benefits of near-zero-latency monitoring.

Vocal Preamp Models

Most of what's in the Toneports comes from other existing Line 6 products, but the vocal preamp modelling is new. There are models based on the analysis of Neve and Avalon high-end hardware, as well some deliberately coloured preamps. Even the clean preamps have a noticeably different character from each other, almost like changing microphones, which helps in getting a sound to suit a specific voice, though you can record your vocals without any modelling if you want to. The more obviously coloured or distorted 'genre' preamps also add the right kind of character, providing you restrict their use to the musical styles that rely on these more excessive vocal treatments. Again, you can use any of the general-purpose stomp effects to liven up the sound or just to add monitoring delay or reverb, though my preference would normally be to record without unnecessary processing so as to leave me with the flexibility to make changes when it comes to mixing. Where effects are needed, the quality is generally very good, especially the simulated tape delays, though the reverbs are none too shoddy either and the spring guitar reverb is uncannily authentic-sounding. Most of these effects are aimed at guitar but the compressors, EQ, delays and reverbs work just as well on vocals.

Models In Action

The models included are based on the Pod XT algorithms, and though you get slightly fewer of them than in the hardware equivalent, the quality is exactly the same. There are 16 guitar amp models, five bass amp models and six vocal preamps. On top of this there are 24 effect modules that can all be used on guitar, bass or vocals, and if these aren't enough, you can download optional Line 6 Model Packs from Line 6's web site to upgrade your software to include all the Pod XT models or go further and buy the additional Vetta amp and effect models currently available to Pod XT owners.

The amplifiers that you do get cover a broad tonal spectrum and include models 'inspired' by various Marshall and Fender classics as well as Vox, Soldano and Mesa Boogie. As with the Pod XT, you can switch speaker cabinets around to get more tonal permutations and there are some superb effects, including a very realistic tape-loop echo complete with wow, flutter and just the right degree of degeneration as the sound repeats.

At the very start of the effects chain is a conventional noise gate, but there's also a new hum reducer that works by first 'learning' the hum from your guitar and then reducing it. The manual doesn't say whether this is achieved by adding it back to the guitar signal out of phase, by automatically configuring a series of notch filters or by subtracting a noise fingerprint, but it works. There's a significant reduction in hum with no apparent effect on the guitar tone, so this is actually more sophisticated than what goes on in the Pod XT hardware. Following the noise gate is a volume pedal, which can be controlled remotely via MIDI, as can the wah pedal that comes next. A pre/post switch allows the volume pedal to be moved to the end of the effect chain, immediately prior to the Send 3/4 output. Then we have the stomp effects, which can be one of several distortion types, a Vetta compressor or a choice of male or female de-esser. In all cases, the number of knobs you get to adjust is similar to what you'd expect on a stomp pedal — there's nothing too scary. If you switch the pre/post order of any effect, the current signal path is shown with each of the icons in its correct position in the chain.

From there, the signal feeds into the amp model section, where you get to choose the amplifier type, the speaker cabinet, the type of mic and its position. All the usual amp controls (Drive, EQ and Volume) are present, though the EQ configuration changes to suit the amp type being modelled. Extra EQ controls not present on the original amp appear in a small window to the right of the main controls to give the user a little more tonal flexibility.

Clicking on any stomp pedal icon bypasses it and selects its edit window. A graphical panel display is shown in the lower half of the window and the amp or

New to the Toneport are models of classic mic preamps and studio effects.

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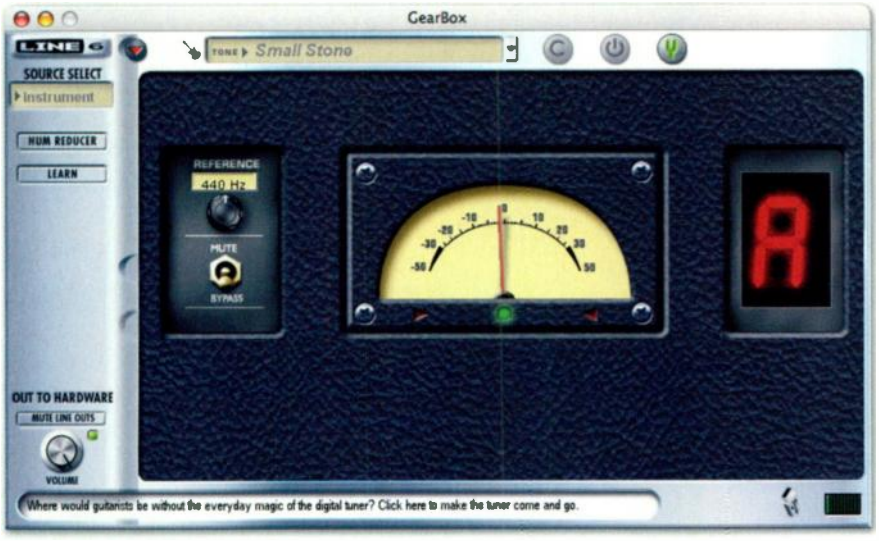
The slightly more expensive UX2 has additional features including a second mic preamp, phantom power, footswitch sockets and an S/PDIF output.

▶ preamp controls in the upper half; clicking on the amp icon shows the miking arrangement for the current speaker cabinet. The only thing I found confusing was that on the vintage preamp model, it was difficult to tell which of the four protruberances on the control knobs was actually the pointer!

Directly after the amplifier comes another compressor block with just threshold and gain controls, then a four-band EQ with variable-frequency shelving filters at each end and swept filters for each of the middle two bands. Following the point in the chain where send 3/4 can be tapped off come the Mod Reverb and Delay blocks, though all three have pre/post switches that allow them to be moved before the send 3/4 tap point when required. Output 1/2 always comes from the end of the signal chain. This flexibility makes it possible to monitor without recording effects such as delay or reverb that help your playing but which you'd like to replace later in the recording process.



Gearbox's guitar tuner.

At the top of the window, just to the right of the patch name window, are three buttons. The first changes between the stored setting and any edits you have made, allowing you to make comparisons before saving. The second bypasses the modelling chain, giving you a clean signal path and shedding any computer CPU load that *Gearbox* imposes, while the third opens up a very precise and stable guitar tuner with an analogue meter-style readout.

Where two-channel operation has been selected in the input source menu, you can set up two independent processing chains for the two input channels using the two icons immediately to the left of the patch name to switch between their controls. In this mode you lose the ability to record a different signal path from the one you monitor, as one channel comes out via outputs 1/2 and the other via 3/4. The reason two channels are required for each output is that some of the effects are stereo.

Other controls allow the level of the output to be adjusted or muted and there's also an output pan control with a mono button for when you want to record the output as a simple mono track. Separate Record and monitor Level controls are available to help you set the correct balance of track and the source being recorded. Overall, the graphical aspect of *Gearbox* is very well thought-out and almost everything about it is intuitive. Patches, or Tones as they are called in the documentation, can be saved independently for the two channels and there's a generous selection of factory patches to get you started.

In Use

Although you don't get all of the amp models from the Pod XT, 16 different classic amps will be enough for most people, and the factory presets give a very good introduction to the range of sounds available, from clean and country through raunchy blues and rock to ear-melting shred. In all cases the sounds respond in a fairly natural way to picking intensity and the character of the different amps and speakers comes across very clearly. If you need more variation than this, you can always buy the optional Model Packs. Bass players have a somewhat smaller choice, but again all the key genres are covered and you can use any of the stomp effects to spice up the sound where needed. These amp models come directly from the Bass Pod XT and so are of a very high quality. I've also found that you can get excellent results on bass using some of the standard guitar amp models with the right bass speaker cabinets.

The mic amps might not be exotic, but they are certainly clean and competent. The near-zero-latency monitoring approach really works, the trade-off being that you can't record dry and add the effects later as plug-ins. Perhaps Line 6 might like to consider making the effects available as additional plug-in versions, still protected by the hardware, as they'd be useful in all kinds of mixing situations, but then there's only so much you can expect at these prices and Line 6 have already exceeded expectations by quite a long way. If there's a frustration, it is that when using the UX interfaces in conjunction with other, multi-I/O interfaces, the near-zero-latency monitoring always has to come out of the UX interface.

Cosmetically the units are attractive and practical, and the software user interface is very intuitive and visually friendly. *Gearbox* has fun written all over it, but despite its jolly appearence and entry-level price, it is capable of really serious results, while if you don't already have audio recording software, the bundled version of Ableton *Live* will do just about everything you need until you get fully up to speed with the process. If you play guitar and record on a computer, then it's pretty safe to say that you could find use for a Toneport system, even if you already own a Pod XT. SOS

information

£ UX1 £102; UX2 £159. Prices include VAT.
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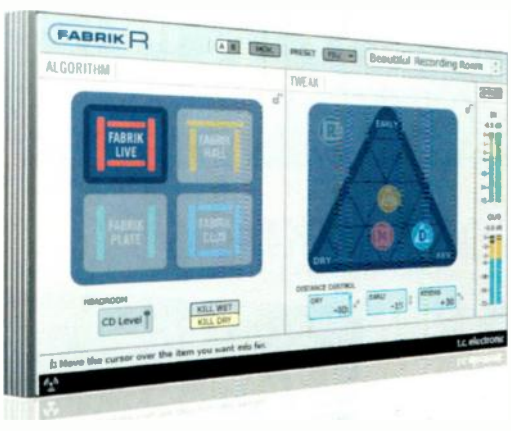

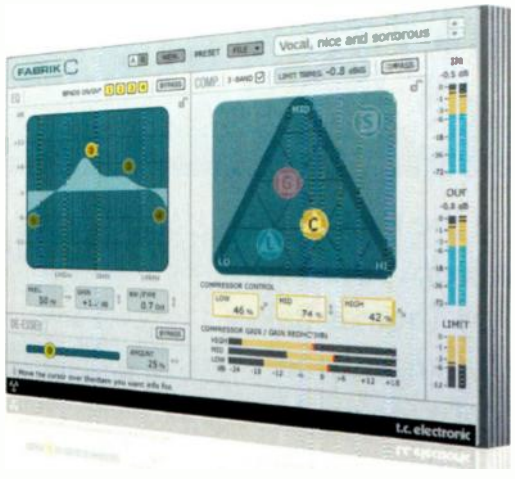

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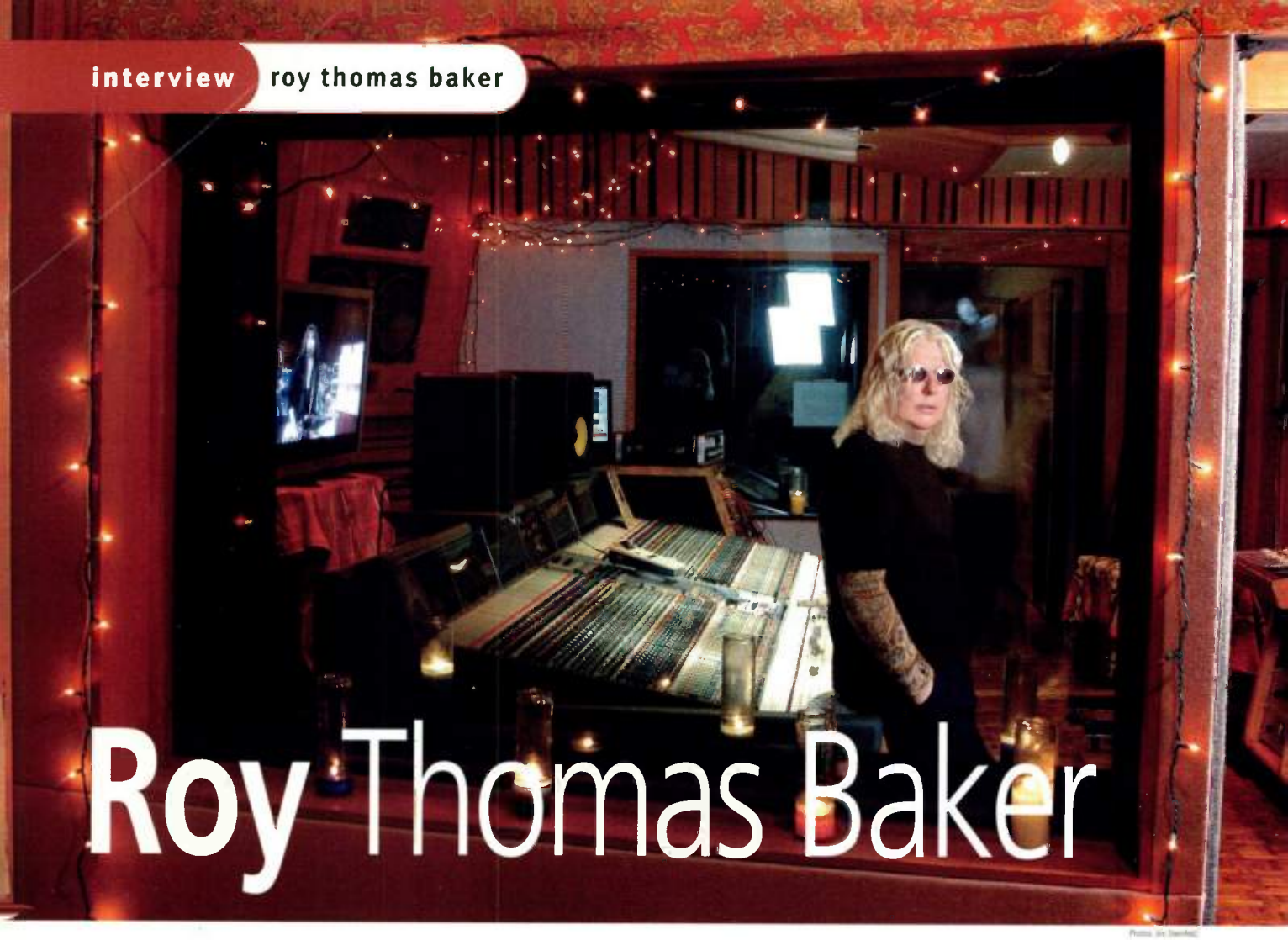


Roy Thomas Baker

Recording the *One Way Ticket To Hell... And Back* album, Roy Thomas Baker and the Darkness used 400 reels of tape, up to 1000 tracks per song and a year in the studio — not to mention custom-made panpipes.

Paul Tingen

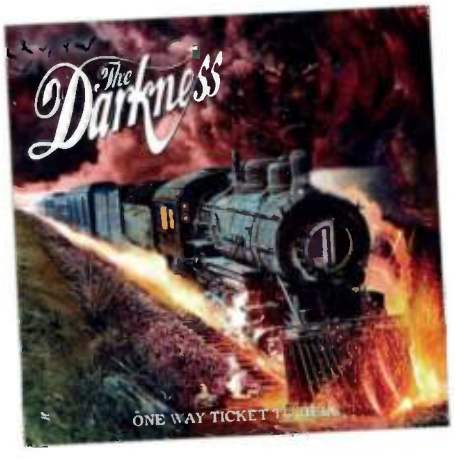
Producing The Darkness

The pairing of Roy Thomas Baker and the Darkness is a one-way ticket to heaven. It had been on the cards ever since the band landed in the public eye with *Permission To Land* in 2003. Take a lead singer (dis)graced with leotard suits and a balls-in-the-bench-vice falsetto, add music that takes its inspiration from 1970s hard rock, season with lots of operatic bombast, and you have a band that can lay claim to being genuine 21st-century heirs to the likes of Led Zeppelin, Queen, AC/DC, Slade, and other stars of rock's golden age, pomp, glam or otherwise. Meanwhile, Roy Thomas Baker is, of course, the man behind much of the most innovative and outrageous rock music from the 1970s and 1980s, and is perhaps best known for producing several Queen albums and the perennial 'Bohemian Rhapsody'.

From Lowestoft With Love

Baker and the Darkness are kindred spirits, and unsurprisingly, when the two parties met after a Darkness show in LA in the beginning of 2004, it was love at first sight. Work on the new album began in earnest in the late summer of 2004, when the band set up in a barn converted to a rehearsal room-cum-studio somewhere close to their native town of Lowestoft, Suffolk, to work on new material. Baker remembers arriving in October, and elaborates "We had two stages to the writing process. One was referred to by the band as the 'round table', and this was literally done sitting at a round table in the control room where everyone would play acoustic instruments through Line 6 guitar and bass Pods and a Roland electronic drum kit, and put in their 10 cents. We recorded all that with a couple of mics.

"The next stage was to go into the live room and play the songs with guitar amps and a real drum kit. We had a Pro Tools and Mackie setup there, but we didn't use any of these initial pre-production recordings. We just kept them as references. Justin and Dan [*Hawkins*] are pretty unique songwriters and they can churn out a song a minute. We had what seemed like thousands of songs. The whole purpose for me as a producer in being there was to work out what the best parts were and help evolve them. We were working arrangements out as we went along, and ended up with very clear ideas of the kind of arrangements that we wanted."



That last statement turns out to be of much greater importance then one would initially suspect, but more about that later. First Baker continues his story. "The band took

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some time off for a UK tour, and then went back to writing. When it got close to New Year, I commuted between the barn and Rockfield studios in Wales to get things organised there. We had checked out a number of studios while they were touring the UK, and we decided on Rockfield partly for nostalgic reasons — it was the place where I recorded 'Bohemian Rhapsody' and a couple of Queen albums — and partly because of the way it was set up. It's a good studio that has totally unique acoustics, with many different rooms and echo chambers, all with varying degrees of liveness. Even better was that Rockfield has two studios set in different cottages, and we ended up booking both. It meant that we could lock the door and keep ourselves to ourselves, and also that we could record in two studios at the same time."

Rockin' The Coach House

Rockfield, founded in 1969, is located in the middle of nowhere and is one of Britain's few surviving residential studio facilities. It still has the very Bösendorfer on which Mercury recorded 'Bohemian Rhapsody'. It was the perfect place for the Darkness to wallow in rock & roll history and get lots of work done during the first half of 2005. "Other than a couple of times when we went out for dinner, we were there seven days a week," remarks Baker.

With help of Rockfield engineer Nick Brine, recording took place at both wings of the studio complex, the Quadrangle and the Coach House. And how. For several months Baker had the band recording the backing tracks, mostly drums, bass, and rhythm guitars, in endless different configurations and locations, all to get the densely, subtly and richly textured sound he was after.

"In the smaller studio, the Coach House," explains the producer, "they have a [*48-channel*] Neve 8124 and Rosser mic pres, which came from the Rosser desk on which I recorded 'Bohemian Rhapsody'. In the Quadrangle there's an old [*82-input*] MCI 500, which was the same desk on which I mixed the *Jazz* album with Queen. Both studios also have several Neve 1060/1 mic pres and API 550 EQs, and each has two Studer 24-track recorders.

"We spent maybe two weeks setting up, finding out what sounded best on what, and for the most part we used the Rossers for drums, while the Neve, API and MCI worked best on guitars. We laid down the drums and guitars first. One set of drums was set up in the Coach House live room, on top of the stage that the band uses on the road. So the bass drum was halfway between the floor and the ceiling, equidistant to all eight corners of the room, and we had ambient microphones in each of the eight corners, plus close microphones and overhead mics. Typically we would use 36 microphones to record the drums, but we would have nearly double that amount set up. For a couple of tracks we put a drum kit outside in the Quadrangle parking lot, which resulted in an unusual ambience with a slap echo coming back off the brick stables."

Baker is reluctant to elaborate which mics were used where, stressing that there is "no such thing as a favourite drum or vocal or guitar microphone. When you're miking you're going for the sound that's appropriate for the song, not necessarily what's a good sound. And what's appropriate can vary greatly. That's why you need a multitude of mics, because different songs need different sounds. It's why we had three drum kits and a multitude of different snare drums and tom-toms, and each kit had different surroundings and a different miking situation, and different mic placements. We had Shure condenser and dynamic mics, and Telefunken overhead microphones, and several other old microphones that we found in the closets, like the M50, N49, U67, U87, C12 and C24, and a whole bunch of more modern microphones, AKG tubes and so on."

Two Seconds Of Guitars

Moving on to the subject of rhythm guitars, Baker exclaims breezily, as if it's

The Real Thing

The album begins with an exotic blend of Mellotron, backwards gong samples and panpipes — all the way from Peru. According to Roy Thomas Baker, "Justin had worked out a panpipe part during pre-production with a sample on a Yamaha keyboard, which he also used to demo the monk choirs and gongs you hear at the beginning of the album. Then when we moved to mixing stage we used a big Korg keyboard, the one with the blue screen, but I heard that pan flute sample being used by Shakira, so we decided to go for the real thing. We asked someone we knew, Peter Schneider, for the best pan flautist in Peru — he owns several radio stations there — and he recommended Fredy Gomez. Since a pan flute is not in the tempered scale, we had to create a new pan flute from a whole bunch of other pan flutes. It was recorded at a radio station studio in Peru."

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PRODUCING THE DARKNESS

the most normal thing in the world: "Oh, of course there were at least 120 guitar parts in many of the songs. A lot of people play one guitar from the beginning to the end of the track, but we didn't do that. Dan has a lot of different guitars, and so we went 'OK, the first half of this verse sounds good on this guitar, but why don't we change to a different guitar in the second half, and then go back to the first guitar for the chorus, but in a different tuning, or with different strings, or a different amplifier, or a different microphone,' and so on. By the time we multitracked all those we ended up with up to 160 guitar parts on a good deal of the songs. If you listen closely, one set of guitars will come in and then a totally different set of guitars, and then yet another set of guitars. In some places there may be a bunch of 100 guitars that comes in for just two seconds."

It sounds crazy in theory, but not quite so crazy when you're actually listening to *One Way Ticket To Hell... And Back*. One striking example is the song 'Dinner Lady Arms', which begins with a truly impressive wash of guitars that ripples majestically from the speakers, sounding as big as the ocean. "The way I like to work," says Baker, "is to have all the guitars in the control room, so they're all at the same temperature, and you never spend half an hour waiting for a guitar to stabilise and remain in tune. I also want the guitarist with me in the control room, so we can have complete communication all the time. With the sound coming back from the monitors you instantly know whether you have the right sound or not.

"Dan had between 40 and 50 guitars in the control room during this stage of the recording, but we were not only surrounded by guitars but also by guitar amplifiers, because the amp heads were also all in the control room. It's far better to push a signal than to pull it: running a short lead from the guitar to the guitar amp is better than running a long lead from control room to studio. We had the speaker cabinets outside the control room, wired in such a way that we could connect any amp head to any cabinet — each lead was marked. We also tested all the different speakers on all cabinets. They're supposed to sound the same, but if you're using a 4x12 cabinet, each of these four

Baker Country

Roy Thomas Baker divides his time between England, Los Angeles and Lake Havasu City, Arizona. The last place is home to his estate and a top-flight studio — as well as another unique export from his home country, the original London Bridge. In the late 1960s, the 130,000 tons of granite that made up this early-19th-century structure were dismantled and transported to the Arizona desert, where the 938-feet bridge was rebuilt stone by stone.

As a producer, Roy Thomas Baker will, of course, forever be associated with one of the other famous large structures that arose in the 1970s: Queen's 1975 'Bohemian Rhapsody'. At the time the most expensive single ever made, the song was originally intended as a ballad with a small operatic section thrown in. But Freddie Mercury kept adding 'Galileos', Baker kept submixing and filling 24-track slave reels, and the six-minute-long song ended up having more than 200 overdubs, unheard of at the time (Baker described the recording of 'Bohemian Rhapsody' in a *Sound On Sound* interview in October 1995: www.soundonsound.com/sos/1995_articles/oct95/queen.html).

Baker can take credit for standing at the cradle of several new directions in rock & roll. He cut his teeth in London at Decca and went on to become staff engineer at the pioneering Trident Studios in the beginning of the '70s, where he engineered a whole array of classic albums by the likes of Frank Zappa, Free and Santana. Baker co-founded Trident's production company, and Queen were one of his singings. He produced *Queen* (1973) and *Queen II* (1974). The latter, he says "was a staggeringly major piece of work. It was the blueprint for my kitchen-sink production time, a time when Freddie would say 'Any idea that you have, just throw it on.' We threw things on that we thought we might later get rid of, but we ended up keeping everything.

"Then came *Sheer Heart Attack* and immediately afterwards *Night At The Opera*, with 'Bohemian Rhapsody', which was the pinnacle of my period of overproduction. I went straight from that into the Cars' album [Cars, *1978*], which was totally the opposite. I made a conscious effort to pare down the overproduction, even though it still had some aspects of overproduction. It was like a blueprint for sparsity, but it still had power at times when you needed it. When the backing vocals came in, they were massively overdubbed and sounded really big."

The Cars' debut album became a classic, and helped lay the foundations for the New Wave movement. Baker went on to do *Jazz* (1978) with Queen, three more Cars album, and even helped shape the sound of electro-pop with Devo's *Oh No! It's Devo* (1982). His career then took an unexpected turn with albums for MOR rock bands Foreigner and Journey. Derided by some critics, they nevertheless sold by the bucketload, as did albums Baker produced during the 1980s and early 1990s for the likes of Slade, T'Pau, Ozzie Osbourne, the Stranglers, Mötley Crüe, Dokken and Alice Cooper.

In the mid 1980s the Briton relocated to the US, where he acted for a while as senior VP for Elektra. As the 1990s progressed, Baker dropped a little out of view, at least from the British perspective. "There was a huge change in overall attitude," Baker remembers, "from bigger-sounding records towards small bedroom-type records, and I chose to pass on many artists that were offered to me during that time." He did work with US bands like Spun Monkeys and Local H that had hits in their home country, but preferred to spend a couple of years researching Italian, Egyptian and Eastern Mediterranean architecture in order to apply his findings to his estate in Lake Havasu.

Around the turn of the century, Baker, like several other producers, spent a couple of years of his life producing a forthcoming album by Axl Rose/Guns 'n Roses, working title *Chinese Democracy*. Recordings for the album began in 1994, and it is said to have cost 13 million dollars by the time Geffen pulled the plug on funding it. It still hasn't seen the light of day, putting it on course for the most expensive unreleased album of all time. Under a gagging order, Baker is prohibited from speaking about the ill-fated project. In the light of this, it looks like the Darkness's album title *One Way Ticket To Hell... And Back* is as relevant to the producer as the band. So confident is he of its success that he took the band down to the Bentley showrooms after the recording was completed, where they ordered some of these sofas on wheels. They will probably sit nicely next to Baker's own Rolls-Royce, licence plate: RTBAKER.

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Roy Thomas Baker at the Village Studios, LA, mixing some Darkness live performances.

speakers may sound different. So we listened to them individually and put microphones in front of the best speakers.

"We also had the cabinets in different rooms: sometimes identical cabinets would be placed in different surroundings, one in a live room and one in a dead room. The microphones could be everywhere, hung from the ceiling, lying on the floor, and so on, but we often had dynamic mics for close-up and antique tube-like mics for ambient. The microphones themselves were of every conceivable vintage and make and we had everything ready to record via a preamp of our choice. For a more American sound we used the MCI console or API EQs, for a more British sound the Neves. So every time we did a guitar part, we chose the most appropriate guitar, head, speakers, microphones, preamps, and so on.

"We did all this stuff," Baker continues, "because we were making a massive-sounding type of record. We were going for a huge, huge production sound." Justin Hawkins, when asked in an interview what he had learned from Baker, summed it up as "more is more". Unsurprisingly, basses were recorded according to the same approach, with the bassist in the control room and playing different basses and amplifiers, recorded through different microphones for different parts of each song. The bass often ended up double-tracked in the final mix, panned left and right.

Rock Field (Of Cows)

It was during the Rockfield period that tensions in the band came to a head, eventually leading to the sacking of bassist Frankie Poullain, who was replaced by the band's guitar tech, Richie Edwards. According ▶

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to interviews with the band there was a great amount of angst and paranoia going on, but all this drama didn't register too highly on Baker's radar. Presumably he was too busy surfing the tidal wave of material that he was gathering.

"There was the bass player issue, yes," he muses, "but from the recording perspective, it was far less strenuous than it sounds. It was relatively seamless moving from one bassist to another, since we had laid the drums and guitars down first. So the bass part was totally academic at that stage. Luckily Richie is a really good bass player, and he became the band's and my right-hand man, coming up with ideas like: let's put this guitar amplifier in the middle of the cow field next door."

Having resolved the bass player issue, and successfully laid down all the backing tracks at Rockfield, the company moved to Whitfield Street Studios in London, where Justin Hawkins recorded his vocals, lead guitars, sitar, and most of his keyboard parts, during a period of two months in the summer of 2005. "It was," recalls Baker, "a welcome relief from being in the middle of nowhere. For the recording of Justin's vocals, we sat down and worked out the parts at a grand piano. Even though everyone thinks of him as the guy with the falsetto, he's actually very good across the board, on the low stuff as well as the high stuff. On 'Blind Man', for instance, Justin was emulating a male Russian choir.

"During the vocal recording, Justin was in the recording area, just behind the glass. We used the full ambience of the studio itself, and I put a whole slew of microphones around him — he looked a little bit like the president does doing a press conference. All the microphones went to the Neve 88 mic pres, which have a great sound. Because I could have the mic pres next to where Justin was singing, the signals were pushed into the control room, which gives a much better signal-to-noise ratio. We might use one, or two, or six microphones, at all sorts of different levels, EQ settings, and so on, to get the right vocal sound for a part of a given song. Sometimes each line of each verse would have a different sound. I would also run his voice through a compressor, like a Fairchild or, something I particularly like, a Tube-tech compressor going into a Tube-tech EQ.

"Some songs would have 10-part harmonies, and each one of these parts would be multitracked. And then we would do a whole bunch of those, spread them across the stereo on the left, and do the whole thing again, this time spreading across the right. Or we'd have the first line of a song coming out of one speaker, and the next line out of another speaker. This was not a matter of panning, but of recording it that way. On a track like 'Blind Man' we could have 160 vocal overdubs, with me changing the sound of every part, especially the low ones. On a couple of songs we had a microphone in a champagne bucket, to get a slightly hollow sound. For me it was a bit of a waste of a champagne bucket, but he loved singing into it! All these changeovers may sound a bit complicated, but ended up being excessively slick. Obviously, his voice would sometimes get tired, and then he would go on to playing keyboards or guitar."

The Darkness (left to right): guitarist Dan Hawkins, singer, guitarist and "one of the world's best keyboard players!" Justin Hawkins, drummer Ed Graham and guitar tech-turned-replacement-bassist Richie Edwards.

The Icing On The Cake

Lead guitar overdubs were done according to a process similar to laying down the rhythm guitars. In addition, Whitfield Street was the scene for multitudes of keyboard overdubs, with Justin Hawkins playing some nifty piano on tracks like 'Knockers' (Baker: "Very few people seem to realise that Justin is one of the world's best keyboard players!"), and adding Minimoog, Mellotron and Hammond organ, as well as some modern synthesizers. Hawkins also played the sitar there for the album's title track, which is set in a 'psychedelic dream sequence' for which Baker created phasing using four tape recorders ("It was trial and error and took a long time to get right"). The bagpipes, played by Stuart Cassalls, BBC Scotland's 2005 Traditional Musician of the Year, were also recorded at Whitfield St.

With its exotic opening section (see box earlier in this article), plus the bagpipes, marching drums and banjo-like guitars in 'Hazel Eyes', the sitar in the title track, and the lush orchestral sections in various songs (arranged by Paul Buckmaster, who has worked with artists as diverse as Elton John and Miles Davis), it's clear that some eyebrows will be raised, as opposed to heads banged. According to Baker, these things came out of an experimental try-anything mentality. They clearly were part of a desire by the band to stretch musically, and not just be a carbon copy of what went before.

Notwithstanding its innovations, *One Way Ticket To Hell... And Back* is full of references to the past. Justin Hawkins excels in massive Freddie Mercury-style vocal overdubs, sings like Kevin Rowland in the blue-eyed cod-soul

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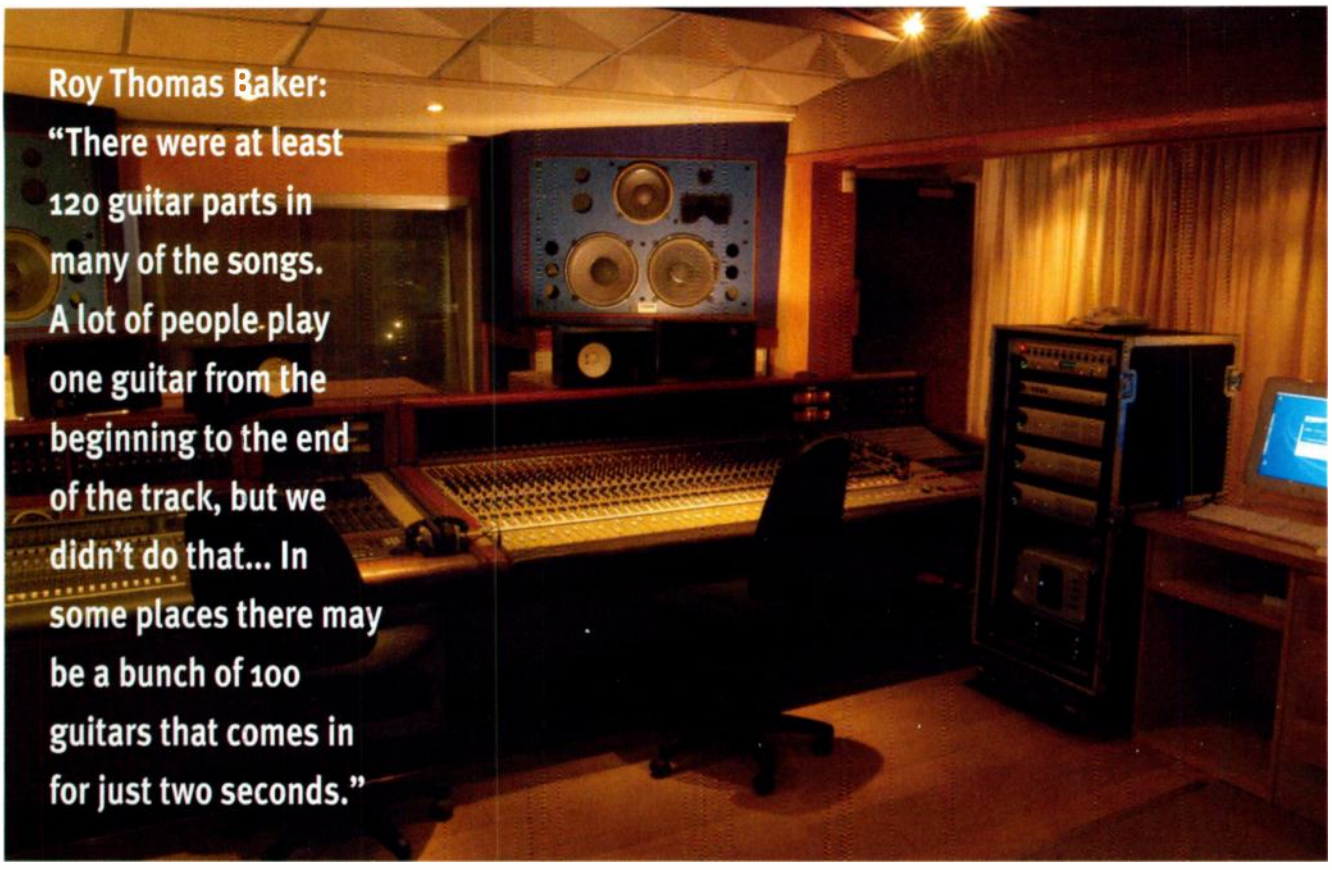

The Quadrangle at Rockfield, where the Darkness recorded through the studio's vintage MCI desk.

▶ of 'English Country Garden', and plays Brian May-esque multitracked guitar solos. Influences from Slade, Sweet, AC/DC, Big Country and others from the '70s and '80s are also obvious.

Baker is adamant, however, that it was not the intention "to make a retro record. We wanted to get the best of both worlds, of old and new. I think we ended up succeeding, because it sounds like it was done last week, and yet there are aspects where you go 'Wow, I recognise that from the '70s or '80s.' There may be a John Bonham snare sound recorded in a huge room, coming from analogue tape, but at the same time I wanted to make a modern record. I love the hybrid thing."

Full Textures

Baker's preferred method of mixing analogue and digital was the perfect foil for his ambitions. "Since the aim was to go for the big, hybrid sound, we used analogue 24-track to record on," he explains, "and then transferred everything to Pro Tools HD, and did our editing in there. It's hugely weird that people go 'Do you prefer analogue or digital?' It's like saying 'Do you prefer blondes over brunettes?' or 'Are you a tits or a leg man?' Totally and utterly academic. When you make a movie, you shoot on 35mm film, and that's dumped into an Avid, where you do your editing, and then back onto 35mm again. You're utilising the best aspects of both. At my home studio I have a 40-track Stephens tape machine, the best-sounding analogue machine ever made, and both Pro Tools and Nuendo systems.

"Basically, people use digital because it's fucking cheap. I can't think of any other reason, because you are missing out on a lot of textures with digital. But the other side of the coin is that you can get textures on Pro Tools that you can't get on analogue. Analogue is certainly much more fun, but it's so expensive. Fifteen minutes of tape costs the same as a hard drive that can hold 500 albums. And it's also hard to get a hold of tape. When we first started the album, we were told that there wasn't any. Tere [*RTB's wife, manager, and the album's production co-ordinator as well as the Darkness' US manager*] managed to get a hold of 60 reels somewhere, and without that we would have had to do the whole thing in 'slow toys'.

"That's my nickname for Pro Tools," Baker laughs, "because while everyone thinks it's fast, for me it's so slow. Anyway, we recorded everything to analogue, because it gives you a nice, full texture that you cannot get any other way. When recording on analogue I make sure that the levels are at full tilt and the red lights are flashing. I press it exceptionally hard. For this reason I don't need to use Dolby. We align the tapes so that everything is just on the verge of distorting, and the tape acts like a giant compressor. It's why I don't like to use outboard compressors during the recording stage, because you stop the sound of tape compression from happening.

"The other important aspect of analogue is that it records high frequencies. People say that we don't hear anything above 17k, so with digital they clobbered everything above it, not realising that the sound above that point modulates the lower frequencies. If you put an oscillator at 1k and sweep another around, say, 25k, you'll hear that it will affect the way the 1k tone sounds. The good thing is that once you have recorded on analogue, you don't lose these low-frequency modulations, and they translate to digital. So we after we recorded things on analogue we transferred them to Pro Tools for editing. We were basically running 'slow toys' as a workstation and a back-up. We worked at 96k resolution, and the good thing about it is that, unlike with 44.1, where you lose a bit of punch and resolution, you get an exact clone of the analogue, including all the textures."

Baker's insistence that everything was recorded on analogue, combined with the hundreds of overdubs for each song, meant that he ended up filling about 400 reels of 24-track tape. "We must have used the world's entire supply of tape!" grins Baker. "We were trying to get a hold of more tape because we were wiping tapes that we had already used to make space for new overdubs. We had bunches of slaves. We might have a whole slew of guitars on one slave, and then submix

World Radio History

those to two tracks on another slave, and carry on overdubbing onto that one. We were always submixing and bouncing backwards and forwards. It was very, very time-consuming."

Front Seat Mixing

For the orchestra recordings and the final mix, the whole company decamped to Los Angeles. "We decided to mix at the Village Studios because I know the studio inside out," recalls Baker, "and I really like mixing on their Neve 88R. I felt it was good to mix on something that's discrete — I'm a big fan of Neve. I'm sitting at one now: I have a 1073 here in my studio. We also thought that it would be easier to use all the orchestral players that Paul Buckmaster uses anyway, so we shifted gears and jumped on a plane to Los Angeles. We recorded the orchestra at Capitol. That's if we could get into the studio — the security guys often wouldn't let anyone in. It was ludicrous — one day they would not let me in, and another day we had to stop the session so we could go out and have a fight with these guys because they would not let half the band in."

The orchestral recordings themselves don't appear to have suffered, for they are truly sumptuous courtesy of Buckmaster's arrangements and the in-your-face way in which Baker captured the orchestra, with a lot of close miking resulting in 50-odd tracks. "Basically in the last stage before the mix we had transferred everything to Pro Tools for ease of operation," Baker continues. "It's also far easier and safer to send a bunch of files over to Los Angeles than 400 reels of tape! We then did a lot of sub-bouncing inside of Pro Tools. Some tracks had loads and loads of guitars and vocals and we'd end up with 1000 tracks otherwise. That's impossible, so we got everything down to 72 tracks.

"We then set Pro Tools up with the Neve 88R and started mixing. I don't like mixing inside of Pro Tools, because it feels a bit Mickey Mouse to me when you need a cursor to push up and down faders and so on. I don't get a feel for it the same way as when I push a fader with a huge motor in it. I have very versatile fingers, I can use every finger, including my thumbs, to do different things at the same time. When I drive a car I like to have the steering wheel and the gear stick under my hands. I don't think I could do it from the back seat using a computer.

"I always record with effects, because it adds to the performance, and I tend to blend in the ambient tracks. This means that mixing is mainly balancing, and giving the final tweaks sound-wise. Because I don't add much compression during recording I may add compression. I'll be using old and new stuff during mixing, like Fairchild, Summit, or Tube-tech. Instead of sticking a Lexicon on the vocals I used natural echo: echo chambers, plates, or slap tape echo. And we mixed the album to half-inch analogue on an Ampex two-track and also back into Pro Tools, as a comparison. We listened to both, and found that the analogue had a nice, big, saturated bass sound, while the digital had a really nice crispy top end. We ended up using the analogue mix for mastering, adding some treble to make it sound as sparkling at the top end as the digital did."

Know Your Goals

And so, after a year of intense work, Baker had managed to pare 37 songs, 400 reels of tape and almost 10,000 tracks down to just 10 songs and 35 minutes. Excess had made way for economy. The end result sounds remarkably focused, with no dead wood discernable, and many songs barely making it past the three-minute mark. One wonders how Baker had managed to keep track of the whole process, and to choose the best performances and sounds out of the thousands of options at his fingertips.

"Oh yeah, you have to be mentally organised," says Baker, "and make very good notes of everything you do. There were recording engineers who made sure that it all got to tape and who did the transfers to Pro Tools, which was a task as well. But for me there's no risk of not seeing the wood for the trees. It's totally the opposite. You get focused on what you think is appropriate for a song, and then you tune into different microphones and preamps and EQs and so on. As long as you stay focused on what's appropriate, you end up not getting confused whether it's this mic or that mic.

"But you have to know what your goal is. It's not like 'Let's try this, let's try that.' That's an indecisive way of doing it and you end up being all over the place. In this instance the band and I had discussed beforehand what we planned to do, and we mapped it out before we went into the studio. Of course it changes, it always changes. In the studio you're running 100 percent on instinct, and you sometimes end up with something that's a lot better than you had planned. But the structure of every song on the album is exactly the way it was planned out to be. Our vision was exceptionally clear. We had a vision of how the record was going to pan out, and we stuck to that vision, unless happy accidents happened. And I think we pulled it off." SOS

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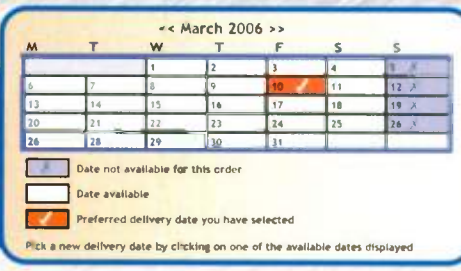

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Paul White

At one time Roger Quested was best known for his monstrous soffit-mounted monitors, but recently he has focused on more pragmatic solutions for smaller studios. His latest range of active monitors is the S series, comprising the smaller S6 and S7 (which I had for review) and their larger brethren, the S8 and S10, any of which can be used with the range's SB10 subwoofer.

All the speakers other than the subwoofer are two-way active designs, where the S6 is the smallest, with its five-inch Italian-built bass/mid-range driver and 28mm Morell soft-dome tweeter. These are magnetically shielded, as smaller speakers may be used close to CRT monitors. Whereas the other models in the range are based on conventionally ported cabinets, the S6 employs a fully enclosed 'infinite baffle' topography. Driving the woofer is a 65W power amplifier, while the high-frequency unit is powered by its own 45W amplifier, with the crossover frequency set at 1.19kHz. Additional sub-bass and high-frequency filtering is implemented at 45Hz (24dB/octave) and 75kHz, resulting in a frequency response of 75Hz-22kHz ±2dB. Quested rate the maximum SPL of the S6s at 104dB using pink noise, or 116dB per pair at one metre using an RMS music source.

While some speaker designers spend a large part of their budget on cosmetics, the S-series monitors are very unpretentious, with machine-built cabinets fabricated from

SOUND ON SOUND

Quested S Series

pros

- Excellent clarity and stereo imaging.
- Seamless integration with the SB10 sub-bass unit.
- Sensibly priced given the quality.
- Forgiving of positioning within the room.

cons

- It could be a problem if you partner doesn't like black ash!

summary

These are really good-sounding, revealing monitors with exceptional stereo imaging, and are built to last at a realistic price. For my money, the S6s with the SB10 subwoofer represent the best buy for the smaller studio.

World Radio History

19mm high-grade MDF, laminated on both faces with a black ash finish. As the S6 measures only 240 x 170 x 290mm, no internal bracing was felt to be required. Nevertheless, what you do get is properly engineered — the speakers are secured into their machined rebates using metal 'T' nuts and cap-head screws, not plain old woodscrews, and the underside of the cabinet has threaded metal inserts to accommodate standard Omnimount fittings or to secure it to Quested's own speaker stands should you choose those. Overall, the S6s weigh 7.5kg each.

Acoustic damping material (bonded acrylic fibre) is used inside the cabinet, and the amplifier section resides within the back of the box, using the substantial metal rear panel as a heat sink. A combi-jack/XLR connector is used to handle the input, while the screwdriver-adjustable gain trim is calibrated with the unity-gain point clearly shown. High- and low-frequency compensation is available via the familiar DIP-switch system, providing a choice of flat, 2dB tilt up, or 2dB tilt down at 10kHz, as well as two degrees of bass roll-off below 82Hz (-2dB or -4dB) as an alternative to flat. All my tests were carried out using the flat settings. Mains IEC cables are supplied, and once the power is on, LEDs on the front panel glow green. There's no formal speaker protection, as such circuitry often compromises audio performance, but the LED changes from green to red when the signal levels approach clipping. Amplifier specifications of -100dB hum and noise (relative to clipping) and a THD of better than 0.03 percent (and typically 0.005 percent at 1kHz) are quoted.

Other than the port tube fitted to the front baffle, the S7 is built in a similar way to the S6, and combines the same one-inch tweeter with a 6.5-inch bass/mid-range driver. Again magnetically shielded, it uses a 120W amplifier on the low end augmented by a 70W amplifier on the high end, and manages a frequency response of 65Hz-22kHz ±2dB. It features the same rear-panel connections and controls as the S6, as well as the Omnimount points in the base, but of course the cabinet is somewhat larger at 250 x 300 x 350mm and weighs 11.75kg. The maximum SPL per pair with a music source is 121dB at one metre. The internal subsonic filter operates at 30Hz, though the ultrasonic filter frequency and crossover frequency remain the same as those of the S6.

SB10 Subwoofer & Controller

Quested's SB10 subwoofer is also made with black-ash-veneered 25mm MDF, and its amplifier and crossover electronics come as a separate 1U controller, rather than being built in. This has the advantages that the controls are easy to access and the circuitry is subjected to less vibration. Substantial speaker cables connect the unit to the speaker cabinet, and combi-jack/XLR connectors are provided for the audio inputs. Line-level outputs are fed to the main active speakers via XLRs. The subwoofer can be bypassed from a button on the rack unit's front panel, allowing the main speakers to be heard in isolation without the low-cut filtering that is applied when the subwoofer is active. The control unit also provides gain, crossover-frequency, and phase adjustment, with a button for inverting the subwoofer's phase — something that the constraints of possible room positions sometimes require. A Test button activates an onboard pink-noise source for setting up, although this is filtered, as only low-frequency content is required. Essentially, the SB10 speaker is a conventional passive, ported design using a single ten-inch long-throw driver powered by the 215W amplifier in the rack unit. It measures ▶

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JOSEPHSON C42

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▶ 617 x 333 x 290mm, which is surprisingly compact for such an effective subwoofer, and weighs a manageable 19.8kg. Subsonic and ultrasonic filters are built into the controller unit at 14Hz and 100kHz, where the crossover between the subwoofer and the main speakers is user adjustable in the range 40Hz-135Hz. With the S6s, the crossover frequency needs to be set to around 70Hz, or 60Hz for the S7s. (The larger S8 and S10 models apparently work well without a subwoofer, but you can still add a subwoofer if you need extra headroom at the low end.)

Auditioning

I started my listening tests using the SB10 sub, starting with the S7s mounted on a pair of Quested stands. The subwoofer was set up between the monitors, but offset to one side, and Roger Quested came along to check the result in my room using hand-held test equipment. Using a noise source and spectrum analyser, it was a fairly straightforward job to balance the subwoofer to get a flat response, though adjusting the phase control is also important, as this determines how even the response is across the crossover transition. Unusually, Quested are offering purchasers a one-day free loan of the test equipment, with setting up instructions of course, so that they can optimise the system for their own room.

It was clear from the outset that this system performed well, and the stereo width and separation between instruments was excellent, with a smooth but very detailed high end. Voices were carried smoothly and positively in the mid-range, and the subwoofer integrated so well into the overall sound that there was absolutely no way to tell that a subwoofer was in use at all, other than the extra bass extension.

Some speaker systems make a big fuss about bass, but on first listening the Quested system doesn't actually seem to be doing anything spectacular at the low end. I think this is because the bass is very tightly controlled, so you don't get that giveaway boomy overhang on low notes. It's not often that you can describe bass as being transparent, but here it is — you definitely don't perceive that over-inflated 'I've added a subwoofer!' effect. The chest-shaking frequencies are still there, but only when they should be. A further point — and one which shouldn't be overlooked — is that the system seems very forgiving of placement and is less adversely affected by sub-optimal room acoustics than some monitors I've tried, especially those with rear-mounted ports. I set the speakers up around a metre from the end wall in my studio so as not to disturb my existing monitor system, which I wanted to use for comparison, and they performed brilliantly with no need to fiddle around with their positions.

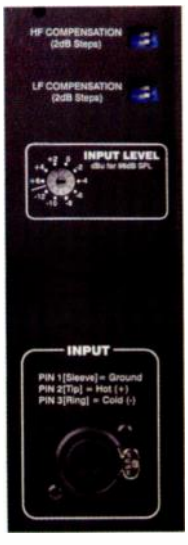
Switching to the little S6s and readjusting the subwoofer crossover settings produced a remarkably similar result. Indeed, the low end may have actually sounded a hint clearer, but the essential family sound was maintained. This consistency across the range is particularly important in professional circles, as it allows multiple rooms to be set up using different monitors, where mixes can be meaningfully moved from one room to the other. It's also possible to set up a surround system using the smaller S6s at the rear and larger S-series speakers at the front without losing coherence.

Repeating the tests without the subwoofer showed the larger S7s to have a very respectable bass extension when used on their own. Having said that, the larger models would probably make more sense for full-range monitoring without a subwoofer in a larger room. As expected, the smaller S6s are a bit bass light when used on their own, though they still have enough low end for desktop pre-production or tracking work, where their clarity and revealing nature would be definite advantages.

Quest Completed?

These monitors come out at the upper end of the project-studio market price range in the UK, being in a similar ball park to Genelec, Dynaudio, and bigger Mackie monitors, so they're by no means out of reach for the serious enthusiast who wants professional-quality monitoring that's designed to last. I wouldn't really recommend buying the S6s to use without a subwoofer unless you are working in a very small room. However, if you're going to buy a subwoofer, there seems to be no huge advantage in buying anything bigger than the S6s, as in conjunction with the SB10 they sound fantastic and can generate plenty of clean volume. The S7 is just on the verge of needing a subwoofer, depending on room size, while the larger S-series speakers would probably benefit very little from an added subwoofer given their stated low-end performance.

Roger Quested seems to me to be a very pragmatic speaker designer, and he gets results by spending money on the parts that count, engineering the enclosure properly and then getting the electronics right. There's no excess money spent on fancy cabinet cosmetics and no forays into unknown technology — just solid engineering. This approach certainly seems to have paid off in the S series, and I can honestly say that these are amongst the most impressive monitors I've heard in some time. SOS



Above its rear-panel combi-jack/XLR input, the S7 carries HF and LF frequency-tailoring switches and an input gain trimmer.

information

£ Active monitors: S6, £763.76 per pair; S7, £1128 per pair; S8, £1633.26 per pair; S10, £tbc. SB10 remote powered subwoofer, £1169.13 each. Prices include VAT.
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Forgotten Science

The Lost Art Of Sampling: Part 7

We bring our series on rediscovering the the art of sampling to a close with a look into the future.

Steve Howell

We've covered a lot of ground during this series, from a basic explanation of sampling, to multisampling, sample editing and program creation, not to mention delving into certain areas of synthesis. In addition, I hope that I have shown that sampling your own sounds is not the onerous task that many believe it to be, and that you've felt inspired to regard your sampler as a tool for sound creation, not just the playback of stock library sounds with a few minimal tweaks.

Having covered much of the history of sampling in these articles, I thought it might be interesting to look to its future in this, the final part of the series. One area that I think will be an increasing problem over the coming years is sample-format compatibility — or rather the lack of it! This has been a problem since the early days of sampling, but I think the difficulties could well increase in future. It's worth looking generally at this issue, as it will affect almost every sampler user at some point.

The Joy Of Formats

There was once a wag who commented that standards were a great thing, which was why we had so many of them — and although he wasn't talking about sampling, he might as well have been. Today, if you have a particular brand of hardware or software sampler and you want to use a library created for another sampler in it, you may well not be able to, or only be able to with some restrictions. Sometimes you'll be able to access the raw audio data in the samples, but you'll have to do all the programming to map them out and make them 'playable' yourself.

Even this awkward situation is, however, an improvement on how things were in the early days of sampling, when each sampler manufacturer had their own proprietary sample format. In those days, compatibility was not seen as a necessary requirement, and indeed, most companies refused to make their samples compatible with those of other manufacturers for fear of acknowledging the existence of their competitors in the marketplace.

But as time went on, Emu users began to wish that they could read Akai libraries, and *vice versa*. Roland users wanted to use both, and as Roland developed more and more quality libraries for their S700-series samplers, so Akai and Emu users wanted to use those. Eventually, Emu were (I believe) the first to meet their customers' demands by allowing the import and loading of Akai S1000-format samples. Akai held out for a while, but from the mid-'90s and the arrival of their S2000- and S3000-series samplers onwards, you could import Emu and Roland sound libraries.

These days, most software samplers claim to read most sample formats, but as hinted a moment ago, this compatibility only extends up to a point. When you import samples in a 'foreign' format, you'll often only succeed in importing the basic samples and their keygroup mappings — other parameters, such as filter cutoff, envelope, or modulation settings, are often either ignored or incorrectly converted. Also, some software samplers don't support features such as velocity and positional crossfading, so attempting to import samples with these features may result in them sounding wrong. Loop points, too, are not always read or interpreted correctly, resulting in clicks or pops not present when the sounds are used on their original sampling platform. These problems are nothing that can't be fixed by editing the loop start or end point of the samples once you've imported them onto the platform of your choice, but this is a nuisance nonetheless.

> **"The originators of sampling technology never predicted the uses it would be put to."**

Often, these problems occur because you're attempting to import samples made for a sampler with one set of functions onto a sampler with different functions. Korg's Triton, for example, can't handle positional crossfading of samples, so any attempt to import multisampled sounds with overlapping keygroups into the Triton won't come out correctly (the keygroups will simply be arranged next to one another with no overlaps). Likewise, if one sampler has a sound based around a resonant high-pass filter, how is that sound going to translate into a different sampler that only has a non-resonant low-pass filter? Different samplers also handle modulation in different ways, and these functions often have to be approximated or ignored when the sounds are imported onto another platform.

Although the built-in format-conversion functions on modern software samplers will at least get most samples in other formats into your sampler in *some* form that you can make usable, sometimes you have to reach for a third-party conversion utility, particularly if you're looking to import samples in formats specific to older hardware samplers, like those made by Emu or Ensoniq. Chicken Systems'

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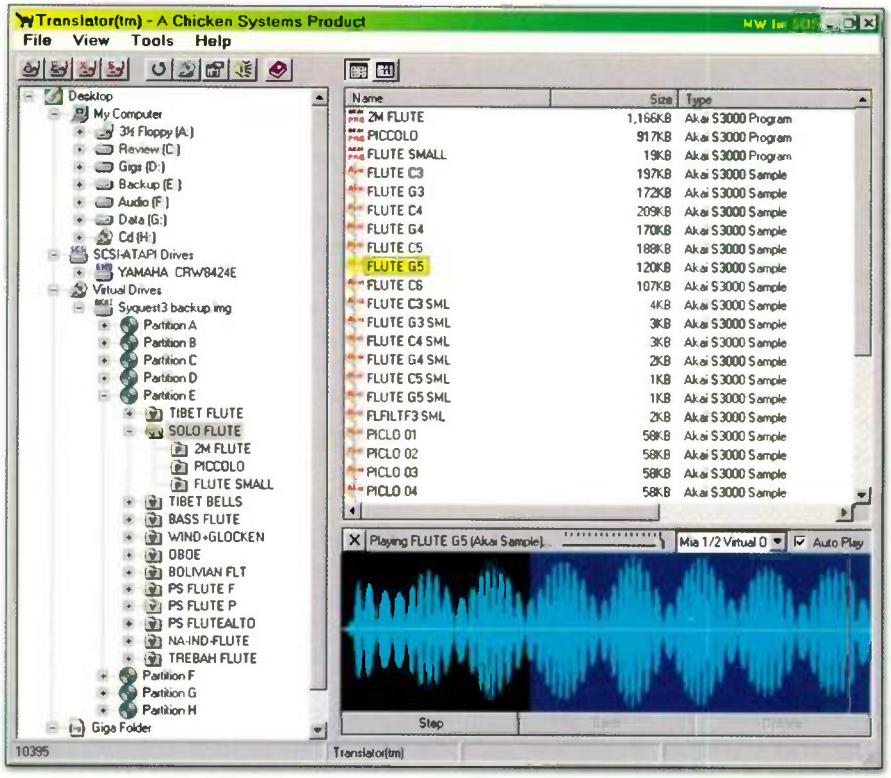
Translator (available at www.chickensys.com and shown right) allows the conversion of the vast majority of sampler formats into others, and it's constantly being updated to incorporate ever more conversion permutations. If their 'full' version is overkill for you (or too expensive), there are 'lite' versions that can deal with specific source/destination combinations, and there's even a free version that might help dig you out of a conversion hole. Another similarly comprehensive third-party utility is *CDXtract*, a demo version of which is available at www.cdxtract.com/cdxtract.php. Both of these allow you to 'mount' Akai and other proprietarily formatted floppies and/or CD-ROMs on your Mac/PC, something that Mac OS and Windows do not ordinarily allow (such media will normally be regarded as unreadable).

Protection & Copyright

If there are so many built-in and third-party tools available to handle sample-format conversion, why do I think the issue of format compatibility is going to get worse in future? In a nutshell, it's because of the threat of Internet piracy, which has resulted in many



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manufacturers deliberately imposing 'proprietary' limitations on their libraries. For example, sound libraries based around Native Instruments' *Kompakt Player* have the raw samples converted into what Native Instruments call a 'monolith': one huge file with all the samples embedded within it. This means, of course, that there is no way to edit the individual samples, but the *Kompakt Player* doesn't offer that facility anyway, unlike NI's full-blown sampler, *Kontakt*. Similarly, Tascam's *Gigastudio* embeds the samples in its GIG patches, and the innovative Italian software house, Nusofting, develop their sound library in a proprietary format, arguing that if they released their samples in standard WAV or AIFF format, anyone could copy and use them in any modern sampler that supports those formats, thus potentially scuppering their own sales.

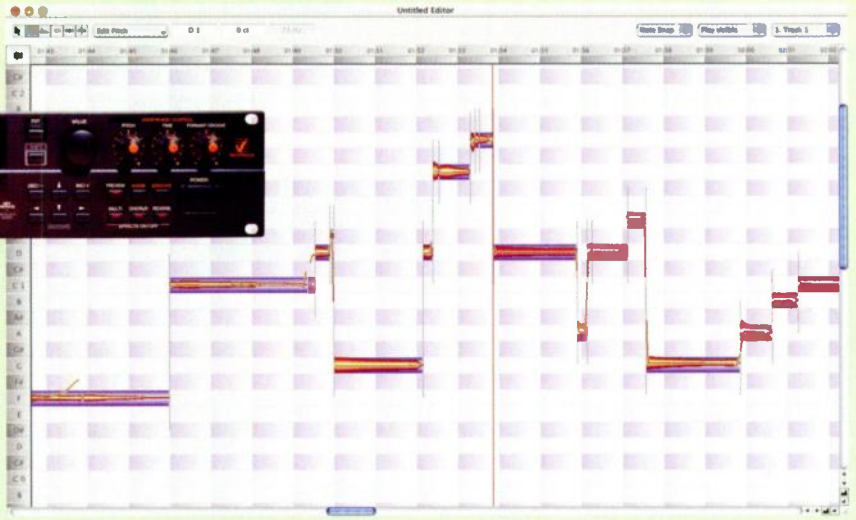
For developers like these, many of whom depend on the income from these libraries, there's nothing worse than having spent a lot of time and money to develop a decent-sounding commercial library (possibly employing talented freelance session musicians, engineers, studios and editors at significant cost), only to find that its contents are available to download for free on the Internet three days after its release. Consequently, my feeling is that we will see more of this kind of 'protectionism' as developers and manufacturers become more aware of the need to protect their intellectual copyright against piracy, and fight to protect their (often quite substantial) investment in their sound libraries.

The Future Of Sampling

Other than copy protection on sample libraries becoming more complex, what else lies in the future for sampling? This is, of course hard to predict, especially when the field has seen so much change over the past few years. When the original samplers were released, I don't suppose anyone imagined the kind of software sampling products we have today... or even 10 years ago. One thing is certain — the originators of sampling technology never predicted the uses it would be put to, the technology being originally intended simply for playing realistic representations of acoustic instruments. Who'd have thought that a few years later, musicians would be sampling entire rhythmic and musical phrases to construct songs with? Loop-based sampling and song construction has really taken off in the last decade and a half, and has grown still faster since affordable software tools became available to do the job. In the last few years, accessible software packages that integrate loop libraries and tempo-matching capabilities, like Sony's *Acid* and latterly Apple's *Garage Band*, have proved hugely successful, and it's not hard to see why, as applications like this have made it simple for people with little or no musical training or experience to construct decent-sounding tracks quickly and easily.

The End Of Multisampling?

Back in the second part of this series (see ***SOS*** September '05, or www.soundonsound.com/sos/sep05/articles/lostscience.htm), I explained in some detail why multisampling was necessary — it's simply not possible to take one sample of a real instrument, stretch it over the whole span of a MIDI keyboard, and expect it to remain realistic at all extremes. One of the reasons, you may recall, was to do with the shifting of 'formants' — fixed frequencies in the sound of certain instruments. This formant shifting, which sounds most unnatural, occurs when a sample is pitched up and down, but not when a real instrument plays notes up and down a scale.



Roland's original Variphrase product, the rackmount VP9000 (above), and (right) Celemony's *Melodyne*, which offers similar facilities in a piece of software.

However, so-called formant-corrected pitch-shifting has been around for a decade now, and in 2000 Roland released their first Variphrase product, the VP9000 (shown above). Initially, it seemed as though this might herald the end of a need for multisampling. The VP9000 claimed to be capable of keeping formants and sample length constant in sounds, irrespective of the pitch at which you wanted to play them. Alternatively, it could (Roland claimed) play back samples at any length, or separately shift formants to any degree (enabling you, for example, to change the 'gender' of vocals from male to female), whilst keeping the pitch of a sample the same.

Of course, such real-time processing came at a price, and it wasn't just financial (the VP9000 wasn't cheap at £2300 in the UK on release), but also in terms of its facilities. Offering only six-voice polyphony, and with some curious limitations on memory usage (the maximum single sample size you could record was 8MB, even though 136MB of RAM could be installed), the VP9000 was not the success Roland probably intended.

But Roland persevered with Variphrase technology, and the most recent manifestations have been in the form of the V-Synth and V-Synth XT, powerful sampler/synth hybrids that offer many exciting creative possibilities for the adventurous programmer (see our reviews in ***SOS*** May 2003 and September 2005 respectively, or read them on-line at www.soundonsound.com/sos/may03/articles/rolandvsynth.asp and www.soundonsound.com/sos/sep05/articles/rolandvsynthxt.htm).

One thing that has become clear with the release of all this Variphrase kit, however, is that you still can't take just one sample of a Steinway and have a perfect rendition of it across the keyboard range. The current real-time Variphrase processes have some audible artifacts of their own, although you can do more to stretch and mangle samples with Variphrase than you could with early '90s time-stretching.

The release of the VP9000 was, of course, followed by similar technology from Celemony (*Melodyne*, shown below), which also allows you to adjust the pitch, formant and length of samples independently of one another (although again, not without audible artifacts becoming apparent at extremes). Some software samplers (such as IK Multimedia's *Sampletank*) are also beginning to incorporate similar features.

Even if these products are not (yet) a true substitute for multisampling, they can be very creative tools for sound mangling and manipulation nonetheless, and Roland's V-Synth, with its real-time controls, is a lot of fun. But if we're not quite at the point where the technology allows us to dispense with multisampling yet, the likes of Variphrase may be pointing the way.

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Whilst it's not really appropriate to discuss these applications in great detail in this series because they do not 'sample' in the traditional sense of the word, and most of the techniques we've discussed do not apply (there's no multisampling, keygroup mapping, looping or velocity switching to be done), I suspect that there will be a lot more products like these incorporating samples and sampling technology in the future. And if *Garage Band* (or one of its successors) encourages people into the world of music technology, then that's got to be a good thing.

Like loop-based music-making, the full-blown software sampler isn't going to go away either — if anything, these will become more and more powerful, with bigger libraries that are able to take advantage of ever-increasing computer power. Whether we'll ever see a resurgence in the popularity of the 'traditional' hardware sampler is harder to say. There are still people like me, who (as I've made fairly obvious throughout this series) prefer hardware samplers and haven't yet been persuaded otherwise. However, I've also talked to software-sampler owners who have bought a hardware sampler for live use, and have subsequently been so impressed that they've stuck with it for studio work. There are also software sampler users who are growing tired of the business of keeping their sampler running smoothly with respect to changes in their host computer's OS or DAW/sequencing software — an on-going task which, frankly, can be a right pain. I'm not suggesting there might be the same kind of resurgence in hardware samplers that there was from the late '80s onwards with analogue synths, but already some samplists are seeking out eight- and 12-bit samplers for their 'lo-fi' sound...

Even if rackmount hardware samplers never return to their former prominence, sampling will continue to be available in hardware products such as Akai's ever-popular MPC-series and also in 'hybrid' sample-based synths and workstations that feature a vast array of onboard ROM samples together with an integrated sampling section. Roland, Korg and Yamaha all have workstation products of this type on the market, although in some of these, the sampling functions feel like something of an afterthought. Korg's new OASYS is perhaps more of a pointer to where sampling in a hardware product will go next, as is the new Alesis Fusion. Both of these neatly integrate sample and synthesis, virtual analogue and other types of synthesis with hard disk recording and traditional sampling features. The software brigade like to point out that all of this can be done on a laptop, and so it can, but the fact remains that many people do like the idea of truly integrated and reliable technologies from one manufacturer in one box — it avoids the conflicts that can arise from mixing and matching different technologies from different manufacturers.

Recent all-in-one workstation products like the Alesis Fusion and Korg's OASYS may be the future of sampling in hardware — where sampling is just one set of features amongst the many recording and audio-manipulation facilities on offer.

There's also no doubt that more can still be done to make sampling easier, and technological developments yet to come may well, for example, do away with the need for multisampling as processing power increases (see the box on the previous page). The ideal to shoot for here would be something that many of us, including *SOS*'s august Editor In Chief, have been requesting for years — an 'intelligent' sampler that will allow you to provide just the lowest and highest (or the softest and loudest) notes of an instrument, and leave the notes and articulations in between to be realistically extrapolated for you by the sampler. Given the rate at which software is developing, this might be closer than you think.

In the more immediate short term, I think we might see tighter integration of hardware sampling with software. DSP accelarators that help overstressed computers to run processor-heavy plug-ins, such as TC's Powercore or Waves' APA32, are now common — why shouldn't we offload sampling duties to a similarly dedicated piece of hardware? To those who claim in response that computers are always getting faster, I would point out that so far, sample libraries and virtual instruments have matched this progress, becoming ever larger and/or more processor-intensive to use at the same time (24-bit, 96kHz samples, anyone?). By integrating dedicated, optimised hardware tightly with editing software, computers and DAWs, we might find ourselves in a position when our computers can cope properly with the demands we place on them. Akai did this quite successfully with their *Aksys* editor and their S5/6000 and later Z-series, and it's a fine combination (though underdeveloped). Imagine a powerful, self-contained hardware workstation with a tactile control surface that fully integrates various synthesis techniques, sampling and hard disk recording, which can be taken out to gigs but which can also be seamlessly integrated with your Mac or PC via plug-in-compatible front-end control software similar to that used in Access's Virus TI... Well, I'd buy one, anyway!

Whether any of these predictions will come true or not, only time will tell. However, sampling has already had as much, if not more impact on music-making than the invention of the electric guitar, and it's here to stay, in whatever form it takes next.

Final Thoughts

As this series comes to a close, I hope I have dispelled some of the myths surrounding sampling — it really isn't (or needn't be) that complicated. It's not necessarily easy either, but then neither is learning to play an instrument to any degree of proficiency. Certainly judging from feedback I've received to this series, many of you have taken the plunge and started sampling in earnest with encouraging results. I hope that you're one of those who now regard your sampler in a different light! SOS

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World Radio History

If only the *original* Korg M1 had included this Easy page to control its envelopes and parameters!

Korg Legacy Digital Edition

Virtual Instruments For Mac & PC

Korg are continuing to develop virtual instruments based on their hardware synths. This time, it's 1988's classic M1 workstation that's been rendered in software...

Martin Walker

As a Wavestation SR user, I was excited when Korg released their software version in the original *Legacy Collection*, but I always viewed the MS20 and Polysix emulations in the bundle as odd bedfellows. The Wavestation is renowned for its slowly evolving timbres and its strings of rapidly changing wave-sequenced tones, while the other two synths and the mini MS20 controller were unquestionably aimed at analogue fans.

Many other Wavestation enthusiasts seemed to agree, so there was renewed excitement when Korg recently announced the *Legacy Collection Digital Edition*. This once again includes the Wavestation emulation (now up to v1.5), but this time it's partnered with a software emulation of Korg's M1 workstation. This makes far more sense to me, as the M1 is probably the most famous and best-selling digital workstation of all time. Even people who still have Wavestations and M1s have an incentive to buy the *Digital Edition*, since it includes the sample and patch collections that were originally only available on expensive ROM/PCM cards. By my reckoning, the cards in this bundle would have cost over £1000 at their original prices.

Both synths in the *Legacy Digital Edition* can be run as stand-alone applications or as VST, AU, or RTAS Instruments, and the bundle is completed by the *MDE X* multi-effects plug-in of the previous collection, which has also been upgraded to version 1.2 by the addition of RTAS support. On Macs, OS 10.2.8 or later is required to run *Legacy Digital Edition*, along with a minimum of a G4 500MHz machine with 256MB of RAM, while PC owners will need at least Windows XP, a Pentium III 1GHz processor, and 256MB of RAM. These are modest requirements, but borne out by my tests — 64 notes played on *Legacy M1* typically required just 25 percent of my Pentium 4 2.8GHz PC's CPU power.

Dongle Mania

The original Korg *Legacy Collection* used challenge/response protection, but Korg, like Steinberg and Arturia, have switched to using a Syncrosoft USB dongle. I'm certainly happier with this form of protection, since you never

World Radio History

SOUND ON SOUND

Korg *Legacy Collection Digital Edition* **£119**

pros

- The *Legacy M1* sounds almost identical to the original hardware version, but with less background noise.
- Both synths in this collection include the data from the original optional PCM/ROM cards, which cost well over £1000 on release.
- The *M1* software features filter resonance and extra effects options not found in the original.
- The package is superb value for money overall.

cons

- Effects levels in *Legacy M1* are slightly higher than on the hardware version.
- Patch card/number is not displayed after sounds have been selected.
- No way to add Browser search tags to User bank sounds.

summary

Anyone who ever liked any of the Korg M1 or Wavestation sounds should reach for their credit cards immediately — it's as simple as that.

have to reauthorise a dongle after changing your computer or hard drive. You don't have to worry about possible dongle conflicts if you already have one or more Syncrosoft dongles installed either, since Syncrosoft's *Licence Control Centre* software supports multiple dongles from different manufacturers.

If you're already using a Syncrosoft dongle, another option is to add the licence for the *Digital Edition* into it, rather than into the new dongle provided by Korg, so that you're not tying up your USB ports with unnecessary devices. I checked with both Korg and Steinberg to see how they felt about one of their dongles being used to store the licence relating to another company's product, and they confirmed that there's no technical reason why it can't be done, but did point out the complications that might ensue if the dongle was lost or stolen. In the end, I had insufficient space on my existing dongle to license the *Digital Edition* anyway, so I plugged both dongles into a USB hub, registered the *Digital Edition* on the www.korguser.net web site, got my Activation code, and then used it to license the Korg dongle. So far, so good.

Return Of The M1

Many *SOS* readers won't need me to describe the M1 'sample and synthesis' instrument, but for those who weren't around when it was first released in 1988, here's a quick summary. M1 Programs (patches) feature either one oscillator, filter, and an amplifier chain (in Single mode), two in parallel (Double Mode), or a drum map, filter, and amplifier chain. Up to eight Programs can be combined into a Combi, layered, split across the keyboard or at a certain MIDI velocity, or used as a Multi, with each Program on a different MIDI channel. Two effects blocks were also included at the end of each chain to provide a 'finished' sheen to your Programs.

But it was the sounds themselves that caused a stir. There were 16-bit samples from a variety of acoustic instruments, a set of short sampled attack portions, digital waveforms, and of course that famous hard acoustic piano, which proved ideal for cutting through dense rock and dance mixes. Astoundingly by today's standards, these sounds filled just 4MB.

All these sounds are available on *Legacy M1*, plus the original 100 factory Programs and Combis, and the samples, Programs, and Combis from the M1EX internal expansion. The real bonus, though, is the inclusion of the contents of all 19 of Korg's original ROM/PCM cards (see the box below). Not all the content is recycled; Korg have added a preset bank to showcase the extra features unique to this *Legacy* recreation. There's a resonant filter (how hard we programmers tried to work around the lack of one on the original M1), an extra LFO for amp modulation, and a new compressor, plus many extra effects.

While the original M1's Programs sounded rich due to their two effects blocks, when you switched into Combi mode these two blocks became Master effects assigned to all Programs, so the individual sounds lost a lot of their character. On the *Legacy M1*, when you switch to Combi mode the two Master effects are available as before, but you can also optionally retain the two Insert effects of the individual Programs (so up to 16 supplementary effect blocks are available). For more control, there's also a new Multi mode that offers full eight-part multitimbral operation with up to eight separate stereo outputs, with individual effect sends from each Program to the Master effects.

Although there is still a maximum of eight multitimbral parts, it almost goes without saying that with *Legacy M1*, limited polyphony is no longer a problem (the M1's 16-note polyphony dropped to eight in Double Mode, and even lower in many Combis). The Global settings now include user-selectable polyphony values of eight, 16, 32, 64, 128, or 256 notes to suit your needs. ▶

Test Spec

- 2.8GHz Intel Pentium 4C PC with Hyperthreading, an Asus P4P800 Deluxe motherboard with an Intel 865PE chip set, and an 800MHz Front Side Buss, running Windows XP (SP2) with 1GB of DDR400 RAM.
- Steinberg *Cubase SX* v3.0.2 & Cakewalk *Sonar 4*.
- Korg M1 & Wavestation SR (for comparison purposes).
- Korg *Legacy Collection Digital Edition* v1.0.1 (*M1* v1.0.1, Wavestation v1.5.2, *MDE X* v1.2.0).

M1 Card Collection

The contents of the 19 expansion cards originally sold as optional extras for the M1 (shown right) are instantly available in the software version via a mouse click. Most were originally sold as a pair of plug-in hardware cards — one for the PCM (sample) data, plus a ROM card holding various amounts of Program/Combi data. There's also a new KLC (Korg Legacy Collection) 'card' that showcases the new features, and incorporates 15 new sets of drum-kit samples, with genres from orchestral to trance, house, drum & bass, and hip-hop.

I suspect that only a few musicians have ever had access to this complete collection of sample/preset cards, but they are all bundled with the software *M1* — an absolute bargain.

World Radio History

The new Multi mode is a supercharged multitimbral Combi with up to eight Programs (each with two Insert effects), assignable to a maximum of eight MIDI channels and eight stereo outputs.

User Interface

I always found the M1's interface fairly straightforward, but as you can see, the virtual version's is a dream by comparison, with graphical displays of filter responses and envelope shapes, plus draggable rotary controls to replace the bland parameter readout and Up/Down buttons of the original.

Most people will start by selecting one of the five Select buttons across the top of the interface: Browser, Combi, Multi, Prog, or Global. Clicking on the Global buttons produces a screen with three sections devoted to MIDI settings, keyboard and scale tuning, and system settings such as polyphony, output gain, and number of stereo outputs.

In Prog mode, you can access six of the row of nine 'Page Select' tabs that appear across the top of the main interface. These let you explore the various controls for the Oscillator, VDF (filter), and VDA (amplifier). The Control tab lets you map aftertouch and an external MIDI controller to various parameters, and under Insert Effects, you can choose and program one or both of the two effect blocks from the 34 available. The sixth tab is a new Easy page with a subset of the most useful parameters from each of the other pages, and in the case of Double programs both sets of filter responses, envelopes, and amp envelopes are displayed here graphically superimposed — you can either select them individually or use the Link Edit button to drag and edit them together.

The left side of the interface displays a Performance area where you can globally tweak various aspects of the Program, such as output level, pan, filter frequency, and attack, decay, and release times. These edits are normally lost unless you specifically save them to another Program slot.

Combis & Multis

Switching to Combi mode, the Performance area disappears, and in its place are the level, pan, and output-channel settings for the maximum of eight Programs that can be associated with the Combi. However, one huge improvement is that the Combis don't just store the Program numbers associated with them — they also let you directly edit the Programs, so you don't have to keep jumping back and forth between Prog and Combi mode when editing the Combi.

In Combi mode three additional Page Select tabs are enabled: Performance, MIDI, and Master Effects. Performance lets you tweak the same list of Program parameters as in Program mode, but this time they're shown on the right side of the interface as a table displaying all eight sets of parameter values (one for each Program).

The MIDI page lets you adjust the MIDI channels, key zones, velocity zones, transpose, detune, and various MIDI filters for each Program in the Combi, so you can split sounds across the keyboard, switch between them as you play louder and softer, have some but not others respond to aftertouch, and so on. These controls largely explain why the Korg M1 can have such a 'full' sound.

The Master Effects page in Combi mode is essentially identical to the Insert Effects page of Prog mode, and on the original M1, this was all you got — two effects to be shared by the eight Programs. This time around, each of these eight possible timbres has a tiny button labelled IFX that lets you reinstate the two effects blocks already associated with each Program, albeit at the expense of some CPU overhead.

Multi mode is almost identical to Combi mode, except that by default each of the eight possible timbre slots is routed to a different stereo output (from 1/2 through to 15/16) for multitimbral use, and this time all the IFX buttons are enabled by default to retain their Program effects. Essentially Multi mode makes it quicker and easier to assemble Programs for multitimbral use.

Browsing

The final Mode Select button is Browser, and this makes choosing suitable sounds for your songs much easier than on the original M1. With over 2700 sounds available in this version, this is just as well! The Browser functions in Prog and Multi mode, letting you audition individual Programs, while in Combi mode you can either select individual Programs to be pasted into the timbre slot of the current Combi, or complete Combis.

You can browse by the contents of each Card (handy if you're familiar with their contents), or use the Search button to look directly across all cards for instruments of 16 different categories, including piano, organ, strings, woodwind, brass, vocal, guitar, bass, synth lead, synth pad, and drums. Multiple

The Browser provides a quick and versatile way to find the sound you need from the 2700 supplied, using Instrument and Character choices such as those shown at the top of the window.

World Radio History

Wavestation v1.5 Update

The main improvement to *Legacy Wavestation* in the *Digital Edition* is that in addition to the three RAM banks and eight ROM banks of the Wavestation SR model, *Legacy Wavestation* v1.5 includes the contents of the six optional Wavestation cards, which are now very difficult to get hold of in their hardware form (particularly the Synth/Timeslice one). Each provides an additional 50 Performances, plus associated patches and wave sequences, giving a grand total of around 1400 presets and sounds, and more than 700 sampled waveforms.

choices are accepted, and you can further refine your choice using the 16 Character buttons, which encompass such aspects as bright or dark, fast or slow, and fat or soft! Once again, multiple choices are possible. Once you've selected a sound in Card mode you can also switch to Search mode and all sounds with the same search instrument and character settings will appear, so you can hone your choice.

The browser can also be used to choose the basic Multisounds used in each Single and Double Program, and even the kit used in a Drum program. You can audition each sound using your MIDI keyboard or the on-screen one, and either hear it in context with the oscillator, filter, and amplifier settings in place (and the other Programs in the case of a Combi or Multi), or click on the Solo button it to hear the Multisound in its raw state, or the selected Program by itself. There's also a handy Preview button that helps when browsing by continuously playing one of six preset phrases. My only regret is that you can't assign instrument/character tags to the sounds of imported User banks, to include them in your subsequent searches.

In Use

The Preferences panel of the stand-alone PC version lets you choose MME, DirectSound, or ASIO drivers (or Core Audio on Macs) and up to three MIDI input devices, so I was soon happily comparing the sounds of the *Legacy M1* with those of my original keyboard. Individual Programs and Banks (all Programs, Combis, and drum kits) can be loaded and saved in FXP/FXB format, but the dedicated File button also lets you load and save individual Combis and Multis, and import MIDI SysEx dumps of All Data, All Combis, All Programs, or a single Combi or Program from existing M1 libraries.

I had no problems importing any of the M1 SysEx dumps I've collected and programmed over the years, and I was pleased to find that everything sounded almost identical to before. The only difference was that everything sounded cleaner, with less background noise, presumably because I was listening via a modern interface, and not through 18-year-old A-D converters.

The new resonant filter sounded lovely and adds lots more versatility to the synth, as do the new effects options, although to my ears the effects output levels did seem to be globally slightly higher in the mix, and on most Programs and Combis I had to reduce the reverb level from around 18 down to 13 for a better match with the old hardware (this was particularly noticeable with drums). If you want to revisit old M1 songs, your mixes won't sound quite the same until you perform this tweak.

I did find it slightly frustrating that once you'd selected a sound in the Browser and returned to one of the other edit pages, the card and number of your choice wasn't displayed anywhere in the interface, and although clicking on the Browser button again returns you to the same card page, your most recent choice isn't still highlighted. Because of this, it was often hard to find sounds I liked for a second time. Similarly, it would be helpful in a future version if the file name of an imported User bank was displayed somewhere, to remind you which one you're auditioning several hours down the line.

Conclusions

While the original *Legacy Collection*, at a UK price of £399, had no single philosophy tying it together, the *Digital Edition* should please digital Korg fans by restricting itself to the M1 and Wavestation, and at £119, it's superb value for money. There's some talk of reissuing the *Legacy MS20* and *Legacy Polysix* as the *Analogue Edition* and dispensing with the miniature hardware controller to bring the price down to a similar level, which also makes a lot of sense. I normally qualify my recommendations in various ways, but at this price, there's nothing further to say. Unless you hate the sounds of the original M1 and Wavestation, you should snap up these emulations before Korg realise their mistake and put up the price! SOS

Information

- £ *Legacy Collection Digital Edition*, £119; upgrade from original *Legacy Collection*, £69. Prices include VAT.
- T Korg UK Brochure Line +44 (0)1908 857150.
- W www.korg.co.uk

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NI Guitar Rig 2

Guitar Amp Simulator For Mac & PC

With version 2 of their *Guitar Rig*, Native Instruments are taking amp modelling into the realms of modular synthesis.

Sam Inglis

In the decade or so since Line 6 launched *Amp Farm*, software amp modelling has come a long way in both quality and diversity. Among the many high-quality packages now available, Native Instruments' *Guitar Rig* stands out as the only truly modular system there is. Its free-form interface allows the user to choose any number of elements from a list that includes amps, speakers, stompbox and studio effects, and arrange them in any order to create their own guitar sound.

NI also broke new ground by making a hardware unit integral to their software package. *Guitar Rig* came with Rig Kontrol, a floor unit that didn't act as an audio interface, but served both as an impedance-optimised DI box and a foot controller for the software.

Time marches on, and NI have produced a thorough overhaul of both *Guitar Rig* and Rig Kontrol. The software now includes numerous new amps — including, for the first time, bass amps as well as guitar amps — new cabinets and new effects, as well as an entire new category of module called Modifiers. The hardware is now not only a controller and DI box, but also a USB 2.0 audio and MIDI interface, meaning that you no longer need a third-party soundcard to use *Guitar Rig* on your Mac or PC.

With so many new features to talk about, I won't go into detail here about the modules that were already included in version 1, and I suggest that anyone unfamiliar with *Guitar Rig* should read Paul White's review in *SOS* September 2004, or on-line at www.soundonsound.com/sos/sep04/articles/niguitar.htm.

SOUND ON SOUND

NI *Guitar Rig 2* £350

pros

- The new modules are impressive, especially the Tweedman amp model and Loop Machine looper.
- Modular design and the new Modifiers offer scope for sound design that goes way beyond any other amp modelling program.
- The Rig Kontrol 2 is well built, sounds good, and offers more control with fewer wires!

cons

- In the review system, the Rig Kontrol 2 suffered from occasional clicks unless the buffer size was set too high for comfortable playing.
- Foot pedal in the review unit often needed to be calibrated before it would work.

summary

Good for copying classic guitar sounds and fantastic for creating new ones, *Guitar Rig 2* is a brilliant creative tool. The new hardware is pretty neat, too, if you can run it at low enough latency.

Rip Rig And No Panic

The new Rig Kontrol is a smart-looking beast with a reassuringly thick metal skin. It could probably survive being run over by a car,

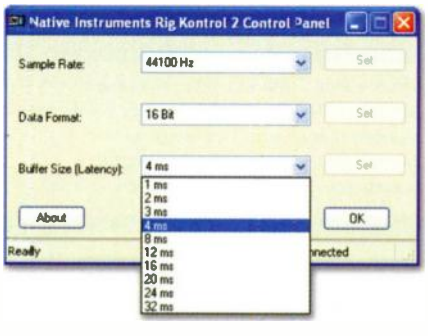
World Radio History

Guitar Rig 2 in action, showing the versatile new Tweedman amp, the modelled Sansamp distortion box and the noise filter.

and should certainly be robust enough to stand up to stage use. It terms of the control it offers, it's similar to version 1 except that there are now six rather than four independent footswitches (plus the switch built into the rocker pedal). Like the original, Rig Kontrol 2 transmits its control messages to the computer not as MIDI, but embedded inaudibly in the audio signal from your guitar. The difference is that this signal is converted to digital within the Rig Kontrol 2 and sent to the computer over a USB cable with no need for a separate soundcard. This will be a boon for many people, but particularly for those using *Guitar Rig* live. The new Rig Kontrol handles all audio inputs and outputs and puts them at your feet just like a conventional multi-effects board, cutting down clutter and reducing the number of ways for things to go wrong.

As an audio interface, the Rig Kontrol 2 is pretty well specified. There are two high-impedance inputs, each with its own gain control, so you can connect two guitars at the same time, with their input levels matched; again, this will be handy for live players who switch guitars for different songs. There are left and right stereo outputs on balanced quarter-inch jacks, with an associated button that switches the output level between high (for connection to keyboard amps, mixers or powered monitors) and low (for output to guitar amps). There's also a headphone output, with a level control that I found to be a little on the sensitive side, plus inputs for two expression pedals, and MIDI In and Out. A large two-digit LCD shows you the current patch number, and four LEDs show the presence of signal at the input and output, MIDI data activity, and the on/off status of the foot pedal's switch. What's more, the Rig Kontrol 2 is powered over USB, so there's no need for a separate power supply (and, in fact, no input for one). Live players rejoice!

USB 2.0 has been standard on new computers for the last few years, but as yet, most audio interface designers have chosen to support Firewire or stick with the low-bandwidth USB 1.1. I've talked to several manufacturers about this, and have heard some tales of woe about how hard it is to write a good low-latency USB 2 driver. I guess Native Instruments haven't listened to these tales, because the Rig Kontrol 2 connects via USB 2 and offers buffer sizes down to 1ms (which equates to a 2ms round-trip latency). The Rig Kontrol 2 has the simplest installation procedure I've ever seen, and its ASIO Configuration page offers just a few simple controls. You can set the buffer size and sample rate, from a choice of 44.1, 48 or 96 kHz.



I started with a 4ms buffer size, giving a round-trip latency of 8ms which I found comfortable for playing. Initially this seemed to work, but after a while, I began to notice the odd click and splat — often, but not always, when the cooling fan in my laptop started or stopped. Unfortunately, the next lowest buffer size is 8ms, with a round-trip latency of 16ms, which was high enough to put me off when playing. After hours of testing and many emails to NI, we couldn't detect any CPU spiking or throttling going on, and were forced to conclude that this was just the best setting that could be achieved on my computer. In fact, Native Instruments told me that only the fastest computers will be able to handle the 4ms buffer size, and that most guitarists are happy with a 12ms round-trip latency.

This raises a couple of questions. If a newish 2GHz Centrino laptop isn't fast enough to run the Rig Kontrol with 4ms buffers, then what is? And if NI believe 12ms is acceptable, why isn't it possible to set the latency to 12ms? In the end, I chose to keep the buffers set at 4ms and put up with the clicks, which were not very frequent. My machine doesn't perform any better with other USB interfaces, so I don't want to be too gloomy about this — there are plenty of people running USB devices at lower latencies in other systems, so I'm sure this will be the case for the Rig Kontrol too.

It's probably worth pointing out a couple of consequences of the fact that Rig Kontrol 2 is a USB 2 audio interface as well as a controller. The first is that you'll need a recent operating system: on the PC, Windows XP Service Pack 2 is required, while Mac users need OS 10.3 or better. The second is that you can't just use the analogue circuitry of Rig Kontrol 2 as a DI box for another interface, as you would with ▶

World Radio History

RK1. The third is that its qualities as an interface are not a lot of use to *Pro Tools* users, since *PT* doesn't support open driver standards such as ASIO. You can, of course, still use *Guitar Rig* as an RTAS plug-in, but you'll need to input your guitar via some Digidesign hardware. There are, however, Direct X and MME drivers for those running non-ASIO programs, and Core Audio support for the Mac fraternity.

The new Rig Kontrol 2 is a USB 2 audio and MIDI interface as well as a guitar-optimised DI box.

Finally, I came across a couple of minor problems with the Rig Kontrol 2. There were times when I started my computer up to use it and the pedal completely failed to work. *Guitar Rig 2*'s Pedal Calibration function always got it working perfectly, so in practice it's only a problem if you forget to do this. I also found that the stand-alone version of *Guitar Rig* always crashed if I switched to a different program when its ASIO Configuration page was open, not that this is something you'd often want to do.

Going Soft

As with every major software update, there are plenty of utilitarian enhancements in *Guitar Rig 2* that make it easier to work with, but could hardly be described as exciting. For instance, the browser structure has been changed to improve preset handling — not thrilling, but very worthwhile in a program that comes with several hundred patches and will inspire you to create plenty more.

Fortunately, there's also plenty that can and should be described as exciting, in the shape of a veritable army of new modules. The original Fender Twin, AC30, Plexi and 'Instant Gratifier' models have been joined by no fewer than four new amplifier modules, beginning with Tweedman. Based on a '60s Fender Bassman head, this is one of those models that will find uses in numerous different styles of music. It can, of course, be used as a bass amp, but it's also a very versatile tool for recording electric guitars. With bright and warm channels that can be blended to taste, Tweedman is ready for pretty much anything from clean country picking to clanging power chords. It has nice response to playing dynamics and a sound that sits somewhere between the ringing clarity of a Twin and the rasping distortion of an AC30. Tweedman is definitely my favourite of all the amps on offer here, and is a real highlight of *Guitar Rig 2*.

Jazz Amp gives you a virtual Roland JC120, or at least the clean channel of a JC120. That amp, of course, was a fairly standard transistor affair, the key to its popularity being the built-in ensemble effect, which could provide either vibrato or chorus. Said effect is reproduced here, and to my ears it sounds pretty authentic. However, if I'm after an ultra-clean sparkly sound, I'm usually happy to DI the guitar without any amp simulation, and Ensemble is available as a separate effect, so I didn't find that much use for Jazz Amp itself.

Lead 800 replicates the Marshall JCM800. Although this is one of the most popular high-gain valve amps, it's never been on my own Christmas list, and I probably won't turn to Lead 800 all that often for exactly the same reasons. The clean sounds tend towards the brittle — more so here than I remember from the real thing — and to my ears, turning the preamp gain more than about 5 percent of the way up turns everything into sonic mush, just like the original. But if that's your bag, it does seem to do the goods for '80s heavy metal soloing and palm-muted riffing, and as with the other valve models, you'll find plenty of scope for fine-tuning in the Expert parameters accessed by clicking a plus symbol at the right-hand side of the module.

Flicking through the bank of presets labelled Bass, I was surprised to find that not many of them actually use the new BassVT amp module, and none of them use the Bassman emulation. Most of them sound fine anyway, perhaps indicating that the choice of cabinet is as important as the choice of amp for bass. Be that as it may, the Ampeg model is comprehensive, with a graphic EQ and several other tone-shaping options on top of the usual amp tone controls. It sounds good, too, particularly for rockier bass parts, with an upper-mid snarl that doesn't detract from a meaty low end. For warmer, more middly bass tones redolent of the 1960s, the Tweedman module is a good alternative.

Doubling the number of amp models has done a lot to increase the sound palette available to *Guitar Rig* users, and the

Looping The Night Away

The new Loop Machine module is a sampling delay along the lines of the Lexicon Jam Man and Akai Headrush, designed to allow the guitarist to build up a layered texture by repeatedly overdubbing loops. As you'd expect, it offers buckets of recording time, and there are some nice additional touches such as the ability to A/B two separate loops, reverse the loop, overdub a longer part onto a shorter loop, and vary the recording level and pan position at each pass. However, what's really impressive about the Loop Machine is the way Native Instruments have integrated it into the *Guitar Rig* environment.

It appears as just another module in the Tools section, and it can be installed as either the first or the last module in the rack, enabling you to loop either 'dry' or 'wet' sounds. The really neat thing about it, though, is that once you've dragged it into the rack, it sticks around when you switch between different *Guitar Rig* patches and banks, so you can build up a multi-layered loop that incorporates any number of different *GR* sounds. You could, for instance, begin by laying down a rhythmic bed in one of the step sequencer-based patches, before using an octaver patch to add a bass part and others for more conventional lead and rhythm guitars.

What's more, if you assign Rig Kontrol buttons to the Loop Machine's Play/Record and Stop controls, *Guitar Rig* will remember these assignments when you change patch, even if that means over-riding the control assignment that's built into the new patch. This is exactly how it should work, since the Loop Machine is only really useful with a foot controller attached.

Another really cool feature is the ability to export the resulting loops as audio files. Not only can you export the bounced loop that you hear from Loop Machine, but you can also export every layer as an individual file. If you export the bounce, you get to name the file and choose WAV or AIFF format; layers are automatically saved as WAVs called 'Layer 1', 'Layer 2', and so on. It's also possible to save an entire Loop Machine setup as a single '.LS' file. You can't import other audio files into Loop Machine, but *GR2*'s tape modules can do that.

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modular nature of the program means you're not subject to the same restrictions as with 'real' amps. For instance, I managed to create a truly evil sound by routing the output of the Tweedman directly into the input of the Plexi amp. Probably not a trick you would want to attempt in real life...

To go with the new amp models, there's an even wider range of cabinets than before, and yet more virtual mics to record them with. As well as the appropriate partners for the new guitar amp models, there's now a range of bass cabs including Ampeg and SWR models, along with the new open and closed Leslie models from NI's *B4 II*. These are worthwhile inclusions, as even when you don't want a spinning effect, have a very distinctive tonality. As you'd expect, different mics have been modelled for the bass cabinets.

Distorted Perceptions

As most guitarists have probably had to explain to their spouses at some time or other, no two distortion pedals sound exactly the same, and that's why we need to have lots of them. *Guitar Rig 2* will satisfy your gear lust in that respect, containing as it does no fewer than 10. New models simulate, at one end of the scale, a clean gain boost, and at the other, the overkill of the Boss Metalzone, whilst the most intriguing addition is a model of the original Sansamp PSA1. There's something vaguely circular about simulating an amp simulator, and it made me wonder whether NI had included the Transamp model just to show off how far technology has come since it was introduced! Certainly, when used on its own, Transamp sounds nothing like as good as NI's amp models; but used as a preamp, it makes a versatile distortion box.

There are no new modulation effects, but the EQ section has been expanded. Crywah is an alternative to the original Wah and Talkwah units, modelled on the Crybaby, and is a worthwhile addition if wah is your thing. Pro Filter, meanwhile, is derived from the filter section in NI's virtual Prophet 5. A continuous rotary knob moves the filter shape from low-pass through band-pass toward high-pass, and the slope can also be varied in any degree from 12 to 24 dB/octave. Cutoff frequency and resonance can also be adjusted, and real-time movements are smooth and free of zipper noise. Pro Filter is not very exciting with static settings, but comes into its own when you assign its parameters to the foot pedal or to a Modifier (OK, OK, I'll get to them in a minute...). The other notable addition in this bank is Auto Filter, an auto-wah effect intended primarily for bass. Modelled on a Boss unit, this is basically a resonant filter

Modifiers in action: the Analog Sequencer is set up to control two Pitch Pedal parameters, while the Envelope manipulates the Pro Filter cutoff.

controlled by an envelope follower, and it works really well, with a smooth and rich sound that is devoid of glitching or stepping. Funky.

Elsewhere, the old Noise Gate has been joined by a more sophisticated Noise Reduction unit based on dynamic filtering. In general, low-level signals from your guitar contain little high-frequency information, so this technique employs a low-pass filter to clean up quiet signals. When the signal level drops below the Threshold setting, it is gated completely. You can set the Threshold automatically by hitting the Learn button whilst not playing. Although I found this erred on the conservative side, the Noise Reduction module is a very handy addition, particularly if you're putting together high-gain patches. Also new in the Vol collection is the Stomp Compressor, an idiot-proof and good-sounding compressor.

Mods & Rockers

Finally, we come to an entire new category of module. With its modular nature, *Guitar Rig 2* already went beyond mere emulation of hardware amps, but the new Modifiers take it into the realm of synthesis. In fact, anyone familiar with basic synth architecture will have no difficulty grasping what these modules do: they generate not audio signals but control messages. Five Modifiers are available: a flexible LFO, an envelope follower, a multi-stage envelope which can be triggered by audio input, and two varieties of step sequencer. There's no

Crossover Hits

One of the neat things about *Guitar Rig 1* was the ability to split the input signal into two paths and have independent amp and processing chains for each. That facility is still there in version 2, but there's another way of doing it, courtesy of the Crossover Mix module. What this does, in essence, is send the high-frequency component of the input signal down one path, and the low-frequency component down another. You can, of course, specify the crossover point, and split either path further if you want yet more control. This has lots of applications, but perhaps the most obvious are for bass patches. There are a number of effects that sound good on bass, but if you apply them to the full-bandwidth signal, play havoc with the bottom end. Setting up a Crossover Mix allows you to split off the treble component of the bass signal and apply chorus or flange to it while keeping a solid low-frequency base to the sound.

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The new Marshall JCM emulation will make a lot of rockers very happy.

room here to list all the features on offer for each of these modules, but all are well specified, with parameters carefully chosen for the job in hand, and can sync to host tempo where appropriate.

Setting up the Modifiers is child's play. Each has a big square button labelled Assign. Click on that and drag the mouse to the parameter you want to control, and it's done. And yes, Modifiers can be assigned to multiple destinations, in different amounts. Each Modifier has a drop-down menu listing its Targets and the amount by which it is modulating them. This can be adjusted from -100 to 100 percent using a slider. The same slider can also be accessed by right-clicking the destination parameter, in just the same way as you would to assign it to a Rig Kontrol pedal or switch.

The scope of what's possible with Modifiers is boundless. You want to assign an LFO to the Pitch Pedal pitch-shifter, so as to create a vibrato? No problem. How about a vibrato that gets faster as the note sustains? Easy: Modifiers can be modulate each other, so add an Envelope module and assign that to LFO Rate. OK, so how about we keep that vibrato, but also use the Pitch Pedal to turn single notes into tunes? It's the work of minutes. Add an Analog Sequencer module, assign that to the Pitch Pedal as well, and set the sliders for each step to 'play' the pitch-shifting. This sort of thing becomes completely addictive, and you can create amazing effects by modulating the most unlikely *Guitar Rig* parameters.

The only thing I found limiting was that the LFO module has no level control of its own: this makes it difficult to modulate the amount of LFO that is applied to another parameter, for instance when you want vibrato or tremolo to fade in on sustained notes. Even better would be a general way of applying one Modifier to the connection between another Modifier and its Target, allowing you for example to modulate the amount of LFO that reaches the Target. This small restriction aside, however, I absolutely love the way NI have implemented Modifiers, and I feel they really do take the program to a new level. Perhaps the future of guitar synthesis lies not in MIDI pickups and so on, but in something like this.

The other three Modifiers are a well-specified LFO, an envelope follower and a simpler sequencer where each step is either on or off.

Power To The CPU

***Guitar Rig 2*'s CPU demands depend on how many modules you use. On my 2GHz Centrino laptop, its CPU meter went from 2 percent, for simple effects patches with no amp module, to 17 or more for complex dual-amp patches. Typical setups came in around the 8 to 10 percent mark, so a modern computer should handle three or four instances within a mix. New in *GR2* is a High Res button, which switches the internal processing to a high sample rate. This does make it sound slightly smoother, but at the cost of a huge CPU hit.**

Too Much Fun

I have never reviewed a product that has given me as much pure enjoyment as *Guitar Rig 2*. I lost count of the number of occasions I found myself thinking 'Ah, but it would be really cool if it did that...' only to discover that NI's designers had been thinking along exactly the same lines. The modular setups you can put together are limited only by your imagination, and it's easy to while away the hours just tinkering with Modifiers and Splits. At the same time, if you need to get a sound fast, a couple of mouse clicks is often all that's required. The only real worry I have concerns the Rig Kontrol 2. If my experience is typical, then it will be frustratingly difficult to run it at an acceptable latency without some glitching, so I really hope this isn't universal.

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A new Crossover Mix module allows the input signal to be divided into high and low-frequency sections, which can then be processed separately. This is especially useful for bass patches: also shown are the new BassVT amp model and the Auto Filter, used on the 'high' split.

Anyone who owns and likes version 1 should definitely upgrade their software to version 2. Whether it's also worth trading in your Rig Kontrol for the new hardware (latency issues aside) is less clear; it doesn't offer that much more control than the original, although the two extra buttons will be very useful if you want to use the Loop Machine. It seems to me that those planning to use it live have most to gain by upgrading, since cutting down the number of wires and computer peripherals in the rig has got to be a good thing. By contrast, those who use a multi-input soundcard in the studio might not want to tangle with running a separate USB interface alongside it, and it's of little use to *Pro Tools* users.

With products such as this, the question that matters most to many people is 'How realistic is it?' If, by that, you mean 'Can you use *Guitar Rig 2* to get recorded sounds that will be indistinguishable from a real amp?' I would say yes, at least within the context of almost any real-world mix. If, on the other hand, you mean 'Will the experience of playing through *Guitar Rig 2* be exactly like playing through a real amp?', then no, it won't. To me, the fact of sitting in front of a computer to play means you'll never be in quite the same state of mind as with half a dozen smoking valves behind you. You'll evaluate sounds differently and make different choices — and there will be options available that you have never had before. It's in this department that *Guitar Rig 2* really shines, and where it leaves the competition behind. If you want to copy hardware amp setups in software, *Guitar Rig 2* is at least as good as any other program, but to do only that would be a waste of its potential. When you want to go beyond what's possible in hardware, nothing else comes close. SOS

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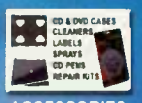

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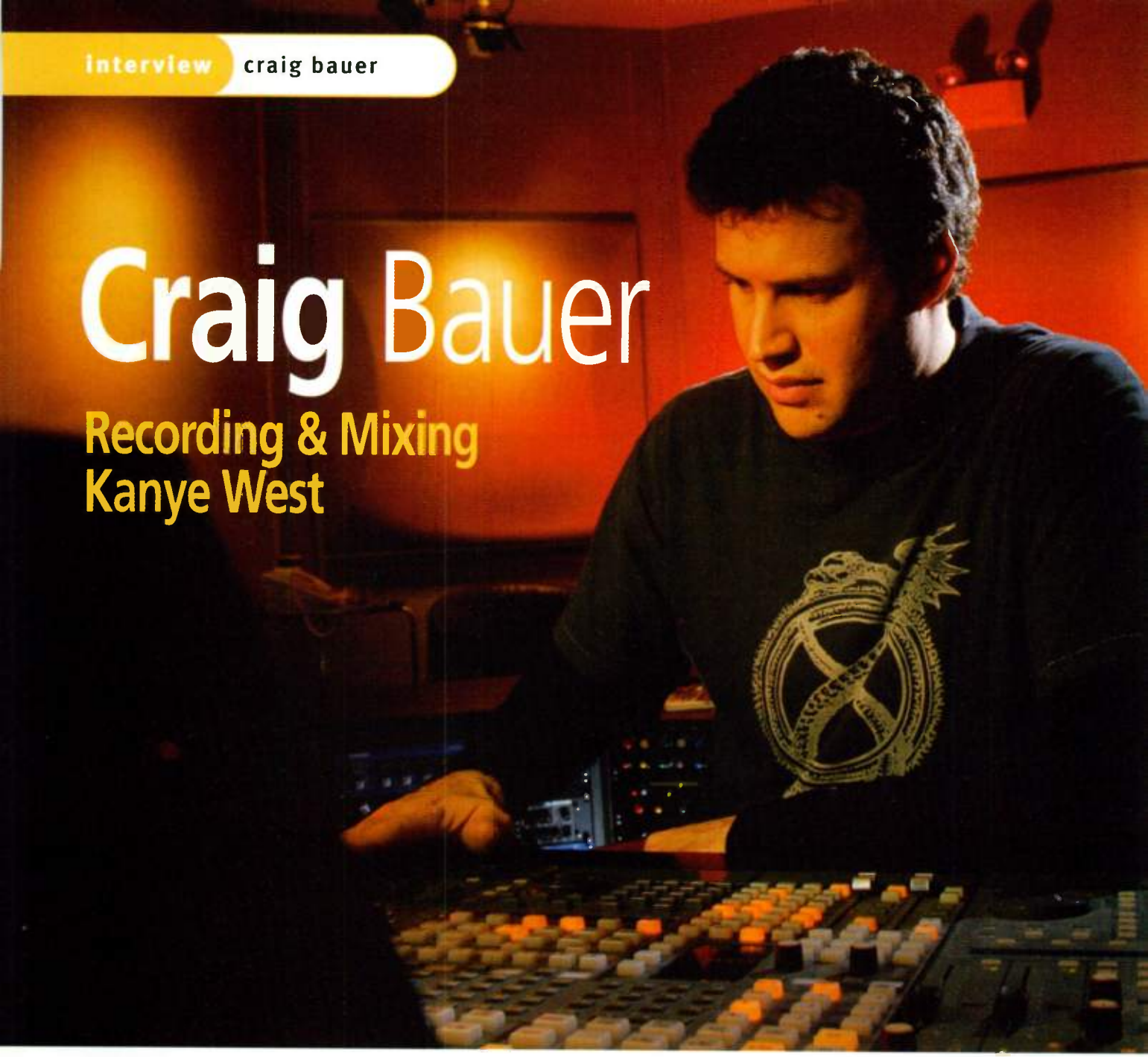

Craig Bauer

Recording & Mixing Kanye West

Craig Bauer has been part of Kanye West's career from the beginning, and as a mix engineer on the smash hit *Late Registration* album, he had to marry West's artistic perfectionism with his own technical standards.

Dan Daley

Chicago, home to genre pioneers like Steve 'Silk' Hurley, and the sophisticated city blues of Buddy Guy, is a great source of innovation in urban music but often lacks the gravity to keep those innovators there. So the disappointment that Craig Bauer felt when Kanye West told him, in 2000, that he was headed for New York City to take his career to the next level was both understandable and predictable.

Bauer, a passionate musician from Cleveland who came up through the ranks of that city's studios in the 1980s before migrating to Chicago to set up his own facility, Hinge Studios, in 1992, had watched as West progressed from a promising but anonymous local beatmaker, brought to the studio in 1998 by local producer John 'Monopoly' Johnson. Johnson had cadged hours here and there over two years off the studio invoices for his *protégé*, and it was at Hinge that West learned to go beyond eight-bar loops on his MPC sampler.

The beat-making process might have seemed technologically primitive to Bauer, who by then had already established a successful niche as a mixer specialising in the much-maligned smooth jazz format. Bauer was drawing the leading artists of that genre, including Dave Koz, Brian Culbertson, Steve Cole and Peter White, out of their sunny colonies in California and into a studio in gritty downtown Chicago.

Just Another Client

Compared to the glossy tracks that Bauer was giving them through the Euphonix System 5 console and the Genelex 1034B/7072 sub array of monitors at Hinge, Kanye West must have seemed as much an exercise in cultural relativism as just another client. But that's exactly how Bauer treated West, and he believes that his respect for him as a client is what led to a strong bond of friendship developing between the two.

Bauer worked often with West during the two years that 'Monopoly' had installed him

World Radio History

as a regular client in the studio, through the artist's stint in the Go-Getters, a Chicago rap group that West was a member of and produced. Bauer is candid when he says that there's little to talk about in terms of recording West's early work. "It wasn't what you'd call 'challenging'," he recalls. "If you listen back to the stuff now, which Kanye and I did not too long ago at the studio, it would not stand out and I doubt he'd disagree. It didn't suggest the genius you hear now on his records. It was all stuff that was sampled off of other records. He'd take a kick drum or a hi-hat where he could find them in the open on a track, sample them, and then 'flip' them — record them 'hot' to add a little distortion. If you could route a quarter-inch cable in a patchbay you could engineer those sessions. But what was there was there on the tracks was an attitude in the sound, grittiness. The talent was in the process of revealing itself."

And not only to Bauer. West's beats were quickly gaining the attention of artists on the coasts, including P Diddy, RZA of Wu Tang Clan, and Li'l Kim. "He was doing an increasing amount of 'ghost' beat work for other artists," Bauer says. "He'd bring the MPC in and we'd track it and lay it off to tape and it would get shipped off. The number of POs [*purchase orders*] to the studio kept going up, even though Kanye was not getting the credit for all of that work — I checked those records when they came out. But that's just part of getting yourself across in that genre. When you're young and new at it, lots of guys are happy just to get a few hundred dollars for a beat. I know, because they still ask me to help them sell them."

Late Registration

The recognition his beats garnered eventually led to label deals out of New York, and when Kanye left Bauer was disappointed, but he understood. "In Chicago that happens a lot," he says. But by the same token, he was not surprised when he got a call less than two months later saying West needed studio time — in Chicago, at Hinge. The College Dropout (his mother headed up the English department at the University of Chicago) was headed home.

Several of the demos that West recorded at Hinge were built into tracks on the *College Dropout* album, including the hit 'Kanye's Workout Plan'. For the follow-up, *Late Registration*, Kanye West came back to Chicago for mixing. Some of the tracks sounded familiar to Bauer when they arrived. "They were the demos we had cut when Kanye was here," he says, nodding towards a locked closet in the studio that holds scores of those *Pro Tools* Sessions, any of which are now worth thousands of dollars on eBay. The tracks were not necessarily more complex than in his early days, but there certainly were lots more of them. 'Bring Me Down', featuring guest vocals by Brandy, was a *Pro Tools* Session comprising 107 tracks, 48 of which were just Brandy. Bauer had to rent additional interfaces to make sure each track had its own analogue output to the Euphonix console.

The mix of 'Bring Me Down' took eight hours just to set up. Once it was, Bauer ran into often disorganised tracks that required a day's worth of editing, cleaning and crossfades. The thought of it makes him a bit cranky, and he suggests that it reflects an ongoing deterioration of engineering skills in an age of preset black boxes. "It's typical of hip-hop sessions but even more so of the whole business these days," he comments caustically. "There's no one to crack the whip, to make sure that the tracks being worked on are clean, with good punches and edits, and ready to be sent on to the next guy in the engineering chain."

The same loose technical attitude was apparent at the delivery stage. West and his crew were still working at Right Track Recording in New York City as Bauer was mixing in Chicago. When the first version of the mix was done, they requested Bauer send it as an MP3 file. He was appalled. "I didn't just spend three and a half days on a mix on a tight deadline to send it out as an MP3," he says. "Their thinking is that if it sounds good as an MP3, then it'll sound just as a good or better in a higher resolution. That just goes ▶

Credit Where Credit Is Due

Craig Bauer displays his annoyance candidly at the haphazard manner in which the credits appear on *Late Registration* — when they appear at all. Several of his mixes were credited to others, and he gets credit for others' mixes. When Bauer received an advance copy of 'Heard 'Em Say', he found his name nowhere on it. "I called and told [*Kanye West's camp*] they had fouled up on the credits and at first they argued that, then said that it would be corrected on the next pressing," he says. Nearly two million units later, the error is still uncorrected.

"When you put your heart and soul into a complicated project like this, you're doing it for more than money," says Bauer. "It's devastating not to get properly credited for it."

Credits on hip-hop recordings, which are already paperwork nightmares from logging hundreds of samples, are notoriously inaccurate. Multiple producers and engineers per track vie with dozens of studios, musicians, vocalists, guest artists and posse members in a stew of data that's nearly impossible to keep straight. And it's gone beyond urban music — the problems associated with such record-keeping prompted Trent Reznor to put the liner notes of his most recent CD on the Internet as a downloadable PDF file. As Bauer's case suggests, the hard work that goes into each record demands acknowledgement, both for emotional and professional reasons. "These are good and decent people," he says of West and his management. "They didn't do this on purpose. But it's frustrating."

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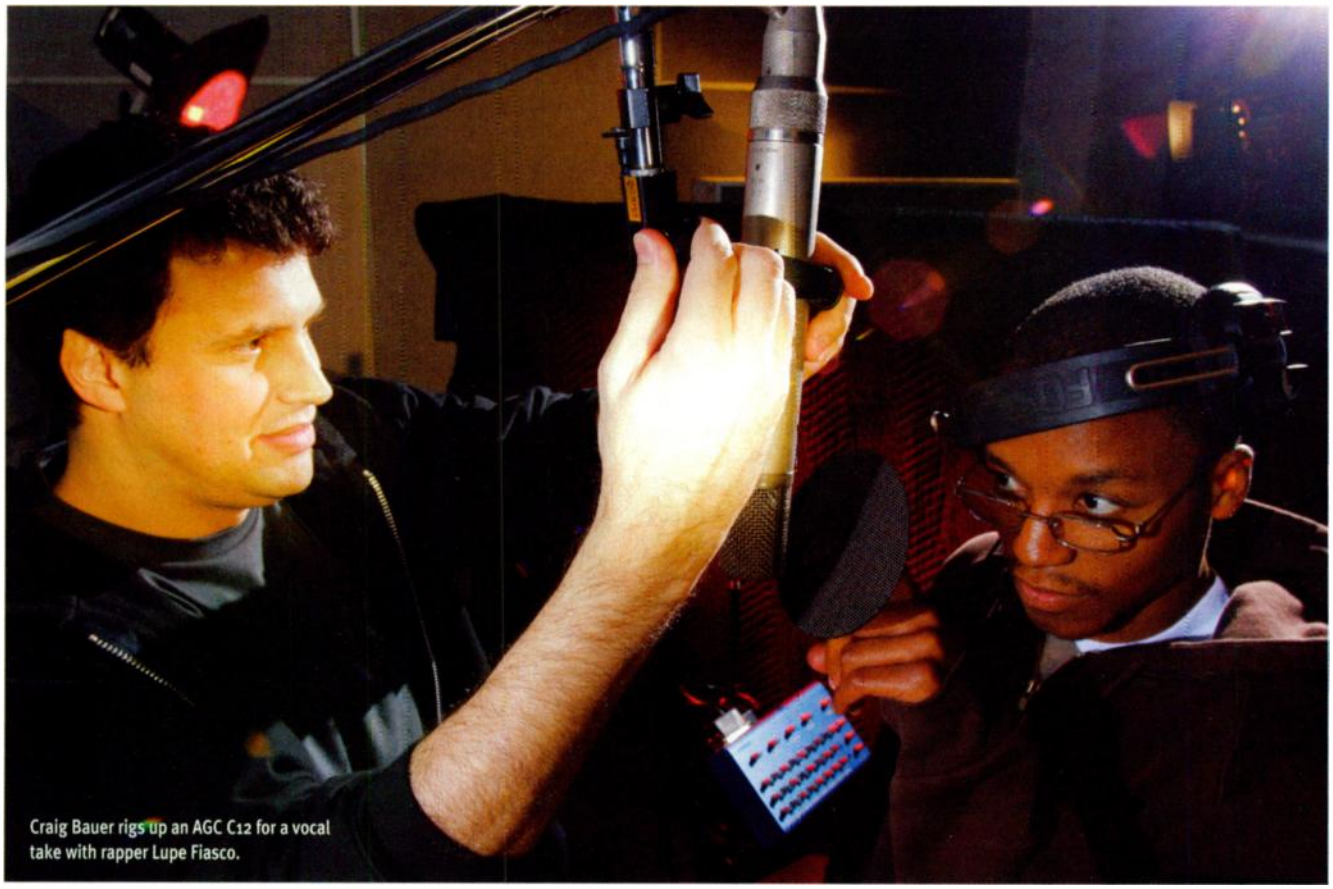


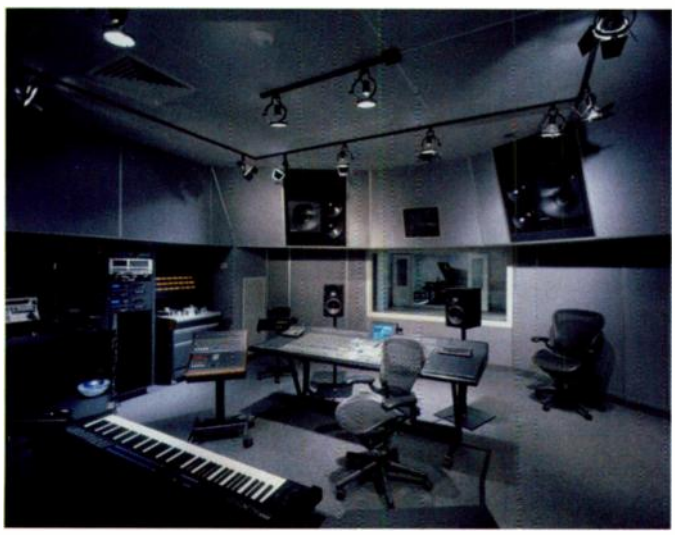
Craig Bauer rigs up an AGC C12 for a vocal take with rapper Lupe Fiasco.

against everything I believe in as an engineer and a musician."

Instead, Bauer burned a mix at 44.1kHz, 16-bit and sent it as an AIFF file attached to an iChat message, a method he says keeps the quality intact for Internet delivery. Kanye liked the mix, but sent back a laundry list of tweaks, including a request that the drums 'knock' more. "'Knock' is a big term in hip-hop these days that relates to frequency," Bauer explains. "When he first used it with me, I assumed it meant more low frequencies, but he said no, and he went over to my rack and rapped on it with his knuckles. 'That's knocking,' he said to me. I heard that and said OK, that's low-mids, around 800Hz to 1kHz. It's where you can get some more definition out of a kick drum, for instance. Hip-hop sessions generally don't use the conventional terminology of engineering. You just have to learn it and translate it."

For all its technical asperity, *Late Registration* revealed Kanye West's growing sophistication as a composer and producer, displaying new facets that had blossomed in his travels. "I guess that started happening the first time he went to New York and worked with Jay-Z on the *Blueprint* album," Bauer surmises. "On *Late Registration*, I was discovering a Kanye I hadn't known yet. There were treats on those tracks."

Co-producer Jon Brion, best known for producing precocious records by Fiona Apple and creating off-kilter soundtracks for unconventional Hollywood movies, brought complex string arrangements and sounds to the table from a huge arsenal of synths and samplers. "I was hearing live strings orchestrated by someone who knew what they were doing, intelligent licks on guitars — nothing was dumbed down, musically," says Bauer.



Hinge Studios is based around a Euphonix desk and Pro Tools.

A Level Playing Field

Kanye West has an odd perspective on relative dynamics: once relative levels are established, he prefers to use compression rather than fader rides to control them. "We're using compressors" — GML 8900 dynamic controllers and Chandler EMI reissues, largely — "for level control," says Bauer. "Kanye doesn't like a lot of rides on the vocals. He'd rather have that done with compression." It's not just vocals that that technique is used on, either. Bauer recalls a celeste sound played by a keyboard with a dynamically uneven performance that he wanted to smooth out. "Normally, I'd use a touch of compression and then ride it, but that's not how Kanye wants it done. The trick is to compress it enough to get level control without having the compressor start pumping. You just experiment with settings and watch the meters till you get it right."

Compression had other purposes on the record. West's proclivity to twist sounds led

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RECORDING KANYE WEST

Bauer editing a *Pro Tools* Session.

▶ Bauer to over-compress certain sounds using a McDSP *Compressor Bank* plug-in within *Pro Tools*, and then adding even more from the Euphonix's channel strip dynamics. More grit came from distortion from a Sansamp guitar amplifier emulator and the distortion effects from an *Amp Farm* plug-in. Bauer also tuned the sounds a bit using the GML 8200 five-band parametric EQ and an API 550 EQ module on many of the melodic instruments. "The vocals were generally well recorded and didn't need much," he says. "The drums — well, they're exactly the way Kanye makes them sound. That's his signature. There's always a certain grit to them. He pitches and EQs them in a certain way that goes back to when he was doing beats at Hinge. They're un-techy, but in a positive way. There's an art to that. Sometimes he'll overdrive the input from the MPC. He can play that like an instrument instead of a sampler. Kanye's a knob-turner — he knows what he's looking for and even though he doesn't necessarily know how to get there, he stays at it until he does."

Listening to *Late Registration*, it takes a minute to realise that it is dry as a bone. "There is not an ounce of reverb," on any of the five mixes of Bauer's that made it to the record, he says, another of West's quirks that tested Bauer's engineering chops but that in the end wound up a source of pride. "I had put a lot of reverb on the vocals on the Brandy track to make it sound really lush, like an R&B track. Reverb on the strings, too. Very rich-sounding. He sent it back and said 'Take it all off.' So I go back and I'm listening to this dry, stark orchestration and I keep listening until it dawns on me — Kanye doesn't want this to sound like a brilliant, lush R&B mix; he wants it gritty and street and hip-hop, even though the song isn't what you'd normally consider in that vein. That's really where the brilliance lies: in taking things — drum sounds, vocals — and putting them into other contexts."

Craig Bauer at Hinge Studios with John Legend (left) and Kanye West.

On 'Heard 'Em Say', for example, which features a guest vocal by Adam Levine of Maroon 5, Bauer found a stereo pair of acoustic guitars. "It was such a brilliant juxtaposition of elements for a hip-hop record — Kanye's groove against Adam's high, soulful voice and those acoustics in there," he says. "I pushed them up in the mix and sent it off to Kanye. He comes back to me and says 'I like the mix but get rid of the acoustic guitars.' He meant just pull them back so that they're more a suggestion than a presence. You have to listen to the track very carefully but they're in there. You never know what combination of elements he'll want."

Kanye West himself is on the record as citing influences ranging from Portishead to the Beatles to Pink Floyd and Stevie Wonder. Bauer found processing on some instruments that might not have seemed out of place at Abbey Road in 1966. On 'Addiction' West had treated the hi-hat heavily, adding his trademark distortion and a lot of phase shifting. Bauer's response was to automate a pan throughout the song as the hat tracked through two sweeping bands on a Focusrite D3 equaliser.

Dazed & Confused

The mixes — Bauer ultimately did five, including 'Addiction', 'Roses', 'Late', and 'Heard 'Em Say' — continued in a frenzy from June through August of last year. "Kanye has to experiment with every possible combination of sounds and levels, and that resulted in 15 to 25 recalls of every mix," says Bauer. Discs would arrive via Fed Ex and mixed tracks would get sent back as AIFF files (the requests for MP3s continued but Bauer turned a deaf ear to them). The endless remixes were probably were exacerbated by the fact that West and his entourage were constantly on the move between studios and in different monitoring environments — the recording's itinerary included stops at Right Track in New York, Ocean Way and Chalice in Los Angeles, and Circle House in Miami. "He moved around more than Saddam Hussein, never in the same studio twice," says Bauer. "It was like throwing darts in the dark — you knew they were never listening to the same mixes on the same monitors. On one system, the drums are 'knocking'; on the next, they're not. Like with the MP3, Kanye's logic is, if it sounds good on a whole bunch of different monitors, then it'll sound good anywhere. But as an engineer, I want to compare mixes on a consistent set of monitors."

Kanye West's compulsive pursuit of perfection put Bauer through a lot, and the engineer later discovered that he'd been mixing in competition: West had sent each of the songs to as many as three mixers simultaneously, even as he continued to record other songs for the 21-track CD. Was it worth it in the end for Bauer? Despite the madness, he unhesitatingly says yes. "It's rewarding to watch someone evolve creatively like that over time and see that talent rewarded and to be part of it," he says, adding that it has led to more work from emerging hip-hop artists, like Lupe Fiasco, who appears on *Late Registration* and whose first major-label solo outing is co-produced and mixed by Bauer. "Kanye's not an easy person, but he's a great talent. In this business, they rarely to go together. But if it was easy, it wouldn't be as good." SOS

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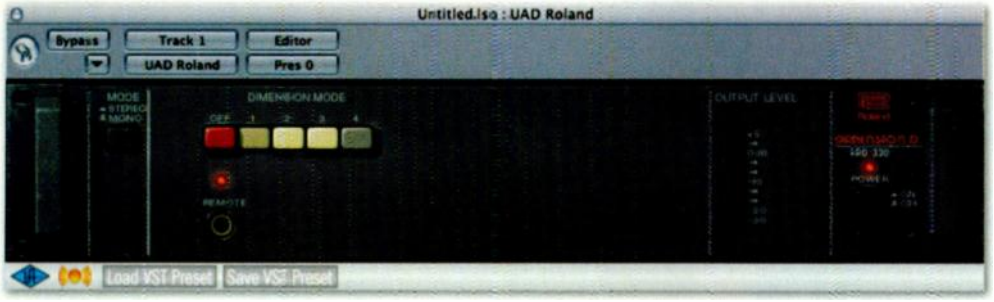

Universal Audio *Dimension D*

Formats: Mac & PC UAD1

Based on the legendary Roland Dimension D rack chorus processor, Universal Audio's plug-in of the same name brings this unique effect to their UAD1 platform, enabling Audio Units, VST, Direct X and RTAS hosts to run the plug-in on both the Mac and PC platforms as appropriate. The UAD1 card is inexpensive and that the bundled plug-ins are good, making it a cost-effective way to add plug-in horsepower to any computer with a free PCI slot. *Dimension D* is the second UA plug-in modelled on a Roland original with the full blessing of Roland Japan, following the *CE1* chorus, with a Space Echo tape modelling plug-in due some time in the next few months. To use the plug-in, you need to download version 4 or above of the UAD1 operating software, after which an authorisation can be bought from the UA web site enabling the plug-in to be activated for your particular UAD1 card. This authorisation can be freely copied or downloaded again from the UA web site but will only work with your particular UAD1 card, so moving computers is painless.

Considering that it was essentially a chorus device with just four preset buttons, the original Dimension D was both large (2U) and pretty expensive. Like many other delay devices of the time, it employed charge-coupled analogue delay lines, but the exact effect it created was a bit of a mystery, as it seemed to combine a very subtle but rich stereo chorus effect with stereo width enhancement or mono-to-stereo simulation. It worked well on synths and string pads without producing an over-obvious chorus-style modulation and also lent an attractive shimmer to the high end.

Roland's original design came onto the market back in 1979 and it became a firm favourite with recording engineers and producers. I recall playing with one at the time and wishing I could afford it! Universal Audio have clearly gone to great lengths to duplicate the analogue character of the unit, as the effect the plug-in produces is uncannily accurate. What is extraordinary about the Dimension D is that aside from a bypass button, it has only four push-button settings — though as users soon discovered, these could be used in combination to provide 16 effect permutations. Nobody was quite sure what the buttons did but the effect was subtly different from each and my guess is that they were based on different, closely spaced, delay taps so that when used in combination, they added complexity to the chorus sound. Whatever the trick, it works just as well today as it did back then, and of course the UAD1 plug-in version is also extremely quiet.

Tonally, I felt the plug-in came extremely close to the sound of the original, especially in the way it was able to provide a sense of stereo width and richness to otherwise bland, unmodulated synth pads. It doesn't produce the annoying churning sound of a traditional chorus effect — it's more like the results you get by layering two very slightly detuned sounds. Furthermore, unlike a conventional chorus, *Dimension D* doesn't seem to push the sound into the background or dilute its immediacy but instead makes it more interesting and spacious-sounding. While it is great on synths, it also performs well on guitars and even vocals.

Old Dimension D units are still changing hands for considerable sums, but for me the UA version is so close that I doubt if many people could detect a difference. The effect is as applicable today as it was a quarter of a century ago, and to make the deal more attractive, UA are offering a bundle deal where you save money by buying the *Dimension D* and *CE1* chorus together. When the Universal Audio guys set their mind to modelling something, they do it to the best of their ability and their efforts have paid off in this case too. I can't wait to hear their Space Echo!

Paul White

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Ugo *Rez, Texture, String Theory & Motion*

Formats: PC VST

New soft synths are as common these days as hurricanes in the Gulf Coast, but for one-stop VST Instrument shopping, it is hard to beat Ugo's collection of free synths. Not only are they more than just your typical S&S or virtual analogue synths, but their visual design gives the commercial companies a run for the money — which makes sense, since by day Ugo masquerades as a mild-mannered graphic artist.

Ugo has four soft synths available for download. Each features a different approach to synthesis, although their sound and associated presets tend toward industrial music and sci-fi soundtracks. If you know some of the 'name' synth patch authors on the Web, you'll recognise them credited on these synths.

First up is *Rez*. The function of this synth is easy enough to conjure from the name: it's a fat monosynth with multiple, chained filters, which produces a very wet, squelchy sound. A sub-oscillator adds depth and can be detuned, while the main oscillator's pulse width can be modulated. The oscillator and the filter each have their own ADSR envelope, and the filter has a separate LFO for cutoff modulation. *Rez* also has a nice portamento/retrigger combination, and Ugo has hit the sweet spot for the control-fader travel. This allows one to easily find the perfect glissando rate for analogue-style swoops and dives, as well as quicker bleeps, and helps replicate the feel of old monosynths.

Texture is next up, and is also aptly named. It is a polyphonic instrument based around an oscillator which can produce multiple instances of the same waveform, which can be detuned over a wide range. Pulse-width and modulation controls are available for square waves. The oscillators then run through two filters. First is a band-pass, followed by a low-pass filter. Each has its own cutoff and resonance control, as well as separate LFOs for cutoff. Both amplitude and filter have their own ADSR, and the audio is then routed to the effects. Along with reverb and delay, Ugo includes a 'metal' effect. This is simply a super-fast delay unit which can add anything from an almost vocoder-like sheen to a clangorous tone on sound passing through it. Many delay units will do fast delays, of course, but often don't have fine enough calibration at this ▶

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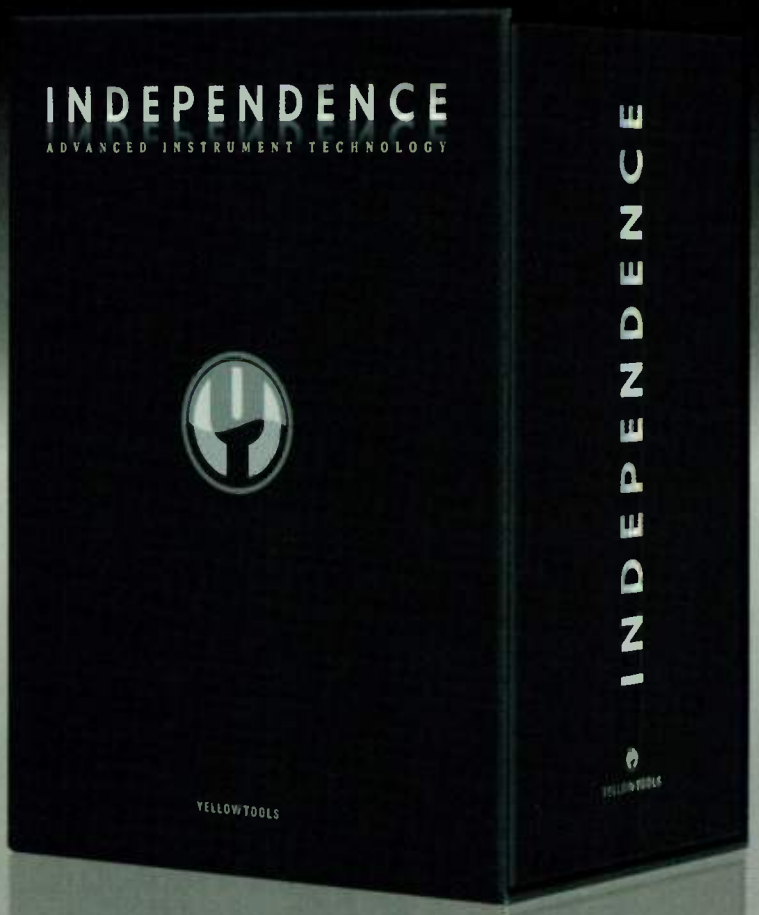

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extreme setting to offer this level of control — more kudos for the feel factor. Between the band-pass filter, metal effect and a built-in sequencer, *Texture* excels at thick, moving textural soundscapes. All of Ugo's synths come with PDF help, and *Texture* includes a MIDI CC map.

String Theory eschews VA for physical modelling. Two wave/noise generators feed pitched delay units to form the base of the sound. Enveloped sound then passes through a selection of filters and on to the metal and delay units. *String Theory* includes dual phrase arpeggiators that can both run at the same time set to different speeds, ranges, directions and so on. It sounds the most subdued of the synths — until you play chords which arpeggiate up, down and all around like a sailor stumbling back to ship after fleet week.

The final synth is *Motion*, which combines VA with a Phase Distortion engine. Phase Distortion was Casio's answer to Yamaha's patented Frequency Modulation synthesis back in the dark ages of digital synthesis, and works by 'slewing' the wave shape to create additional harmonics. Each engine includes a choice of wave shape, filter with envelope and amplitude envelope, as well as other goodies which make each engine a synth by itself. There are eight assignable LFOs, as well as analogue-style sequencers for pitch and filter cutoff. A sequencer gate controls the first two, provoking even more sequencer stutter. The abundance of LFOs and sequencers provides the clue to the name, *Motion*. This was the only one of the synths I had a problem with: it took up almost all the screen space available on my 17-inch monitor. There are workarounds for this gigantism, but I ended up replacing my monitors with dual 19-inchers about the same time, which worked even better! There is more to all these synths than can be dealt with in this short review, but finding more about them is just a download away. Any or all are worthy additions to a more sober and tame S&S synth collection.

By the time you read this, Ugo will also have released his first effects unit, called *Metallurgy*. It uses many tweaked effects from his synths, all strung together in a handy package. The audio first passes through a 'filth' effect (downsampling and distortion), into a metal section, then through parallel filters and into a second filth effect (in case you didn't get dirty enough the first time). The sound next goes through a sequenced gate, is processed by the dual delays and finally exits after an envelope follower. There are LFOs for most sections, randomisers, and three sequencers, including one for the gate. Enough to make even the most uptight sound let down its hair. *Metallurgy* is particularly wicked for vocals — show the lead singer who's his daddy when his delicate inflections come back sounding like Robbie the Robot gone to hell. *Metallurgy* is the only plug-in that Ugo asks payment for, and it's still only 20 dollars — not bad for a package of so many simultaneous effects, especially as it sounds good and wraps them up in an easy-to-use package. *Alan Tubbs*

S Synths are free; *Metallurgy* $20.
W http://cortisdesign.com/ugo

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Formats: Mac & PC Powercore

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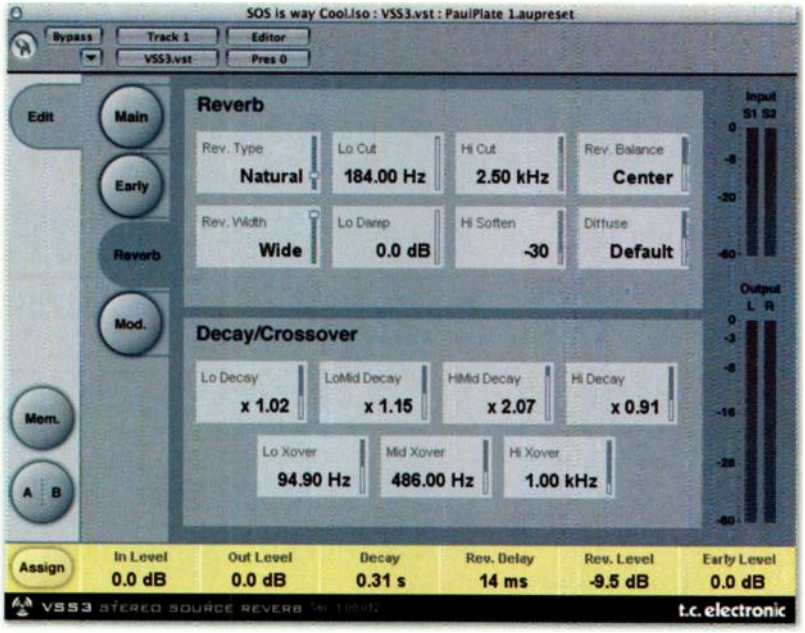
▶ unlike synthetic reverb, there's no way to incorporate modulation within the reverb generation algorithm. In *VSS3*, however, numerous modulation possibilities are available for detuning, chorusing, special effects and so on. All algorithmic reverbs are more complex than they appear on the surface, with far more adjustable parameters than the user ever sees — here there are approaching 800 internal parameters, but thankfully the user has to deal with considerably fewer!



Indeed many users will manage perfectly happily by tweaking the large library of presets that come with the plug-in, many of which have already been heard on albums and in film soundtracks thanks to the proliferation of the System 6000 in those areas. *VSS3* is pretty DSP-hungry, but even the Powercore Element and Compact can run a single instance at 96kHz if need be.

The 'Stereo Source' part of the title reflects the fact that the early-reflection portion of the reverb pattern differs depending on the left/right placement of the original signal, so the sense of position on the final sound stage remains strong, even when a lot of reverb is added. Alternatively, the algorithm also handles traditional 'mono-in, stereo-out' perfectly effectively. Furthermore, because the System 6000 is used as much in film post-production as in music, you'll also find presets for unusual spaces such as car interiors and other popular film locations, plus a library of special effects presets. In all there are over 200 presets, which can be organised into subfolders to help you categorise them, and users of the *VSS3* algorithm for System 6000 or the Reverb 4000 can export their patches to the plug-in via MIDI Sys Ex. The familiar A/B compare function allows two different setting configurations to be compared, but as usual, the A/B memory locations are temporary so you have save any changes you wish to keep.

VSS3 has the same look and feel as the hardware System 6000, with a user interface arranged as a series of pages with the parameter adjustments and value displays along the bottom. There are four main pages: Main, Early Reflections, Reverb and Modulation. Six main or 'focus' parameters are shown at the bottom of the plug-in window, and these can be customised to give direct access to whatever the user feels is most important. Focus fields are stored with the session and when you save your presets.

The reverb decay can be set from 0.1 to 20 seconds and though there are actually four bands of decay parameters, the Main page provides a simple way to adjust them all in one operation. Up to 200ms of reverb delay can be added to the diffuse field part of the reverb tail, while a conventional pre-delay of up to 100ms is available to offset the entire reverb part of the sound from the dry sound. Hi Cut can be used to take unwanted top end out of the signal prior to the audio being processed by the reverb engine while the Hi Decay acts as a multiplier in the usual way, extending or reducing the HF decay time relative to the other frequencies. Separate level controls are provided for the early reflections and the reverb tail and there's also a Dry Level value for when the reverb is not being used in a send/return loop. The plug-in can be locked into Dry Kill mode for wet-only operation. Output level is also adjustable, while numerous other parameters affecting the sound of the reverb are to be found on successive pages.

The Early page allows editing of the early-reflections part of the reverb and a choice of different types of room character. Early Color adjusts the high frequencies and is one of those apparently simple controls that alters a number of internal parameters at the same time. Early Pos selects between a close and a distant setting, creating the illusion that the listener is closer to or further away from the source without changing early-reflections patterns; not all early-reflection patterns have this option. The same applies to Early Size: some patterns offer a choice of Small, Medium or Large while others offer only one fixed size. The Lo Cut frequency for the Early Reflections can also be set, while Early Balance allows the pattern to be biased to one side or the other.

The Reverb page handles the reverb tail settings, including the crossover frequencies and decay-time multipliers for the four frequency bands. Modulation is dealt with on a page of its own where you can select a type of Space Modulation, then adjust the parameters, including rate, width and depth.

There's no denying that this is a seriously high-quality reverb that has a distinctly different character to the Powercore's existing *Classicverb* and *Mega Reverb*. Having the option of using a stereo source does produce a more definite sense of placement within the stereo field, but still in a very natural and convincing way. Unusually, you don't get all the familiar halls, rooms, plates and chambers as algorithmic starting points, though you can emulate all these environments by adjusting the parameters carefully. There's a respectable range of presets to get you started, though from what's included it is evident that this plug-in is aimed as much at the film and post-production market as it is at music — it's not often you'll want to mix a track to sound as though it's played in the back seat of a car, for example. The ability to place things in the mix both left/right and front/back can add a lot of perspective to a mix, so if you're into more experimental music this would be a good choice of reverb. In conventional pop music, I haven't found much that *Classicverb* and *Mega Reverb* wouldn't handle, but if you're into space exploration or need to post-produce sound for film and TV, *VSS3* has much to commend it. *Paul White*

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Loopmasters Afro-Latin Producer

Multi-format

This is the eleventh library in the Loopmasters Origin series. and comprises more than 600MB of sample data split over 1000 loops. Seeing 'Latin' in any sample library title brings the word 'percussion' instantly to mind. However, while there are a good number of drum and percussion loops provided, this library also contains folders of bass, guitar, keyboard, sax, trumpet, and vocal loops, so all elements of a typical production are represented.

All the instrument groups are subdivided on the basis of tempo, and these cover a range from 90bpm to more than 160bpm. Aside from the aforementioned drum and percussion loops, there is also a folder of individual drum hits that covers all the usual suspects. Usefully, there are *Reason NNXT*, *Halion*, *Kontakt*, and *EXS24* patches for both the standard kit sounds and percussion sets if you do like to programme your own rhythms.

This added flexibility is great, but the drum and percussion loops are also so good that there is an easy route if, like me, your drumming skills are somewhat limited!

Good though the rhythmic material is, what really sets this collection apart are the pitched instrument loops. From bass guitar through to trumpet, the quality and feel in the playing is excellent and, as a result, the vibe created by the individual instrument loops is extremely convincing. At first glance, the file names look a bit odd, but they actually contain a lot of useful information. For example, AL_Bass_Cuba_CFG_115 would be a Cuban-inspired bass loop cycling through the notes 'C', 'F', and 'G', with an original recording tempo of 115bpm. This same file-name convention is used with chord sequences for many of the guitar or keyboard loops, and there are plenty of ninth, 11th, and 13th chords thrown in for good measure — great for a touch of Latin-influenced jazz. For me, the highlights are probably the nylon-strung-guitar loops and the brass (both sax and trumpet), but even the vocal loops are full of character.

I could imagine these sounds would appeal to anyone interested in Latin-tinged music, from pop (think Enrique Iglesias) through to contemporary takes on more authentic South American styles such as salsa or rumba. Throughout, the recording quality is very good, and the user is completely free to use the loops in any type of commercial recording. If there is a minor downside, it is that Loopmasters have avoided going down the construction-kit route and, given the sometimes exotic chord voicings and the often jazz-influenced melodic lines of the brass, it does take a little extra work to find two or three loops that work together harmonically. On the other hand, this could be seen simply as a reflection of the dominance of melodic and chord-based loops in the library. The bottom line is that, while *Afro-Latin Producer* may not be everyone's musical cup of tea, the playing is full of genuine Latin vibe and it also represents excellent value for money. *John Walden*

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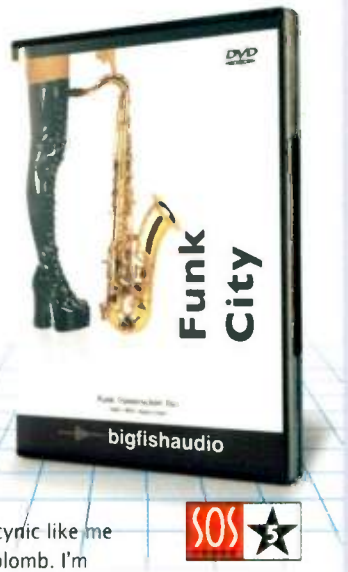
Big Fish Audio Funk City

Multi-format

Don't be deceived by the rather naff cover artwork: this library is actually impressively well put together, containing many very usable sounds recorded at 16-bit, 44.1kHz resolution. There are 29 different construction kits, plus an additional folder containing 19 types of single-hit drum and percussion sounds, ideal for programming extra fills or for ornamentation.

The kits cover a 95-130bpm range and stylistically provide more or less exactly what you'd expect. There's a strong hint of the '70s about many of them, although the production is bang up to date and steers clear of any self-consciously 'retro' touches. Live instrumentation is the order of the day, and various musicians are credited for drums, guitar, bass, alto/tenor/baritone sax, keyboards, vocals, and scratch effects. Particular credit is due to one Butch Taylor, who apparently supplies the guitar and the bass parts for this collection, and proves himself equally adept at both.

There's always a danger with this kind of library that the artists will start out demonstrating an affectionate knowledge of the conventions of their chosen genre, and end up drifting into an overdone parody or caricature of the same. Not so here: it's all judged more or less perfectly. So although the construction kits are bursting at the seams with sleazy wah-wah rhythm guitars, thunking slap-bass lines, spiky clavinets, and fat legato synth leads, the results always manage to sound solid, lively, and convincing — funky rather than funny.



The horn parts stab, blast, and generally punctuate the proceedings in all the right places, while some nice organ and Rhodes piano sounds hover in the background. The drummer fulfils his role admirably, never over-playing, and the conventional kit sounds are often augmented by conga patterns, which add some extra life and movement to the rhythm section. Even the sounds which are most difficult to make work (and which a cynic like me might expect to fall horribly flat) are handled with aplomb. I'm thinking particularly of the scratch effects, and occasional spoken or rapped vocal interjections. These could easily have descended into the realm of cringe-making novelties, but instead are deployed tastefully and with well-judged restraint.

This is a top-notch sample library, which maintains high standards of musicianship and production throughout. It delivers exactly what it promises, never straying from its chosen territory. The samples are consistently usable, with no obvious filler. Funk, soul, and urban producers in general will find plenty to work with here, and would be well advised to put *Funk City* somewhere near the top of their shopping lists. *Paul Sellars*

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Tekniks
The Mixtape Toolkit

Multi-format

Regular readers of Sample Shop will recall the reviews of Teknik's two *Ghetto Grooves* sample libraries, both of which were aimed at hip-hop and R&B styles, and were based primarily on construction kits, but with a very healthy dose of individual hits featuring both drums and percussion. This new release follows a very similar format. The 28 construction kits (dominated by 80-100bpm tempos) are supplemented by folders containing individual samples for drum kits, scratches, vocals, and various special effects. In total, there are more than 3000 files taking up over 650MB of disc space.

Each of the 28 construction kits is based around a small number of loops (usually between five and 10) and, helpfully, a complete mix is also provided for easy auditioning. While the sleeve notes suggest the library is aimed predominantly at hip-hop, some of the construction kits would most certainly work at the sassier end of R&B — maybe Christina Aguilera in a dark mood? Indeed, the overall feel is quite moody and melodic, perhaps not suitable for the grittier hip-hop styles, but I could easily imagine something like an Eminem-style vocal line sitting over the top of these backings. The majority of the kits feature a combination of a drum loop and separate kick or hi-hat loops, plus various instrument loops such as guitar, piano, bass, and synth. While the individual loops mean that it is easy to drop mix elements in and out to create a song structure, it might have been nice to have a few more loops within each construction kit for some instant variety. That said, there are plenty of effects, vinyl scratches, and vocal ad libs (with the occasional bit of colourful language for good measure!) that can be used to add a little extra spice. With due care and attention to pitch-matching, it is also easy enough to mix and match loops between the various kits.

Drum samples dominate the individual samples, and there are some excellent sounds on offer here. All the usual hip-hop classics are present, including various TR808/909-inspired sounds and plenty of crunchy snares and speaker-flapping kicks. The Scratches folder includes not just turntable spinning, but also a good collection of vinyl noise samples — great if you want things to sound like they have been lifted from an old record.

There are a large number of hip-hop construction-kit sample libraries available, so users have plenty of titles to choose from. *The Mixtape Toolkit* perhaps doesn't break any radical new ground in terms of format or content, but the construction kits are instantly usable and very musical. Given the inclusion of the large number of other samples, it is also hard to dispute that the title offers good value for money. If you like your hip-hop samples both melodic and on a strict budget, then *The Mixtape Toolkit* provides a decent starting point. *John Walden*

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Big Fish Audio Big Beat 2 Multi-format

As the 'Nu School Breaks' subtitle suggests, this collection concentrates on drum-heavy, breakbeat-oriented dance styles, and provides plenty of raw material recorded at 24-bit, 44.1kHz resolution: 115 drum loops (115-143bpm), 25 complete construction kits (110-128bpm), and 31 extra synth loops (120-130bpm).

The construction kits all plough essentially the same stylistic furrow. Fat, pounding hip-hop-flavoured drum beats dominate the mixes, while various analogue synths provide burbling basses, rasping leads, and miscellaneous pings and flourishes. Occasional vocal sound bites and turntable scratches are thrown in for good measure, and the whole mixture bounces along very cheerfully.

The beats, of course, are absolutely essential to a library of this kind, and producer Matt Bushbacher demonstrates a thorough understanding of the genre's demands. His drum sounds tend to be dirty, lo-fi, compressed, and EQ'd, and generally pushed as far upfront as possible — which is exactly as it should be! The programming has a bit of swing and funk about it, the patterns aren't fussy or overly complicated, and the overall effect is very convincing. The extra drum loops maintain the same high standards as those in the construction kits, and will doubtless prove useful.

The synth sounds, which are the backbone of many of the construction kits, are also very attractive. The bass and lead lines are nicely melodic, with plenty of filter sweeping and burbling going on. So much so, in fact, that I did occasionally begin to get a little tired of it! A few guitar and organ sounds turn up in some of the arrangements, and it might have been nice if there had been a few more. As it is, some of the kits can seem a bit over-reliant on the same rather similar synth sounds. They're nice enough for the most part, though, so it isn't too much of a problem.

This one minor quibble aside, I have to say that *Big Beat 2* is a solid and well-produced library, which fulfils its remit quite respectably. It provides fat, funky, danceable rhythms, with lots of pleasing hooks to grab the ear. It avoids sounding too 'clean' or 'polite', and exhibits plenty of life and character. The collection remains faithful to its chosen genre, and doesn't spring too many surprises, which is a strength rather than a weakness in a collection of this type, and it succeeds in providing loads of usable material of just the right kind. If big beats are what you're looking for, you can feel confident of finding them here. *Paul Sellars*

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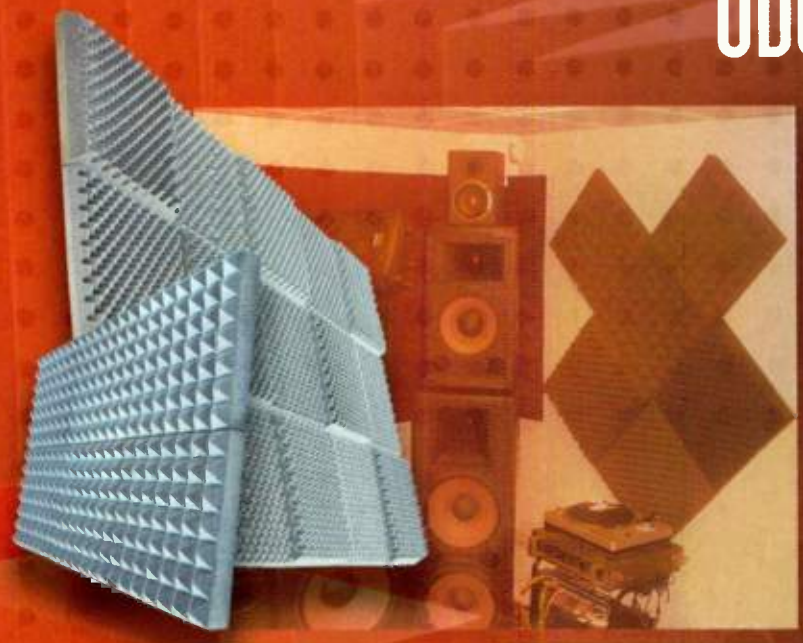

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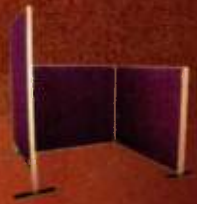

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Processing For Mastering

Paul White

More tips on mastering your tracks this month, specifically for those musicians who find themselves limited to using *Logic*'s own bundled plug-ins.

Last month, I had a look at how I approach mastering tasks in *Logic*. However, I used a number of third-party plug-ins which musicians on a budget may not have access to, so this month I wanted to pass on some advice for those trying to master their own tracks using *Logic* alone.

Mastering Using *Logic*'s Bundled Plug-ins

If I had to do a mastering job using only *Logic*'s own plug-ins, I'd set up a three-band *Multipressor* to handle the overall compression, and team this with *Logic*'s *Channel EQ*, though I'd also try the *Linear Phase Equaliser* to see which gives the best results on a specific mix. Normally I'll set my *Multipressor* crossover frequencies to around 120Hz and 5kHz so that the vital mid-band isn't split. By balancing the levels of the three bands, you can also control the bass and treble regions of the mix quite effectively. As with all mastering jobs, I tend to start out with very low compression ratios (1.2:1 or thereabouts) and then use a low threshold (which typically ends up between around -30dBFS and -40dBFS) to get just a little gain reduction happening. Any more than a few decibels (3-6dB maximum) in mastering is usually excessive, though some styles of music can accept more squashing than others.

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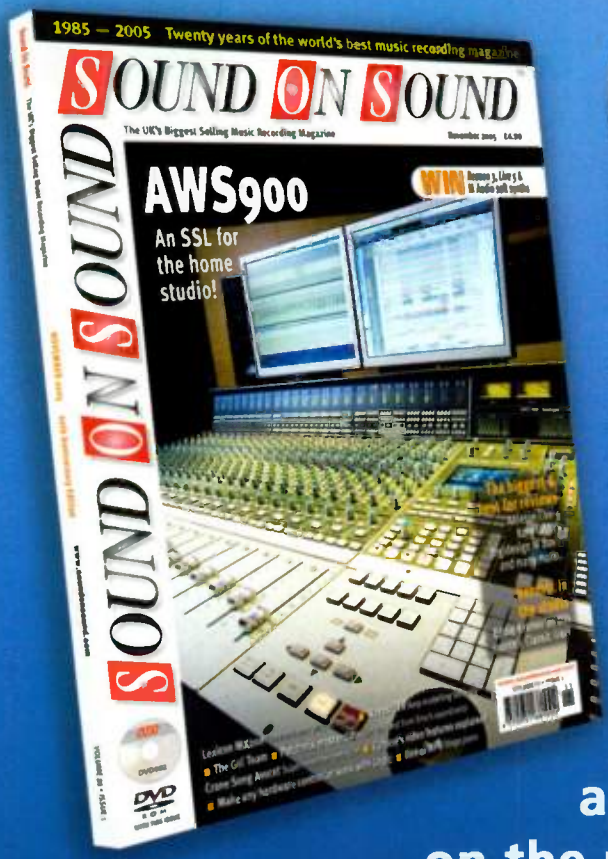

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without you needing to add gain elsewhere in the chain. One process that I haven't been able to replicate in *Logic* is the multi-band tube-distortion emulation included in my Drawmer DC2476 mastering processor. This is really handy if you have track where the bass end just doesn't seem dense or warm enough, for example. You can add 2-5dB of tube drive to really pump it up without messing up the mid-range or the high end. Similarly, if you have a track where the high end is weak, you can add tube drive just to the top band to spice up the harmonics and add density. You can also increase the compression ratio of the high band slightly. I rarely need to add tube drive to the mid-band, but there are occasions where it works.

Getting back to *Logic* and its plug-ins, *Match EQ* can be useful for fine-tuning one mix to make it sound more like another, but even if you decide not to use it, the 'difference' curve that it calculates based on the source and destination material can give you useful clues as to where you may need to apply EQ. In my experience, *Match EQ* is seldom entirely successful if you just apply 100 percent of what it comes up with, but if you adjust the curve manually, change the smoothing settings, and adjust the amount of correction applied, it can be extremely useful. As with any mastering task, your ears must be allowed to have the final say — don't let flashy graphics and frequency curves convince you that something must be right if it still doesn't sound right to you.

There are reports of *Logic* becoming unstable on new Mac G5 Quad machines.

For final limiting, though, I find the Powercore *Brickwall* plug-in particularly good, though I've also used the Waves *L1* and *L2* plug-ins on numerous occasions and always found them extremely effective. Whatever limiter I use, I try to set it so that it only limits the loudest signal peaks by a few decibels — if your final audio file looks like a freshly mown lawn side-on, you've probably overdone it, though some commercial mixes have gone out in this state. Limiting comes at the end of the track processing chain, but you still need to mix your final work to 24-bit files rather than 16-bit, as there may be further small gain adjustments to be made at the playlist stage, and dithering down to 16-bit resolution has to be undertaken as the very last process before burning your master disc.

Burning Your Master CD

I like burning CDs from Roxio *Jam*, because it can dither for you, so you just assemble a playlist comprising 24-bit, 44.1kHz files and it does the rest. Within *Jam* I audition the transitions between songs and look for a subjective similarity in loudness. Don't trust the meters or assume that all normalised tracks will sound the same volume, because they won't. My technique is to pretend that I'm listening to a band on stage and then to adjust the relative levels where necessary so that the performers don't seem to get closer or further away between tracks. Although Jam can turn levels up as well as down, you'll almost certainly have processed your individual tracks to peak very close to 0dB, so it's best not to increase the gain for risk of going into clipping. Track gaps or crossfades have to be created by trial and error, as the subjectively correct gap length depends on how different the songs are, how quickly or slowly the last track fades to silence and whether the new track creeps in or comes in with a bang. SOS

Logic News

Reports have been trickling in from the few lucky *Logic* users who have purchased Apple's new Quad G5 Power Macs. Everything seems to be working smoothly — unless of course you have a PCI-based audio card, in which case you'll be kicking yourself because the new Macs come with PCI Express slots, which are totally incompatible with PCI. One area of concern is that several users aren't getting the *Logic* performance they may have expected from a computer which is, effectively, a four-processor Macintosh. Several people have reported that *Logic* is throwing up Out Of CPU Power error messages when the Mac OS X Activity Monitor is showing plenty of CPU overhead. Using the old 'stop then start *Logic*' trick, which spreads CPU load evenly over the two processors in dual-processor Macs, seems to work with the quads as well.

This problem is all the fault of *Logic*'s primitive CPU monitor. Mac OS X itself spreads the processing load evenly for all programs, but *Logic*'s CPU monitor seems to live in a world of it's own. Once one of the CPU monitor bars hits the red *Logic* complains that it has run out of processing power, instead of off-loading the extra processes onto the next CPU. This behaviour is a left-over from dual-processor G4's running Mac OS 9, when *Logic* itself controlled processor load by using one CPU for audio and the other for everything else, and it really needs to be updated very soon. The fact that *Logic*'s CPU monitor only shows two CPU usage bars on a quad-processor Power Mac doesn't inspire confidence that *Logic* is aware of the extra processing power available on the new computers. I assume Apple are working hard on a new version of *Logic* that can take better advantage of the new Mac's power.

Logic also has some memory-usage limitations, so loading your new G5 Quad with 16GB RAM may not provide the performance boost you were hoping for. *Logic* itself can apparently use up to 4GB of RAM — but that includes some RAM for sample libraries as well as for the plug-ins and core software. This figure has been disputed — some people will tell you that *Logic* can only use 2GB Ram, but I've been able to get the software to use over 3GB on my G5. Hopefully this will change in the future if and when *Logic* becomes a true 64-bit application. Of course, extra RAM will allow you to run all those extra programs alongside *Logic* without impacting on the sequencer's performance, so it's still a good idea to get as much RAM as you can afford.

Finally, there have been some reported problems with *Logic* and the latest Mac OS v10.4.3 update. These include MIDI and audio not working anymore and *Logic* crashing on booting, although I've not had any problems personally. Each OS update is a shot in the dark for *Logic* users and I'd advise caution whenever a new update is announced. It's always a good idea to have the latest OS revisions and Security updates, but these can have subtle and unpredictable effects on complex combinations of hardware and software. My advice is to back up your whole hard drive before updating and keep an eye on the various *Logic* forums before jumping in with any OS updates. *Stephen Bennett*

Have Your Say!

If you want to suggest changes or improvements to *Logic*, then here's your chance! The Apple development team are inviting *SOS* readers to send in their suggestions of what they'd most like added or changed in *Logic*. Email your top five suggestions (in order of preference) to logicnotes@soundonsound.com, and we'll forward your lists on to the *Logic* team. We'll be asking them for feedback on which changes users deem most important and how these might be addressed.

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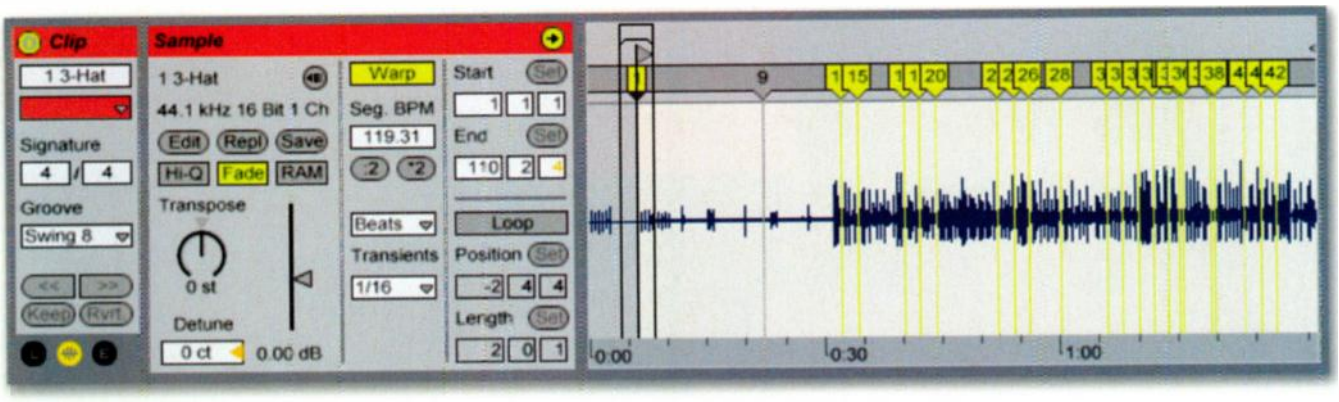


The yellow Warp Markers, once moved, stay locked in position. The grey ones move automatically in relation to the Markers that are being moved by the programmer.

Ingo Vauk

Recording & Remixing

In Ableton *Live*

In part two of our recording and remixing article we examine how you can use *Live*'s unique features to prepare a recording for remixing.

In the last two *Live* workshops we've looked at how to create an arrangement from the Session View and explored how you can use *Live* as a more conventional DAW. This month we're going to take things full circle by taking a 'normal' recording and getting it remix-ready.

Based on the recording that was the subject of last month's *Live* workshop, the following methods show how to tighten up (quantise) a recording and use the resulting Clips as the source material for re-arrangement and additional sequencing, as you would for a remix.

Here's What You Need To Do...

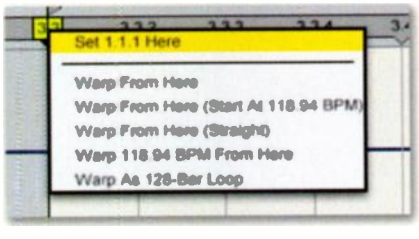
Live has a very useful feature that allows entire multitrack recordings to be re-quantised with the minimum of fuss. Basically the trick lies in the fact that it is possible to superimpose Warp Markers from one audio Clip on another. For this to work all of your audio files need to be *exactly* the same length, so before you begin it's necessary to prepare the files you're going to use accordingly.

The best way to do this is to use the Consolidate function to create new Clips from each of the required audio tracks. It can also be useful for combining all the different Clips and/or drop-ins that make up each track into single Clips, which will make the whole process simpler.

Start by highlighting all of the tracks you want to use in the Track Display window and then use the Consolidate function found in the Edit menu (or Apple/Control+J). The resulting Consolidated Clips will be placed in your *Live* Set's Sounds folder. Obviously it only makes sense to use this feature if all the tracks to be re-quantised come from the same performance or have at least been recorded to the same basic timing reference.

The idea behind a 'Warp template' is that you can set the Warp Markers for one Clip and have the all the other Clips follow those Markers — thus ensuring that the whole recording will stay together and perfectly in time with itself. This technique is also very useful for avoiding phase problems that might occur if there's any spill between tracks on a live recording.

For my own track I have taken the hi-hat track from the recording I created for last month's article as the 'reference track' to work from. The hi-hat track seemed the most suitable because it had spill from every drum in the kit and it was therefore easy to see the waveform and set the Warp Markers appropriately.



You can define the first beat of the track using this option from the Context Menu. This is a quick way to tidy up the beginning of a recording and set the initial beat that the timing of the track will be based on.

And Here's How You Do It

Although the following can be done in the Arrangement View I find it easier to work in the Session View. The first thing to do is to insert the Consolidated 'reference track' (hi-hat in my case) into a Clip Slot in a new *Live* Set by dragging it from the browser. Open the Clip and Sample Displays by double clicking on the Clip. Using the Zooming Hot Spot underneath the Clip Display (a magnifying glass appears when you scroll over this area with the mouse) you can quickly locate and zoom into the first downbeat of the track. Enable Warping (I'll use the Beat Mode in this case as it's a percussion track) in the Sample Display window to the left of the waveform and you will see some grey Warp Markers appear. Double-click on the one closest to the downbeat (it will turn yellow) and drag it as close to the beginning of the transient waveform as you can get. Using the Context Menu (right-click on a PC or Control-click on ▶

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Here the same Clip was copied into all the relevant Clip Slots. If you now drag other audio files of the same length into the sample display of each Clip View the Warp Markers (and all other Clip information) will be retained and applied to the new audio.

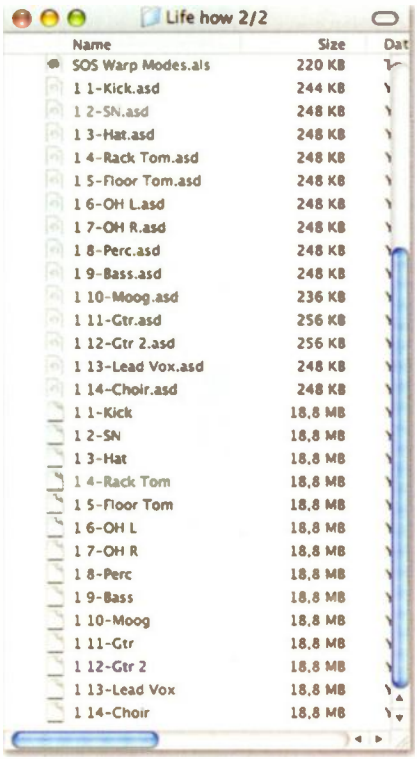
Live will only allow you to use a set of Warp Markers on a different Clip if the files are *exactly* the same size. This makes sense because the assumption is that you would only want to do this on tracks that were recorded at the same tempo, thus being the same length. You can check this easily by comparing file sizes in your file browser.

a Mac) you can now Set 1.1.1 Here (see the screen at the bottom of the first page) to define the first downbeat of the track.

The next bit can be a little time-consuming, depending on how tight the original performance was — the aim is to set Warp Markers as close to the transients of the waveforms as possible for the length of the performance, but don't worry because, given the 'Warp template', you'll only have to do this for one track.

Before you begin it is best to set the Global tempo as close to the tempo of the original track as possible. Obviously if you recorded the track yourself you will know the original tempo, but otherwise (if you've been given someone else's track to remix for example) you can do this by listening to a section of the track and tapping the Tap Tempo button in the top left corner of the screen (this can also be assigned to a MIDI or Key Command using Apple/Control+M or K respectively). The Global tempo (and therefore Warping) will adjust to this tempo and this should be accurate enough to work with. Using the commands in the Context Menu to Auto Warp to the right of the downbeat as described above, you can get a pretty good approximation of what you need. I find that the Auto Warp algorithm is usually pretty good and that you only need to adjust the occasional Marker.

Now you need to go through the Clip and move any Warp Markers that aren't precise enough for you.



To adjust Markers double-click them and drag them to the correct location.

It's important to note that only markers that are yellow retain their position (are locked) when the Markers around them are moved, grey markers will only move in relation to the yellow markers as they (the yellow Markers) are moved, and remain equidistant to one another, creating an average tempo.

You can check the timing by listening to your metronome or click track together with the corrected Audio Clip. Once you have finished going through the track and are happy with the results, the main bit of work is done.

You are now ready to copy your 'Warp template' to all the other tracks you wish to treat. Copy and Paste the reference Clip into the Clip Slots of all the other tracks in the same Scene (the horizontal row of Slots), as shown in the screen at the top of the page.

Now double-click on the first Clip and then drag the audio file that you want to place in this track (any of the Consolidated tracks you created earlier — eg. Kick Drum) from the browser into the Clip Display (the

Warp Modes & Grain Sizes

When you double-click on a Clip in either the Arrangement or Session Views you will see a waveform display on the bottom right of the screen that Ableton call the Clip View. To the left of it there is the Sample View window, and it is here that you set the method of time-stretching (Warping) you want to apply to the audio.

There are five different modes to choose from: Beats, Tones, Texture, Re-pitch and Complex.

Beats and Re-pitch are fairly self-explanatory, but it is worth spending some time experimenting with these modes to find what best suits the audio in question.

In Beats it is important to set the Transients to the highest possible value, since this parameter can introduce unwanted rhythmic side effects if it is set to a smaller subdivision than the material requires. If there are no hits on even 16th values, set it to 8ths, if there are none on even 8th values set it to quarters.

Tones is best used on simple, possibly monophonic audio with a clear pitch structure — vocals and most acoustic instruments. Texture lends itself to more complex, rich and layered sounds.

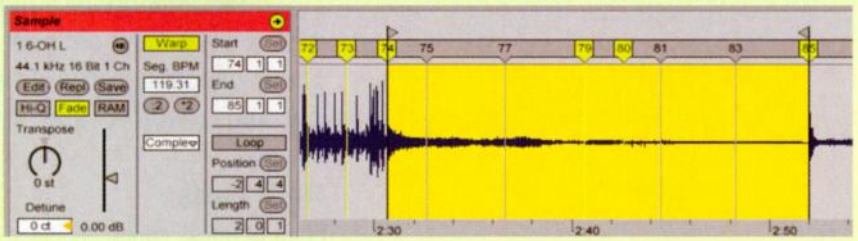
The grain size in the Tones and Texture modes determines the size of the 'chunks' that are created to stretch the audio — similar to Stretch Cycles in Akai samplers or Granulation in Native Instruments' terminology. You need to play with these parameters to get a feel for what they do, but in general terms the audio sounds a little less effected by bigger values, with the trade-off being that you sometimes get audible loops for values that are set too high.

Complex mode was designed to be used for composite (ie. mixed-down) material, it generally works best on audio that only needs gentle treatment. Beware though, since this mode can put some serious load onto the CPU.

Sometimes it can be useful to alternate between modes even within the same take.

For example, in the recording this article is based on there is a middle-eight section in which the drummer plays atmospheric cymbal swells, and the Beat Warp mode, which works very well for the main part of the track was introducing unwanted artifacts. This problem was solved by isolating the section into another clip, (select a section and use the Edit menu's Split command) and applying the Complex mode.

It is always worth keeping in mind that it might not be necessary to Warp at all, and not using Warp will always result in better audio quality, not to mention being kinder to the CPU.



For this more atmospheric section in the drum track the Complex Warp mode worked much better than the Beat mode used for the rest of the recording.

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▶ waveform display in the bottom right-hand corner of the screen) of the selected Clip. This will replace the sample but retain the Warp Markers from the template Clip. Rename the resulting clip to correspond to the sound. Repeat this procedure for all tracks, and when you trigger the whole Scene the entire multitrack recording will play back in time with the metronome.

In order to recreate the original arrangement of the track you can record these Clips back into the Arrangement View. In the Session View, press Global Record and trigger the Scene that contains the corrected audio Clips. This will record the corrected tracks into the Arrangement View — you can stop before the end of the track and drag the right corners of the Clips in the Arrangement view to the end. Now you should be looking at something very similar to your initial recording — the important difference being that it is now quantised, and you can change the tempo and generally muck about with it.

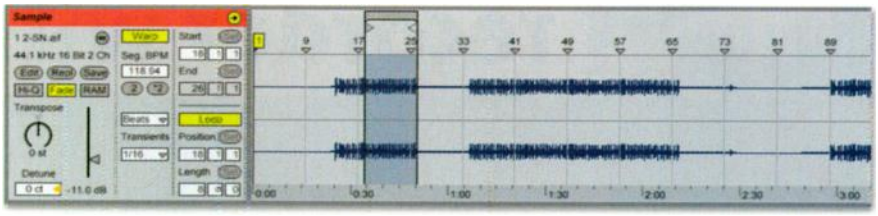
You may find that all the Warping is too much for your CPU to handle, in which case it is sensible to Consolidate all the tracks at the desired tempo. Before you do that though, make sure that your Warp settings (see the 'Warp Modes & Grain Sizes' box) are properly set up to achieve the best sonic results possible. It's also a good idea to save the Set under a new name before Consolidating, as the resulting files will then end up in their own folder.

Once this is done you will have a collection of files that are all quantised to the same tempo and are therefore easy for the software to play back, since there is now no need for time-warping.

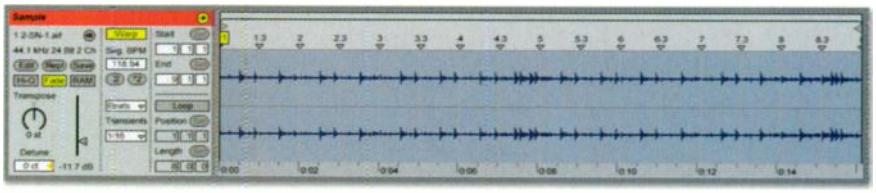
Cut It To Pieces

If you want to rearrange the arrangement, you can do this by copying and pasting within the Arrangement View, much as you would in any other DAW. Of course it's also possible to add loops or other audio files from your collection in this mode, and if you're essentially just developing the arrangement you started with, this might be the way to go. However, for remix purposes you'll get the most out of *Live* if you chop the material and prepare it for use in the Session View. To do this you can make use of the fact that it is possible to copy a Clip between the two modes — the Session and Arrangement Views.

Using the Arrangement View as the source of audio to select from and the Session View to collect snippets to be triggered and treated, you can quickly build up a totally different loop palette and arrangement. When you've started sequencing new material and combining it with other material from your library in the Session View you can always flip back to the Arrangement View to 'harvest' another sound bite from the original.



Here all of the drum tracks were selected and separated into individual Clips using the Edit menu's Split function. You can see the Start and End Markers of the Clip as flagged by the Software. The Loop had to be set manually, using the graphic Loop Braces in the Sample Display.



The same section of audio as before, Consolidated into a new Clip.

To create a new Clip from an audio file, you need to set the Start Markers to the beat you want the Clip to trigger on. Although it is possible to do this within the Clip View window it is often easier to select the part in Arrangement View and use the Split command from the Edit menu (Apple/Control+E). As shown in the screen at the top of this page, the resulting Clip will have the Start Marker set to the beginning of the Clip, regardless of its position within the track. In order to make it loop you'll need to set the Loop Start and Length markers at the bottom of the Clip View window.

To get the Clip into the Session View, all you need to do is Copy and Paste it into the desired Clip Slot. And if you apply the same method described above you can use the settings of one Clip across the whole multitrack recording.

A much faster way to separate out loops is to Consolidate the audio of the Split tracks in the selected area (as shown in the screen above), which can be done simultaneously for multiple tracks. You can then copy a selection of Clips across to Session View in one go. This has the advantage that *Live* writes new, smaller files onto the disk and these are easier to handle than lots of Clips all using the same audio file as a source. If you like working with smaller loops, this is the way to go. For long sections it is more economical just to use the Clips straight from the original audio file and adjust the Start and End Points, since Consolidation takes longer and uses up more disk space.

Once you have collected and created enough material in Session View, you are in a position to quickly create a variety of arrangements, as we described in our first *Live* column a couple of months ago — and that takes the whole process full circle! SOS

Clip Around The Ears

One of the more unusual concepts within *Live* is that of the Audio Clip. At first glance it is easy to mistake it for a strangely named standard audio file — in fact the concept of the Audio Clip is at the centre of Ableton's software design.

As in the famous painting by René Magritte (this is not an audio file, this is a picture of an audio file) a Clip is one representation of an audio file within a *Live* Set. Think of it as a container that holds the address of a sample, but only refers to it by reading it from the disk drive. *Live* treats all audio files as 'read only' files — all the manipulation of the audio is done in a non-destructive way, and the same sample can be the basis of a multitude of Clips that all sound completely different. Quantisation, tuning and any envelope-controlled manipulation of the data such as sample offsets are done purely by the CPU in software.

Let's take the example of the Sample Offset Envelope. The individual hits of a loop are being played back in a different order to the original audio file without that original file being physically cut into component parts. Neither is a new file of the re-arranged playback order being written to disk. *Live* just reads the data in the order determined by the envelope. By using the same file with a different envelope you can achieve completely different results. The data that manipulates the audio is separate from the audio itself, so you can replace the audio of a Clip without touching any of the other Clip data.
As we have seen in the main text, this can be very useful when you are dealing with multiple tracks of the same sound source or timing, as you only have to perform certain 'edits' (setting the Warp Markers for example) once. In this *Live* behaves much like a sampler, with the difference being that the data is being streamed straight from a disk rather than sitting in the RAM.

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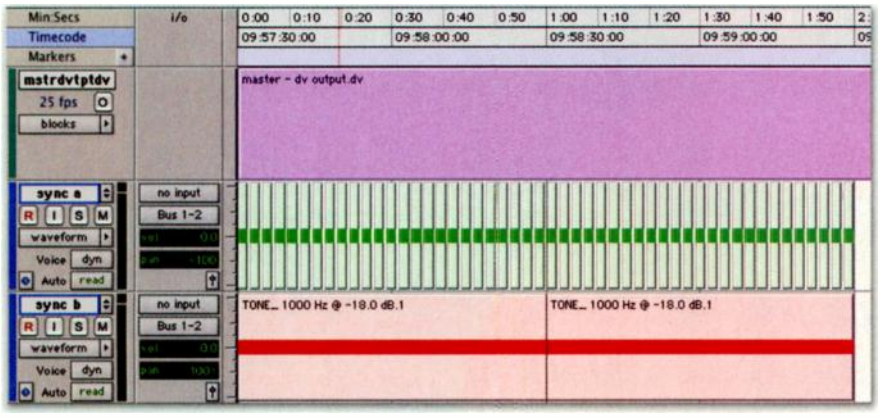
Working In *Pro Tools* With Video

You've got your system set up, and you've received the video files from the director. This month we explain how to get the video and its associated sound files into a *Pro Tools* Session ready for you to start work.

Mike Thornton

Last month, I explained the choices you need to make when setting up a Pro Tools system to work with video. Following on from that, we are going to look in detail at how you get your audio from a video editing package such as *Avid Express* or *Final Cut Pro* into *Pro Tools*, using Digitranslator for TDM systems and the DV Toolkit for LE systems.



It's often useful to set the Session Start earlier than the start of the video file, in order to leave room for line-up tones and so on.

Digitranslator is a software add-on for *Pro Tools* that enables it to open OMF, AAF and MXF audio files, video files and sequences. With the Digitranslator v2.0 option, *Pro Tools* supports the import and export of OMF media files and sequences as well as AAF sequences directly into *Pro Tools* 6.x Sessions without launching a separate application. From v6.9 *Pro Tools* supports import of MXF video, as well as import and export of MXF audio. Finally, with *Pro Tools* 7.0 and higher, you can import or export AAF files with embedded audio. If all these different standards are confusing you, take a look at the box on the next page.

DV Toolkit is a post-production bundle for *Pro Tools LE* 6.1 and higher, which enables various features otherwise only available on TDM systems, so providing you with the opportunity to 'work to picture' using a very cost-effective LE-based system. Firstly it enables the Time Code functions, including the Time Code ruler, and so enables you to edit to picture with time code accuracy and convenience. It also includes Digitranslator 2.0, as described above, which handles the OMF, AAF or MXF exchanges. Included in the bundle are Synchro Arts' *Vocalign Project*, which enables you to sync up replacement dialogue very accurately, and Digidesign's *DINR* Audiosuite plug-in to help with de-noising any dodgy audio that might come along your way. This is nice, though it has to be said that *DINR* is getting very long in the tooth these days and can't really compete with the likes of Waves' and Sony Oxford's restoration bundles.

You Put Your OMF In...

Having looked at the tools available to you, let's go through the process of getting an OMF into *Pro Tools* in more detail. Always remember that most problems with OMF imports stem from OMF creation problems on the video editing system. It is very important to co-ordinate in advance with the video editor to make sure they create the correct format of OMF file. (See the 'Links' box on the last page for details of some help guides available on-line.)

To recap from last month, you should always try to get an embedded OMF, which will provide you with all the audio files and edit information in one large file. The only other file you will need is the video — which, in a nutshell, can be in any format you like as ▶

Book Review: *Pro Tools For Video, Film & Multimedia*

Ashley Shepherd has written a very accessible guide to working with *Pro Tools* in video, film and multimedia (ISBN: 1-59200-069-X). He begins by outlining the history of the technology used, going right back to the start of the 'talkies' and Disney's *Fantasia*, which was way ahead of its time in both artistic and technical innovation. He then goes on to outline an overview of the possible workflows and equipment in use today.

The third chapter deals solely with the sticky topic of time code in all its different forms, before we see how to get started with *Pro Tools* and video. This covers machine control as well as working with video files, including the process of capturing your own using either iMovie or *FCP*. Chapter five looks in detail at the actual workflow of 'recording to picture' including much more detail on how to deal with OMFs and associated problems, recording foley sounds and the use of sound effect libraries.

The next chapter shows how to edit and manipulate the audio to picture within *Pro Tools*, and will probably be the most familiar section of the book to anyone who is already a competent *Pro Tools* operator. After that, Shepherd examines some of the processing techniques commonly used in sound for picture, including the use of Synchro Arts' *Vocalign* plug-in to help sync up replacement dialogue, before moving on to the mixing stage of the workflow. This section includes material on setting up stem mixes, the different surround formats in use, the use of 'pre-mixes' and the different control surfaces available. Finally, he explains how to deliver the mixed masters back to the client, covering line-up tones, tape formats and Dolby encoding.

All in all, this is a definite must for anyone working in this area. Ashley Shepherd has managed to combine comprehensive overviews of each phase in the workflow with detailed *Pro Tools*-specific techniques and tips.

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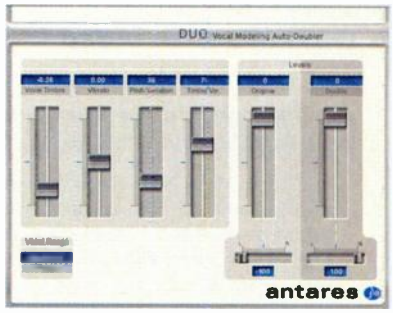

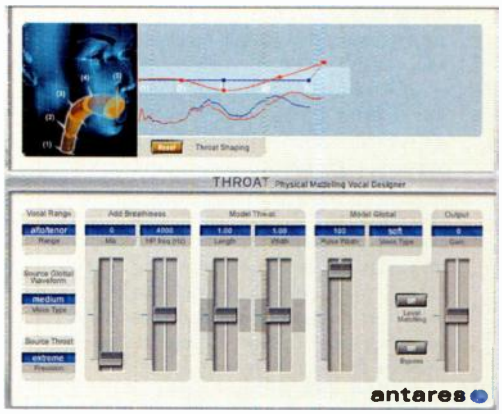

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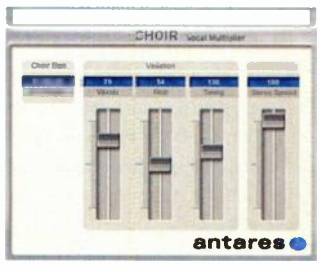

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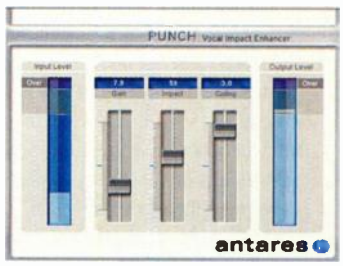

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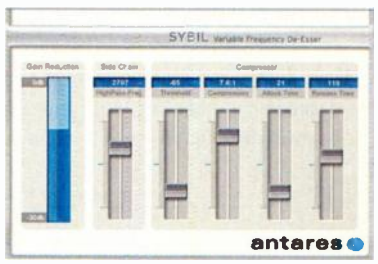

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How Many Standards Do We Need?

Avid's Open Media Framework (OMF) was the first 'transfer file format' to come into widespread use, but two new standards, Advanced Authoring Format (AAF) and Media Exchange Format (MXF), have evolved to resolve the various interchange limitations. They are robust enough to contain all the information that any sequence contains and are extensible, meaning that new features can be added later.

OMF has become a 'standard' because Avid, who designed it, have a hold on the video-editing market and not because it came from a recognised standards organisation. However, there have been a number of obstacles to it becoming a universal standard. First, it has a history of instability, and second — partly as a result of this — Avid changed the format with the introduction of OMF2, which is actually different enough from OMF1 to be considered a completely separate format. Finally, not all third-party companies wanted to support a standard with proprietary origins.

To be fair, Avid made serious attempts at moving OMF into the public domain through both the SMPTE and AES standards bodies. Unfortunately, the attempt foundered for several reasons, the main one being that OMF uses an underlying technology called Bento, which is a 'container' format for recording data on disk. Although it is freely licensed to OMF developers, Bento was developed by and is owned by Apple, and for SMPTE or AES to standardise something, all proprietary issues, including patents and copyrights, must be formally waived, which Apple refused to do.

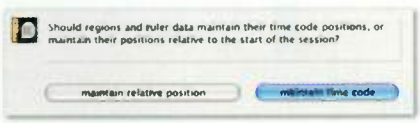
From the start, both the AAF and MXF formats were designed to avoid the limitations OMF came with. To speed this along and to gain some independence, an organisation was created called the AAF Association. AAF was initiated by Avid and Microsoft, who have since been joined by many other important companies and organisations. Avid and Microsoft worked together to replace Bento with a new container format, and the resulting AAF design is derived from OMF and retains its power and flexibility while refining the details and adding significant capabilities. In a further step to aid take-up and improve independence, the AAF Association have made the software developer kits to support AAF 'open source', meaning that they can be freely copied and are available at Source Forge.

Meanwhile, in true 'standards form' (why have one standard when you can have three or four?) another effort was under way. Industries beyond the professional production business, such as telecoms, Internet and computer companies, now require a universal way to transport video and audio media around. The Pro-MPEG Forum (another consortium) was formed to take up this challenge, and, in co-ordination with the European Broadcast Union and SMPTE, helped create MXF.

Even though the standardisation process is not complete, more and more companies are supporting both the AFF and MXF formats in their software. Together, AAF and MXF offer the prospect of data interchange between picture, audio and effects systems and thus the ability to cut a sequence on a picture system, hand it intact to sound, move it to the mixing stage, and finally load it back into the picture system with everything visible and audible everywhere. Through Digitranslator 2, *Pro Tools* supports them both as well as OMF2s.

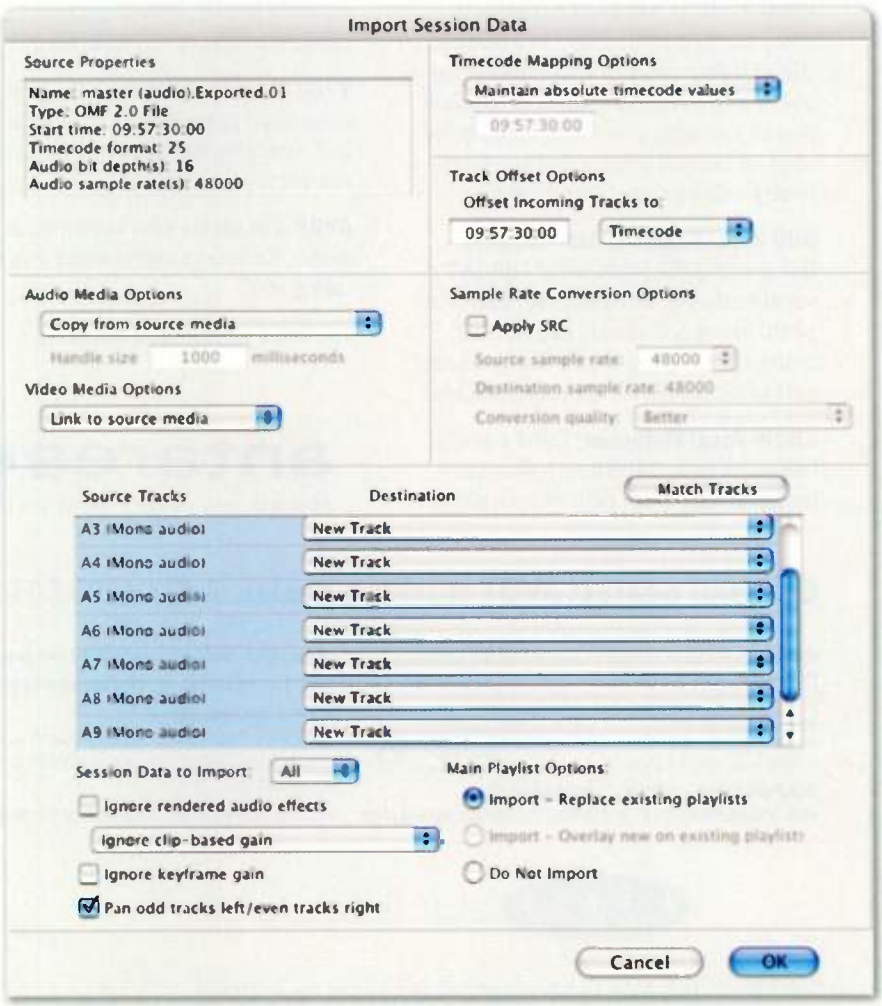
long as it is a Quicktime movie and preferably a DV movie. It is very helpful if this includes 'burnt in' time code so you have a continual visual read out of the time code on the video screen.

First, import the video, following the instructions described last month. Remember that *Pro Tools* will always put the video file at the start of the session. Your Session will now contain a Video track and a Movie. Go to the start of the Session and view the first frame of the video. Look at the burnt-in time code and set the Session Start Time in the Session Setup window to the same time code value as the first frame. Alternatively, you can set the Session start time to a value before the video start time to leave space for line-up tones and the like. To do this, Change the Session Start time in the Session Setup window to the desired time; when you hit Enter, a dialogue box will come up. We need to make sure the



video stays at the correct time code position so select Maintain Time Code and you will see that the Session now starts earlier but the video has remained at the correct time code.

We can now import the OMF into this Session to bring in all the audio that has been laid up by the video editor. To do this you must have Digitranslator 2 installed and authorised on your machine. Select Import Session Data in the File Menu of *Pro Tools* and the usual navigation window will open. Select the appropriate OMF file, click on the Open button, and a variation of the normal Import Session Data window will open, showing a list of the audio tracks as they were in the video editing package. Leave all the tracks set to



The Import Session Data dialogue contains numerous parameters which will help you to ensure that data from the video editor is translated in a useful way in *Pro Tools*.

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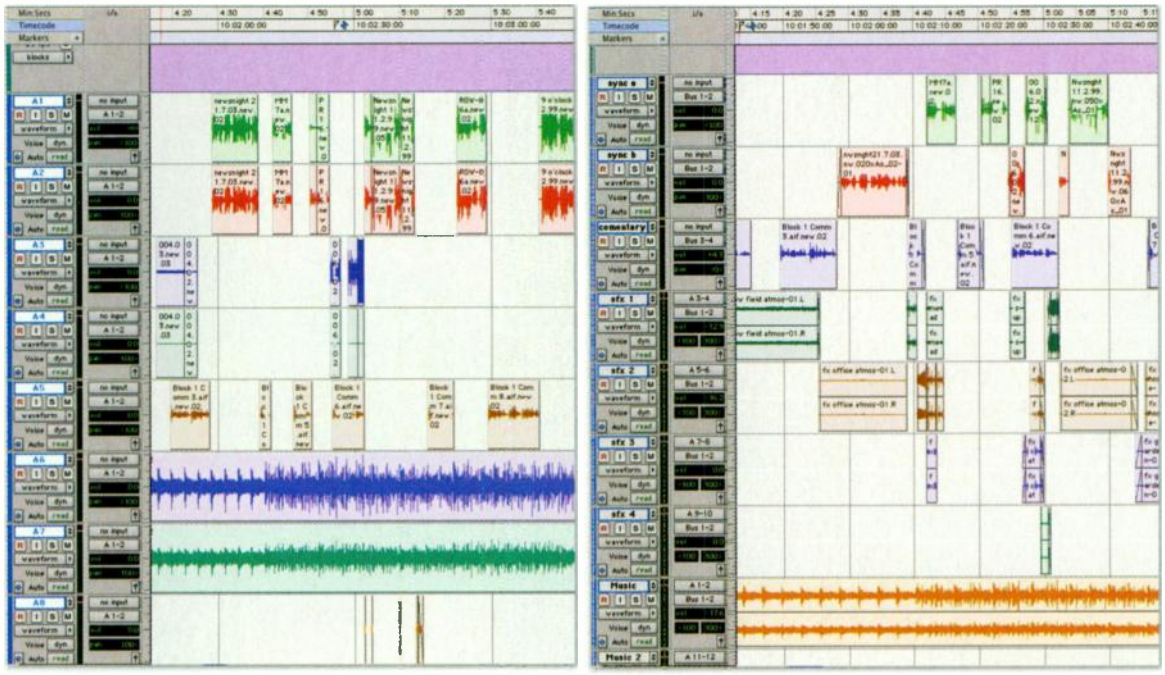

When you import an OMF into *Pro Tools*, stereo parts will be split across two mono tracks, and the order of the tracks might not be very helpful (far left). The first stage in working with such a project is usually to reorganise and rename the tracks to make it easier to see what's going on (left).

▶ New Track, but before you click the OK button you need to look at some of the tick boxes and pull-down menus.

Take a look at the bottom left-hand corner (see screen on previous page). For instance, I tend to change the pull-down menu from 'Ignore clip-based gain' to 'Convert clip-based gain to automation'. I also untick the 'Pan odd tracks left/even tracks right' box as I find these defaults are more often wrong than right, and anyway I tend to rearrange things on to different tracks very soon after importing the OMF into my Session.

Then take a look at the left-hand middle section. I prefer to set the upper pull-down menu to 'Copy from source media' so that *Pro Tools* creates new audio files in the Session's audio files folder. This way, the Session doesn't remain dependent on the embedded OMF file, which may get lost if the Session is moved around to different drives and/or systems later on in the work flow. On this occasion you can ignore the Video pull-down menu, as embedded video files in OMFs are not supported by *Pro Tools* and anyway you already have your video file on its track in the *Pro Tools* Session.

Finally, you can click OK. *Pro Tools* will start copying the audio files across and they will appear on the Edit window as each one is done.

Getting Going

Now you can start work. One the first things I do is to reorganise the track allocations making new stereo tracks where appropriate. This is necessary as, like older versions of *Pro Tools*, neither *FCP* nor *Avid* supports stereo tracks, so all stereo material will have been split across two tracks by the video editor. I move all stereo material across to stereo tracks and reorganise the other material on to tracks that suit my way of working. Then I can start work on the material. We will look at the following stages in next month's article.

Video On The Cheap

If you don't have Digitranslator or a TDM system, it is still possible to do some work to video in *Pro Tools*. Here's how...

In your video editing package, create a copy of the finished sequence. Then you will need to consolidate each of the audio tracks so that all the material on each track is bounced into a single file, with each file starting at the beginning of the sequence — even if that includes silence — so you can line them all up again when you get them into *Pro Tools*. Then export the audio from each track and the finished video, making sure that you have a version of the video with 'burnt in' time code (a time code reader is one of the video effects in *Avid* or *FCP*). This will make working in *Pro Tools* without a time code ruler much easier. Remember to make sure the video file is a Quicktime movie and don't use the Avid codec as *Pro Tools* doesn't support it — go for a Quicktime DV movie file.

In *Pro Tools* (LE or TDM), create a new Session and remember to set the sample rate at 48kHz. Then import the Quicktime movie with the 'burnt in' time code onto a video track. Next, import all the audio files into the Region List. I tend to use Import Audio from the Audio menu at the top of the Region List. Now highlight the video file and drag each of the audio files into the Edit window whilst holding down the Ctrl key. This constrains the audio file to line up with the start of the video file. Once you have dragged all the audio files into the Edit window you are ready to continue the audio production in *Pro Tools*.

Because you have 'burnt in' time code on the video file you have your very own equivalent of a time code timeline. Use the Mins and Secs timeline as a guide to general position of things on the timeline and then refer to the 'burnt in' time code on the Video window for more detailed positioning. SOS

Web Links

AAF Association
W www.aafassociation.org

AAF Software developer kits
W http://sourceforge.net/projects/aaf

Pro-MPEG Forum
W www.pro-mpeg.org

European Broadcast Union
W www.ebu.ch

SMPTE
W www.smpte.org

DV Toolkit
W www.digidesign.com/products/details.cfm?template=overview&product_id=3941

Digitranslator 2
W www.digidesign.com/products/details.cfm?product_id=1040

OMF export advice for Apple's *Final Cut Pro*
W www.kenstone.net/fcp_homepage/basic_export_using_omf_jordan.html

OMF export advice for *Avid*
W www.northbeachpost.com/audio_primer/omf_export_for_avid.html

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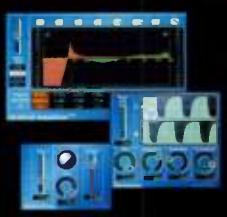

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Plug-in Power Tips

Effects & Processing Techniques

Many of today's most interesting and popular audio-processing techniques are achieved with plug-ins. This month, we look at how you'd go about recreating some of them in *Digital Performer*, and continue our coverage of more unusual plug-in features.

Robin Bigwood

Last month, I explained that many bundled and third-party plug-ins for *Digital Performer* have 'hidden' or less obvious features that can be used for creative audio treatments. Some effects, though, are best achieved in specific ways, sometimes using a combination of plug-ins and other *DP* features, and it's these that we'll be looking at this month, with step-by-step descriptions of how they're set up.

'Pumping' Compression

A compressor controls the dynamic range of your audio, making it easier to mix, creating a more full-blooded effect, or causing it to take on a different character. While some compressors are designed to be transparent, doing an important job without drawing attention to themselves, others are all about attitude and creating rather more obvious effects. One of these effects is 'pumping', where the dynamic gain-changes the compressor is responsible for cause decay portions of piano, bass and cymbals to apparently bulge and surge, while sustained parts, and even whole mixes, can take on a pulsing rhythmic energy independent of the underlying musical content. Two obvious examples are the drums in Radiohead's 'Idioteque' (from the album *Kid A*) and Portishead's track 'Pedestal' (from *Dummy*) — although an altogether less clever kind of compressor pumping is increasingly being heard on various mainstream dance tracks.

There are many ways to experiment with pumping in *Digital Performer*. Firstly, compressors can be set up on individual tracks (such as bass guitar, for example) to provide very obvious compression that becomes an integral part of the sound of the instrument. Second, for instruments (or submixes) that occupy a wider frequency range, such as drums or piano, a compressor can be set up so that its action is controlled (or 'keyed') by only one part of the instrument's frequency range. Some great effects can be produced in this way. Finally, you can apply compression to an instrument, or a whole mix, and have the pumping effect keyed by a separate audio track, which may or may not be audible in your mix. We'll look at all three techniques, as each one is useful in its own right.

Compressing Individual Tracks

Treating individual tracks with obvious 'pumping' compression is relatively straightforward, but the outcome depends almost as much on the actual compressor you're using as on the settings you dial in. The pumping effect is dependent on rather large gain changes being applied by the compressor, so to begin with you need to set Threshold somewhat low (so that compression kicks in 'early'), Ratio rather high (so that there's plenty of gain reduction), and Make-up or Output Gain high (so that you can actually hear your track again!). To achieve the ▶

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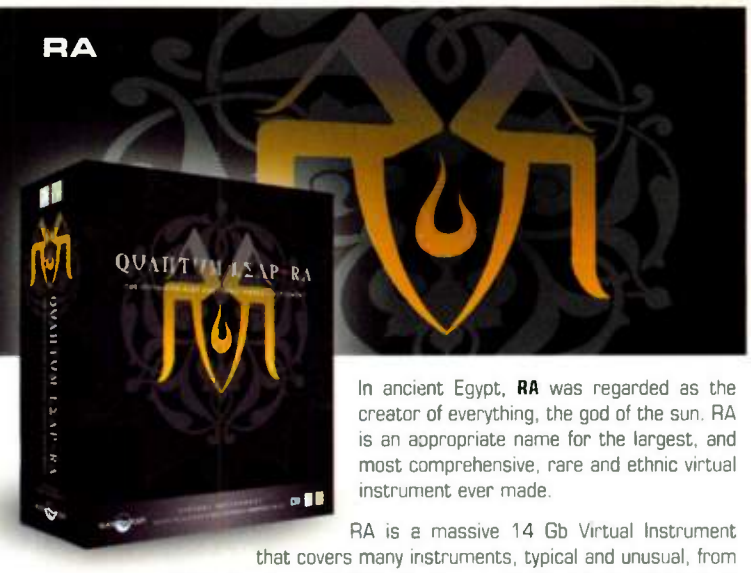
RA



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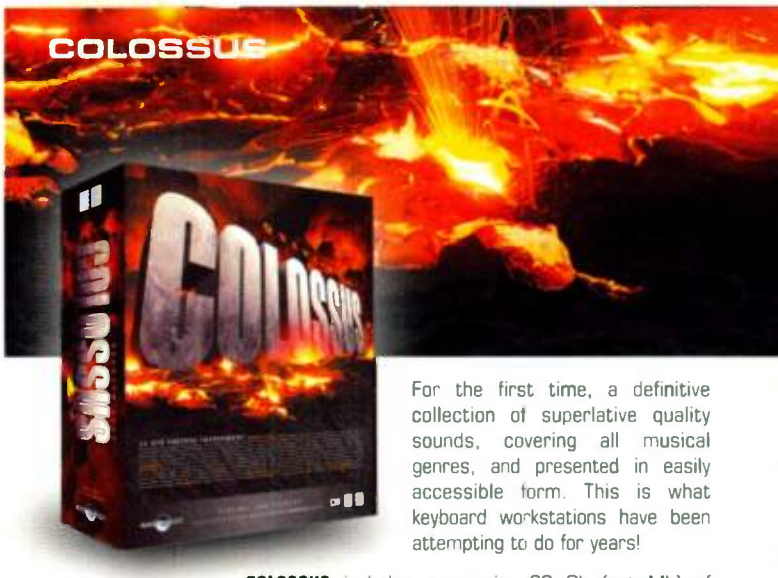
One thing is certain; there has never been a rare and ethnic collection produced that matches the quantity and quality contained in Quantum Leap RA. Includes special version of NATIVE INSTRUMENTS Kompakt sampler.

COLOSSUS



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Recorded in the same concert hall, with the same team of engineers and producers as the award-winning EastWest/Quantum Leap Symphonic Orchestra (see right), **Symphonic Choirs** features 5 choirs - Boys, Alto (female), Soprano (female), Basses (Male), Tenors (Male) plus solo singers, all recorded in position and chromatically sampled with multiple dynamics (non-vibrato, light-vibrato and heavy-vibrato).

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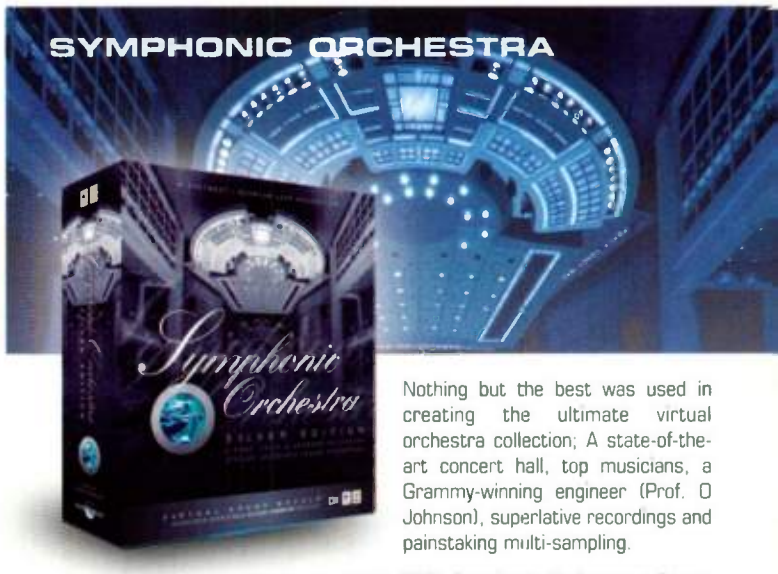
SYMPHONIC ORCHESTRA



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a narrow band-pass filter (around 5-7kHz) to isolate troublesome sibilant frequencies, which would then be used to 'key' the compressor.

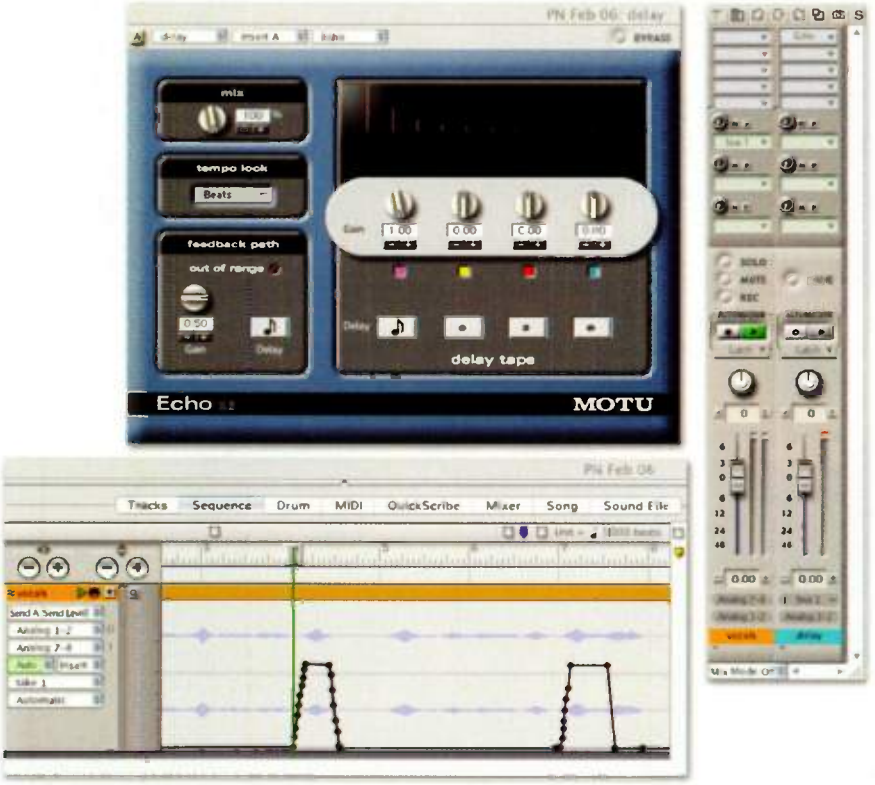
Side-chain Keying

Band-limited keying is all very well, but for the ultimate in flexibility, especially to maximise your compression 'pump' factor, you should try keying your compressor from an independent external signal. You can then trigger the pumping effect regardless of what the kick drum (or any other instrument) is doing. With a bit of experimentation, some very sophisticated effects are possible: try triggering the compression of one rhythmic loop with the snare hits from another, or trigger compression repeatedly during a sustained portion of a vocal or synth note, for example.

Selective Delays

The addition of echoes to individual words on vocal tracks, often at the ends of phrases, is a subtle and distinctive effect. As well as allowing you to draw attention to single, perhaps important, words, it can also make mixing easier, since you get a strong echo effect without having to have a delay constantly enabled on the track.

This type of 'selective delay' effect is not quite as straightforward to set up as you might think, however. Just placing a delay on your vocal track and then automating its Bypass parameter doesn't really work properly, because often the onset of echoes is too brutal and sudden. You have a problem, too, if you want the echoes to overlap with subsequent non-echoed words, as these also start to be delayed and chaos ensues.



A lot can be achieved by combining *DP*'s plug-ins with some of its other features. Here, for example, by combining a delay plug-in hosted on an Aux track with an automated send on a vocal track, it's possible to have individual words 'echoed' without affecting the rest of the track.

What's needed, then, is a different approach, and the one that works best is to have your delay plug-in running on an Aux track, and to send to it the words (or other audio) you want to treat, using an automated send on the vocal track. To try out this technique, first open a Project which has a suitable vocal track, or perhaps record 30 seconds or so of speech into an audio track.

1. Create an Aux track and put a suitable delay effect on it — perhaps MOTU's *Echo* plug-in. Set the wet/dry mix to 100 percent wet. Make the track's input a single buss

Other Goodies

There are some interesting features hidden amongst *DP*'s bundled plug-ins that you might not have thought of using.

One of those is the Decorrelation section in the *Plate* reverb. To get at this, click the Expand triangle in the plug-in window, to see the 'full monty' view, and then look in the bottom left under the Diffusion Control section. Decorrelation basically refers to the pitch integrity of the reverb tail, with increased Decorrelation leading to an 'out of tune' reverb tail, just as occurs in some natural acoustics. Here, though, Decorrelation is controlled by a low-frequency oscillator, so you get a Frequency parameter (which controls the speed of the pitch wobble) and an Amount parameter (which controls the depth). Any number of settings produce beautiful results, with frequencies of around 2-3 Hz sounding obviously weird, but faster (and shallower) wobbles producing wonderful shimmering effects. Adding a little Decorrelation to almost any Plate reverb tail seems to improve it, lending a sort of chaotic, organic quality that's impossible to produce with many other reverbs.

Because of its automatable envelope generator and on-board LFO, the Pattern Gate plug-in can do a lot more than 'stuttering' effects.

Another technique to try involves the new *Pattern Gate* plug-in. This does a lot more than abrupt 'stutter' effects, because each of the 16 possible gate triggers is subject to the settings of the on-board envelope generator. That not only means that the length (sustain) and abruptness (decay) of each gate trigger can be tightly controlled, but also its onset, courtesy of the Attack parameter. Rhythmically aligned with and applied to a drum mix, for example, tweaking sustain and decay settings can lead to very dynamic and aggressive gating effects, but increasing the attack time can make your hits sound 'rubbery', or almost 'bowed'. What's more, these parameters can be automated so that the effect can be brought in gradually, or you can use the built-in envelope generator to effectively 'automate' the parameters internally. Just turn up the LFO amount for any of the envelope stages to explore this effect. Incidentally, the Period parameter for the LFO relates to number of steps for the step sequencer, so if you're using 16 steps but you make the LFO Period, say, 17 steps, you instantly set up an interesting out-of-phase polyrhythmic effect. Far from being a one-trick pony, *Pattern Gate* is worthy of serious experimentation.

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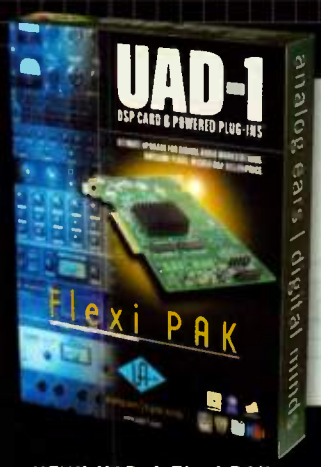

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(perhaps buss 1), and the output your main audio-hardware output pair.

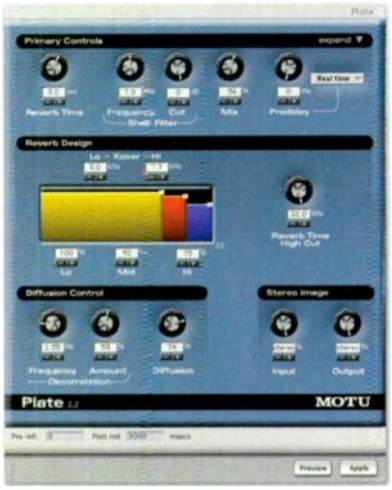
2. In the Mixing Board, go to the sends section of the vocal track to which you want to add the selective delays. In an empty send slot, choose the same buss you configured in step one.
3. Place *DP*'s playback wiper to the left of the section where you want the delays to occur. Hit Play and raise the send level quite high, to allow you to hear what sort of delay you have set up on your Aux track. If necessary, switch back to the plug-in window and dial in more appropriate settings. Finally, go back to the Mixing Board and return the Send level control to its -[INFINITY]dB setting.
4. Re-position the playback wiper, and, in the Mixing Board, hit the Automation record button on your vocal track. Play your sequence, and every time you reach a word you want to add delays to, raise the vocal track's send level with your mouse, returning it to -[INFINITY]dB immediately afterwards.
5. When you're done, click the track's Automation record button once more, making sure that Automation play remains selected. Replaying the section you just worked on should result in proper selective delays being produced.

Obviously, dragging the send-level control in real time isn't the only way of entering the appropriate automation data. If you're familiar with *DP*'s automation, it might be even better to enter the send level data graphically in the Sequence Editor, as there you can see precisely where individual words occur by looking at their waveform in soundbites.

This technique works really well because the Aux track and its delay plug-in run totally independently of the vocal track, and by just feeding it with the audio you want to effect, you keep the dry and wet signals entirely separate. As well as delays, this technique also works well with reverbs (which can also sound great on individual words, or drums, or chords...) and other 'send friendly' effects such as chorus, harmonisers, and even granular synthesizers.

Reverse Reverb

It's immediately recognisable and arguably over-used, but genuine 'predictive' reverse reverb, where the reverb tail builds up and culminates in the sound that 'caused' it, remains an arresting and often very beautiful effect that works well in all sorts of applications. The key to achieving it in *DP* is the use of 'off-line' rather than real-time plug-ins, accessed from the audio menu. It's no coincidence that it's only here that you'll find *DP*'s Reverse plug-in.



Perhaps because of the fact that it's so unnatural, true reverse reverb is a striking effect, and one which can be created in *DP* by combining soundbite editing with reverbs and the Reverse plug-in used 'off-line'.

1. In the Sequence Editor window, isolate the section of audio you want to treat with the reverse reverb effect. For various reasons, it's easier if this is contained in one soundbite, so if it currently consists of several it's a good idea to select them and use the Audio menu's 'Merge Soundbites' command first. If the section is contained within a longer soundbite, use the I-Beam cursor to select the section, then hit Apple-Y to split it into its own soundbite. Now select the soundbite you want to treat.
2. Go to the Audio menu and find Reverse in the Audio Plug-Ins sub-menu. Select it, and if necessary click Apply in the window that appears. This will cause your soundbite to reverse, after a short processing time.
3. Now, with the soundbite still selected, go back to the Audio menu, and this time choose a reverb plug-in such as *eVerb* or *Plate*. If you're using more recent versions of *DP*, you can click Preview in the window that appears and adjust parameters while your audio plays, to achieve the desired effect. A certain amount of trial and error is necessary, especially regarding reverb times and dry/wet mix ratios, so just stick with any promising setting for now.
4. If the audio you selected in step one has only a short lead-in time (ie. the first sound starts only shortly after the soundbite begins), you need to use some 'post-roll', so that the reverb tail you're about to apply to the reversed soundbite doesn't get cut off too soon. Type in a value, in milliseconds, in the 'Post Roll' field at the bottom of the plug-in window. This should at least match the length of the reverb tail you're using.
5. Hit Apply, wait for the reverb to be 'printed' to your soundbite, and then choose Reverse again from the Audio menu, as you did in step two. If you didn't have to use post-roll in step four, you're done! If you did, read on...
6. Reversing a soundbite with an additional post-roll section causes it to lose its original alignment with the other elements of your sequence. It's easy to fix, however. Use Alt-Apple-N to bring up the Nudge amount dialogue box. Choose Milliseconds in the pop-up menu and type in the same value as you chose for post-roll amount in step four. Hit Enter and then, back in the Sequence Editor, with your misaligned soundbite selected, hit the left arrow key. This 'nudges' the soundbite back by the chosen amount of time, restoring correct alignment and timing.

The best choice of reverb for the reverse reverb effect depends on what you're trying to achieve, and you'll need to experiment. Don't be afraid of trying out different pre-delay values, which will tend to detach the reverb build-ups from the dry audio that follows them. Consider, too, substituting the reverb for a delay plug-in, or use a mix of both, by first applying the backwards delays and then repeating the whole process to add backwards reverb to the whole shebang. SOS

Digital Performer News

It has been an unusually quiet month for *DP*-related news, but MOTU's release of a USB2-compatible 828 MkII audio interface provided some interest. It seems very likely that this new product has come about because of the relatively poor support for Firewire offered by some PC workstations and laptops. For Mac (and *DP*) users, the Firewire 828 MkII is still probably the right choice, despite the recent rumours on the internet — almost certainly inaccurate — that Apple are dropping Firewire support from some of their laptops. Even if this somehow proves to be true, it's more likely to mark a move towards the newer FW800 standard, which is backwards-compatible with the familiar FW400 used in MOTU's audio interfaces.

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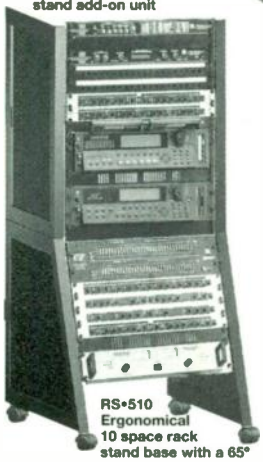

RS•510 Ergonomical 10 space rack stand base with a 65° angle upward

OR•120B 20 Unit Rack Stand Base

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RS214

BS•300

View of Z-600 project desk system in combination with Z-612 rack stand

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View of Z-600 project desk system complete with Z-712 BK/CY optional pull-out shelf

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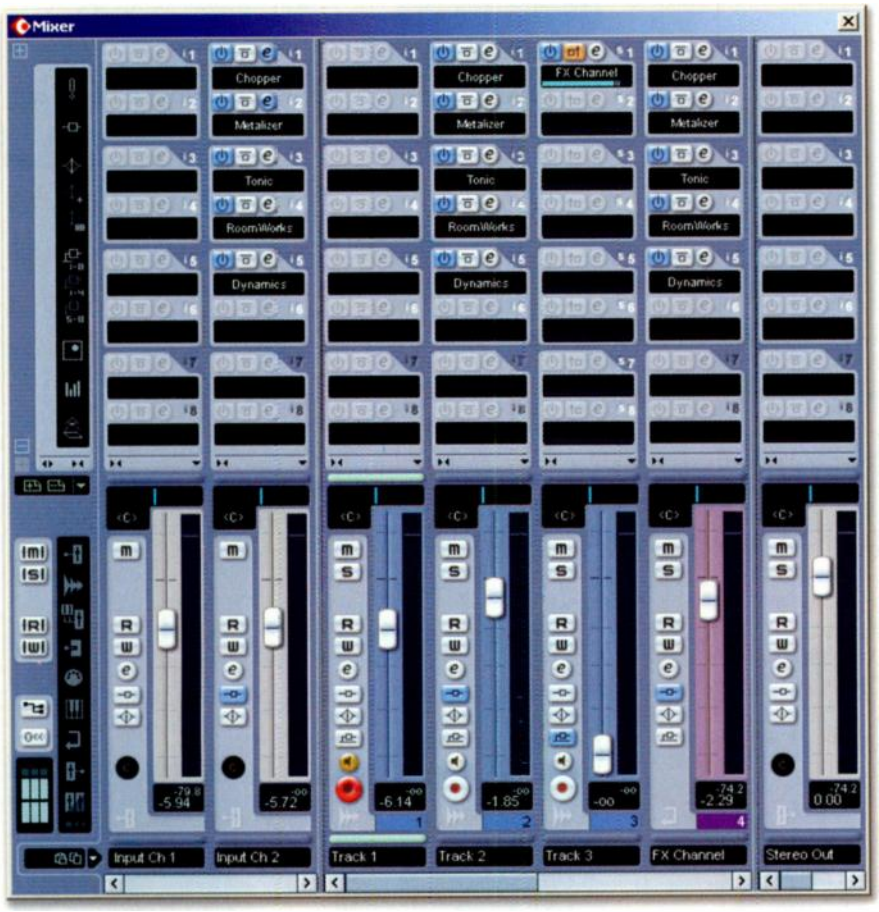
Creative Use Of Effects In Cubase SX & SL



As described in the main text, *SX* provides very flexible routing options when using audio effects.

The world is awash with plug-in audio effects, but don't miss out on those included within *Cubase SX* — there are some excellent creative possibilities on offer.

John Walden

Far be it from me to admit to a touch of 'sequencer envy', but one of the things I've enjoyed most about the new DVDs that have accompanied *SOS* every few months has been Paul White's practical and creative tips on using the audio effects built into *Logic*, as demonstrated in the 'Experimental Guitar Processing' and Studio SOS pieces on November's DVD002. As an ex-*Logic* user (I switched to *SX* soon after Apple took over Emagic), the only area of *SX* that has ever left me with any regrets has been that of the bundled audio effects plug-ins where, frankly, *Logic's* offerings seem a little slicker, certainly in appearance. However, Steinberg's more recent additions — such as the *Tonic* filter and *Roomworks* reverb — are certainly impressive to look at. And anyway, it is the sounds we should be interested in rather than the looks. So, inspired by Paul's examples using *Logic*, what sort of creative sound manipulation possibilities are possible with the audio effects supplied with *SX*, and what is the best way to configure *SX* to experiment with these effects?

On The In

While there are an almost unlimited combination of effects that you might wish to apply if you come over all experimental with your audio, perhaps the first decision that requires some thought is the position within the signal chain to place them: either you can record your audio through them, so that you can hear the effects as you play and/or sing a part into *SX*; or, alternatively, you can record the audio first and then apply the effect as part of the mixing process. Fortunately, *SX*, like most modern sequencers, offers plenty of flexibility to accommodate both of these situations. As Paul demonstrated in his Studio SOS piece with Bella Saer, there is all sorts of fun to be had with effects applied at the input stage, so let's start there...

Provided that you have a system that can achieve reasonably low audio latency, perhaps the biggest advantage to being able to hear the effects as you play and record a particular part is that you can adjust your playing to interact with the effects — essentially, you are 'playing' the effects as an element of the musical performance. However, depending upon how you route the audio through the *SX* mixer, you can either 'print' the effects (that is, record them as part of the audio track) or you can simply monitor them as you play, recording the performance 'dry'. This latter route offers greater flexibility as the same effects can then be applied to the part during the mixing stage, but you can continue to fine-tune them so that they work to their best within the complete musical arrangement. By the way, before attempting the examples described below, it is probably best to switch off any Direct Monitoring provided by your audio interface.

These different approaches can be illustrated via the Mixer screenshot above. This shows a simple *SX* Mixer with two input channels, three audio tracks, an FX channel and the stereo output channel. If we wished to simply record the effects as part of the audio track, then a combination of Input Channel two and Track one would be most suitable. Here, a series of effects have been placed as Inserts on the input channel. (I'll come back to this particular set of effects in a minute but, for the moment, let's concentrate upon the audio routing.) In order to hear the effects, the Monitor button (the small speaker icon located next to the ▶

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track's Record button within both the Mixer and the Arrange windows) needs to be engaged. This enables software monitoring and, as this means your audio is passing through *SX* and the various effects, before being sent via the *SX* outputs to your amp and speaker monitor system, it really requires a computer system capable of fairly low latencies — although, these days, almost all modern Macs and PCs with suitable soundcard/driver combinations ought to be up to the task. Anything that is recorded to Track one will then be 'as heard' — including all the effects.

If you would rather just monitor the effects with a view to being able to fine-tune them later as part of the mix process, then two alternative signal routings are available. If Track two is armed for recording and the Monitor switch engaged, the insert effects placed on this channel of the mixer will be heard as you play, but only the 'dry' signal will be recorded. On playback, the insert effects are applied again, so the end result is identical to what was heard when recording the original performance. The advantage is, however, that the effects can subsequently be tweaked if some adjustment is required.

If you wish to apply the same series of effects to several audio tracks, placing them as a series of inserts into those tracks is obviously going to chew up further CPU resources. In this case, it is more efficient to use the combination shown in Track three and the FX Channel. Here, Track three has its Monitor switch engaged and its first Send control is routing the signal to the FX Channel. Again, the dry signal is recorded and, on playback, the dry signal is again sent to the FX Channel so that the effects are re-applied. This effects chain could, however, also be used to serve any other audio tracks that require the same processing options, saving replication of the effects plug-ins (and therefore CPU grunt) within each track.

There is one other thing worth noting about Track three; the Send has the 'pre-fader' switch activated (illuminated orange). This means that the amount of the input signal fed to the FX Channel is controlled only by the FX send control and it is totally independent of the main channel fader. This is helpful, as it means that the channel fader can be used to set an appropriate balance between the dry signal and that produced by the effects chain.

Going Free

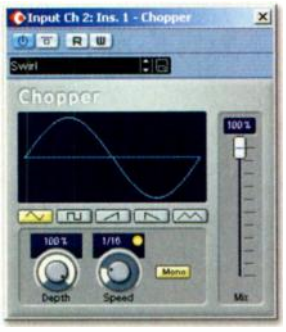
One of the examples Paul White used in his Studio SOS visit to Bella Saer was chaining a pitch-shifter (set to plus one octave) and reverb to process a guitar input. This produces an almost ghostly, synth-like sound that can sit behind the guitar part. While *SX* features excellent pitch- and tempo-shifting for off-line processing of audio, unfortunately it does not feature a dedicated pitch-shifter plug-in for real-time use. Of course, *SX* users should not despair, or feel envious of their *Logic*-using friends — there are plenty of third-party pitch-shifters (and an almost endless supply of other) plug-ins available via the web. And if you are happy to deal with the occasional bit of flaky coding(!), there are all sorts of freeware and shareware VST plug-ins to be downloaded.

While a quick search on Yahoo or Lycos will soon turn up a host of possible links, a couple of suitable starting points would be the software sections of Harmony Central (www.harmony-central.com/Software) or the KVR Audio web site (www.kvraudio.com). The latter is dedicated to information and news on all forms of audio plug-ins, whether they be VST, DirectX or Audio Units. It includes plenty of interesting and useful information and links to both commercial and shareware/freeware plug-in effects.

Lowering the channel fader to the bottom of its travel will therefore, effectively mute the dry signal so only the output from the effects will be heard — great if you are after something a little more extreme!

On The Chain Gang

So much for the routing, what about the effects themselves? The example included in the main screenshot is based upon a chain of *Chopper*, *Metalizer*, *Tonic*, *Roomworks* and *Dynamics* plug-ins. This is a combination that I find can work really well with a guitar input but, if the dry guitar signal is kept at a low level (using the Track three/FX Channel combination described above), some very synth-like sounds can be created. In this chain, *Roomworks* and the *Dynamics* module are simply being used to provide a little ambience and to add a noise gate to clean up the output — the bulk of the 'sound' is provided by the *Chopper* (giving a smooth tremolo effect), *Metalizer* (creating a wah-wah effect) and *Tonic* (adding some overdrive) plug-ins.



The *Chopper* plug-in using the Swirl preset to provide a smooth tremolo effect.

Add a touch of wah-wah with *Metalizer*.

And top it off with some warm overdrive via the *Tonic* filter.

As shown in the individual screenshots, all three are based upon presets supplied by Steinberg. Both *Chopper* and *Metalizer* are being sync'ed to the Project tempo, although at different values (1/16 and 1/1 respectively). The result of this lot is a very rhythmic sound with plenty of movement in the stereo image and a nice warm overdrive. If you completely remove the dry guitar sound, this chain works well with muted arpeggios, sustained power chords or rapid strumming — just watch the final output levels from the FX Channel so that no nasty clipping reaches your speakers. Incidentally, the Drive preset for *Tonic* is a nice starting point for warming up any sound requiring a touch more grit — not a substitute for a dedicated amp modelling plug-in such as *Amplitube* perhaps, but, as with *Quadrafuzz*, well worth experimenting with nonetheless. *Tonic* can also achieve tremolo-style 'chopping' effects on its own — just check out some of the other presets.

Top Chopper

The routing option using Track three and a send to the FX Channel is, of course, exactly how you would configure things if you wished to apply some processing to pre-recorded audio during a mix — perhaps just to spice it up a little or perhaps just to see if something conventional such as a guitar or synth part could be suitably

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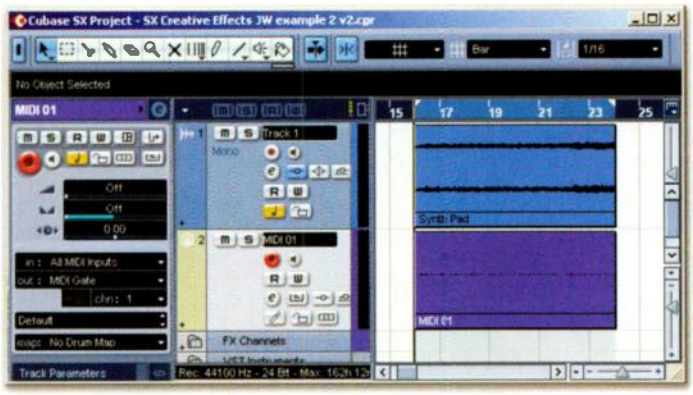


Above left: place the *MIDI Gate* plug-in as an insert effect on the audio track that you want to process.
Above: set the MIDI output to MIDI Gate for the MIDI track used to control the *MIDI Gate* effect.
Left: the *MIDI Gate* plug-in itself.

▶ mangled to create something a little more off-the-wall.

If you want more control over the type of tremolo-style effect described above, perhaps *SX's* best weapon is the *MIDI Gate* plug-in. With any sustained part (perhaps a pad sound or sustained power chords from a guitar), this can be used to create some fantastic rhythmic effects from an audio track. The end result is not unlike that of the *Chopper* in that a range of tremolo effects are created by the opening and closing of a noise gate. However, with *MIDI Gate*, the rhythm of the gate's opening and closing is totally controlled via MIDI notes — either from a pre-recorded MIDI track or via live playing from a MIDI input. To make this work requires a number of steps. First, the *MIDI Gate* plug-in (found alongside *SX's* Dynamics plug-ins) needs to be placed as an insert effect in the audio track to be processed. Next a MIDI track needs to be created and, via the Inspector, the output of the MIDI track needs to be set to MIDI Gate. If the MIDI track is then selected, once playback is started, any MIDI notes arriving at the MIDI input are used to control the action of the gate, effectively 'chopping' the part on the appropriate audio track.

The *MIDI Gate* screenshot shows all the controls at zero. With these settings a MIDI Note On message instantly opens the gate while a MIDI Note Off message instantly closes it. This is great for creating strong rhythmic patterns from a simple pad sound. Of the various controls, one in particular is worth experimenting with for slightly different effects. With the Velocity To VCA control set to zero, the gate is either fully open or fully closed when a MIDI note is played and then released. This means that, when open, the loudness of the audio heard is controlled only by the loudness of the original recording. However, as the Velocity To VCA control is shifted further to the right (towards a maximum value of 127), the degree to which the gate opens becomes increasingly controlled by MIDI note velocity — essentially, the MIDI input to the gate is controlling both when the audio is played and its loudness; play softly on the MIDI keyboard driving the gate and the audio will be quieter when the gate opens; play at higher MIDI velocities and the gate will open more fully giving louder output. With a suitable pad sound, this can produce some excellent additional expressive control.

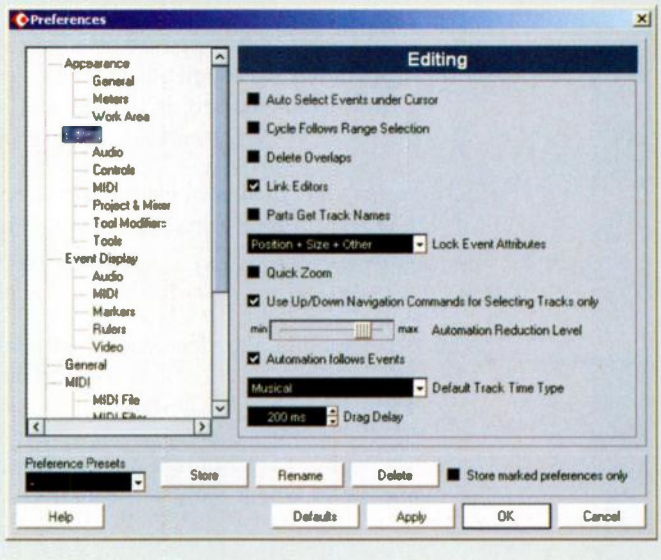
Can I Have More, Please?

Of course, given the range of plug-ins provided with *SX*, there are plenty of other possibilities for creative, rather than corrective, use of audio effects. This is certainly a topic that can be returned to in a future *Cubase* column. Hopefully, however, with the various routing options described above and the two short examples provided to whet your appetite, you will be encouraged to get creative and do some experimentation for yourself.
A final word of warning — just be careful out there. When exploring the wilder side of any audio plug-in effects chains, do tread carefully with your use of the various filters until you are sure what is happening — don't blow your ears or your speakers! SOS

Tiny Tips

The *Cubase SX 3.1* update has been with us for a little while now, but I'm still finding all sorts of useful things within the new features added. What might appear to be one of the most modest is actually one that I have found most useful. Under the Editing section of the Preferences dialogue, there is now a Use Up/Down Navigation Commands For Selecting Tracks Only option. Selecting this option means that the up/down arrows on the computer keyboard only cycle through the tracks within the Arrange window, rather than also moving between individual events on the track. I find this behaviour much less likely to cause confusion, as it means I'm not accidentally selecting a part when, really, I just want to move between tracks.

A further new option that can considerably speed the workflow is the Scroll To function available in the Project & Mixer section of the Preferences dialogue's Editing page. This has a number of different settings that may suit different users depending upon how they work, but the setting I prefer is Channel. This causes the display within the Mixer window to automatically scroll to the channel for the track currently selected within the Arrange window. If you flip between the two windows a lot during the editing and mixing of a complex project, this avoids a lot of scrolling back and forth within the Mixer window — very neat!



The Use Up/Down Navigation Commands For Selecting Tracks Only option makes track selection using the cursor keys more straightforward.

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Mastering In *Reason 3*
External Audio

Reason can be a simple yet surprisingly sophisticated mastering suite — and not just for audio generated in the _Reason_ environment.

Craig Anderton

With the addition of the *MClass* processors in *Reason 3*, Propellerheads addressed the fact that *Reason* had been a studio without a mastering suite. Prior to v3, people would export their masterpieces as audio files, then complain about a "wimpy" sound — until the file found its way into the hands of a good mastering engineer. Now much of that kind of work can be done inside *Reason* itself. For a detailed description of the new *MClass* processors and how to use them to master material generated within *Reason*, check out the article 'Mastering Your Mixes in *Reason 3*', in the November 2005 issue of *Sound On Sound*.

Reason's mastering processors are even good enough that you might want to try using them for mastering audio files generated by other programs, such as *Cubase*, *Live*, *Sonar*, *DP*, *Logic* and so on. (And to the list of *MClass* processors I'd also add subtle use of the *RV7000* reverb as suitable for mastering, if your material needs a bit more ambience.)

Although the conventional wisdom is that *Reason* isn't suited for digital audio-based signal processing, that's not really true. You can load digital audio files into the *NNXT* or *NN19* sampler, play them back through the processors in real time, tweak the settings, then export the audio to disk.

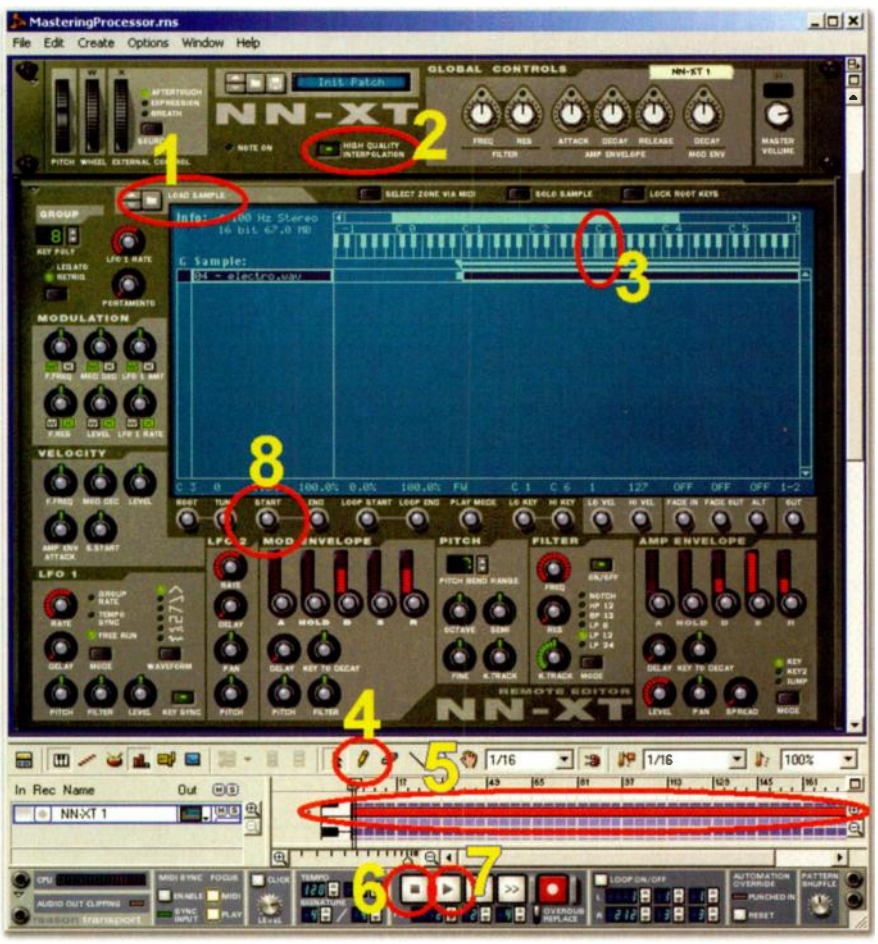
The *NNXT* File Player

Although it's touted as a sampler, *NNXT* can play back any digital audio file, including ones that are quite long (within the limits of available RAM, as it doesn't stream from disk). So you may not be able to fit an entire CD in there, but you can certainly fit most songs.

So why use *NNXT* instead of *NN19*? Either will work, but *NNXT* allows layering. So if you want to crossfade two songs, or add another last-minute effect or transition, you can do so very easily. You don't need to load a patch, as the Init Patch works just fine for our purposes. Here's the step-by-step process for setting up the *NNXT* file player; the steps correspond to numbers on the screen shot, left.

1. Click on Load Sample, navigate to the sound file you want to master, then click on OK. The NNXT accepts WAV or AIFF files, 16-bit or 24-bit; however, if you load 24-bit files, note that the *MClass* processors do not include dithering. For many types of files this won't matter, but it probably will for acoustic music.
2. Click on High Quality Interpolation, as you may want to change the pitch. We'll discuss why shortly.
3. At this point, the sample is sitting inside *NNXT*, with the root note at C3.
4. Go to the sequencer and click on the Pencil tool.
5. Draw a very long note at C3 — long enough to last the entire length of the song.
6. Double-click on the Stop button to send the Play cursor to the beginning of the sequence.
7. Click on the transport's Play button and you'll hear the file.

Although using *Reason* in this way doesn't allow for true random-access playback within the file, you can come close by modifying the sample Start point. ▶



The numbers identify the relevant features of *NNXT* and correspond with the steps listed in the text.

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Looped Playback

In addition to the sample Start-point trick mentioned above, there are also some advantages to using looped playback. For example, one part of the file may be considerably louder than the others; this is what you'll want to listen to when adjusting the Maximizer, to make sure that the sound doesn't get squashed too much as you increase the level of maximisation. To loop a portion of the file:

1. Adjust the Start point for where you want the loop to begin.
2. Match the Start-point control's setting with the Loop Start control.
3. Set the Loop End control for where you want loop playback to end.
4. Set Play Mode to FW-Loop (forward looping).

The Start, Loop Start, Loop End and Play Mode controls are the keys to providing looped playback.

Now, when you start playing the sequence (remember, you always have to start from the beginning) you'll hear only the looped portion.

Vintage Variable Tape Speed

One fun aspect of using *NNXT* for playback is that you can alter pitch, just like in the old days when hit music producers routinely turned up an analogue tape-recorder's variable speed control by a few percent. There are three ways to do this with *Reason*:

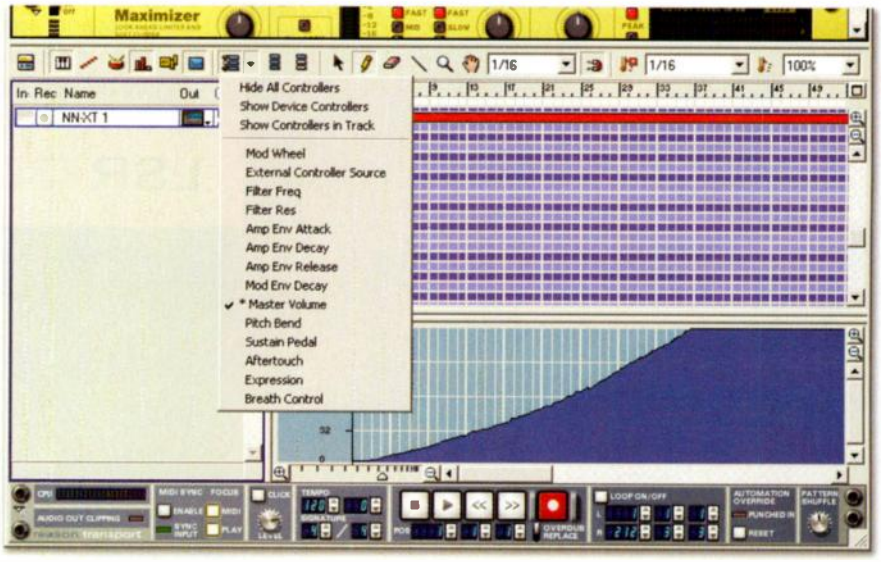
- In the sequencer, move the note up by the desired number of semitones.
- With *NNXT*, use the sample Tune control (located next to the Start control) to alter tuning in cents.
- Add a pitch-bend controller message in the sequencer. The advantage of this option is that you can make very subtle pitch changes over the course of the tune.

Automating Levels

Something even most digital audio editors won't let you do is automate levels throughout the file, which you can certainly do in *Reason*. You can fade in to the file, fade out, or even change gain in particular passages. As an example, if one section is considerably softer or louder than the rest of the file, rather than relying on compression to smooth things out, you can use automation to reduce the level of the over-loud section. To do this:

1. Click on the Show Controller Lane button. The controller lane appears.
2. Size the controller lane as desired for easy viewing.
3. Click on the Controllers drop-down menu.
4. Select Master Volume (see screen below).
5. Draw the desired automation curve.

You can use the same basic principle to automate pitch-bend, if you want to do variable-speed tricks as mentioned earlier.



Most digital audio editors don't allow for parameter automation, but *Reason* does. This screen shows a fade-in that's been added to a file.

Yes, Master!

Now that you're done with mastering, don't forget to go File / Export Song as Audio File. If you've come up with a great mastering setup, shift-click on all the devices you used, right-click on one and select Combine: they'll end up in a *Combinator* patch, at which point you can save your efforts as a preset. SOS

Mastering Suite: Out Of Order?

While *SOS*'s November 2005 article on mastering with *Reason 3* gives one example of a mastering configuration based on *Reason*'s *MClass* Master Suite Combi, the signal flow shown in that example is not the only one that's possible, and other variations may be more effective with different types of material.

Obviously, for the application presented here, *NNXT* must go at the beginning of the chain, because it's providing the signal to be processed, and the *Maximizer* should go at the end, because it's designed to catch peaks and prevent 'overs'. Anything inserted after it could introduce peaks again. But the order of the other three modules is open to debate; I tend to go with *EQ*, *Compressor*, *Stereo Imager*.

Although *Reason*'s *MClass* mastering Combi places the *Stereo Imager* before the *Compressor*, I'm not a big fan of stereo image processing. I'll use it subtly, if at all, so I don't want a compressor after it to emphasise the effect. But if you love stereo imaging, you may want the *Compressor* after it.

Another issue is which order you prefer for EQ and compression. I prefer EQ first, because any peaks caused by serious equalisation are tamed by the compressor. But you could also argue that compression after EQ 'undoes' some of the EQ's effects, and you might therefore want to place the EQ after compression. Some of this depends on how much EQ and compression you use; as always, your ears are the best judge.

Here's the patching for the mastering suite I like to use, as viewed from the back of the rack.

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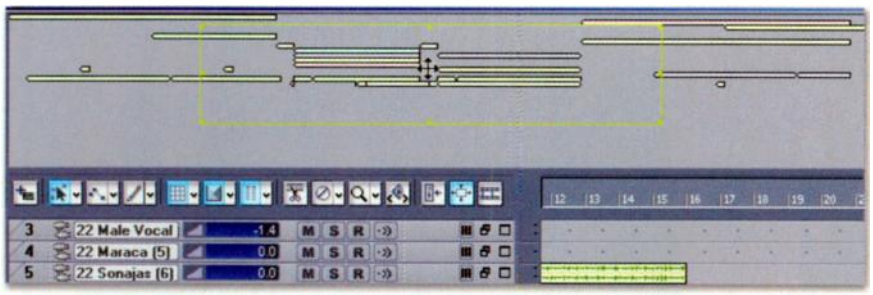


You can think of the rectangle, outlined in green, as a magnifying glass that causes the Clips pane to expand or shrink to show what's inside the rectangle.

The Navigator pane can be shown or hidden if you click on the appropriate Track View button, as shown in the screen at the bottom of the previous page, or simply type 'D' while in the Track View. ('D' doesn't make much sense to me, so I came up with the memory aid of associating it with seeing the entire project's 'Domain'.) You can also open the pane from the View menu. Note that there's a splitter bar between the Navigator pane and the Track view, so that you can change the pane's height.

The key to the Navigator is the resizeable rectangle, as it determines what will be seen in the Clips pane. Note the eight nodes on the rectangle's corners and sides; you click on these to change the rectangle's size and shape. As you do this, what's shown in the Clips pane follows. Shrinking or expanding the rectangle's height causes the Track view track heights to change as well, providing a convenient way to minimise all the track heights simultaneously.

Once you have the rectangle sized as desired, position the cursor inside the rectangle and the cursor turns into a cross-hair. You can now drag the rectangle wherever you want and the Clips pane will show what's inside the rectangle.

The Navigator Pop-up Menu

Right-click anywhere within the Navigator pane to see a pop-up menu. Its options allow you to customise the pane's display.

First, consider what happens if you click within the Navigator pane but outside the rectangle. If 'Left Click Positions Rectangle' is ticked, the upper-left corner of the rectangle jumps to wherever you click. If it's unticked, the rectangle stays at its current position, regardless of where you click. I don't see much point in leaving this unticked, as clicking in the pane doesn't then do anything. (Perhaps the option is there for the future?) If you Control-click, though, several things happen at once:

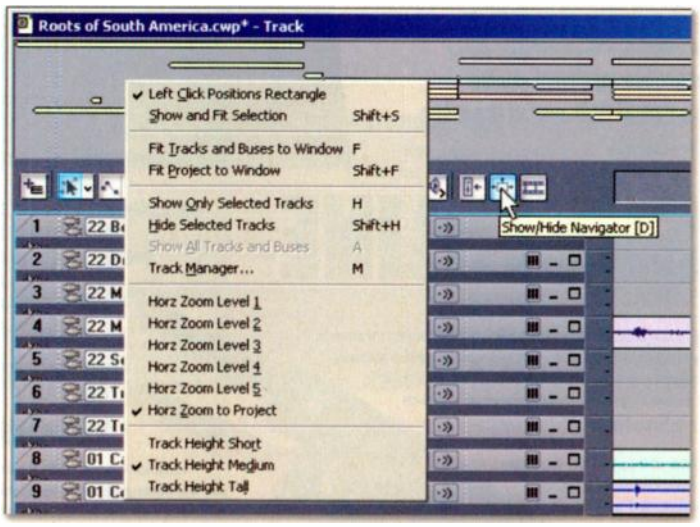
- The Now time jumps to where you clicked.
- The rectangle moves horizontally to where you clicked, but the left edge of the rectangle moves slightly left of the Now time rather than sitting right on it. This is good, as in the Clips pane the Now time is not slammed up against the left side of the pane, where it might be hard to see, but somewhat to the right.
- The rectangle doesn't care whether you click toward the top or bottom of the Navigator pane, it simply moves horizontally from its existing location. This is unlike what happens when you just click (not Control-click) with 'Left Click Positions Rectangle' ticked. In that case, the rectangle's upper-left corner jumps to where you clicked.

The 'Show and Fit Selection' option can be scary if you don't know what's going on. If you've selected a region or group of clips in the Clips pane and you choose 'Show and Fit Selection' (or type Shift-S), the following things happen:

- The Clips pane and Navigator pane will show only the tracks containing the selected clips.
- The Clips pane will zoom to fit the selected clips.
- The Navigator pane rectangle will automatically resize to fit the selection.

What's scary is that it seems everything that wasn't selected has disappeared, but fear not: Type 'A', or right-click in the Navigator pane and select 'Show All Tracks and Buses' from the pop-up, and all tracks reappear. Here are the other pop-up menu functions:

- **Fit Tracks and Busses to Window** (shortcut F): Use this if you've dragged the rectangle so that not all tracks are visible in the Track view. Invoking this option will cause all the tracks to show up in the Track view, with their heights adjusted to take up all available space. Note that if you have so many tracks that they won't all fit, *Sonar* will do the best it can and you'll have to scroll vertically to see the other tracks.
- **Fit Project to Window** (shortcut Shift-F): This zooms horizontally so that all clips in the project fit in the Clips pane, and the rectangle resizes itself to encompass the entire project. Use this when you want to see your entire project at a glance.
- **Show Only Selected Tracks** (shortcut H): The Clips pane and Navigator pane show only tracks that have been selected, and the rectangle automatically resizes its height to fit the tracks that are shown.
- **Hide Selected Tracks** (shortcut Shift-H): Selected tracks disappear from the Clips pane and Navigator pane.



The Navigator pane pop-up menu provides several ways to alter the display of both the Navigator pane and the Clips pane, as the two are related.

Sonar News: v5.0.1 Arrives

This is quite a bug fix, but it also offers a few enhancements. You can see the list of major changes at http://www.cakewalk.com/Support/kb/kb2005295.asp; this is also where you can download the update.

Many of the fixes fall under the category of 'Under some circumstances, if you did 'A' and then 'B' but not 'C', the following problem might happen'. But a few important issues have been addressed as well, such as inconsistent envelope and mute-tool operation. I've downloaded the update and can report that it works very well.

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- **Track Manager** (shortcut M): This is the standard *Sonar* Track Manager function, allowing you to see a list of all tracks and busses and choose to show or hide particular types of tracks, or alternatively use check-boxes to show or hide individual tracks.

This may seem like way too many options, but since they're on a pop-up menu you needn't concern yourself with them if you don't want to. But to the advanced *Sonar* user, these facilities mean that the Navigator pane not only provides a quick way to focus in on part of a project, but also lets you go further and hide tracks that aren't of immediate interest. Yet by typing a single letter ('A' to show all tracks, 'F' to fit tracks and busses), you can go back to seeing the big picture.

Below these options in the pop-up menu are the choices for the Navigator pane's Horizontal Zoom level. Basically, choosing a higher number zooms further out, but what's cool here is the shortcut. Right-click to see the pop-up menu: rather than dragging down to the desired zoom level and clicking, just type the corresponding number (1-5), or 'Z' to make the Navigator pane zoom out to show the entire project.

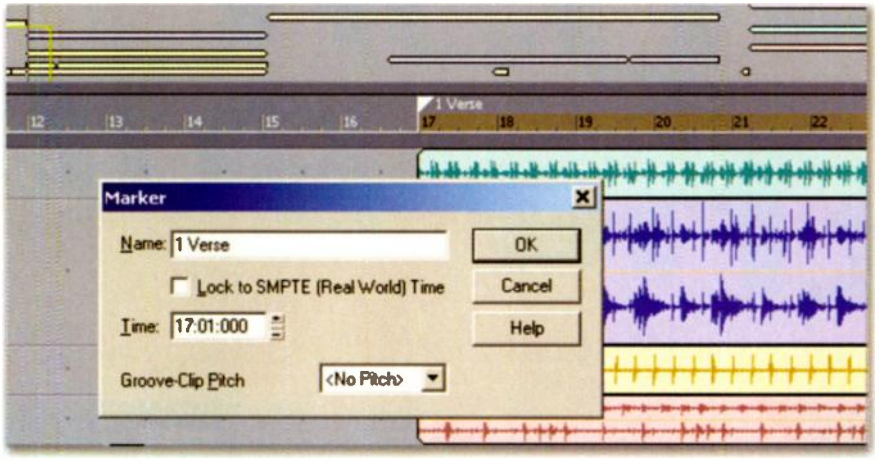
The final group of pop-up menu options relates to the height of tracks shown in the Navigator pane. I'd recommend the following choices:

- Use Short if you have lots of tracks and don't want to have to scroll vertically in the Navigator pane.
- Choose Medium for most situations.
- Select Tall if you don't have a lot of tracks and don't mind allocating more space to the Navigator pane's height.

As with the Horizontal Zoom level options, there are keyboard shortcuts. After the pop-up menu appears, type R, D, or L for Short, Medium or Tall respectively.

Meet The Markers

I realise that sounds vaguely like the title of a '60s album from a Merseybeat group, but in the context of *Sonar* it relates to another method of navigation. In fact, using markers provided the only *Sonar* navigation option until version 4 came along, and this technique is still extremely useful. The subject of markers can be pretty complex, because they also relate to altering pitch for groove clips, and for locking locations to SMPTE time. There are numerous ways to go to markers, too, some of which are more complex than others. So for the purposes of this article, we'll do the 'executive summary' treatment on markers.



Note the marker in the timeline labelled '1 Verse', and its associated Marker dialogue box.

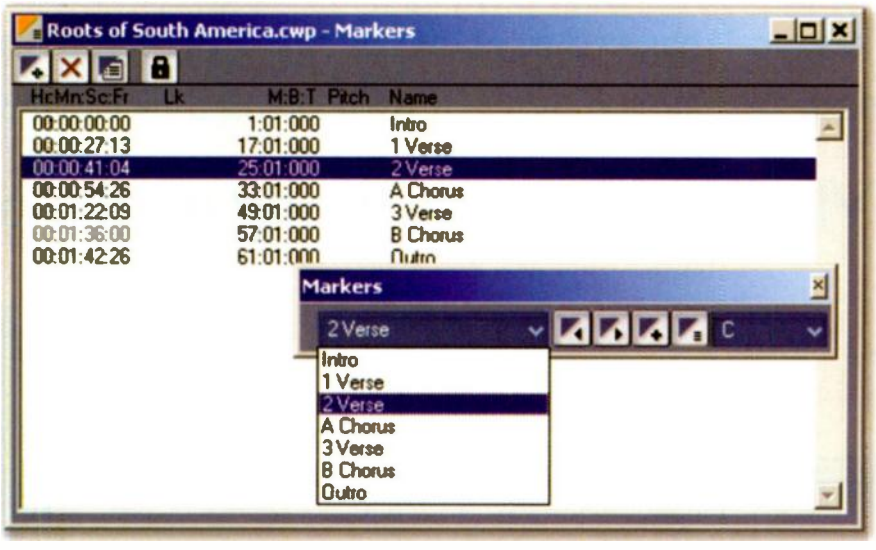
The key to placing a marker is the F11 function key. If you hit F11 when the transport is stopped, the marker will be placed wherever the Now time is sitting. Simultaneously, a Marker dialogue box will appear (see screen above), where you can enter a name and verify that the time is correct (optionally, this is also where you set the pitch for groove clips or tick the 'Lock to SMPTE' box). You can call up this dialogue box at any time, by holding the cursor over the marker until it turns into a downward-pointing arrow, then right-clicking.

It's also possible to place markers in real time, by hitting F11 as the project plays, but they won't be quantised. Also, the dialogue box will not appear, and an arbitrary name will be assigned (A1, A2, etc). As a result, after the marker is placed, you may want to go back and call up its dialogue box to name it, as well as moving the marker to exactly the right position.

Moving To Markers

The Marker toolbar is where the action is when it comes to working with markers. Of course, like other toolbars, this can dock or float. There are only six components to the toolbar — from left to right:

- **Current marker indicator** and drop-down menu: This field shows the current marker (the most recently selected marker position). It also has a drop-down menu, and selecting a marker from this menu automatically adjusts the Clips pane so that the marker appears toward the left of the timeline and the Now time is placed at the marker. Incidentally, the rectangle in the Navigator pane follows what's showing in the Clips pane.
- **Previous Marker button:** Moves to the previous marker on the timeline.
- **Next Marker button:** Moves to the next marker on the timeline.



The Markers toolbar is located toward the centre right of this screen. Behind it is the Markers view, which shows all markers, plus their timings and names. The drop-down menu toward the toolbar's left is a stripped-down markers list that simplifies navigation.

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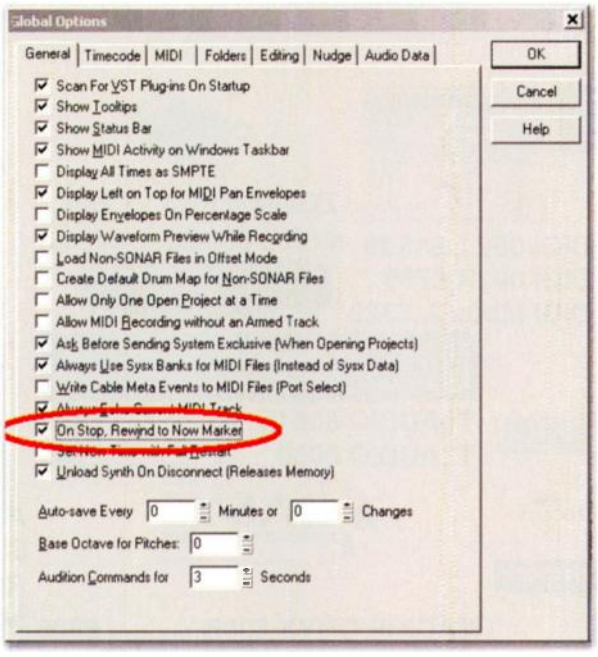
- **Insert Marker button:** Click on this to insert a marker. Its main value is for people who haven't figured out yet that hitting F11 is a lot easier.
- **Markers View button:** This brings up the Markers view, which we'll discuss a little later.
- **Default Project Pitch field:** This has nothing to do with navigation, but specifies the default project pitch for the benefit of groove clips.

Sonar cognoscenti know that the quickest way to jump from marker to marker is via keyboard shortcuts: Control + Shift + Page Up takes you to the previous marker, while Control + Shift + Page Down moves to the next one. Memorise these and you'll be really glad you did. What's even cooler is that the Markers toolbar displays the name of the marker to which you've moved.

Managing Markers

Now we know how to place markers and move around from one marker to another. But what about managing and editing markers?

Clicking on the Markers toolbar's 'Markers View' button calls up a window that lets you manage markers in a fair amount of detail. If you click on one of the markers in the list, the Clips pane automatically jumps so that the marker appears toward the left of the timeline and the Now time is positioned at the marker. However, I feel that it's faster to do this from the drop-down menu toward the left of the Markers toolbar. There are also four buttons in the upper left of the Markers view (see screen at bottom of previous page). Here's what they do:



There are a lot of options in the Global menu; the one we're interested in is circled for clarity.

- **Insert Marker:** Click on this button, or type 'A' to insert a marker. As with the Markers toolbar 'Insert Marker' button, its main value is for people who haven't figured out how to place markers by hitting F11.
- **Delete Marker:** Click in the list on the marker you want to delete, then click on the big 'X' or type 'D' to delete it.
- **Change Marker Properties:** Click in the list on the marker whose properties you want to change, then click on this button or type 'C'. This brings up the Marker dialogue box, where you can change its name, time, and so on.
- **Lock/Unlock Marker:** This doesn't relate to navigation, but if you select a marker from the list you can lock it to SMPTE or unlock it without having to open the Marker dialogue box.

Changing 'Now Time' Characteristics

In the last stop on our tour through the world of *Sonar* navigation, let's look at the Now time itself. The Now-time marker looks like other markers, but it's the only one that's green. You place it anywhere you want simply by clicking in the Clips pane or on the timeline. However, the Now-time marker also indicates where playback will begin once the transport is stopped, and this characteristic can be changed (see screen, left).

Go Options / Global. If you tick 'On Stop, Rewind to Now Marker', during playback the Now-time marker remains where it was originally set and a cursor line moves along the timeline. If you untick this option, during playback the Now time still remains where you originally set it. However, when you stop the transport, the Now time jumps immediately to where you stopped.

While we're talking about the Global Options menu, there's one other item that involves the Now time — although it only really has relevance if you're synchronising *Sonar* with other devices. If you tick 'Set Now Time with Full Restart', whenever you change the Now time the transport stops before restarting playback. While this sort of defeats the purpose of *Sonar*'s engineers trying to make the audio engine as gapless as possible, it produces more robust synchronisation, because while the transport is stopped, *Sonar* can verify its position. SOS

Transport Navigation Options

In addition to the above-mentioned 'precision' ways to navigate through markers, there are also easy ways to move about a sequence on a more general level, by using the Large Transport toolbar or the Small Transport toolbar in conjunction with the Position toolbar. These options have associated keyboard shortcuts as well.

In the case of either the Large Transport or Position toolbar, you can grab the slider to move the Now time. This is best for large changes, as it's not a particularly precise way to set the Now time, especially with longer songs. However, you can still manage some fine movements with these toolbars. Clicking along the slider to the right of the handle moves the Now time to the next measure (the keyboard equivalent is Control + Page Down). Clicking along the slider to the left of the handle moves the Now time to the previous measure if the Now time is on a measure boundary, or to the beginning of the current measure if the Now time is located within a measure.

If you click and hold, or hold down the keyboard-shortcut keys, the Now time will continue stepping backwards or forwards, one measure at a time. But there's a nice little extra: holding the keyboard keys moves the Now time faster than if you click on the Transport or Position toolbar slider, effectively giving you two speed choices for moving through a project a measure at a time.

The Transport and Position toolbars provide extra navigation functions.

In either Transport toolbar, click on the button to the left of the Stop button to return to the beginning of the project, or the button to the right of the Play button to go to the project end. These also have keyboard shortcuts: Control + Home (beginning) and Control + End (er... end!). But two options that I find even more useful relate to the selected region on the timeline: hit F7 to go to the beginning of the selection and F8 to go to the end. There are equivalent buttons on the Position toolbar, but not on the Large Transport. The button to the immediate left of the position slider jumps to the end of the selected region, while the next button to the left jumps to the selection's beginning. If you like to type, you can also send the Now time to a precise location. Just hit F5, then type where you want to go in Bars:Beats:Clocks.

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pc notes

We revisit the subject of IRQ sharing, to see if the problems it used to cause for musicians have been solved — as well as discussing a partitioning controversy...

Martin Walker

Years ago, many musicians, especially those running Windows 95 and 98, had problems with certain soundcards if these soundcards ever had to share the same IRQ (Interrupt ReQuest) with another device. The reason for the enforced sharing might have been because the PCI slot in which the card was installed had been hardwired with another slot or motherboard device, or because Windows didn't have enough spare IRQs to go round and decided to share the one allocated to the soundcard's slot with something else, seemingly at random.

The resulting problems ranged from occasional clicks and pops that wouldn't go away, through having to run at a much higher latency than normal, to refusal of the PC to boot up at all as soon as the soundcard had been placed in a particular PCI slot. This was nearly always because one of the shared devices had drivers that assumed they were in total charge of an interrupt and refused to let go until they were finished with it. Sometimes it was the soundcard drivers that didn't like sharing, and sometimes it was the fault of the other device.

Over the years, I've provided extensive advice on how to make sure you have a unique IRQ for your PCI soundcard (most notably in 'Hitting The Slot', *SOS* May 2003) and, happily, IRQ-sharing problems have now almost completely disappeared. This is partly down to the wider use in motherboards of APIC (Advanced Programmable Interrupt Controller) chips, which provide 24 or more Interrupts instead of the 16 offered by the older PIC (Programmable Interrupt Controller) chips, but the arrival of Windows XP (which implemented IRQ sharing in a far more reliable manner) and more co-operative drivers have also played their part.

Nowadays it's very likely that Windows XP will allocate a unique interrupt to your PCI audio interface (it did for all three of mine, with no help from me). However, IRQ sharing is still commonplace among USB and Firewire devices, and it doesn't prevent us from plugging multiple devices into USB hubs or connecting chains of Firewire peripherals, and without too many problems, which proves that IRQ sharing can work.

In fact, I haven't heard of any audio-interface problems specifically traced to IRQ sharing for a long time, so while choosing the most suitable PCI slot to avoid sharing is still sensible advice (it does save a tiny extra amount of overhead), no-one should be following the old advice to switch Windows XP from its default ACPI mode to Standard mode to set their IRQs manually. If your motherboard features an APIC chip, doing this will reduce the number of IRQs from 24 to 16 and make things worse. If you do get click and pop problems that don't respond to the usual tweaks, they're more likely to be related to PCI latency (see PC Notes October 2004), or possibly to PCI Express issues.

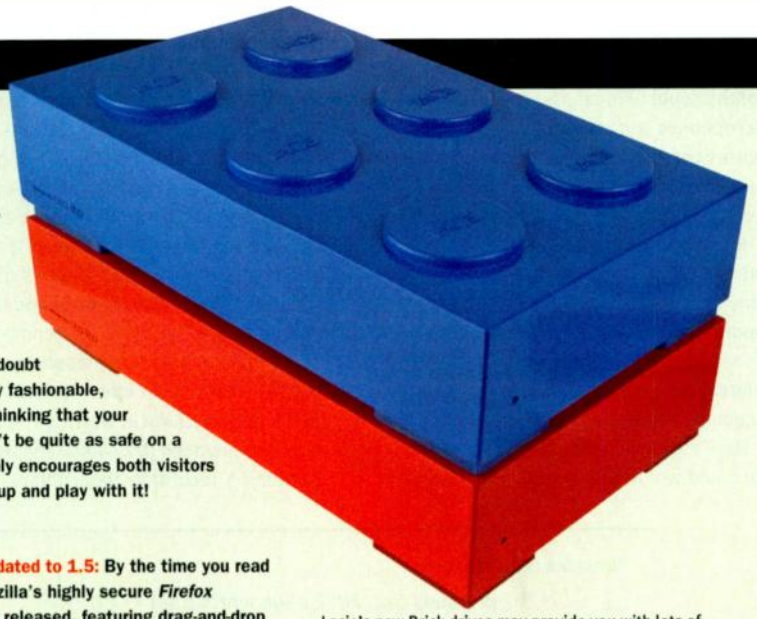
PCI Express Update

In the PC Notes column of September 2005, I discussed the problems that some musicians had been having with certain motherboards featuring the new PCI Express slots, and specifically some of those with the nForce 4 chip set. The villains of the piece appear to be high-bandwidth PCI-E graphics cards, which seem to hog the PCI buss. Certainly, the more powerful the graphics card, the worse the problems become.

If you look in Device Manager, using the option to view 'Devices By Connection', you'll see that the PCI buss hosts many other classes of device, including Firewire and USB devices and your hard drives, which may, therefore, all be affected by such buss hogging. Anyone whose computer is prone to this particular chip set problem won't notice the 'hogging' unless a specific device requires a lot of bandwidth, which is why PCI soundcards, DSP cards and Firewire interfaces have been reported to have problems, forcing some musicians to raise ▶

PC Snippets

Lacie drives stick together: Lacie have produced a new range of USB 2.0 hard drives that look just like Lego bricks. Available in white (160GB), blue (300GB) and red (250GB and 500GB) versions, they are, of course, stackable. No doubt they will become highly fashionable, although I can't help thinking that your irreplaceable data won't be quite as safe on a hard drive that positively encourages both visitors and children to pick it up and play with it!
W www.lacie.com



Lacie's new Brick drives may provide you with lots of external USB 2.0 storage potential, but your data won't last long if the kids get hold of them!

***Firefox* net browser updated to 1.5:** By the time you read this, version 1.5 of Mozilla's highly secure *Firefox* browser will have been released, featuring drag-and-drop re-ordering of its multi-tabbed interface, more intelligent caching of pages accessed via the forward and back buttons, and background updates of both the application and any extensions you may have installed, so that any security issues can be patched automatically 'behind the scenes'. It's already reported to be rock-solid, and is still only a 5MB download. Some third-party version 1.0 extensions aren't compatible with the 1.5 browser, but many will also have been updated to bring them back into sync by the time of its release.
W www.mozilla.org/projects/firefox

New peek at Vista: Microsoft released another beta version of their forthcoming Vista Operating System in late November. Build 5259 contains new versions of Internet Explorer 7, Windows Media Player 11 and Media Center, and incorporates anti-spyware features. Microsoft have also announced that there could well be *seven* different Editions of the product when it finally ships (Starter, Home Basic, Home Premium, Professional, Small Business, Enterprise and Ultimate). Judging by the current list of differences (which will, no doubt, change by release date), musicians are most likely to find the Home Basic Edition or Home Premium Edition the most suitable, but expect global confusion sometime during 2006.
W www.microsoft.com

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▶ their buffer size to avoid clicks and pops. Processor overhead is also reportedly larger than expected, so the problems also tend to appear when overhead is already high — the exact scenario faced by musicians running loads of plug-ins and soft synths.

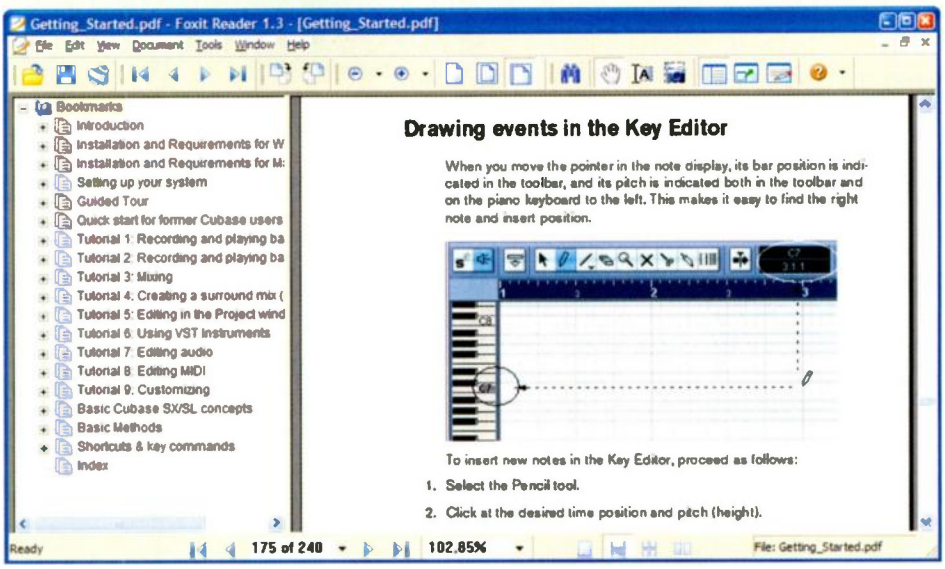
These issues should disappear for anyone buying a PCI Express soundcard, but the interface manufacturer's Round Table in *SOS* December 2005 suggested that few manufacturers are developing new PCI Express products. Mind you, some people remain convinced that at least one or two manufacturers are beavering away in secret, and that we'll see a few new interfaces early in 2006.

This leaves those with PCI and Firewire devices (and possibly a few multi-channel USB 2.0 interfaces). Firewire device owners should now be able to bypass the problem (if they experience it) by buying one of the new PCI Express Firewire adaptor cards, so that they no longer rely on the PCI buss. PCI-card owners have several ways forward. As I mentioned in September, using a fairly low-powered graphics card such as Nvidia's 6200 or ATI's Radeon X300 (if you have a PCI Express motherboard) can significantly reduce audio problems, and this approach has now been proven to work well with Intel's 915/925 dual-core motherboards. However, the best news for fans of the Intel range is that their new 955 dual-core P4 chip set doesn't seem to be causing bandwidth-hogging problems at all, even with fast graphics cards, so this seems the current best choice for anyone interested in a new Intel-based dual-core PC. Good news for AMD enthusiasts is that while single-core AMD motherboards featuring PCI Express slots still seem to be causing audio problems, the same boards do seem to work a lot better with audio apps when fitted with one of the new dual-core AMD X2 processors. Exceptions such as Tyan's rather expensive S2895 Dual Opteron motherboard are also continuing to provide excellent performance without any hogging problems.

Foxit *PDF Reader*

In my continuing quest to bring worthy freeware to your attention, this month I'm focusing on Foxit Software's *PDF Reader* (www.foxitsoftware.com). We all need a PDF reader to view the various documents and manuals that accompany most of today's software applications, but nearly all of us accept and install Adobe's freeware *Acrobat Reader* by default, as this is already bundled with many audio applications. However, the latest version is a hefty 20MB download, which seems very large for what it does, while the Foxit reader is just 1MB in size and launches much more quickly.

The latest version, which is 1.3, runs on Windows 95, 98, NT, 2000, XP and 2003, and I could find no commercial PDF documents that it didn't display identically to Adobe's *Acrobat Reader*. Foxit's *PDF Reader* also includes a Typewriter feature that lets you add text to existing PDF documents and print out the modified version, while the *Pro* version, for just $39, lets you save such modified documents, as well as converting pages or the whole PDF file to pure text form (normally resulting in much smaller files). Other products in the Foxit range include a fully-featured *PDF Editor* with a comprehensive set of features. That costs just $99, which is far cheaper than many alternatives. Thanks to *SOS* reader Bill Blackledge for bringing this range to my attention.



Fancy a PDF utility for reading your manuals that's freeware, only 1MB in size and loads in a flash? Foxit's *PDF Reader* ticks all the right boxes.

Partitioning Revisited

Since my feature on the subject in *SOS* May 2005 there's been some discussion and controversy on the *SOS* Forums about the best way to partition drives for audio. I'm pleased by the healthy debate, as my suggested layouts were just that. As I said in that feature, "you don't have to religiously follow any of the schemes I've outlined here, since once you've grasped the reasons for each of my suggestions you can adapt them to your own needs."

The most contentious issue seems to be my suggestion of a small outer 'Current Project' partition on your audio drive, with completed projects being moved to the inner (slower) partition for backup. Some people maintain that this is unlikely to yield measurable benefits. Well, this is entirely possible, depending on how many simultaneous tracks you need. For example, my Seagate Barracuda drives measure about 58MB/second sustained transfer rate on the outside, and I've run up to 76 24-bit/96kHz tracks on an empty one. However, the same drive only measures about 32MB/second on the inside, so when it's almost full and is filling its 'inside' area, maximum track count is likely to drop to under 40 at 24-bit/96kHz.

So if you record multitrack epics, it makes sense to reserve the faster area of the drive for your current project. However, if your songs never need more than 40 tracks at 24-bit/96kHz (in this example), creating a dedicated 'Current Project' partition may not provide any benefit — although it may be reassuring that using an outside partition for recording means that you're not running the drive so close to its limits. The other possible advantage is that you can back up the 'Current Project' partition in one 'hit', as an image file, using a utility such as Norton's *Ghost*. An image file preserves exact file layout, which may be important if your sequencer places audio chunks in a certain way. Some musicians have experienced audio 'stuttering' after defragmenting an audio partition, a process that can change file layout.

On a related topic, remember that if you've got a partitioning utility such as *Partition Magic* (www.symantec.com) or *Disk Director Suite* (www.acronis.com) you can change partition size and arrangement any time. You'll get maximum potential from the outer sections of each drive (on the left-hand side as displayed by most utilities). SOS

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World Radio History

apple notes

With the rumour mills already grinding away in preparation for next month's Macworld show, we make a brief survey of 2005, as well as taking a look at using Apple's *DVD Studio Pro* application to distribute surround mixes.

Mark Wherry

December is always a good month for nostalgia, and while the date on the front of this magazine says February, as I write this it's still December, which made me think about what a good year it's been for Apple. The year 2005 started well, with a Macworld show that brought the Mac Mini, iPod Shuffle and *iLife 05*, featuring *Garage Band 2* with its new score-editing options and more, into the world. The Mac Mini (reviewed in May 2005's *SOS* — www.soundonsound.com/sos/may05/articles/applemacmini.htm) was a turning point for Apple: a low-cost, entry-level Mac computer. And even though it's not the most powerful system Apple markets, a Mac Mini and *Logic Express* is a pretty remarkable 'first' system for anyone new to computer music.

The iPod Shuffle was the first new iPod of 2005, and by the end of the year Apple had replaced its entire iPod line-up: the unbelievably small iPod Nano was introduced, along with a new video-capable iPod, while video content — most notably, TV shows — became available to US customers of the *iTunes* Music Store. In fact, just before Christmas, Apple announced new content from channels such as NBC and the Sci-Fi channel, including, er, *Knight Rider*! But 2005 was also about transitions — including the transition from Power PC chips to Intel's x86 architecture, a move that was both expected and shocking. And while, at present, the move to PCI Express seems daunting for new Power Mac customers, it will be interesting to see how music software developers respond to the challenge of Universal Binaries (the term used to describe an application that contains the code to run on both architectures) as Intel Macs appear in 2006.

By the time you read this month's column, Steve Jobs will already have been on the stage at the San Francisco Macworld show on January 9th and, hopefully, will have started the year with a selection of new and interesting products. If the current rumours are to be believed, a media-orientated Mac Mini might be in the offing, offering features such as the Front Row interface from the new iMac, and there's even speculation about Intel-based Macs appearing sooner than originally expected...

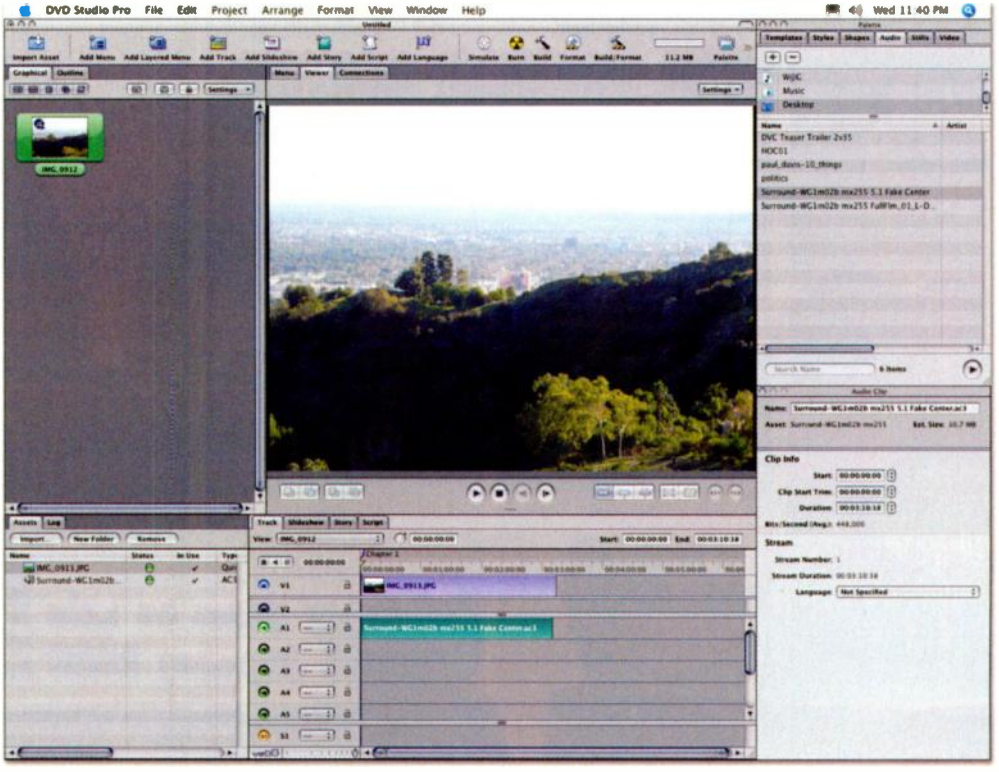
Personally, I'll be interested to see whether *iLife* gets its annual makeover, and, if so, whether a *Garage Band 3* will be introduced, and whether last year's rumours concerning Apple offering a consumer audio interface might still yield some substance. Speaking of Apple's music offerings, it'll be even more interesting to see what happens with *Logic Pro* in 2006: despite a strong presence, Apple have never made a major product introduction at a NAMM show. And with Apple's other 'Pro' applications moving onto what seems to be a yearly development cycle, September 2004's *Logic 7* announcement is starting to seem rather distant. So here's to an Emagical Christmas, and an Intel new year!

I Want My DVD

When everyone worked in stereo, letting other people hear your work was pretty easy. As recording your own CDs became affordable towards the end of the '90s, CDs became a pretty easy way of distributing your work as one-offs for clients, friends and family, or even preparing masters for distribution. However, with many musicians and audio engineers now working (or moving towards) surround sound on a day-to-day basis, it's a lot less obvious how to share a surround mix with the same convenience — in terms of both creation and playback.

The simplest way to share a surround mix is simply to put the audio data files on a CD-ROM, but this means that the person you're giving the disc to has to a) know what to do with the files, and b) have enough equipment to play them back, even taking the speakers out of the equation. The successors to CD for audio distribution are DVD-A (Audio) and SACD (Super Audio Compact Disc), which both offer multi-channel, high-resolution audio. SACD has one big limitation for the content creator: the equipment you need to burn a one-off SACD disc is fairly expensive, and it doesn't seem as though it's going to get much cheaper any time soon, since SACD as a format is far from reaching a critical mass.

DVD-A discs, on the other hand, can be easily created by any Mac user who has a Super Drive, ▶



Apple's *DVD Studio Pro* application can be used to create full-featured DVD-Video discs, but it's also a useful way for musicians and audio engineers to conveniently share surround mixes. Note how the image and audio files appear on the timeline, on the V1 and A1 tracks respectively, at the bottom of the main window.

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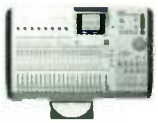

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using Minnetonka's *Discwelder Bronze* (www.discwelder.com), which allows you to create surround tracks at up to 24-bit/48kHz with a maximum of six channels, or stereo tracks at up to 192kHz. *Discwelder Bronze* is available for just $99, but while it's cheap and easy to create DVD-A discs to distribute your work, the format suffers from the same problem as SACD: not everyone has a player compatible with DVD-A-compatible discs.

However, there's yet another possibility (and I'd like to thank my friend Geoff Foster for showing me this), which is to create a DVD-Video disc to demo your surround mixes. In many ways, this is the perfect compromise: most people have DVD players these days, and a large number of these people also have a surround-capable speaker configuration of some kind for watching movies. At worst, even if someone doesn't have the ability to listen in surround, the audio encoders for DVD-Video audio tracks, such as Dolby Digital, have the ability to perform fold-downs, so that at least people can still listen to your music from the same disc, even if they don't have access to a surround setup.

So how do you create a DVD-Video disc? Even though every Mac with a Super Drive is supplied with *iDVD*, which can create DVD-Video discs, it can only author discs with stereo audio. However, Apple's *DVD Studio Pro* application is a full-blown DVD-Video authoring system that includes a Dolby Digital encoder with support for 5.1 audio. As you might be aware, Dolby Digital uses AC3 lossy compression (similar to AAC) and DVD-Video supports a relatively low bit-rate of just 448K per second for 5.1 audio, but the results are still surprisingly satisfactory in most situations.

DVD Studio Pro

DVD Studio Pro can be pretty complicated, but fortunately you don't need to dip your toes too far into the water to create a disc containing some audio. Once you've created AC3 files of your surround mixes (see 'Creating Surround AC3 Files' box for more information), load *DVD Studio Pro* and at the 'Welcome to *DVD Studio Pro*' window, choose the Advanced layout, set PAL or NTSC (if you're in Europe you'll want PAL, while if you're in the US you'll want NTSC, although most DVD players will actually handle NTSC these days, no matter what display you're using), set Standard Definition, and use English as the default language. When you click OK, an empty project will automatically be created for you. We're going to make a really simple disc with just one track that plays as soon as you insert the disc in a DVD player.

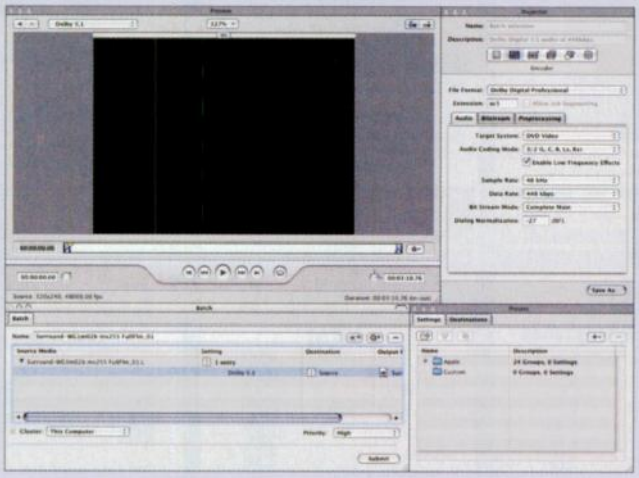
1. Select 'Menu 1' in the left area of the main window and choose 'Edit / Delete'.
2. Right/Control-click the 'Track 1' object, choose First Play from the pop-up menu and double-click the 'Track 1' object to bring it into focus.
3. Drag the AC3 file containing the music you want to put on the disc onto the 'Track 1' object in *DVD Studio Pro* and you should notice an audio object appear on the timeline at the bottom-centre of the *DVD Studio Pro* window.
4. We're creating a DVD-Video disc, so we have to add some video content, then the disc will play properly. The easiest thing is to simply import a picture file. This is actually a good thing to do, as it enables you to create a title page with the track name, your name, contact info, and so on. At the very least it could just be a pretty picture! To do this, simply drag a picture from the Finder on to the 'Track 1' object in *DVD Studio Pro* and you'll notice the name of this object change to the name of the picture, and an object representing the picture appear on the V1 (first video track) on the timeline.
5. Next, make sure the picture object is the same length as (or just slightly longer than) the audio object: hover the mouse over the picture object until the mouse cursor changes to a resize-right tool (as seen in other Apple 'Pro' applications), then drag the object's end point to mark out the new length.

That's all there is to it. You can use *DVD Studio Pro*'s built-in DVD Player Simulator to see how the disc will work by clicking the Simulate button in the main window's toolbar. Alternatively, click Burn on the toolbar, insert DVD-R disc and *DVD Studio Pro* will burn your disc for you. We'll be looking at creating more complicated, multitrack discs in a future Apple Notes column. SOS

Creating Surround AC3 Files

The first step in creating an AC3 file for use with *DVD Studio Pro* is to make sure your final mix is available as a collection of non-interleaved files — which is to say, each channel in the mix (L, C, R, etc...) is a separate file. *Pro Tools* always deals with non-interleaved files, for example, but in some applications, such as *Cubase*, you have to ensure that you choose to export non-interleaved files when creating a final mix.

Once you have the files in the correct format, you have to run the *Compressor* application included with *DVD Studio Pro 4* to convert your surround mixes to AC3 format (previous versions of *DVD Studio Pro* used a utility called *A.Pack* to do this particular job).



Compressor is an application bundled with *DVD Studio Pro* that enables you to batch-convert audio and video files into the right format for creating a DVD-Video disc.

1. **Load *Compressor* (which you should be able to find in your Applications folder), choose the 'File / Import Surround Sound Group' option (or press Apple-Shift-I), and a panel will appear in the Batch window with seven speaker buttons, for L, C, R, Ls, Cs, Rs and LFE.**
2. **There are two ways to assign an audio file to a channel: you can either click on the relevant speaker button and choose the required file from the file selector, or, alternatively, you can simply drag the appropriate audio files from the Finder on to the speaker buttons. Click OK when you've finished that step.**
3. **In the Batch window you should notice an entry appear that represents the surround sound group you just created. Select this entry and, in the Setting column, click the pop-up menu button and choose 'Audio Formats / Dolby 5.1'. Make sure the row in the list that has 'Dolby 5.1' listed in the Settings column is selected.**
4. **For now, leave the default settings as they are, and in the Batch window choose a Destination for the AC3 file from the Destination column's pop-up menu, or double-click the file name in the Output column to set a different name for the destination file you're about to create.**
5. **Once you're ready, click on Submit in the Batch window, and the Batch Monitor will appear, to inform you of progress as the AC3 file is created.**

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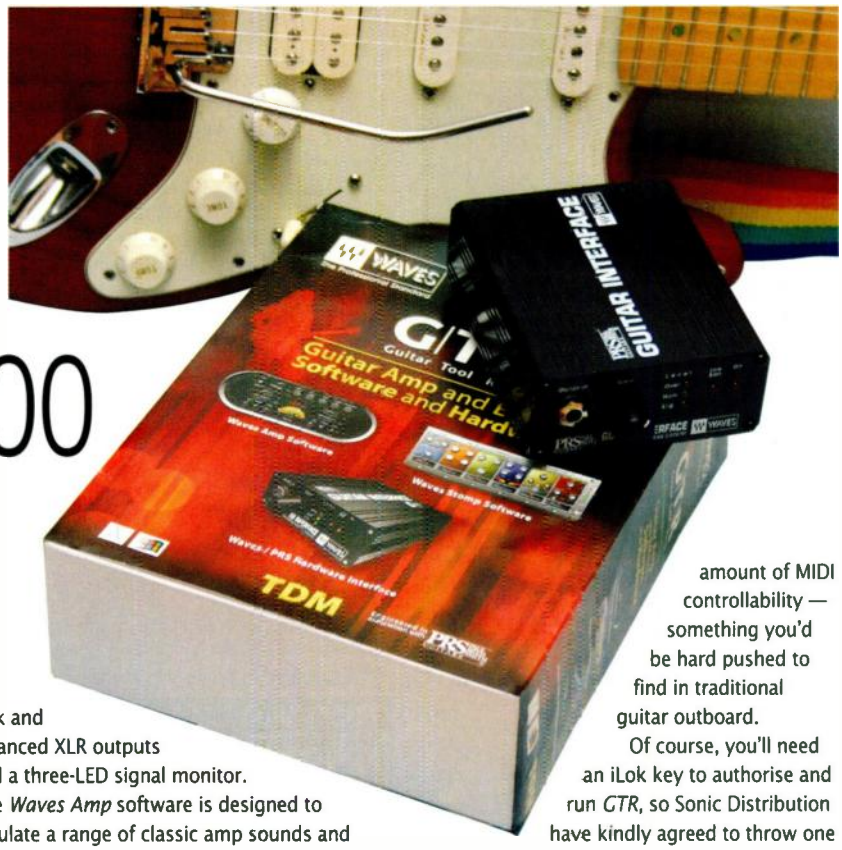
Waves GTRs Worth £1000



Waves *Guitar Tool Rack* (*GTR*) is a hardware and software package for guitarists developed by Waves in collaboration with Paul Reed Smith Guitars. This month the generous folks at Sonic Distribution have agreed to give away two Waves *GTR* packages worth £449 each and two iLok software licensing keys worth £49 each to *Sound On Sound* readers.

Waves have a well-established reputation for their plug-ins and processors, so it's no surprise that the *GTR* package manages to combine such high-quality processing with such simple usability. *GTR* basically comprises a guitar-optimised DI box, *Waves Amp* amp- and speaker-simulation software, *Waves Stomp* (which includes 23 guitar effects plug-ins) and the *Waves Tuner* plug-in, which offers standard and alternate tunings. Waves worked with guitar-design specialist Paul Reed Smith on both the hardware and software modelling for *GTR*. Together they've produced a system that is both authentic sounding and affordable, and should prove invaluable to any guitarist with a computer recording setup.

The WPGI guitar interface included with *GTR* features an extremely transparent preamp circuit and offers both unbalanced jack and balanced XLR outputs and a three-LED signal monitor. The *Waves Amp* software is designed to emulate a range of classic amp sounds and includes the usual amp-drive, bass, middle and treble and presence tone controls, as well as emulations of different cabinets and mic positions to further manipulate the sound. All these parameters are laid out in a single-screen plug-in window.

Waves Stomp offers 23 different stomp box effects which can be arranged and routed as you like, both before and after the amplifier. The effects can be divided into four basic sections: distortion, modulation, spatial and dynamics — each section featuring a variety of highly versatile and easily controllable processors. Wherever appropriate (with delay times or modulation frequencies, for example) the effects also offer a healthy amount of MIDI controllability — something you'd be hard pushed to find in traditional guitar outboard.

Of course, you'll need an iLok key to authorise and run *GTR*, so Sonic Distribution have kindly agreed to throw one in for each winner as well.

If you would like a chance to win one of these fantastic prizes, 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 your postcode and your daytime telephone number. The closing date for entries is 31st March, 2006. SOS

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1. Only one entry per person is permitted. 2. Employees of SOS Publications Ltd, Sonic Distribution 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.

questions

What does *GTR* stand for?
- a. Guitar Tone Rig ☐
- b. Guitar Tool Rack ☐
- c. Guitar Toast Rack ☐
- d. Guitar Type Racket ☐

How much is Waves *GTR* worth?
- a. £4.49 ☐
- b. £44.90 ☐
- c. £449 ☐
- d. Five magic beans ☐

Who did Waves collaborate with on *GTR*?
- a. Paul Reed Smith ☐
- b. Mark Reed Smith ☐
- c. Mark E Smith ☐
- d. Patti Smith ☐

Waves *GTR* tie-breaker

Guitar technology is pretty sophisticated these days but these things can always be pushed further. If you could have a guitar do *anything*, what would it be and why? Answers in 30 words or fewer.

.....

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Would you like to receive more information on Sonic Distribution Products? If yes, please tick or cross this box. ☐

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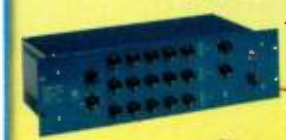

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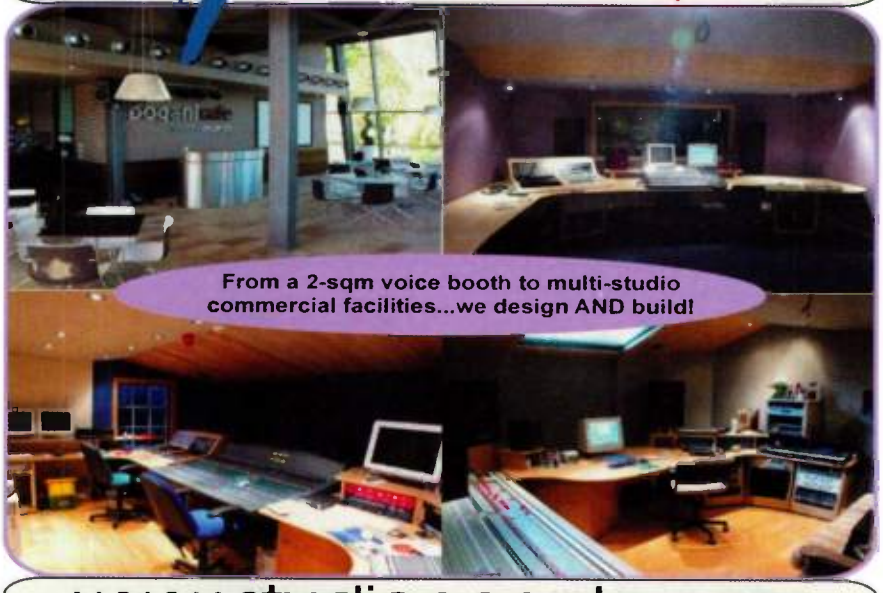

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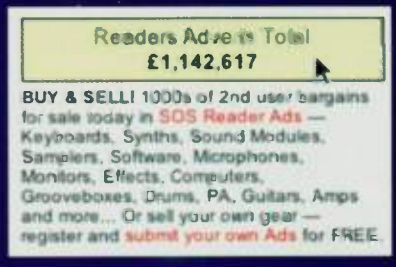

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World Radio History

How I learned to stop worrying and love distortion.

Ethan Winer

I've always considered myself an audio purist. Many years ago I owned a professional recording studio and I hated the slight grunge added to every track by our two-inch MCI recorder. In those days, 16-track was considered state of the art, so large productions often required the bouncing of sub-mixes, which produced more distortion. The final mixdown to quarter-inch tape added yet more distortion, which could be exchanged for tape hiss by recording at low levels.

The problem with tape is not so much the extra harmonics but IM [*inter-modulation*] distortion, which adds musically unrelated content. When digital recording on computers became practical in the mid-'90s, I was ecstatic. At last I could have nearly limitless numbers of tracks with low noise and, even better, low distortion.

Since digital audio has become mainstream, I've heard people complain that its sound is sterile and lifeless — perhaps too clean — but I always attributed that to a misguided fixation with the past. Indeed, as a purist I prefer that my signal chain and recording medium be as transparent as possible; I can always add colouration manually if needed. While I still feel that a recording medium should be free of artifacts, events over the years have changed my thinking.

My first experience with the benefit of subtle distortion was unintentional. Years ago I did a mix in my digital audio workstation and made a cassette copy for a friend. I noticed that the cassette sounded better — more 'cohesive', for lack of a better word. A few times I even copied a cassette back into the computer, used a noise-reducer program to remove the hiss, then put the result on to a CD. I knew it was an effect, not higher fidelity or the superiority of analogue tape, but I had to admit I liked it. I also tried an early tape-simulation plug-in and liked that too. And I didn't have to clean up the hiss.

Now fast forward to the present, where I'm trying to create a good-sounding mix from a difficult group of tracks. My current project is a pop tune comprising 37 cello parts and nothing else. I pounded the cello body with my fist for a kick drum, stroked the front and scratched the strings for sounds like a brushed snare, and tapped and poked it with pencils. There's plenty of traditional bowed and pizzicato playing as well. But trying to produce a good-sounding mix from so many tracks of the same physical instrument presented a huge challenge. I bought Charles Dye's *Mix It Like a Record* DVD mixing course, hoping for some useful hints. That's when I struck pay dirt. After hearing what great results Charles had achieved using valve and tape simulator plug-ins on every track and on the mix buss, I tried Cakewalk's tape simulator plug-in on the stereo buss in *Sonar* for my tune. Bingo! Now it sounds, as Charles Dye would say, 'like a record'.

There are many ways to add 'warmth' using tools you may already own. For example, 'aggressive' compression seems to be a holy grail among mix engineers, and that's another good way to add some useful colouration. You can get this effect with any reasonably flexible compressor — analogue or plug-in — by simply setting fast attack and release times. I use a very fast attack, and then shorten the release time to taste. As the release time is reduced, low-frequency distortion increases, adding a welcome touch of character to a track or mix. When both times are set fast, the compression operates on individual cycles, which is more like clipping than compression. A similar effect is possible using volume maximiser plug-ins such as Sony's *Wave Hammer* or *Peak Slammer* from www.scrollworks.com. These plug-ins reduce the level of individual cycles, letting you increase the overall volume of a mix without compression artifacts. But when pushed harder than intended they can add a desirable edge to the sound.

To be perfectly clear, I'm not talking about the 'lo-fi' productions popular these days, or using large amounts of distortion as an obvious effect. Nor can distortion substitute for good mixing practice such as overall thinning, brightening, and reducing offending resonant frequencies with EQ. But the addition of subtle distortion can add the final touch to an otherwise solid but lacklustre mix. The 'tubes rule' and 'analogue forever' folks should understand that this is just an effect. I'm still not convinced that one has to pay handsomely for boutique outboard analogue gear when the goal is simply to add a little grit to a track or mix. SOS

About The Author

Ethan Winer designs acoustic treatment for Real Traps in the US. You can hear his mix of 37 cellos — with tape-simulation — at www.ethanwiner.com/rondo.html.

If you would like to air your views in this column, please send your submissions to soundingoff@soundonsound.com or to the postal address listed in the front of the magazine.

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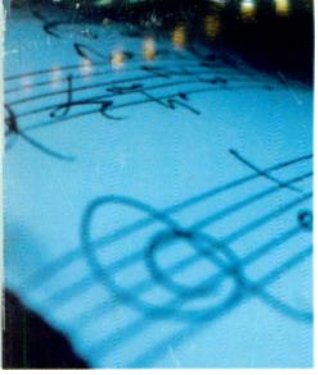

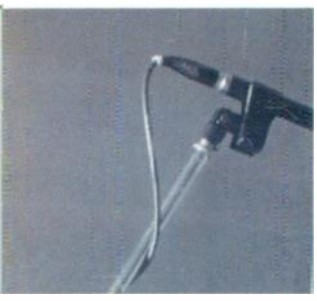

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